



GOVERNMENT
COMMUNICATIONS
SECURITY BUREAU
TE TIRA TIAKI

NZISM

New Zealand Information Security Manual

DECEMBER 2014

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Foreword

Safe, secure and functional information systems are vital for the successful operation of all government organisations. These systems underpin public confidence, support privacy and security and are fundamental to the effective, efficient and safe conduct of public and government business.

Chief Executives or heads of government departments and agencies are ultimately accountable for the management of risk and security within their organisations. The consequences of a security lapse can be significant, regardless of where in an organisation it occurs or how severe it is. These consequences can damage an organisation's reputation, undermine public confidence and cause significant damage to information systems.

The New Zealand Information Security Manual (NZISM) is a practitioner's manual tailored to meet the needs of agency information security executives as well as vendors, contractors and consultants who provide services to agencies. It includes minimum technical security standards for good system hygiene, as well as providing other technical and security guidance for government departments and agencies to support good information assurance practices. The NZISM is an integral part of the Protective Security Requirements (PSR) framework which sets out the New Zealand Government's expectations for the management of personnel, information and physical security.

The NZISM has been prepared by GCSB to provide "best practice" guidance and standards. It is consistent with recognised international standards to support agencies own approaches to risk management. It is essential that agency executives, particularly those with information security governance responsibilities, keep abreast of technology challenges and threats and update their organisation's risk stance and security practices accordingly.

The world of information technology and associated threats and risks is constantly evolving. This update of the NZISM provides new guidance including "supply chain management", "cloud" and "bring your own device (BYOD)". We intend to publish updates of the NZISM more frequently to take into account the rapidly changing nature of the information technology landscape.

The NZISM (December 2014) is now publicly available and supersedes all previous versions of the manual.

The NZISM will enable information assurance and security good practice to be shared widely across both the public and private sectors. I commend it to all Information Security executives and practitioners.



Ian Fletcher
Director
Government Communications Security Bureau

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NEW ZEALAND Information Security Manual

1.ABOUT INFORMATION SECURITY

1.1. Understanding and Using This Manual

OBJECTIVE

1.1.1. The New Zealand Information Security Manual details processes and controls essential for the protection of all New Zealand Government information and systems. Controls and processes representing good practice are also provided to enhance the essential, baseline controls. Baseline controls are minimum acceptable levels of controls. Essential controls are often described as “systems hygiene”.

CONTEXT

Scope

1.1.2. This manual is intended for use by New Zealand Government departments, agencies and organisations. Crown entities, local government and private sector organisations are also encouraged to use this manual

1.1.3. This section provides information on how to interpret the content and the layout of content within this manual.

1.1.4. Information that is Official Information or protectively marked UNCLASSIFIED, IN-CONFIDENCE, SENSITIVE or RESTRICTED is subject to a single set of controls in this NZISM. These are essential or minimum acceptable levels of controls (baseline controls) and have been consolidated into a single set for simplicity, effectiveness and efficiency.

1.1.5. All baseline controls will apply to all government systems and information. In addition, information classified CONFIDENTIAL, SECRET or TOP SECRET has further controls specified in this NZISM.

1.1.6. Where the category “All Classifications” is used to define the scope of rationale and controls in the Manual, it includes any information that is Official Information, UNCLASSIFIED, IN-CONFIDENCE, SENSITIVE, RESTRICTED, CONFIDENTIAL, SECRET, TOP SECRET or any caveats, endorsements, releasability markings or other qualifications appended to these categories and classifications.

The purpose of this Manual

1.1.7. The purpose of this manual is to provide a set of essential or baseline controls and additional good and recommended practice controls for use by government agencies. The use or non-use of good practice controls MUST be based on an agency’s assessment and determination of residual risk related to information security.

Target audience

1.1.8. The target audience for this manual is primarily security personnel and practitioners within, or contracted to, an agency. This includes, but is not limited to:

- security executives;
- security and information assurance practitioners;
- IT Security Managers;
- Departmental Security Officers; and
- service providers.

Structure of this Manual

1.1.9. This manual seeks to present information in a consistent manner. There are a number of headings within each section, described below.

- Objective – the desired outcome when controls within a section are implemented.
- Context – the scope, applicability and any exceptions for a section.
- References – references to external sources of information that can assist in the interpretation or implementation of controls.
- Rationale & Controls
 - Rationale – the reasoning behind controls and compliance requirements.
 - Control – risk reduction measures with associated compliance requirements.

1.1.10. This section provides a summary of key structural elements of this manual. The detail of processes and controls is provided in subsequent chapters. It is important that reference is made to the detailed processes and controls in order to fully understand key risks and appropriate mitigations.

The New Zealand Classification System

1.1.11. The requirements for classification of government documents and information are based on the Cabinet Committee Minute EXG (00) M 20/7 and Security in The Government Sector which references CAB (00) M42/4G(4). The associated guidance and protective handling instructions are provided in the Protective Security Manual (PSM). *Note:* The PSM and NZISM will be incorporated into a cohesive Protective Security Framework which is expected to be promulgated in late-2014 and authorised by a Cabinet Directive.

KEY DEFINITIONS

Accreditation Authority

1.1.12. The Agency Head is generally the Accreditation Authority for that agency for all systems up to and including those classified RESTRICTED. See also Chapter 3 – Roles and Responsibilities and Section 5.2 – Accreditation Framework.

1.1.13. Agency heads may choose to delegate this authority to a member of the agency's executive. The Agency Head remains accountable for ICT risks accepted and the information security of their agency.

1.1.14. In all cases the Accreditation Authority will be at least a senior agency executive who has an appropriate level of understanding of the security risks they are accepting on behalf of the agency.

1.1.15. For multi-national and multi-agency systems the Accreditation Authority is determined by a formal agreement between the parties involved. Consultation with the Office of the Government Chief Information Officer (GCIO) may also be necessary.

1.1.16. For agencies with systems that process, store or communicate caveated or compartmented information, the Director GCSB is the Accreditation Authority *irrespective of the classification level of the information*.

Certification and Accreditation Processes

1.1.17. Certification and accreditation of information systems is the fundamental governance process by which the risk owners and agency head derives assurance over the design, implementation and management of information systems. This process is described in detail in Chapter 5 – System Certification and Accreditation.

1.1.18. Certification and Accreditation are two distinct processes.

1.1.19. Certification is the formal assertion that an information system complies with minimum standards and agreed design, including any security requirements.

1.1.20. *In all cases*, certification and the supporting documentation or summary of other evidence will be prepared by, or on behalf of, the host or lead agency. The certification is then provided to the Accreditation Authority.

1.1.21. Accreditation is the formal authority to operate an information system and requires the recognition and acceptance of risk and residual risks associated with information systems operation.

1.1.22. The requirements described above are summarised in the table below. Care **MUST** be taken when using this table as there are numerous endorsements, caveats and releasability instructions in the New Zealand information classification system that may change where the authority for accreditation lies.

Information Classification	SHOULD SHOULD NOT	MUST MUST NOT	Accreditation Authority
<p>Information classified RESTRICTED and below, including UNCLASSIFIED and Official Information</p>	<p>Control represents good and recommended practice. Non-use may be medium to high risk.</p> <p>Non-use of controls is formally recorded, compensating controls selected as required and residual risk acknowledged and agreed by the Accreditation Authority.</p>	<p>Control is a baseline or “systems hygiene” control and is essential. Non-use is high risk.</p> <p>The Accreditation Authority <i>may</i> grant a dispensation (Waiver or Exemption) if the control cannot be implemented and compensating controls are selected to manage identified risks.</p> <p>Some controls cannot be <i>individually</i> risk managed by agencies without jeopardising multi-agency, all of government or international systems and related information.</p>	<p>Agency Head/Chief Executive/Director General (or formal delegate)</p>
<p>All use of High Grade Cryptographic Equipment (HGCE)</p> <p>All information classified CONFIDENTIAL and above.</p>	<p>Control represents good and recommended practice. Non-use may be high risk</p> <p>Non-use of controls is formally recorded, compensating controls selected as required and residual risk acknowledged and agreed by the Accreditation Authority.</p>	<p>Control is a baseline or “systems hygiene” control and is essential. Non-use is high or very high risk.</p> <p>The Accreditation Authority <i>may</i> grant a dispensation (Waiver or Exemption) if the control cannot be implemented and compensating controls are selected to manage identified risks.</p> <p>Some controls cannot be <i>individually</i> risk managed by agencies without jeopardising multi-agency, all of government or international systems and related information.</p>	<p>Director GCSB (or formal delegate)</p>

“All Classifications” category

1.1.23. The “All Classifications” category is used to describe the applicability of controls for any information that is Official Information or protectively marked UNCLASSIFIED, IN-CONFIDENCE, SENSITIVE, RESTRICTED, CONFIDENTIAL, SECRET or TOP SECRET, including any caveats or releasability endorsements associated with the respective document classification.

Compartmented Information

1.1.24. Compartmented information is information requiring special protection through separation or is “compartmented” from other information stored and processed by the agency.

Concept of Operations (ConOp) Document

1.1.25. Systems, operations, campaigns and other organisational activities are generally developed from an executive directive or organisational strategy. The ConOp is a document describing the characteristics of a proposed operation, process or system and how they may be employed to achieve particular objectives. It is used to communicate the essential features to all stakeholders and obtain agreement on objectives and methods. ConOps should be written in a non-technical language to facilitate agreement on understanding and knowledge and provide clarity of purpose. ConOp is a term widely used in the military, operational government agencies and other defence, military support and aerospace enterprises.

Information

1.1.26. The New Zealand Government requires information important to its functions, resources and classified equipment to be adequately safeguarded to protect public and national interests and to preserve personal privacy. Information is defined as any communication or representation of knowledge such as facts, data, and opinions in any medium or form, electronic as well as physical. Information includes any text, numerical, graphic, cartographic, narrative, or any audio or visual representation.

Information Asset

1.1.27. An information asset is any information or related equipment that has value to an agency or organisation. This includes equipment, facilities, patents, intellectual property, software and hardware. Information Assets also include services, information, and people, and characteristics such as reputation, brand, image, skills, capability and knowledge.

Information Assurance (IA)

1.1.28. Confidence in the governance of information systems and that effective measures are implemented to manage, protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation.

Information Security

1.1.29. Although sometimes described as cyber security, *Information* security is considered a higher level of abstraction than cyber security relating to the protection of information regardless of its form (electronic or physical). The accepted definition of information security within government is: “measures relating to the confidentiality, availability and integrity of information”.

1.1.30. A number of specialised security areas contribute to information security within government; these include: physical security, personnel security, communications security and information and communications technology (ICT) security along with their associated governance and assurance measures.

Information Systems

1.1.31. The resources and assets for the collection, storage, processing, maintenance, use sharing, dissemination, disposition, display, and transmission of information.

Information Systems Governance

1.1.32. An integral part of enterprise governance consists of the leadership and organisational structures and processes to ensure that the agency’s information systems support and sustain the agency’s and Government’s strategies and objectives. Information Systems Governance is the responsibility of the Agency Head and the Executive team.

Secure Area

1.1.33. In the context of the NZISM a secure area is defined as any area, room, group of rooms, building or installation that processes, stores or communicates information classified CONFIDENTIAL, SECRET, TOP SECRET or any compartmented or caveated information at these classifications. A secure area may include a SCIF (see below). Note also the physical security requirements for such areas as specified in the PSM (to be encompassed by the Protective Security Framework later in 2014).

Security Posture

1.1.34. The Security Posture of an organisation describes and encapsulates the security status and overall approach to identification and management of the security of an organisation’s networks, information, systems, processes and personnel. It includes risk assessment, threat identification, technical and non-technical policies, procedures, controls and resources that safeguard the organisation from internal and external threats.

Sensitive Compartmented Information Facility (SCIF)

1.1.35. Any accredited area, room, or group of rooms, buildings, or installation where Sensitive Compartmented Information (SCI) is stored, used, discussed, processed or communicated. The Accreditation Agent for a SCIF is the Director GCSB or formal delegate.

System Owner

1.1.36. A System Owner is the person responsible for the information resource and to *maintain* system accreditation. Their responsibilities are described in more detail in Section 3.4 – System Owners.

INTERPRETATION OF CONTROLS

Controls language

1.1.37. The definition of controls in this manual is based on language as defined by the Internet Engineering Task Force (IETF)'s Request For Comment (RFC) 2119 to indicate differing degrees of compliance.

Applicability of controls

1.1.38. Whilst this manual provides controls for specific technologies, not all systems will use all of these technologies. When a system is developed, the agency will determine the appropriate scope of the system and which controls within this manual are applicable.

1.1.39. If a control within this manual is outside the scope of the system then non-compliance processes *do not apply*. However, if a control is within the scope of the system yet the agency chooses *not to implement* the control, then they are required to follow the non-compliance procedures as outlined below in order to provide appropriate governance and assurance.

1.1.40. The procedures and controls described in the NZISM are designed, not only to counter or prevent known common attacks, but also to protect from emerging threats.

Identification and Selection of controls

1.1.41. In all cases controls have been selected as the most effective means of mitigating identified risks and threats. Each control has been carefully researched and risk assessed against a wide range of factors, including useability, threat levels, likelihood, rapid technology changes, sustainability, effectiveness and cost.

Controls with a “MUST” or “MUST NOT” requirement

1.1.42. A control with a “MUST” or “MUST NOT” requirement indicates that use, or non-use, of the control is essential in order to effectively manage the identified risk, unless the control is demonstrably not relevant to the respective system. These controls are baseline controls, sometimes described as systems hygiene controls.

1.1.43. The rationale for non-use of essential controls MUST be clearly demonstrated to the Accreditation Authority as part of the certification process, *before* approval for exceptions is granted. MUST and MUST NOT controls take precedence over SHOULD and SHOULD NOT controls.

Controls with a “SHOULD” or “SHOULD NOT” requirement

1.1.44. A control with a “SHOULD” or “SHOULD NOT” requirement indicates that use, or non-use, of the control is considered good and recommended practice. Valid reasons for not implementing a control could exist, including:

- a. A control is not relevant in the agency;
- b. A system or ICT capability does not exist in the agency; or
- c. A process or control(s) of equal strength has been substituted.

1.1.45. While some cases may require a simple record of fact, agencies must recognise that non-use of any control, without due consideration, may increase residual risk for the agency. This residual risk needs to be agreed and acknowledged by the Accreditation Authority. In particular an agency should pose the following questions:

- a. Is the agency willing to accept additional risk?
- b. Have any implications for All of Government systems been considered?
- c. If, so, what is the justification?

1.1.46. A formal auditable record of this consideration and decision is required as part of the IA governance and assurance processes within an agency.

Non-compliance

1.1.47. Non-compliance is a risk to the agency and may also pose risks to other agencies and organisations. Good governance requires these risks are clearly articulated, measures are implemented to manage and reduce the identified risks to acceptable levels, that the Accreditation Authority is fully briefed, acknowledges any residual and additional risk and approves the measures to reduce risk.

1.1.48. In some circumstances, full compliance with this manual may not be possible, for example some legacy systems may not support the configuration of particular controls. In such circumstances, a risk assessment should clearly identify *compensating* controls to reduce risks to an acceptable level. Acceptance of risk or residual risk, without due consideration is NOT adequate or acceptable.

1.1.49. It is recognised that agencies may not be able to immediately implement all controls described in the manual due to resource, budgetary, capability or other constraints. Best practice risk management processes will acknowledge this and prepare a timeline and process by which the agency can implement all appropriate controls described in this manual.

1.1.50. Simply acknowledging risks and not providing the means to implement controls *does not* represent effective risk management.

1.1.51. Where multiple controls are not relevant or an agency chooses not to implement multiple controls within this manual the system owner may choose to logically group and consolidate controls when following the processes for non-compliance.

Rationale Statements

1.1.52. A short rationale is provided with each group of controls. It is intended that this rationale is read in conjunction with the relevant controls in order to provide context and guidance.

RISK MANAGEMENT

Risk Management Standards

1.1.53. For security risk management to be of true value to an agency it **MUST** relate to the specific circumstances of an agency and its systems, as well as being based on an industry recognised approach or risk management guidelines. For example, guidelines and standards produced by Standards New Zealand and the International Organization for Standardization (ISO).

1.1.54. The International Organization for Standardization has published an international risk management standard, including principles and guidelines on implementation, outlined in ISO 31000:2009 - Risk Management -- Principles and Guidelines. Refer to the tables below for additional reference materials.

The NZISM and Risk Management

1.1.55. The ISM encapsulates good and recommended best-practice in managing technology risks and mitigating or minimising threat to New Zealand government information systems.

1.1.56. Because there is a broad range of systems across government and the age and technological sophistication of these systems varies widely, there is no single governance, assurance, risk or controls model that will accommodate all agencies information and technology security needs.

1.1.57. The NZISM contains guidance on governance and assurance processes and technological controls based on comprehensive risk and threat assessments, research and environmental monitoring.

1.1.58. The NZISM encourages agencies to take a similar risk-based approach to information security. This approach enables the flexibility to allow agencies to conduct their business and maintain resilience in the face of a changing threat environment, while recognising the essential requirements and guidance provided by the NZISM.

REFERENCES

1.1.59. This manual is updated regularly. It is therefore important that agencies ensure that they are using the latest version of this Manual.

References	Publisher	Source
The NZISM and additional information, tools and discussion topics can be accessed from the GCSB website	GCSB	http://www.gcsb.govt.nz .
The Protective Security Manual (PSM) <i>Note: The NZISM and the content of the PSM will be consolidated into the Protective Security Framework in 2014</i>	NZSIS	Available through agency DSO's
Another definitive reference is the ISO standard ISO/IEC 27000:2014 Information Technology – Security Techniques – Information Security Management Systems – Overview and Vocabulary (third edition)	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27000.html http://www.standards.co.nz
CNSS Instruction No. 4009 26 April 2010 – National Information Assurance (IA) Glossary, (US),	Committee on National Security Systems (CNSS)	http://www.ncix.gov/publications/policy/docs/CNSSI_4009.pdf
NISTIR 7298 Revision 2 – Glossary of Key Information Security Terms, May 2013	NIST	http://nvlpubs.nist.gov/nistpubs/ir/2013/NIST.IR.7298r2.pdf

1.1.60. Supplementary information to this manual can be found in the following documents.

Topic	Documentation	Source
Approved Products	Common Criteria ISO/IEC 15408, parts 1,2 & 3	ISO http://www.iso.org
	AISEP Evaluated Products List	ASD http://www.asd.gov.au
	Other Evaluated Products Lists	NSA http://www.nsa.gov CESG http://www.cesg.gov.uk CSEC http://www.cse-cst.gc.ca Common Criteria http://www.commoncriteriaportal.org
Archiving of information	Public Records Act 2005 (as amended)	Archives New Zealand or http://www.legislation.govt.nz
	Archives, Culture, and Heritage Reform Act 2000 (as amended)	Archives New Zealand or http://www.legislation.govt.nz
Business continuity	ISO 22301:2012, Business Continuity	Standards New Zealand http://www.standards.co.nz
Cable security	NZCSS 400: New Zealand Communications Security Standard No 400 (Document classified CONFIDENTIAL)	GCSB RESTRICTED document available on application to authorised personnel
Emanation security	NZCSS 400: New Zealand Communications Security Standard No 400 (Document classified CONFIDENTIAL)	GCSB RESTRICTED document available on application to authorised personnel
Information classification	SIGS, Security in the Government Sector	DPMC http://www.dPMC.govt.nz
Information classification	Guidelines for the Protection of Official Information	DPMC http://www.dPMC.govt.nz

Topic	Documentation	Source
Information security management	ISO/IEC 27001:2013	ISO / IEC http://www.iso27001security.com/html/27001.html Standards New Zealand http://www.standards.co.nz
	ISO/IEC 27002:2013	ISO / IEC http://www.iso27001security.com/html/27001.html Standards New Zealand http://www.standards.co.nz
	Other standards and guidelines in the ISO/IEC 270xx series, as appropriate	ISO / IEC http://www.iso27001security.com/html/27001.html Standards New Zealand http://www.standards.co.nz
Key management – commercial grade	AS 11770.1:2003, Information Technology – Security Techniques – Key Management – Framework	Standards New Zealand http://www.standards.co.nz
Cryptographic Security	NZCSS 200: New Zealand Communications Security Standard No 200 (Document classified CONFIDENTIAL) *due to be replaced by NZCSS 300 late 2014	GCSB RESTRICTED document available on application to authorised personnel
Management of electronic records that may be used as evidence	HB 171:2003, Guidelines for the Management of Information Technology Evidence	Standards New Zealand http://www.standards.co.nz
Personnel security	PSM, Protective Security Manual	NZSIS http://www.nzsis.govt.nz
Physical security	PSM, Protective Security Manual	NZSIS http://www.nzsis.govt.nz
Privacy requirements	Privacy Act 1993 (the Privacy Act)	Office of The Privacy Commissioner http://www.privacy.org.nz

Topic	Documentation	Source
Risk management	ISO 31000:2009 - Risk Management -- Principles and Guidelines	Standards New Zealand http://www.standards.co.nz
	ISO 27005:2011, Information Security Risk Management	Standards New Zealand http://www.standards.co.nz
	HB 436:2013, Risk Management Guidelines	Standards New Zealand http://www.standards.co.nz
	ISO/IEC Guide 73, Risk Management – Vocabulary – Guidelines for use in Standards	Standards New Zealand http://www.standards.co.nz
	NIST SP 800-30, Risk Management Guide for Information Technology Systems	http://www.nist.gov
Security Management	HB167, Security Risk Management	Standards New Zealand http://www.standards.co.nz
Security And Intelligence Legislation	Government Communications Security Bureau Act 2003 (as amended)	http://www.legislation.govt.nz
	New Zealand Security Intelligence Service Act 1969 (as amended)	http://www.legislation.govt.nz
	Telecommunications (Interception Capability and Security) Act 2013 (as amended)	http://www.legislation.govt.nz

RATIONALE & CONTROLS

1.1.61. Non-compliance

1.1.61.R.01. Rationale

Controls for classified systems and information within this manual with a “MUST” or “MUST NOT” compliance caveat cannot be *individually* risk managed by agencies without jeopardising their own, multi-agency or all of government information assurance.

1.1.61.R.02. Rationale

Controls within this manual with a “SHOULD” and “SHOULD NOT” requirement may be risk managed by agencies. As the individual control security risk for non-compliance is not as high as those controls with a ‘MUST’ or ‘MUST NOT’ requirement, the Accreditation Authority can consider the justification for the acceptance of risks, consider any mitigations then acknowledge and accept any residual risks. Deviations from the procedures and controls in the NZISM may represent risks in themselves. Ultimately, the Agency Head remains accountable for the ICT risks and information security of their agency.

1.1.61.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

System owners seeking a dispensation for non-compliance with any essential controls in this manual MUST be granted a dispensation by their Accreditation Authority and their agency head. Where High Grade Cryptographic Systems (HGCS) are implemented, the Accreditation Authority will be the Director GCSB or a formal delegate.

1.1.62. Justification for non-compliance

1.1.62.R.01. Rationale

Without sufficient justification and consideration of security risks by the system owner when seeking a dispensation, the agency head or their authorised delegate will lack the appropriate range of information to make an informed decision on whether to accept the security risk and grant the dispensation or not.

1.1.62.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

System owners seeking a dispensation for non-compliance with essential controls MUST complete an agency risk assessment which documents:

- the reason(s) for not being able to comply with this manual;
- the alternative mitigation measure(s) to be implemented;
- The strength and applicability of the alternative mitigations;
- an assessment of the residual security risk(s); and
- a date by which to review the decision.

1.1.63. Consultation on non-compliance

1.1.63.R.01. Rationale

When an agency stores information on their systems that belongs to a foreign government they have an obligation to inform and seek agreement from that third party when they do not apply all appropriate controls in this manual. These third parties will place reliance on the application of controls from the NZISM. If the agency fails to implement all appropriate controls, the third party will be unaware that their information may have been placed at a heightened risk of compromise. As such, the third party is denied the opportunity to consider their own additional risk mitigation measures for their information in light of the agency's desire to risk manage controls from this manual.

1.1.63.R.02. Rationale

Most New Zealand Government agencies will store or processes information on their systems that originates from another New Zealand Government Agency. The use of the Classification System, and implementation of its attendant handling instructions, provides assurance to the originating agency that the information is adequately safeguarded.

1.1.63.R.03. Rationale

Additional controls, not described or specified in this manual, are welcomed as a means of improving and strengthening security of information systems, provided there are no obvious conflicts or contradictions with the controls in this manual. A comprehensive risk assessment of the additional controls is a valuable means of determining the effectiveness of additional controls.

1.1.63.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

If a system processes, stores or communicates classified information from another agency, that agency MUST be consulted before a decision to be non-compliant with the Classification System is made.

1.1.63.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

If a system processes, stores or communicates classified information from a foreign government, that government MUST be consulted before a decision to be non-compliant with NZISM controls is made.

1.1.64. All of Government Systems

1.1.64.R.01. Rationale

All of Government systems, because they are connected to multiple agencies, have the potential to cause significant and widespread disruption should system failures, cyber-attacks or other incidents occur.

1.1.64.R.02. Rationale

Any deviation from the essential controls specified in the NZISM MUST necessarily be carefully considered and their implication and risk for all government systems understood and agreed by all interested parties.

1.1.64.R.03. Rationale

Interested parties may include the lead agency, the Government CIO and key service providers, such as with cloud services.

1.1.64.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

If a system processes, stores or communicates data and information with multiple agencies or forms part of an all of government system, interested parties MUST be formally consulted before non-compliance with any essential controls.

1.1.65. Reviewing non-compliance

1.1.65.R.01. Rationale

As part of the process of providing justification for a dispensation to the Accreditation Authority, an assessment of the degree of compliance, identification of areas of non-compliance and determination of residual security risk is undertaken by the agency or lead agency. This assessment is based on the risk environment at the time the dispensation is sought. As the risk environment will continue to evolve over time it is important that agencies revisit the assessment on an annual basis and update it according to the current risk environment, and if necessary reverse any decisions to grant a dispensation if the security risk is no longer of an acceptable level.

1.1.65.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD review decisions to be non-compliant with any controls at least annually.

1.1.66. Recording non-compliance

1.1.66.R.01. Rationale

Without appropriate records of decisions to risk manage controls from this manual, agencies have no record of the status of information security within their agency. Furthermore, a lack of such records will hinder any governance, compliance or auditing activities that may be conducted.

1.1.66.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST retain a copy and maintain a record of the supporting risk assessment and decisions to be non-compliant with any essential controls from this manual.

1.1.66.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Where good and recommended practice controls are NOT implemented, agencies MUST record and formally recognise that non-use of any controls without due consideration may increase residual risk for the agency. This residual risk MUST be agreed and acknowledged by the Accreditation Authority.

1.2. Applicability, Authority and Compliance

OBJECTIVE

1.2.1. Agencies understand and follow the requirements of the New Zealand Information Security Manual. Protection of government information and systems is a core accountability.

CONTEXT

Scope

1.2.2. The NZISM provides guidance and specific ICT controls that form part of a suite of requirements produced by GCSB relating to information security. Its role is to promote a consistent approach to information assurance and information security across all New Zealand Government agencies. It is based on security risk assessments for any information that is processed, stored or communicated by government systems with corresponding risk treatments (controls) to reduce the level of security risk to an acceptable level.

Applicability

1.2.3. This manual applies to:

- New Zealand Government departments, agencies and organisations as listed in:
 - Parts 1 and 2 of Schedule 1 to the Ombudsmen Act 1975 (as amended); and
 - Schedule 1 to the Official Information Act 1982.
- any other organisations that have entered into a formal Agreement with the New Zealand Government to have access to classified information.

Authority

1.2.4. The Government Communications Security Bureau Act 2003, as amended (“the GCSB Act”) provides that one of the functions of the GCSB is to co-operate with, and provide advice and assistance to, any public authority whether in New Zealand or overseas, or to any other entity authorised by the Minister responsible for the GCSB on any matters relating to the protections, security and integrity of communications; and information structures of importance to the Government of New Zealand. The NZISM is one aspect of the GCSB’s advice and assistance to government agencies on information security.

1.2.5. This function furthers the objective of the GCSB to contribute to:

- The national security of New Zealand; and
- The international relations and well-being of New Zealand; and
- The economic well-being of New Zealand.

1.2.6. The NZISM is intended to structure and assist the implementation of government policy that requires departments and agencies to protect the privacy, integrity and confidentiality of the information they collect, process, store and archive. While these overarching requirements are mandatory for departments and agencies, compliance with the NZISM is not required as a matter of law. The controls in the NZISM could be made binding on departments and agencies, either by legislation, or Cabinet direction.

1.2.7. It should be noted that the Protective Security Requirements Framework, to be published later in 2014, will provide a specific authority and mandate through a Cabinet Directive.

Compliance by smaller agencies

1.2.8. As smaller agencies may not always have sufficient staffing or budgets to comply with all the requirements of this manual, they may choose to consolidate their resources with another larger host agency to undertake a joint approach.

1.2.9. In such circumstances smaller agencies may choose to either operate on systems fully hosted by another agency using their information security policies and information security resources or share information security resources to jointly develop information security policies and systems for use by both agencies. The requirements within this manual can be interpreted as either relating to the host agency or to both agencies, depending on the approach taken.

1.2.10. In situations where agencies choose a joint approach to compliance, especially when an agency agrees to fully host another agency, the agency heads may choose to seek a memorandum of understanding regarding their information security responsibilities.

Legislation and other government policy

1.2.11. While this manual does contain examples of relevant legislation (see Tables 1.1.59 and 1.1.60), there is no comprehensive consideration of such issues. Accordingly, agencies should rely on their own inquiries in that regard.

1.2.12. All controls within this manual may be used as the basis for internal and external annual audit programmes, any review or investigation by the Controller and Auditor-General or referenced for assurance purposes by the Government Chief Information Officer (GCIO).

RATIONALE & CONTROLS

1.2.13. Compliance

1.2.13.R.01. Rationale

In complying with the latest version of this manual agencies awareness of the current threat environment for government systems and the associated acceptable level of security risk is vital. Furthermore, if a system is designed to an out-dated standard, agencies may need additional effort to obtain accreditation for their systems.

1.2.13.R.02. Rationale

GCSB continuously monitors technology developments in order to identify business risks, technology risks and security threats. If a significant risk is identified, research may be undertaken, additional controls identified and implementation timeframes specified.

1.2.13.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies undertaking system design activities for in-house or out-sourced projects MUST use the latest version of this manual for information security requirements.

1.2.13.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

When GCSB makes a determination that newly introduced standard, policy or guideline within this manual, or any additional information security policy, is of particular importance, agencies MUST comply with any new specified requirements and implementation timeframes.

2. INFORMATION SECURITY WITHIN GOVERNMENT

2.1. Government Engagement

OBJECTIVE

2.1.1. Security personnel are aware of and use information security services offered within the New Zealand Government.

CONTEXT

Scope

2.1.2. This section covers information on organisations involved in providing information security advice to agencies.

Government Communications Security Bureau

2.1.3. GCSB is required to perform various functions, including the provision of material, advice and other assistance to New Zealand government departments on matters relating to the security of classified information that is processed, stored or communicated by electronic or similar means. GCSB also provides assistance to New Zealand government departments in relation to cryptography, communications and computer technologies.

2.1.4. An agency can contact GCSB for advice and assistance relating to the implementation of the NZISM by emailing policy@gcsb.govt.nz or phone the GCSB's Information Assurance Directorate on (04) 472-6881.

2.1.5. An agency can contact GCSB to provide feedback on the NZISM via email as above.

2.1.6. Agencies can also contact GCSB for advice and assistance on the reporting and management of information security incidents. GCSB's response will be commensurate with the nature and urgency of the information security incident. There is a 24 hour, seven day a week service available if necessary.

2.1.7. Finally, agencies can contact GCSB for advice and assistance on the purchasing, provision, deployment, operation and disposal of High Grade Cryptographic Equipment (HGCE). The cryptographic liaison can be contacted by email at products.systems@gcsb.govt.nz.

Other organisations

2.1.8. The table below contains a brief description of the other organisations which have a role in relating to information security within government.

Organisation	Services
Archives New Zealand	Provides information on the archival of government information.
Auditor General	Independent assurance over the performance and accountability of public sector organisations.
Audit New Zealand	Performance audits and better practice guides for areas including information security.
Department of Internal Affairs	Guidance on risk management, Authentication Standards, One.govt and i-govt services.
Department of Prime Minister and Cabinet	National security advice to government.
Ministry of Business, Innovation & Employment (MBIE)	Development, coordination and oversight of New Zealand Government policy on electronic commerce, online services and the Internet.
Ministry of Foreign Affairs and Trade	Policy and advice for security overseas.
National Cyber Security Centre (NCSC)	Provides enhanced services to government agencies and critical infrastructure providers to assist them to defend against cyber-borne threats.
New Zealand Police	Law enforcement in relation to electronic crime and other high tech crime.
New Zealand Security Intelligence Service	Personnel and Physical security advice Maintenance of the New Zealand Government Security Classification System.
Office of the Government Chief Information Officer (DIA)	Advice, guidance and management for sector and all of government systems and ICT processes. ICT assurance (including privacy and security).
Privacy Commissioner	Advice on how to comply with the Privacy Act and related legislation.
State Services Commission	Monitoring of Public Service organisations and Chief Executives' performance.

REFERENCES

2.1.9. The following websites can be used to obtain additional information about organisations involved in the security of government systems:

Organisation		Source
Government Communications Security Bureau		http://www.gcsb.govt.nz
Archives New Zealand		http://www.archives.govt.nz
Audit New Zealand		http://www.auditnz.govt.nz
Auditor General		http://www.oag.govt.nz
Department of Internal Affairs		http://www.dia.govt.nz http://www.ict.govt.nz
Department of Prime Minister and Cabinet		http://www.dpmc.govt.nz
Ministry of Business, Innovation & Employment (MBIE)		http://www.mbie.govt.nz
Ministry of Foreign Affairs and Trade		http://www.mfat.govt.nz
National Cyber Security Centre (NCSC)		http://www.ncsc.govt.nz
New Zealand Security Intelligence Service		http://www.nzsis.govt.nz
New Zealand Police		http://www.police.govt.nz
Privacy Commissioner		http://www.privacy.org.nz
Standards NZ		http://www.standards.co.nz
State Services Commission		http://www.ssc.govt.nz

RATIONALE & CONTROLS

2.1.10. Organisations providing information security services

2.1.10.R.01. Rationale

If security personnel are unaware of the role government organisations play with regards to information security they could be missing out on valuable insight and assistance in developing an effective information security posture for their agency.

2.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Security personnel SHOULD familiarise themselves with the information security roles and services provided by New Zealand Government organisations.

2.2. Industry Engagement and Outsourcing

OBJECTIVE

2.2.1. Industry handling classified information implements the same security measures as government agencies.

CONTEXT

Scope

2.2.2. This section covers information on outsourcing information technology services and functions to contractors as well as providing those partners with classified information in order to undertake their contracted duties.

Cloud computing

2.2.3. Cloud computing is a form of outsourcing information technology services and functions usually over the Internet. The requirements within this section for outsourcing equally apply to providers of cloud computing services.

RATIONALE & CONTROLS

2.2.4. Outsourcing information technology services and functions

2.2.4.R.01. Rationale

In the context of this section, outsourcing is defined as contracting an outside entity to provide essential business functions and processes that could be undertaken by the Agency itself.

Outsourcing may present elevated levels of risk and additional risks. Outsourcing therefore, requires greater consideration, demonstrable governance, and higher levels of assurance before committing to such contracts

2.2.4.R.02. Rationale

A distinction is drawn between important business functions and the purchase of services such as power, water, building maintenance, stationery and telecommunications. These services are not usually provided by the agency itself.

Purchased services, as identified above, do NOT require accreditation or a third party review as defined in the NZISM. However, normal contract due diligence should be exercised before committing to these supply contracts.

2.2.4.R.03. Rationale

Contractors can be provided with classified information as long as their systems are accredited to an appropriate classification in order to process, store and communicate that information. Contractors and all staff with access to the classified systems must also be cleared to the level of the information being processed. This ensures that when they are provided with classified information that it receives an appropriate level of protection.

2.2.4.R.04. Rationale

New Zealand, in common with most developed countries, has agreements with other nations on information exchange on a variety of topics, including arms control, border control, biosecurity, policing and national security. The lead agency in each sector will usually be the controlling agency for each agreement. While the detail and nature of these agreements is sometimes classified, the agreements invariably require the protection of any information provided, to the level determined by the originator. Agencies that receive such information will be fully briefed by the relevant controlling agency or authority, *before* information is provided. It is important to note that there is no single list or source of such agreements.

2.2.4.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies engaging industry for the provision of off-site information technology services and functions MUST accredit the systems used by the contractor to at least the same minimum standard as the agency's systems. This may be achieved through a third party review report utilising the ISAE 3402 Assurance Reports on Controls at a Third Party Service Organisation.

2.2.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT engage industry for the provision of off-site information technology services and functions in countries that New Zealand does not have a multilateral or bilateral security agreement with for the protection of classified information of the government of New Zealand. If there is any doubt, the agency's CISO SHOULD be consulted.

2.2.5. Independence of ITSMs from outsourced companies

2.2.5.R.01. Rationale

If an agency engages an organisation for the provision of information technology services and functions, and where that organisation also provides the services of an Information Technology Security Manager, they need to ensure that there is no actual or perceived conflict of interest (See also Section 3.3 - Information Technology Security Manager).

2.2.5.R.02. Rationale

When an agency engages a company for the provision of information technology services and functions having a central point of contact for information security matters within the company will greatly assist with incident response and reporting procedures.

2.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an agency has outsourced information technology services and functions, any ITSMs within the agency SHOULD be independent of the company providing the information technology services and functions.

2.2.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an agency has outsourced information technology services and functions, they SHOULD ensure that the outsourced organisation provides a single point of contact within the organisation for all information assurance and security matters.

2.2.6. Developing a contractor management program

2.2.6.R.01. Rationale

The development of a contractor management program will assist the agency in undertaking a coordinated approach to the engagement and use of contractors for outsourcing and provision of information technology services and functions.

2.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop a program to manage contractors that have been accredited for the provision of off-site information technology services and functions.

3. INFORMATION SECURITY GOVERNANCE - ROLES AND RESPONSIBILITIES

3.1. The Agency Head

OBJECTIVE

3.1.1. The agency head endorses and is accountable for information security within their agency.

CONTEXT

Scope

3.1.2. This section covers the role of an agency head with respect to information security.

Chief executive officer /or other title

3.1.3. In some agencies and bodies, the person responsible for the agency or body may also be referred to as the CEO, Director General, Director or similar title specific to that agency. In such cases the policy for the agency head is equally applicable.

Devolving authority

3.1.4. When the agency head's authority in this area has been devolved to a board, committee or panel, the requirements of this section relate to the chair or head of that body.

3.1.5. The Agency Head is also the Accreditation Authority for that agency. See also Section 5.2 – Accreditation Framework.

3.1.6. Smaller agencies may not be able to satisfy all segregation of duty requirements because of scalability and small personnel numbers. In such cases, potential conflicts of interest should be clearly identified, declared and actively managed for the protection of the individual and of the agency.

3.1.7. Refer also to *Compliance By Smaller Agencies* in 1.2.8 for information on joint approaches and resource pooling.

RATIONALE & CONTROLS

3.1.8. Delegation of authority

3.1.8.R.01. Rationale

When an agency head chooses to delegate their authority as the Agency's Accreditation Authority they should do so with careful consideration of all the associated risks, as they remain responsible for the decisions made by their delegate.

3.1.8.R.02. Rationale

The CISO is the most appropriate choice for delegated authority as they should be a senior executive and hold specialised knowledge in information security and security risk management.

3.1.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Where the agency head devolves their authority the delegate MUST be at least a member of the Senior Executive Team or an equivalent management position.

3.1.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

When the agency head devolves their authority the delegate SHOULD be the CISO.

3.1.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where the head of a smaller agencies is not be able to satisfy all segregation of duty requirements because of scalability and small personnel numbers, all, potential conflicts of interest SHOULD be clearly identified, declared and actively managed.

3.1.9. Support for information security

3.1.9.R.01. Rationale

Without the full support of the agency head, security personnel are less likely to have access to sufficient resources and authority to successfully implement information security within their agency.

3.1.9.R.02. Rationale

If an incident, breach or disclosure of classified information occurs in preventable circumstances, the relevant agency head will ultimately be held accountable.

3.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The agency head MUST provide support for the development, implementation and ongoing maintenance of information security processes within their agency.

3.2. The Chief Information Security Officer

OBJECTIVE

3.2.1. The Chief Information Security Officer (CISO) sets the strategic direction for information security within their agency.

CONTEXT

Scope

3.2.2. This section covers the role of a CISO with respect to information security within an agency.

Appointing a CISO

3.2.3. The requirement to appoint a member of the Senior Executive Team or an equivalent management position, to the role of CISO does not require a new dedicated position be created in each agency.

3.2.4. The introduction of the CISO role and associated responsibilities is aimed at providing a more meaningful title for a subset of the security executive's responsibilities that relate to information security within their agency.

3.2.5. The CISO should bring accountability and credibility to information security management and appointees should be suitably qualified and experienced.

3.2.6. Where multiple roles are held by the CISO, for example CIO, or manager of a business unit, conflicts of interest may occur where operational imperatives conflict with security requirements. Good practice separates these roles. Where multiple roles are held by an individual, potential conflicts of interest should be clearly identified and a mechanism implemented to allow independent decision making in areas where conflict may occur.

RATIONALE & CONTROLS

3.2.7. Requirement for a CISO

3.2.7.R.01. Rationale

The role of the CISO is based on industry and governance best practice and has been introduced to ensure that information security is managed at the senior executive level within agencies. Without a CISO there is a risk that an agency may not be resourced to effectively manage information security.

3.2.7.R.02. Rationale

The CISO within an agency is responsible predominately for facilitating communications between security personnel, ICT personnel and business personnel to ensure alignment of business and security objectives within the agency.

3.2.7.R.03. Rationale

The CISO is also responsible for providing strategic level guidance for the agency security program and ensuring compliance with national policy, standards, regulations and legislation.

3.2.7.R.04. Rationale

Some agencies may outsource the CISO function. In such cases conflicts of interest, availability and response times should be identified and carefully managed so the agency is not disadvantaged. Conflicts of interest may also be apparent where the outsourced CISO deals with other vendors.

3.2.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The CISO MUST be:

- cleared for access to all classified information processed by the agency's systems, and
- able to be briefed into any compartmented information on the agency's systems.

3.2.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD appoint a person to the role of CISO or have the role undertaken by an existing person within the agency.

3.2.7.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO role SHOULD be undertaken by a member of the Senior Executive Team or an equivalent management position.

3.2.7.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for overseeing the management of security personnel within the agency.

3.2.7.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where the role of the CISO is outsourced, potential conflicts of interest in availability, response times or working with vendors SHOULD be identified and carefully managed.

3.2.8. Responsibilities – Reporting

3.2.8.R.01. Rationale

As the CISO is responsible for the overall management of information security within an agency it is important that they report directly to the agency head on any information security issues.

3.2.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD report directly to the agency head on matters of information security within the agency.

3.2.9. Responsibilities – Security programs

3.2.9.R.01. Rationale

Without a comprehensive strategic level information security and security risk management program an agency will lack high-level direction on information security issues and may expose the agency to unnecessary risk.

3.2.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD develop and maintain a comprehensive strategic level information security and security risk management program within the agency aimed at protecting the agency's official and classified information.

3.2.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for the development of an information security communications plan.

3.2.9.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD create and facilitate the agency security risk management process.

3.2.10. Responsibilities – Ensuring compliance

3.2.10.R.01. Rationale

Without having a person responsible for ensuring compliance with the information security policies and standards within the agency, security measures of the agency are unlikely to meet minimum government requirements and may expose the agency to unnecessary risk.

3.2.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for ensuring compliance with the information security policies and standards within the agency.

3.2.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for ensuring agency compliance with the NZISM through facilitating a continuous program of certification and accreditation based on security risk management.

3.2.10.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for the implementation of information security measurement metrics and key performance indicators within the agency.

3.2.11. Responsibilities – Coordinating security

3.2.11.R.01. Rationale

One of the core roles of the CISO is to ensure appropriate communication between business and information security teams within their agency. This includes interpreting information security concepts and language into business concepts and language as well as ensuring that business teams consult with information security teams to determine appropriate security measures when planning new business projects for the agency.

3.2.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD facilitate information security and business alignment and communication through an information security steering committee or advisory board which meets formally and on a regular basis, and comprises key business and ICT executives.

3.2.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for coordinating information security and security risk management projects between business and information security teams.

3.2.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD work with business teams to facilitate security risk analysis and security risk management processes, including the identification of acceptable levels of risk consistently across the agency.

3.2.12. Responsibilities – Working with ICT projects

3.2.12.R.01. Rationale

As the CISO is responsible for the development of the strategic level information security program within an agency they are best placed to advise ICT projects on the strategic direction of information security within the agency.

3.2.12.R.02. Rationale

As the CISO is responsible for the overall management of information security within an agency, they are best placed to recommend to the accreditation authority the acceptance of residual security risks associated with the operation of agency systems.

3.2.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD provide strategic level guidance for agency ICT projects and operations.

3.2.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD liaise with agency architecture teams to ensure alignment between security and agency architectures.

3.2.13. Responsibilities – Working with vendors

3.2.13.R.01. Rationale

Having the CISO coordinate the use of external information security resources will ensure that a consistent approach is being applied across the agency.

3.2.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD coordinate the use of external information security resources to the agency including contracting and managing the resources.

3.2.14. Responsibilities – Budgeting

3.2.14.R.01. Rationale

Controlling the information security budget will ensure that the CISO has sufficient access to funding to support information security projects and initiatives.

3.2.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for controlling the information security budget.

3.2.15. Responsibilities – Information security incidents

3.2.15.R.01. Rationale

To ensure that the CISO is able to accurately report to the agency head on information security issues within their agency it is important that they remain fully aware of all information security incidents within their agency.

3.2.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be fully aware of all information security incidents within the agency.

3.2.16. Responsibilities – Disaster recovery

3.2.16.R.01. Rationale

Restoring business-critical services to an operational state after a disaster is an important function of business continuity. As such it will need high level support from the CISO.

3.2.16.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD coordinate the development of disaster recovery policies and standards within the agency to ensure that business-critical services are supported appropriately and that information security is maintained in the event of a disaster.

3.2.17. Responsibilities – Training

3.2.17.R.01. Rationale

To ensure personnel within an agency are actively contributing to the information security posture of the agency, an information security awareness and training program will need to be developed. As the CISO is responsible for information security within the agency they will need to oversee the development and operation of the program.

3.2.17.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD be responsible for overseeing the development and operation of information security awareness and training programs within the agency.

3.2.18. Responsibilities – Providing security knowledge

3.2.18.R.01. Rationale

The CISO is not expected to be a technical expert on information security matters; however, knowledge of national and international standards and best practice will assist in communicating with technical experts within their agency on information security matters.

3.2.18.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The CISO SHOULD provide authoritative security advice and have familiarity with a range of national and international standards and best practice.

3.3. Information Technology Security Managers

OBJECTIVE

3.3.1. Information Technology Security Managers (ITSM) provide information security leadership and management within their agency.

CONTEXT

Scope

3.3.2. This section covers the role of an ITSM with respect to information security within an agency.

Information technology security managers

3.3.3. ITSMs are executives within an agency that act as a conduit between the strategic directions provided by the CISO and the technical efforts of systems administrators. The main area of responsibility of an ITSM is that of the administrative and process controls relating to information security within the agency.

RATIONALE & CONTROLS

3.3.4. Requirement for ITSMs

3.3.4.R.01. Rationale

When agencies outsource their ICT services, ITSMs should be independent of any company providing ICT services. This will prevent any conflict of interest for an ITSM in conducting their duties.

3.3.4.R.02. Rationale

Ensure that the agency has a point of presence at sites to assist with monitoring information security for systems and responding to any information security incidents.

3.3.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST appoint at least one ITSM within their agency.

3.3.4.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

ITSMs MUST be:

- cleared for access to all classified information processed by the agency's systems, and
- able to be briefed into any compartmented information on the agency's systems.

3.3.4.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an agency is spread across a number of geographical sites, it is recommended that the agency SHOULD appoint a local ITSM at each major site.

3.3.4.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

The ITSM role SHOULD be undertaken by personnel with an appropriate level of authority and training based on the size of the agency or their area of responsibility within the agency.

3.3.4.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

ITSMs SHOULD NOT have additional responsibilities beyond those needed to fulfil the role as outlined within this manual.

3.3.5. Responsibilities – Security programs

3.3.5.R.01. Rationale

As ITSMs undertake operational management of information security within an agency they can provide valuable input to the development of the information security program by the CISO.

3.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD work with the CISO to develop an information security program within the agency.

3.3.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD undertake and manage projects to address identified security risks.

3.3.6. Responsibilities – Working with ICT projects

3.3.6.R.01. Rationale

As ITSMs have knowledge of all aspects of information security they are best placed to work with ICT projects within the agency to identify and incorporate appropriate information security measures.

3.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

ITSMs MUST be responsible for assisting system owners to obtain and maintain the accreditation of their systems.

3.3.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD identify systems that require security measures and assist in the selection of appropriate information security measures for such systems.

3.3.6.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD consult with ICT project personnel to ensure that information security is included in the evaluation, selection, installation, configuration and operation of IT equipment and software.

3.3.6.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD work with agency enterprise architecture teams to ensure that security risk assessments are incorporated into system architectures and to identify, evaluate and select information security solutions to meet the agency's security objectives.

3.3.6.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD work with system owners, systems certifiers and systems accreditors to determine appropriate information security policies for their systems and ensure consistency with the NZISM.

3.3.6.C.06. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD be included in the agency's change manage and change control processes to ensure that risks are properly identified and controls are properly applied to manage those risks.

3.3.6.C.07. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD notify the Accreditation Authority of any significant change that may affect the accreditation of that system.

3.3.7. Responsibilities – Working with vendors

3.3.7.R.01. Rationale

The CISO will coordinate the use of external information security resources to the agency, whilst ITSMs will be responsible for establishing contracts and service-level agreements on behalf of the CISO.

3.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD liaise with vendors and agency purchasing and legal areas to establish mutually acceptable information security contracts and service-level agreements.

3.3.8. Responsibilities – Implementing security

3.3.8.R.01. Rationale

The CISO will set the strategic direction for information security within the agency, whereas ITSMs are responsible for managing the implementation of information security measures within the agency.

3.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

ITSMs MUST be responsible for ensuring the development, maintenance, updating and implementation of Security Risk Management Plans (SRMPs), Systems Security Plans (SSPs) and any Standard Operating Procedures (SOPs) for all agency systems.

3.3.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD conduct security risk assessments on the implementation of new or updated IT equipment or software in the existing environment and develop treatment strategies if necessary.

3.3.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD select and coordinate the implementation of controls to support and enforce information security policies.

3.3.8.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD
ITSMs SHOULD provide leadership and direction for the integration of information security strategies and architecture with agency business and ICT strategies and architecture.

3.3.8.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD
ITSMs SHOULD provide technical and managerial expertise for the administration of information security management tools.

3.3.9. Responsibilities – Budgeting

3.3.9.R.01. Rationale

As ITSMs are responsible for the operational management of information security projects and functions within their agency, they will be aware of their funding requirements and can assist the CISO to develop information security budget projections and resource allocations.

3.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
ITSMs SHOULD work with the CISO to develop information security budget projections and resource allocations based on short-term and long-term goals and objectives.

3.3.10. Responsibilities – Reporting

3.3.10.R.01. Rationale

To ensure the CISO remains aware of all information security issues within their agency, and can brief their agency head when necessary, ITSMs will need to provide regular reports on policy developments, proposed system changes and enhancements, information security incidents and other areas of particular concern to the CISO.

3.3.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
ITSMs SHOULD coordinate, measure and report on technical aspects of information security management.

3.3.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
ITSMs SHOULD monitor and report on compliance with information security policies, as well as the enforcement of information security policies within the agency.

3.3.10.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
ITSMs SHOULD provide regular reports on information security incidents and other areas of particular concern to the CISO.

3.3.10.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD
ITSMs SHOULD assess and report on threats, vulnerabilities, and residual security risks and recommend remedial actions.

3.3.11. Responsibilities – Auditing

3.3.11.R.01. Rationale

As system owners may not understand the results of audits against their systems ITSMs will need to assist them in understanding and responding to reported audit failures.

3.3.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD assist system owners and security personnel in understanding and responding to audit failures reported by auditors.

3.3.12. Responsibilities – Disaster recovery

3.3.12.R.01. Rationale

Whilst the CISO will coordinate the development of disaster recovery policies and standards within the agency, ITSMs will need to guide the selection of appropriate strategies to achieve the direction set by the CISO.

3.3.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD assist and guide the disaster recovery planning team in the selection of recovery strategies and the development, testing and maintenance of disaster recovery plans.

3.3.13. Responsibilities – Training

3.3.13.R.01. Rationale

The CISO will oversee the development and operation of information security awareness and training programs within the agency. ITSMs will arrange delivery of that training to personnel within the agency.

3.3.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD provide or arrange for the provision of information security awareness and training for all agency personnel.

3.3.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD develop technical information materials and workshops on information security trends, threats, best practices and control mechanisms as appropriate.

3.3.14. Responsibilities – Providing security knowledge

3.3.14.R.01. Rationale

ITSMs will often have a strong knowledge of information security topics and can provide advice for the information security steering committee, change management committee and other agency and inter-agency committees.

3.3.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD maintain a current and up-to-date security knowledge base comprising of a technical reference library, security advisories and alerts, information on information security trends and practices, and relevant laws, regulations, standards and guidelines.

3.3.14.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD provide expert guidance on security matters for ICT projects.

3.3.14.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs SHOULD provide technical advice for the information security steering committee, change management committee and other agency and inter-agency committees as required.

3.3.15. Responsibilities

3.3.15.R.01. Rationale

ITSMs are generally considered the information security experts within an agency and as such their contribution to improving the information security of systems, providing input to agency ICT projects, assisting other security personnel within the agency, contributing to information security training and responding to information security incidents is a core aspect of their work.

3.3.15.R.02. Rationale

An ITSM is likely to have the most up to date and accurate understanding of the threat environment relating to systems. As such, it is essential that this information is passed to system owners to ensure that it is considered during accreditation activities.

3.3.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The ITSM SHOULD keep the CISO and system owners informed with up-to-date information on current threats.

3.4. System Owners

OBJECTIVE

3.4.1. System owners obtain and maintain accreditation of their systems.

CONTEXT

Scope

3.4.2. This section covers the role that system owners undertake with respect to information security.

RATIONALE & CONTROLS

3.4.3. Requirement for system owners

3.4.3.R.01. Rationale

The system owner is responsible for the overall operation of the system and they may delegate the day-to-day management and operation of the system to a system manager or managers.

3.4.3.R.02. Rationale

All systems should have a system owner in order to ensure IT governance processes are followed and that business requirements are met.

3.4.3.R.03. Rationale

It is strongly recommended that a system owner be a member of the Senior Executive Team or in an equivalent management position, however this does not imply that the system manager(s) should also be at such a level.

3.4.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Each system MUST have a system owner who is responsible for the operation of the system.

3.4.3.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

System owners SHOULD be a member of the Senior Executive Team or an equivalent management position, for large or critical agency systems.

3.4.4. Accreditation responsibilities

3.4.4.R.01. Rationale

The system owner is responsible for the operation of their system and as such they need to ensure that systems are accredited to meet the agency's operational requirements. If modifications are undertaken to a system the system owner will need to ensure that the changes are undertaken in an appropriate manner, documented adequately and that any necessary reaccreditation activities are completed.

3.4.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

System owners MUST obtain and maintain accreditation of their system(s).

3.4.5. Documentation responsibilities

3.4.5.R.01. Rationale

While the system owner is responsible for ensuring the development, maintenance and implementation of Security Risk Management Plans (SRMPs), System Security Plans (SSPs) and Standard Operating Procedures (SOPs), their exposure to information security issues can be too narrowly focused and restricted to the systems with which they are familiar. Involving security personnel in the process ensures that a holistic approach to information security can be mapped to the system owner's understanding of security risks for their specific system.

3.4.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

System owners MUST ensure for the development, maintenance and implementation of complete, accurate and up to date SRMPs, SSPs and SOPs for systems under their ownership. Such actions MUST be documented. See Section 16.5 - Event Logging and Auditing.

3.4.5.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

System Owners MUST involve the ITSM in the redevelopment and updates of the SRMPs, SSPs, and SOPs.

3.5. System Users

OBJECTIVE

3.5.1. System users comply with information security policies and procedures within their agency.

CONTEXT

Scope

3.5.2. This section covers the role that system users undertake with respect to information security.

Types of system users

3.5.3. This section covers responsibilities for all system users i.e. users with general access (general users), and users with privileged access (privileged users).

RATIONALE & CONTROLS

3.5.4. Responsibilities of system users

3.5.4.R.01. Rationale

If agencies fail to develop and maintain a security culture where system users are complying with relevant security policies and procedures for the systems they are using, there is an increased security risk of a system user unwittingly assisting with an attack against a system.

3.5.4.R.02. Rationale

Security policies, procedures and mechanisms aim to cover all situations that may arise within an agency. However there may be legitimate reasons for a system user to bypass security policies, procedures or mechanisms. If this is the case, the system user **MUST** seek formal authorisations from the CISO or the ITSM (if this authority has been specifically delegated to the ITSM) before any actions are undertaken.

3.5.4.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**

All system users **MUST** comply with the relevant security policies and procedures for the systems they use.

3.5.4.C.02. Control: System Classification(s): All Classifications; Compliance: **MUST**

All system users **MUST**:

- protect account authenticators at the same classification of the system it secures;
- not share authenticators for accounts without approval;
- be responsible for all actions under their accounts; and
- use their access to only perform authorised tasks and functions.

3.5.4.C.03. Control: System Classification(s): All Classifications; Compliance: **MUST**

System users that need to bypass security policies, procedures or mechanisms for any reason **MUST** seek formal authorisation from the CISO or the ITSM if this authority has been specifically delegated to the ITSM.

4. SYSTEM CERTIFICATION AND ACCREDITATION

4.1. The Certification and Accreditation Process

OBJECTIVE

4.1.1. Executives and Security Practitioners understand the Certification and Accreditation (C&A) process and its role in information security governance and assurance.

CONTEXT

Scope

4.1.2. This section provides a short, high-level description of the C&A process.

4.1.3. This section must be read in conjunction with the Roles and Responsibilities described in Chapter 3. Subsequent sections of this chapter describe elements of the C&A process in more detail.

The Process

4.1.4. Certification and Accreditation is a fundamental governance and assurance process, designed to provide the Board, Chief Executive and senior executives confidence that information and its associated technology are well-managed, that risks are properly identified and mitigated and that governance responsibilities can demonstrably be met. It is essential for credible and effective information assurance governance.

4.1.5. C&A has two important stages where certification must be completed *before* accreditation can take place. It is based on an assessment of risk, the application of controls described in the NZISM and determination of any residual risk.

4.1.6. Certification and Accreditation are separate and distinct elements, demonstrate segregation of duties and assist in managing any potential conflicts of interest. These are important attributes in good governance systems.

4.1.7. The acceptance of residual risk lies with the Chief Executive of each agency, or lead agency where sector, multi-agency or All of Government (AoG) systems are implemented.

4.1.8. An exception applies where high grade cryptographic equipment (HGCE) is required or caveated or compartmented information is processed, stored or communicated. In this case the Director, GCSB is the Accreditation Authority.

4.1.9. The complete C&A process has several elements and stages, illustrated in the Block Diagram at the end of this section.

Key Participants

4.1.10. There are four groups of participants:

- **System Owners**, responsible for the design, development, system documentation and system maintenance, including any requests for recertification or reaccreditation.
- The **Certification Authority**, responsible for the review of information and documentation provided by the system owner to ensure the ICT system complies with minimum standards and the agreed design.
- The **Assessor** or Auditor, who will conduct inspections, audits and review as instructed by the Certification Authority.
- The **Accreditation Authority** who will consider the recommendation of the Certification Authority, determine the acceptable level of residual; risk and issue the system accreditation, the authority to operate a system.

Certification

4.1.11. Certification is the assertion that an ICT system complies with the minimum standards and controls described in the NZISM, any relevant legislation and regulation and other relevant standards. It is based on a comprehensive evaluation or systems audit. This process is described in Section 4.2.

4.1.12. Certification is evidence that due consideration has been paid to risk, security, functionality, business requirements and is a fundamental part of information systems governance and assurance.

Certification Authorities

4.1.13. For all agency information systems the certification authority is the CISO unless otherwise delegated by the Agency Head.

4.1.14. For external organisations or service providers supporting agencies, the certification authority is the CISO of the agency.

4.1.15. For multi-national, multi-agency, and AoG systems the certification authority is determined by a formal agreement between the parties involved. Within NZ this is usually the lead agency.

Accreditation

4.1.16. Accreditation is the formal authority to operate a system, evidence that governance requirements have been addressed and that the Chief Executive has fulfilled the requirement to manage risk on behalf of the organisation and stakeholders. This element of the C&A process is described in Section 4.4.

4.1.17. Accreditation ensures that either sufficient security measures have been put in place to protect information that is processed, stored or communicated by the system or that

deficiencies in such measures have been identified, assessed and acknowledged, including the acceptance of any residual risk.

Accreditation Authority

4.1.18. For agencies the Accreditation Authority is the agency head or their delegate.

4.1.19. For multi-national, multi-agency systems or AoG systems, the Accreditation Authority is determined by a formal agreement between the parties involved.

4.1.20. In all cases the Accreditation Authority will be at least a senior executive who has an appropriate level of understanding of the security risks they are accepting on behalf of the agency.

4.1.21. Depending on the circumstances and practices of an agency, the agency head could choose to delegate their authority to multiple senior executives who have the authority to accept security risks for the specific business functions within the agency, for example the CISO and the system owner.

Conflicts of Interest

4.1.22. A conflict of interest is a situation in which a person has duties or responsibilities to more than one person, organisation or elements of a process, but is placed in a position where they cannot do justice to all. This includes, for example, when an individual's vested interests or concerns are inconsistent with organisational outcomes, or when an official has conflicting responsibilities. In the context of the C&A process, a conflict of interest can occur when an individual has multiple roles, such as being both the system owner and the Accreditation Authority.

4.1.23. A conflict of interest has the potential to undermine impartiality and integrity of a process and the people involved in a process. It will also undermine the integrity of governance and information assurance derived from the C&A process.

4.1.24. Conflicts of interest are normally managed through segregation of duties, the division of **roles** and **responsibilities** in order to reduce the ability or opportunity for an individual to compromise a critical process. Segregation of duties also reduces errors of interpretation or judgement and better manages risk.

4.1.25. It is important to note that in the C&A process in the NZISM, the Certification Authority, System Owner and Accreditation Authority are *independent* of each other. In smaller agencies, the Assessor may also be the Certification Authority. Ideally this role will also be segregated.

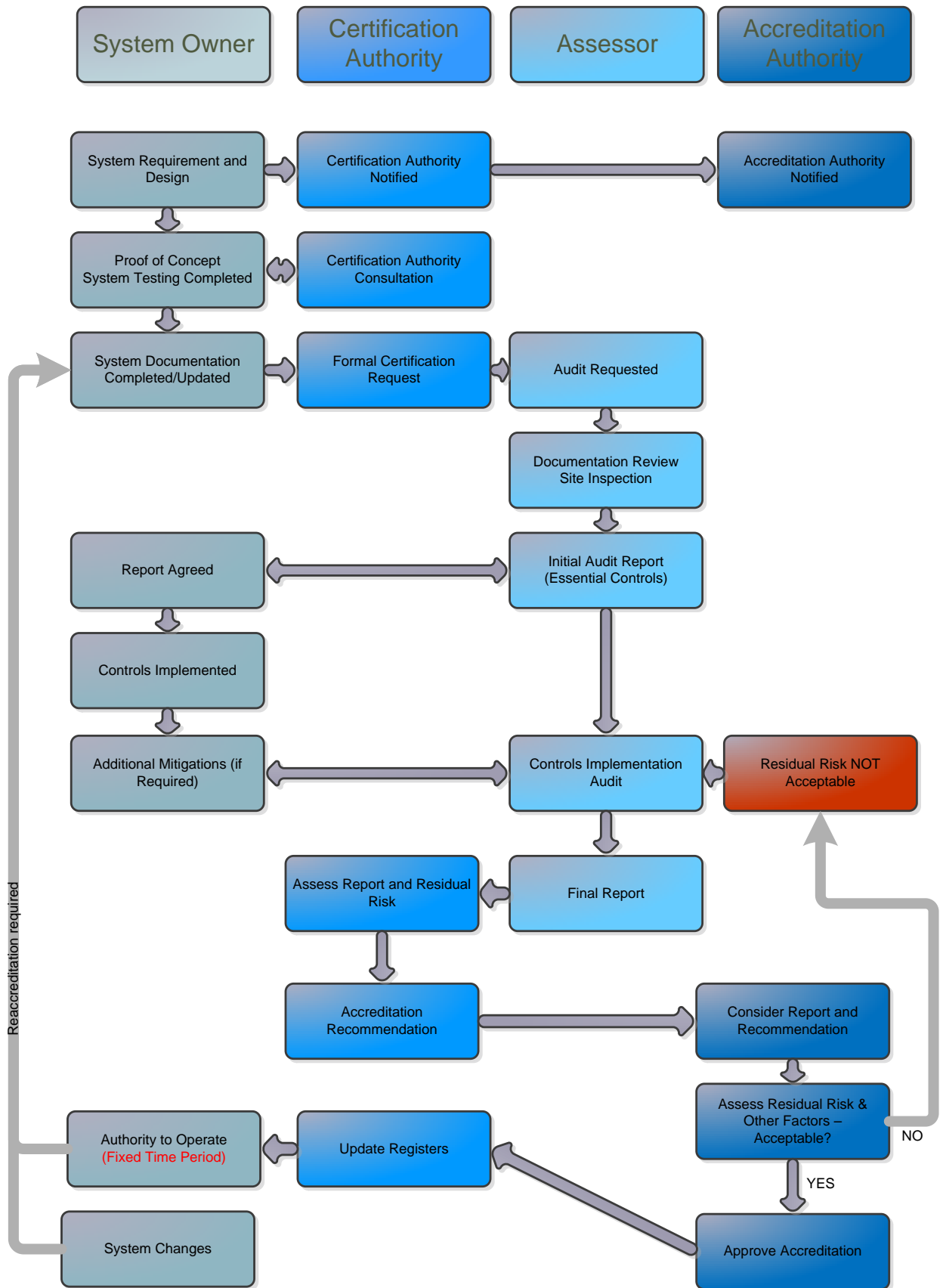
REFERENCES

4.1.26. Additional information relating to systems governance, certification and accreditation can be found at:

Title	Publisher	Source
ISO/IEC 27000:2014 Information technology -- Security techniques -- Information security management systems -- Overview and vocabulary	ISO	http://www.standards.co.nz http://www.iso.org
ISO/IEC 27001:2013 Information technology -- Security techniques -- Information security management systems -- Requirements	ISO	http://www.standards.co.nz http://www.iso.org
ISO/IEC 27002:2013 Information technology - Security techniques - Code of practice for information security controls	ISO	http://www.standards.co.nz http://www.iso.org
ISO/IEC_27006:2011 Information Technology – Security Techniques - Requirements for bodies providing audit and certification of information security management systems	ISO	http://www.iso27001security.com/html/27006.html http://www.standards.co.nz
ISO/IEC_27007:2011 Information Technology – Security Techniques - Guidelines for information security management systems auditing	ISO	http://www.iso27001security.com/html/27007.html http://www.standards.co.nz
NIST SP 800-37 Rev. 1, Feb 2010 Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach	NIST	http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-37r1.pdf
NIST SP 800-171 (Draft) Nov. 18, 2014 DRAFT Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations	NIST	http://csrc.nist.gov/publications/PublicationsDrafts.html#SP-800-171
Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach	NIST	http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-37r1.pdf

Mitre Engineering Guide - Create and Assess Certification and Accreditation Strategies	MITRE	http://www.mitre.org/publications/systems-engineering-guide/se-lifecycle-building-blocks/test-and-evaluation/create-and-assess-certification-and-accreditation-strategies
RAND National Defense Research Institute - Implications of Aggregated DoD Information Systems for Information Assurance Certification and Accreditation	RAND Corporation	http://www.rand.org/content/dam/rand/pubs/monographs/2010/RAND_MG951.pdf
An Introduction to Certification and Accreditation	SANS Institute	http://www.sans.org/reading-room/whitepapers/standards/introduction-certification-accreditation-1259
A Certification and Accreditation Plan for Information Systems Security Programs (Evaluating the Eff)	SANS Institute	http://www.sans.org/reading-room/whitepapers/basics/certification-accreditation-plan-information-systems-security-programs-evaluating-ef-597
Office of the Auditor-General - Managing conflicts of interest: Guidance for public entities	Office of the Auditor-General	http://www.oag.govt.nz/2007/conflicts-public-entities/docs/oag-conflicts-public-entities.pdf
Managing Conflict of Interest in the Public Service - OECD GUIDELINES AND COUNTRY EXPERIENCES	OECD	http://www.oecd.org/gov/ethics/48994419.pdf

System Certification and Accreditation Block Diagram



4.2. Conducting Certifications

OBJECTIVE

4.2.1. The security posture of the organisation has been incorporated into its system security design, controls are correctly implemented, are performing as intended and that changes and modifications are reviewed for any security impact or implications.

CONTEXT

Scope

4.2.2. This section covers information on the process of undertaking a certification as part of the accreditation process for a system.

Certification

4.2.3. Certification is the assertion that a given ICT system complies with minimum standards and the agreed design. It is based on a comprehensive evaluation and may involve:

- development and review of security documentation;
- a physical and technical review of the system and environment; and/or
- testing.

4.2.4. Certification is a prerequisite for accreditation. The Accreditation Authority for a specific system MUST NOT accredit that system until all relevant certifications have been provided.

Certification outcome

4.2.5. The outcome of certification is a certificate to the system owner acknowledging that the system has been appropriately audited and that the findings have been found to be of an acceptable standard.

Certification authorities

4.2.6. For all agency information systems the certification authority is the CISO unless otherwise delegated by the Agency Head.

4.2.7. For external organisations or service providers supporting agencies, the certification authority is the CISO of the agency.

4.2.8. For multi-national, multi-agency, and AoG systems the certification authority is determined by a formal agreement between the parties involved. Within NZ this is usually the lead agency.

REFERENCES

4.2.9. Additional information relating to system auditing is contained in:

Reference	Title	Source
ISO/IEC_27006:2011	Information Technology – Security Techniques - Requirements for bodies providing audit and certification of information security management systems.	http://www.iso27001security.com/html/27006.html http://www.standards.co.nz
ISO/IEC_27007:2011	Information Technology – Security Techniques - Guidelines for information security management systems auditing.	http://www.iso27001security.com/html/27007.html http://www.standards.co.nz

RATIONALE & CONTROLS

4.2.10. Certification Audit

4.2.10.R.01. Rationale

The purpose of a Certification Audit is to assess the actual implementation and effectiveness of controls for a system against the agency's risk profile, security posture, design specifications, agency policies and compliance with the NZISM.

4.2.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

All systems MUST undergo an audit as part of the certification process.

4.2.11. Certification decision

4.2.11.R.01. Rationale

To award certification for a system the certification authority will need to be satisfied that the selected controls are appropriate, are consistent with the NZISM, have been properly implemented and are operating effectively.

4.2.11.R.02. Rationale

Certification acknowledges only that controls were appropriate, properly implemented and are operating effectively. Certification does NOT imply that the residual security risk is acceptable or an approval to operate has been granted.

4.2.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The certification authority MUST accept that the controls are appropriate, effective and comply with the NZISM in order to award certification.

4.2.12. Residual security risk assessment

4.2.12.R.01. Rationale

The purpose of the residual security risk assessment is to assess the risks, controls and residual security risk relating to the operation of a system. In situations where the system is non-conformant, the system owner may have taken corrective actions. The residual risk may not be great enough to preclude a certification authority recommending to the Accreditation Authority that accreditation be awarded but the risk MUST be acknowledged and appropriate caveats documented.

4.2.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Following the audit, the certification authority SHOULD produce an assessment for the Accreditation Authority outlining the residual security risks relating to the operation of the system and a recommendation on whether to award accreditation or not.

4.3. Conducting Audits

OBJECTIVE

4.3.1. The effectiveness of information security measures for systems is periodically reviewed and validated.

CONTEXT

Scope

4.3.2. This section covers information on the process of undertaking a certification and accreditation audit.

Audit aim

4.3.3. The aim of an audit is to review and assess:

- the risk identification;
- design (including the system and security architectures);
- controls selection;
- actual implementation and effectiveness of controls for a system; and
- supporting information security documentation.

Audit outcome

4.3.4. The outcome of an audit is a report of compliance and control effectiveness for the certification authority outlining areas of non-compliance for a system and any suggested remediation actions.

Who can assist with an audit

4.3.5. A number of other agencies and personnel within agencies are often consulted during an audit. Agencies or personnel that can be consulted on physical security aspects of information security may include:

- GCSB for TOP SECRET sites and Sensitive Compartmented Information Facilities (SCIFs);
- MFAT for systems located at overseas posts and missions;
- The Departmental Security Officer (DSO) may be consulted on personnel and physical security aspects of information security;
- The CISO, ITSM or communications security officer may be consulted on COMSEC aspects of information security; and
- The ITSM and System Owner on aspects of secure system design configuration and operation.

Independent audits

4.3.6. An audit may be conducted by agency auditors or an independent security organisation.

RATIONALE & CONTROLS

4.3.7. Independence of auditors

4.3.7.R.01. Rationale

As there can be a perceived conflict of interest in the system owner assessing the security of their own system it is recommended that the auditor be demonstrably independent. This does not preclude an appropriately qualified system owner from assessing the security of a system that they are not responsible for.

4.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that auditors conducting audits are able to demonstrate independence and are not also the system owner or certification authority.

4.3.8. Audit preparation

4.3.8.R.01. Rationale

Ensuring that the system owner has approved the system architecture and associated information security documentation will assist auditors in determining the scope of work for the first stage of the audit.

4.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Prior to undertaking the audit the system owner MUST approve the system architecture and associated information security documentation.

4.3.9. Audit (first stage)

4.3.9.R.01. Rationale

The purpose of the first stage of the audit is to determine that the system and security architecture (including information security documentation) is based on sound information security principles and has addressed all applicable controls from this manual. During this stage the statement of applicability for the system will also be assessed along with any justification for non-compliance with applicable controls from this manual.

4.3.9.R.02. Rationale

Without implementing the controls for a system their effectiveness cannot be assessed during the second stage of the audit.

4.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The SRMP, SSP, SOPs and IRP MUST be reviewed by the auditor to ensure that it is comprehensive and appropriate for the environment the system is to operate within.

4.3.9.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

The System Security Policy (SSP) MUST be reviewed by the auditor to ensure that all relevant controls specified in this manual are addressed.

4.3.9.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The system and security architectures SHOULD be reviewed by the auditor to ensure that it is based on sound information security principles and meets information security requirements, including the NZISM.

4.3.9.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

The System Security Policy (SSP) SHOULD be reviewed by the auditor to ensure that policies have been developed or identified by the agency to protect classified information that is processed, stored or communicated by its systems.

4.3.9.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

The system owner SHOULD provide a statement of applicability for the system which includes the following topics:

- the baseline of this manual used for determining controls;
- controls that are, and are not, applicable to the system;
- controls that are applicable but are not being complied with; and
- any additional controls implemented as a result of the SRMP.

4.3.10. Implementing controls

4.3.10.R.01. Rationale

System testing is most effective on working systems. Desk checks have limited effectiveness in these situations.

4.3.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Prior to undertaking any system testing in support of the certification process, the system owner MUST implement the controls for the system.

4.3.11. Audit (second stage)

4.3.11.R.01. Rationale

The purpose of the second stage of the audit is to determine whether the controls, as approved by the system owner and reviewed during the first stage of the audit, have been implemented correctly and are operating effectively.

4.3.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The implementation of controls MUST be assessed to determine whether they have been implemented correctly and are operating effectively.

4.3.11.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

The auditor MUST ensure that, where applicable, a physical security certification has been awarded by an appropriate physical security certification authority.

4.3.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The physical security certification SHOULD be less than three (3) years old at the time of the audit.

4.3.12. Report of compliance

4.3.12.R.01. Rationale

The report of compliance assists the certification authority in conducting a residual security risk assessment to assess the residual security risk relating to the operation of a system following the audit and any remediation activities the system owner may have undertaken.

4.3.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The auditor MUST produce a report of compliance for the certification authority outlining areas of non-compliance for a system and any suggested remediation actions.

4.4. Accreditation Framework

OBJECTIVE

4.4.1. Accreditation is the formal authority for a system to operate, and an important element in fundamental information system governance. Accreditation requires risk identification and assessment, selection and implementation of baseline and other appropriate controls and the recognition and acceptance of residual risks relating to the operation of a system. Accreditation relies on the completion of system certification procedures.

CONTEXT

Scope

4.4.2. This section covers information on the accreditation framework for systems.

4.4.3. All types of government held information are covered including Official Information and information subject to privacy requirements.

RATIONALE & CONTROLS

4.4.4. Accreditation framework

4.4.4.R.01. Rationale

The development of an accreditation framework within the agency will ensure that accreditation activities are conducted in a repeatable and consistent manner across the agency and that consistency across government systems is maintained. This requirement is a fundamental part of a robust governance model and provides a sound process to demonstrate good governance of information systems.

4.4.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop an accreditation framework for their agency.

4.4.5. Accreditation

4.4.5.R.01. Rationale

Accreditation ensures that either sufficient security measures have been put in place to protect classified information that is processed, stored or communicated by the system or that deficiencies in such measures have been identified, assessed and acknowledged by an appropriate authority. As such, when systems are awarded accreditation the Accreditation Authority accepts that the residual security risks relating to the system are appropriate for the classification of the information that it processes, stores or communicates.

4.4.5.R.02. Rationale

Once systems have been accredited, conducting on-going monitoring activities will assist in assessing changes to its environment and operation and to determine the implications for the security risk profile and accreditation status of the system.

4.4.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that each of their systems is awarded accreditation.

4.4.5.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that that all systems are awarded accreditation before they are used operationally.

4.4.5.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that that all systems are awarded accreditation prior to connecting them to any other internal or external system.

4.4.5.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure information security monitoring, logging and auditing is conducted on all accredited systems.

4.4.6. Determining authorities

4.4.6.R.01. Rationale

Determining the certification and accreditation authorities for multi-national and multi-agency systems via a formal agreement between the parties will ensure that the system owner has appropriate points of contact and that risk is appropriately managed. See Section 5.3 – Conducting Accreditations.

4.4.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

For multi-national and multi-agency systems, the Certification and Accreditation Authorities SHOULD be determined by a formal agreement between the parties involved.

4.4.7. Notifying authorities

4.4.7.R.01. Rationale

In advising the certification and accreditation authorities of their intent to seek certification and accreditation for a system the system owner can seek information on the latest processes and requirements for their system.

4.4.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Prior to beginning the accreditation process the system owner SHOULD advise the certification and accreditation authorities of their intent to seek certification and accreditation for their system.

4.4.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD confirm governance arrangements with the certification, and with the accreditation authorities.

4.4.8. Due diligence

4.4.8.R.01. Rationale

When an agency is connecting a system to another party they need to be aware of the security measures the other party has implemented to protect their classified information. More importantly, the agency needs to know where the other party may have varied from controls in this manual. This is vital where different classification systems are applied, such as multi-national systems.

4.4.8.R.02. Rationale

Methods that an agency may use to ensure that other agencies and third parties comply with the agency's information security expectations include:

- assurance and confirmation that the certification and accreditation process described in the NZISM is adhered to;
- conducting an accreditation of the system being connected to; and/or
- seeking a copy of existing accreditation deliverables in order to make their own accreditation determination.

4.4.8.R.03. Rationale

Ultimately, the agency needs to accept any security risks associated with connecting their system to the other party's system. This includes the other party's system potentially being used as a platform to attack their system or "spilling" classified information requiring subsequent clean up processes.

4.4.8.R.04. Rationale

Special care **MUST** be taken for multi-national, multi-agency and all of government systems.

4.4.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Where an agency's system exchanges classified information with a third-party system, the agency **MUST** ensure that the receiving party has appropriate measures in place to provide a level of protection commensurate with the classification of their information and that the third party is authorised to receive classified information.

4.4.8.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

An agency **MUST** ensure that a third party is aware of the agency's information security expectations and national security requirements by defining expectations in documentation that includes, but is not limited to:

- contract provisions; or
- a memorandum of understanding.

4.4.8.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

An agency **MUST** ensure that a third party complies with the agency's information security expectations through a formal process providing assurance to agency management that the operation of information security within the third party meets, and continues to meet, these expectations.

4.4.8.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies **SHOULD** review accreditation deliverables when determining whether the receiving party has appropriate measures in place to provide a level of protection commensurate with the classification of their information.

4.4.9. Processing restrictions

4.4.9.R.01. Rationale

When security is applied to systems, protective measures are put in place based on the highest classification that will be processed, stored or communicated by the system. As such, any classified information placed on the system above the level for which it has been accredited will receive an inappropriate level of protection and could be exposed to a greater risk of compromise.

4.4.9.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST NOT**

Agencies MUST NOT allow a system to process, store or communicate classified information above the classification for which the system has received accreditation.

4.4.10. Accrediting systems bearing a caveat or compartment

4.4.10.R.01. Rationale

When processing caveated or compartmented information on a system, agencies need to ensure that the system has received accreditation for the information. Furthermore, when agencies are dealing with New Zealand Eyes Only (NZEO) information they need to be aware of the requirement for a New Zealand national to remain in control of the system and information at all times.

4.4.10.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

A system that processes, stores or communicates caveated or compartmented information MUST be accredited for such caveated or compartmented information by the GCSB.

4.4.11. Requirement for New Zealand control

4.4.11.R.01. Rationale

NZEO systems process, store and communicate information that is particularly sensitive to the government of New Zealand. It is, therefore, essential that control of such systems is maintained by New Zealand citizens working for the government of New Zealand.

4.4.11.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies MUST ensure that systems processing, storing or communicating NZEO information remain under the control of a New Zealand national working for the New Zealand government, at all times.

4.4.12. Reaccreditation

4.4.12.R.01. Rationale

Agencies should reaccredit their systems at least every two years; however, they can exercise an additional one year's grace if they follow the procedures in this manual for non-compliance with a 'SHOULD' requirement, namely conducting a comprehensive security risk assessment and obtaining sign-off by senior management.

4.4.12.R.02. Rationale

Accreditations should be commenced at least six months before due date to allow sufficient time for the certification and accreditations processes to be completed. Once three years has elapsed between accreditations, the authority to operate the system (the accreditation) will lapse and the agency will need to either reaccredit the system or request a dispensation to operate without accreditation. It should be noted that operating a system without accreditation is considered extremely risky. This will be exacerbated when multiple agency or all of government systems are involved.

4.4.12.R.03. Rationale

Additional reasons for conducting reaccreditation activities could include:

- changes in the agency's information security policies or security posture;
- detection of new or emerging threats to agency systems;
- the discovery that controls are not operating as effectively as planned;
- a major information security incident; and
- a significant change to systems, configuration or concept of operation for the accredited system.

4.4.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that the period between accreditations of each of their systems does not exceed three years.

4.4.12.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST notify associated agencies where multiple agencies are connected to agency systems operating with expired accreditations.

4.4.12.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST notify the Government CIO where all of government systems are connected to agency systems operating with expired accreditations.

4.4.12.C.04. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT operate a system without accreditation or with a lapsed accreditation unless the accreditation authority has granted a dispensation.

4.4.12.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that the period between accreditations of each of their systems does not exceed two years.

4.5. Conducting Accreditations

OBJECTIVE

4.5.1. As a governance good practice, systems are accredited before they are used operationally.

CONTEXT

Scope

4.5.2. This section covers information accreditation processes.

Accreditation aim

4.5.3. The aim of accreditation is to give formal recognition and acceptance of the residual security risk to a system and the classified information it processes, stores or communicates as part of the agency's governance arrangements.

Accreditation outcome

4.5.4. The outcome of accreditation is an approval to operate issued by the Accreditation Authority to the system owner.

Accreditation Authorities

4.5.5. For agencies the Accreditation Authority is the agency head or their delegate.

4.5.6. For organisations supporting agencies the Accreditation Authority is the head of the supported agency or their authorised delegate.

4.5.7. For multi-national and multi-agency systems the Accreditation Authority is determined by a formal agreement between the parties involved.

4.5.8. For agencies with systems that process, store or communicate caveated or compartmented information, the Director GCSB is the Accreditation Authority.

4.5.9. In all cases the Accreditation Authority will be at least a senior executive who has an appropriate level of understanding of the security risks they are accepting on behalf of the agency.

4.5.10. Depending on the circumstances and practices of an agency, the agency head could choose to delegate their authority to multiple senior executives who have the authority to accept security risks for the specific business functions within the agency, for example the CISO and the system owner.

4.5.11. More information on the delegation of the agency head's authority can be found in Section 3.1 - Agency Head.

Accreditation outcomes

4.5.12. Accreditation is awarded when the systems comply with the NZISM, the Accreditation Authority understands and accepts the residual security risk relating to the operation of the system and the Accreditation Authority gives formal approval for the system to operate.

4.5.13. In some cases the Accreditation Authority may not accept the residual security risk relating to the operation of the system. This outcome is predominately caused by security risks being insufficiently considered and documented within the SRMP resulting in an inaccurate scoping of security measures within the SecPlan. In such cases the Accreditation Authority may request that the SRMP and SecPlan be amended and security measures reassessed before accreditation is awarded.

4.5.14. In awarding accreditation for a system the Accreditation Authority may choose to define a reduced timeframe before reaccreditation, less than that specified in this manual, or place restrictions on the use of the system which are enforced until reaccreditation or until changes are made to the system within a specified timeframe.

Exception for undertaking certification

4.5.15. In exceptional circumstances the Accreditation Authority may elect not to have a certification conducted on a system before making an accreditation decision. The test to be satisfied in such circumstances is that if the system is not operated immediately it would have a devastating and potentially long lasting effect on the operations of the agency.

4.5.16. Certification MUST occur as soon as possible as this is an essential part of the governance and assurance mechanism.

RATIONALE & CONTROLS

4.5.17. Certification

4.5.17.R.01. Rationale

Certification is an essential component of the governance and assurance process and assists and supports risk management.

4.5.17.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

All systems MUST be certified as part of the accreditation process.

4.5.18. Accreditation decision

4.5.18.R.01. Rationale

In order to determine the agency's security posture, a system accreditation:

- examines the risks to systems identified in the certification process;
- reviews the controls applied to manage those risks; and then
- determines the acceptability of any residual risk.

4.5.18.R.02. Rationale

The accreditation process should also examine compliance with national policy, relevant international standards and good practice so that residual risk is managed prudently and pragmatically.

4.5.18.R.03. Rationale

It is especially important that all of government systems and effects on systems of other agencies are also considered in the examination of risk and determination of residual risk.

4.5.18.R.04. Rationale

To assist in making an accreditation decision the Accreditation Authority may choose to review:

- any interaction with systems of other agencies or all of government systems;
- the SRMP(s) for the system;
- compliance audit reports;
- the accreditation recommendation from the certification authority;
- supporting documentation for any decisions to be non-compliant with any controls specified in this manual; and
- any additional security risk reduction strategies that have been implemented.

4.5.18.R.05. Rationale

The Accreditation Authority may also choose to seek the assistance of one or more technical experts in understanding the technical components of information presented to them during the accreditation process to assist in making an informed accreditation decision.

4.5.18.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The Accreditation Authority MUST accept the residual security risk relating to the operation of a system in order to award accreditation.

4.5.18.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

The Accreditation Authority MUST advise other agencies where the accreditation decision may affect those agencies.

4.5.18.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

The Accreditation Authority MUST advise the Office of the Government CIO where the accreditation decision may affect those any all of government systems.

5. INFORMATION SECURITY DOCUMENTATION

5.1. Documentation Fundamentals

OBJECTIVE

5.1.1. Information security documentation is produced for systems, to support and demonstrate good governance.

CONTEXT

Scope

5.1.2. This section is an overview of the information security documentation that each agency will need to develop. More specific information on each document can be found in subsequent sections of this chapter.

5.1.3. While this section describes a number of different but essential documents, it may be more advantageous and efficient to provide agency wide documentation for some elements (for example Physical Security) which can then be re-used for all agency systems.

5.1.4. Similarly some consolidation may be appropriate, for example, SOPs IRPs and EPs can be combined into a single document.

Information Security Documentation

5.1.5. Information Security Documentation requirements are summarised in the table below.

Title	Abbreviation	Reference
Information Security Policy	SecPol	5.1.6
Security Risk Management Plan	SRMP	5.1.7
System Security Plan	SecPlan	5.1.8
Site Security Plan	SitePlan	8.2.7
Standard Operating Procedures	SOPs	5.1.9
Incident Response Plan	IRP	5.1.10
Emergency Procedures	EP	5.1.11

RATIONALE & CONTROLS

5.1.6. Information Security Policy (SecPol)

5.1.6.R.01. Rationale

The SecPol is an essential part of information security documentation as it outlines the high-level policy objectives. The SecPol can form part of the overall agency security policy.

5.1.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST have a SecPol for their agency. The SecPol is usually sponsored by the Chief Executive and managed by the CISO or Chief Information Officer (CIO). The ITSM should be the custodian of the SecPol. The SecPol should include an acceptable use policy for any agency technology equipment, systems, resources and data.

5.1.7. Security Risk Management Plan (SRMP)

5.1.7.R.01. Rationale

The SRMP is considered to be a best practice approach to identifying and reducing potential security risks. Depending on the documentation framework chosen, multiple systems can refer to, or build upon, a single SRMP.

5.1.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that every system is covered by a Security Risk Management Plan.

5.1.8. System Security Plan (SecPlan)

5.1.8.R.01. Rationale

The SecPlan describes the implementation and operation of controls within the system derived from the NZISM and the SRMP. Depending on the documentation framework chosen, some details common to multiple systems can be consolidated in a higher level SecPlan.

5.1.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that every system is covered by a SecPlan.

5.1.9. Standard Operating Procedures (SOPs)

5.1.9.R.01. Rationale

SOPs provide step-by-step guides to undertaking information security related tasks and processes. They provide assurance that tasks can be undertaken in a secure and repeatable manner, even by system users without strong technical knowledge of the system's mechanics. Depending on the documentation framework chosen, some procedures common to multiple systems could be consolidated into a higher level SOP.

5.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that Standard Operating Procedures (SOPs) are developed for systems.

5.1.10. Incident Response Plan (IRP)

5.1.10.R.01. Rationale

The purpose of developing an IRP is to ensure that information security incidents are appropriately managed. In most situations the aim of the response will be to contain the incident and prevent the information security incident from escalating. The preservation of any evidence relating to the information security incident for criminal, forensic and process improvement purposes is also an important consideration.

5.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop an Incident Response Plan and supporting procedures.

5.1.10.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agency personnel MUST be trained in, and exercise the Incident Response Plan.

5.1.11. Emergency Procedures

5.1.11.R.01. Rationale

Classified information and systems are secured if a building emergency or evacuation is required.

5.1.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD document procedures relating to securing classified information and systems when required to evacuate a facility in the event of an emergency.

5.1.12. Developing content

5.1.12.R.01. Rationale

Ensuring personnel developing information security documentation are sufficiently knowledgeable of information security issues and business requirements will assist in achieving the most useful and accurate set of documentation.

5.1.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that information security documentation is developed by personnel with a good understanding of policy requirements, the subject matter, essential processes and the agency's business.

5.1.13. Documentation content

5.1.13.R.01. Rationale

As the SRMP, SecPlan, SOPs and IRP are developed as a documentation suite for a system it is essential that they are logically connected and consistent within themselves and with other agency systems. Furthermore, each documentation suite developed for a system will need to be consistent with the agency's overarching SecPol.

5.1.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that their SRMP, SecPlan, SOPs and IRP are logically connected and consistent for each system, other agency systems and with the agency's SecPol.

5.1.14. Documentation framework

5.1.14.R.01. Rationale

The implementation of an overarching information security document framework ensures that all documentation is accounted for, complete and maintained appropriately. Furthermore, it can be used to describe linkages between documents, especially when higher level documents are used to avoid repetition of information in lower level documents.

5.1.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD create and maintain an overarching document describing the agency's documentation framework, including a complete listing of all information security documentation that shows a document hierarchy and defines how each document is related to the other.

5.1.14.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an agency lacks an existing, well-defined documentation framework, they SHOULD use the document names defined in this manual.

5.1.15. Documentation Consistency

5.1.15.R.01. Rationale

Consistency in approach, terminology and documentation simplifies the use and interpretation of documentation for different systems and agencies.

5.1.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an agency uses alternative documentation names to those defined within this manual for their information security documentation they SHOULD convert the documentation names to those used in this manual.

5.1.16. Documentation Classification

5.1.16.R.01. Rationale

Systems documentation will usually reflect the importance or sensitivity of particular systems.

5.1.16.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that their SecPol, SRMP, SecPlan, SOPs and IRP are appropriately classified.

5.1.17. Outsourcing development of content

5.1.17.R.01. Rationale

Agencies outsourcing the development of information security documentation need to be aware of the contents of the documentation produced. As such, they will still need to review and control the documentation contents to make sure it is appropriate and meets their requirements.

5.1.17.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

When information security documentation development is outsourced, agencies SHOULD:

- review the documents for suitability;
- retain control over the content; and
- ensure that all policy requirements are met.

5.1.18. Obtaining formal sign-off

5.1.18.R.01. Rationale

Without appropriate sign-off of information security documentation within an agency, the security personnel will have a reduced ability to ensure appropriate security procedures are selected and implemented. Having sign-off at an appropriate level assists in reducing this security risk as well as ensuring that senior management is aware of information security issues and security risks to the agency's business.

5.1.18.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

All information security documentation SHOULD be formally approved and signed off by a person with an appropriate level of seniority and authority.

5.1.18.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that:

- all high-level information security documentation is approved by the CISO and the agency head or their delegate, and
- all system-specific documents are reviewed by the ITSM and approved by the system owner.

5.1.19. Documentation Maintenance

5.1.19.R.01. Rationale

The threat environment and agencies' businesses are dynamic. If an agency fails to keep their information security documentation up to date to reflect the changing environment, they do not have a means of ascertaining that their security measures and processes continue to be effective.

5.1.19.R.02. Rationale

Changes to risk and technology may dictate a reprioritisation of resources in order to maximise the effectiveness of security measures and processes.

5.1.19.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop a regular schedule for reviewing all information security documentation.

5.1.19.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that information security documentation is reviewed:

- at least annually; or
- in response to significant changes in the environment, business or system; and
- with the date of the most recent review being recorded on each document.

5.2. Information Security Policies

OBJECTIVE

5.2.1. Information security policies (SecPol) set the strategic direction for information security.

CONTEXT

Scope

5.2.2. This section relates to the development of Information Security Policies and any supporting plans. Information relating to other mandatory documentation can be found in Section 5.1 - Documentation Fundamentals.

RATIONALE & CONTROLS

5.2.3. The Information Security Policy (SecPol)

5.2.3.R.01. Rationale

To provide consistency in approach and documentation, agencies should consider the following when developing their SecPol:

- policy objectives;
- how the policy objectives will be achieved;
- the guidelines and legal framework under which the policy will operate;
- stakeholders;
- education and training;
- what resourcing will be available to support the implementation of the policy;
- what performance measures will be established to ensure that the policy is being implemented effectively; and
- a review cycle.

5.2.3.R.02. Rationale

In developing the contents of the SecPol, agencies may also consult any agency-specific directives that are applicable to information security within their agency.

5.2.3.R.03. Rationale

Agencies should also avoid outlining controls for systems within their SecPol. The controls for a system will be determined by this manual and based on the scope of the system, along with any additional controls as determined by the SRMP, and documented within the SecPlan.

5.2.3.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The Information Security Policy (SecPol) SHOULD document the information security, guidelines, standards and responsibilities of an agency.

5.2.3.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The Information Security Policy (SecPol) SHOULD include topics such as:

- accreditation processes;
- personnel responsibilities;
- configuration control;
- access control;
- networking and connections with other systems;
- physical security and media control;
- emergency procedures and information security incident management;
- change management; and
- information security awareness and training.

5.3. Security Risk Management Plans

OBJECTIVE

5.3.1. Security Risk Management Plans (SRMP) identify security risks and appropriate treatment measures for systems.

CONTEXT

Scope

5.3.2. This section relates to the development of SRMPs, focusing on risks associated with the security of systems. Information relating to other mandatory documentation can be found in Section 5.1 - Documentation Fundamentals.

5.3.3. SRMPs may be developed on a functional basis, systems basis or project basis. For example, where physical elements will apply to all systems is use within that agency, a single SRMP covering all physical elements is acceptable. Generally each system will require a separate SRMP.

REFERENCES

5.3.4. Information on the development of SRMPs can be found in:

Title	Publisher	Source
ISO 27005:2011, Information Security Risk Management	Standards New Zealand	http://www.standards.co.nz
HB 436:2013, Risk Management Guidelines	Standards New Zealand	http://www.standards.co.nz
ISO 22301:2012, Business Continuity	Standards New Zealand	http://www.standards.co.nz

RATIONALE & CONTROLS

5.3.5. Agency and system specific security risks

5.3.5.R.01. Rationale

While a baseline of security risks with associated levels of security risk and corresponding risk treatments are provided in this manual, agencies will almost certainly have variations to those considered during the security risk assessment. Such variations could be in the form of differing risk sources and threats, assets and vulnerabilities, or exposure and severity. In such cases an agency will need to follow its own risk management procedures to determine its risk appetite and associated risk acceptance, risk avoidance and risk tolerance thresholds.

5.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD determine agency and system specific security risks that could warrant additional controls to those specified in this manual.

5.3.6. Contents of SRMPs

5.3.6.R.01. Rationale

Risks within an agency can be managed if they are not known, and if they are known, failing to treat or accept them is also a failure of risk management. For this reason SRMPs consist of two components, a security risk assessment and a corresponding treatment strategy.

5.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The Security Risk Management Plan SHOULD contain a security risk assessment and a corresponding treatment strategy.

5.3.7. Agency risk management

5.3.7.R.01. Rationale

If an agency fails to incorporate SRMPs for systems into their wider agency risk management plan then the agency will be unable to manage risks in a coordinated and consistent manner across the agency.

5.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD incorporate their SRMP into their wider agency risk management plan.

5.3.8. Risk Management standards

5.3.8.R.01. Rationale

For security risk management to be of true value to an agency there must be direct relevance to the specific circumstances of an agency and its systems, as well as being based on an industry recognised approach or risk management guidelines. For example, guidelines and standards produced by Standards New Zealand and the International Organization for Standardization.

5.3.8.R.02. Rationale

The International Organization for Standardization has developed an international risk management standard, including principles and guidelines on implementation, outlined in ISO 31000:2009, Risk Management – Principles and Guidance. The terms and definitions for this standard can be found in ISO/IEC Guide 73, Risk Management – Vocabulary – Guidelines. The ISO/IEC 2700x series of standards also provides guidance.

5.3.8.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD develop their SRMP in accordance with international standards for risk management.

5.4. System Security Plans

OBJECTIVE

5.4.1. System Security Plans (SecPlan) specify the information security measures for systems.

CONTEXT

Scope

5.4.2. This section relates to the development of SecPlans. Information relating to other mandatory documentation can be found in Section 5.1 - Documentation Fundamentals.

5.4.3. Further information to be included in SecPlans relating to specific functionality or technologies that could be implemented for a system can be found in the applicable areas of this manual.

Stakeholders

5.4.4. There can be many stakeholders involved in defining a SecPlan, including representatives from the:

- project, who **MUST** deliver the capability (including contractors);
- owners of the information to be handled;
- system users for whom the capability is being developed;
- management audit authority;
- CISO, ITSM and system owners;
- system certifiers and accreditors;
- information management planning areas; and
- infrastructure management.

RATIONALE & CONTROLS

5.4.5. Contents of SecPlans

5.4.5.R.01. Rationale

The NZISM provides a list of controls that are potentially applicable to a system based on its classification, its functionality and the technology it is implementing. Agencies will need to determine which controls are in scope of the system and translate those controls to the SecPlan. These controls will then be assessed on their implementation and effectiveness during an information security assessment as part of the accreditation process.

5.4.5.R.02. Rationale

In performing accreditations against the latest baseline of this manual, agencies are ensuring that they are taking the most recent threat environment into consideration. GCSB continually monitors the threat environment and conducts research into the security impact of emerging trends. With each release of this manual, controls can be added, rescinded or modified depending on changes in the threat environment.

5.4.5.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies **MUST** select controls from this manual to be included in the SecPlan based on the scope of the system with additional system specific controls being included as a result of the associated SRMP. Encryption Key Management requires specific consideration, refer to Chapter 17 – Cryptography.

5.4.5.C.02. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies **SHOULD** use the latest baseline of this manual when developing, and updating, their SecPlans as part of the certification, accreditation and reaccreditation of their systems.

5.4.5.C.03. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies **SHOULD** include a Key Management Plan in the SecPlan.

5.5. Standard Operating Procedures

OBJECTIVE

5.5.1. Standard Operating Procedures (SOPs) ensure security procedures are followed in an appropriate and repeatable manner.

CONTEXT

Scope

5.5.2. This section relates to the development of security related SOPs. Information relating to other mandatory documentation can be found in Section 5.1 - Documentation Fundamentals.

RATIONALE & CONTROLS

5.5.3. Development of SOPs

5.5.3.R.01. Rationale

In order to ensure that personnel undertake their duties in an appropriate manner, with a minimum of confusion, it is important that the roles of ITSMs, system administrators and system users are covered by SOPs. Furthermore, taking steps to ensure that SOPs are consistent with SecPlans will reduce the potential for confusion resulting from conflicts in policy and procedures.

5.5.3.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD develop SOPs for each of the following roles:

- ITSM;
- system administrator; and
- system user.

5.5.4. ITSM SOPs

5.5.4.R.01. Rationale

The ITSM SOPs are intended to cover the management and leadership of information security functions within the agency.

5.5.4.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

The following procedures SHOULD be documented in the ITSMs SOPs.

Topic	Procedures to be included
Access control	Authorising access rights to applications and data.
Asset Musters	Labelling, registering and mustering assets, including media.
Audit logs	Reviewing system audit trails and manual logs, particularly for privileged users.
Configuration control	Approving and releasing changes to the system software or configurations.
Information security incidents	Detecting, reporting and managing potential information security incidents.
	Establishing the cause of any information security incident, whether accidental or deliberate.
	Actions to be taken to recover and minimise the exposure from an information security incident.
	Additional actions to prevent reoccurrence.
Data transfers	Managing the review of media containing classified information that is to be transferred off-site.
	Managing the review of incoming media for malware or unapproved software.
IT equipment	Managing the disposal & destruction of unserviceable IT equipment and media.
System Patching	Advising and recommending system patches, updates and version changes based on security notices and related advisories.
System integrity audit	Reviewing system user accounts, system parameters and access controls to ensure that the system is secure.
	Checking the integrity of system software.
	Testing access controls.
System maintenance	Managing the ongoing security and functionality of system software, including: maintaining awareness of current software vulnerabilities, testing and applying software patches/updates/signatures, and applying appropriate hardening techniques.
User account management	Authorising new system users.

5.5.5. System Administrator SOPs

5.5.5.R.01. Rationale

The system administrator SOPs focus on the administrative activities related to system operations.

5.5.5.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

The following procedures SHOULD be documented in the system administrator’s SOPs.

Topic	Procedures to be included
Access control	Implementing access rights to applications and data.
Configuration control	Implementing changes to the system software or configurations.
System backup and recovery	Backing up data, including audit logs.
	Securing backup tapes.
	Recovering from system failures.
User account management	Adding and removing system users.
	Setting system user privileges.
	Cleaning up directories and files when a system user departs or changes roles.
Incident response	Detecting, reporting and managing potential information security incidents.
	Establishing the cause of any information security incident, whether accidental or deliberate.
	Actions to be taken to recover and minimise the exposure from information security incident.
	Additional actions to prevent reoccurrence.

5.5.6. System User SOPs

5.5.6.R.01. Rationale

The system user SOPs focus on day to day activities that system users need to be made aware of, and comply with, when using systems.

5.5.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The following procedures SHOULD be documented in the system user’s SOPs.

Topic	Procedures to be included
Acceptable Use	Acceptable uses of the system(s).
End of day	How to secure systems at the end of the day.
Information security incidents	What to do in the case of a suspected or actual information security incident.
Media control	Procedures for handling and using media.
Passwords	Choosing and protecting passwords.
Temporary absence	How to secure systems when temporarily absent.

5.5.7. Agreement to abide by SOPs

5.5.7.R.01. Rationale

When SOPs are produced the intended audience should be made aware of their existence and acknowledge that they have read, understood and agree to abide by their contents.

5.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

ITSMs, system administrators and system users SHOULD sign a statement that they have read and agree to abide by their respective SOPs.

5.6. Incident Response Plans

OBJECTIVE

5.6.1. Incident Response Plans (IRP) outline actions to take in response to an information security incident.

CONTEXT

Scope

5.6.2. This section relates to the development of IRPs to address information security, and not physical incidents within agencies. Information relating to other mandatory documentation can be found in Section 5.1 - Documentation Fundamentals.

RATIONALE & CONTROLS

5.6.3. Contents of IRPs

5.6.3.R.01. Rationale

The guidance provided on the content of IRPs will ensure that agencies have a baseline to develop an IRP with sufficient flexibility, scope and level of detail to address the majority of information security incidents that could arise.

5.6.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST include, as a minimum, the following content within their IRP:

- broad guidelines on what constitutes an information security incident;
- the minimum level of information security incident response and investigation training for system users and system administrators;
- the authority responsible for initiating investigations of an information security incident;
- the steps necessary to ensure the integrity of evidence supporting an information security incident;
- the steps necessary to ensure that critical systems remain operational;
- when and how to formally report information security incidents; and
- national policy requirements for incident reporting (see Chapter 7).

5.6.3.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD include the following content within their IRP:

- clear definitions of the types of information security incidents that are likely to be encountered;
- the expected response to each information security incident type;
- the authority within the agency that is responsible for responding to information security incidents;
- the criteria by which the responsible authority would initiate or request formal, police investigations of an information security incident;
- which other agencies or authorities need to be informed in the event of an investigation being undertaken; and
- the details of the system contingency measures or a reference to these details if they are located in a separate document.

5.7. Emergency Procedures

OBJECTIVE

5.7.1. Classified information and systems are secured before personnel evacuate a facility in the event of an emergency.

CONTEXT

Scope

5.7.2. This section covers information relating to the securing of classified information and systems as part of the procedures for evacuating a facility in the event of an emergency.

5.7.3. The safety of personnel is of paramount importance.

Exception for securing classified information and systems

5.7.4. Where in the opinion of the chief warden, the floor warden or is immediately obvious and where the securing of classified information and systems prior to the evacuation of a facility would lead to, or exacerbate, serious injury or loss of life to personnel, they may authorise the evacuation of the facility without personnel following the necessary procedures to secure classified information and systems.

RATIONALE & CONTROLS

5.7.5. Evacuating facilities

5.7.5.R.01. Rationale

During the evacuation of a facility it is important that personnel secure classified information and systems as they would at the end of operational hours. This includes, but is not limited to, securing media, logging off of workstations and securing safes and cabinets. This is important as an attacker could use such an opportunity to gain access to applications or databases that a system user had already authenticated to or use another system user's credentials for a malicious purpose.

5.7.5.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies **MUST** include in procedures for personnel evacuating a facility the requirement to secure classified information and systems prior to the evacuation.

6. INFORMATION SECURITY MONITORING

6.1. Information Security Reviews

OBJECTIVE

6.1.1. Information security reviews maintain the security of systems and detect gaps and deficiencies.

CONTEXT

Scope

6.1.2. This section covers information on conducting reviews of any agency's information security posture and security implementation.

Information security reviews

6.1.3. An information security review:

- identifies any changes to the business requirements or concept of operation for the subject of the review;
- identifies any changes to the security risks faced by the subject of the review;
- assesses the effectiveness of the existing counter-measures;
- validates the implementation of controls and counter-measures; and
- reports on any changes necessary to maintain an effective security posture.

6.1.4. An information security review can be scoped to cover anything from a single system to an entire agency's systems.

REFERENCES

6.1.5. Additional information relating to system auditing is contained in:

Reference	Title	Source
ISO/IEC_27006:2011	Information Technology – Security Techniques - Requirements for bodies providing audit and certification of information security management systems.	http://www.iso27001security.com/html/27006.html http://www.standards.co.nz
ISO/IEC_27007:2011	Information Technology – Security Techniques - Guidelines for information security management systems auditing.	http://www.iso27001security.com/html/27007.html http://www.standards.co.nz
ISO/IEC_27008:2011	Information Technology – Security Techniques - Guidelines for Auditors on information security controls.	http://www.iso27001security.com/html/27008.html http://www.standards.co.nz

RATIONALE & CONTROLS

6.1.6. Conducting information security reviews

6.1.6.R.01. Rationale

Annual reviews of an agency's information security posture can assist with ensuring that agencies are responding to the latest threats, environmental changes and that systems are properly configured in accordance with any changes to information security documentation and guidance.

6.1.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD undertake and document information security reviews of their systems at least annually.

6.1.7. Managing Conflicts of Interest

6.1.7.R.01. Rationale

Reviews may be undertaken by personnel independent of the target of evaluation or by an independent third party to ensure that there is no (perceived or actual) conflict of interest and that an information security review is undertaken in an objective manner.

6.1.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD have information security reviews conducted by personnel independent to the target of the review or by an independent third party.

6.1.8. Focus of information security reviews

6.1.8.R.01. Rationale

Incidents, significant changes or an aggregation of minor changes may require a security review to determine and support any necessary changes and to demonstrate good systems governance. An agency may choose to undertake an information security review:

- as a result of a specific information security incident;
- because a change to a system or its environment that significantly impacts on the agreed and implemented system architecture and information security policy; or
- as part of a regular scheduled review.

6.1.8.R.02. Rationale

In order to review risk, an information security review should analyse the threat environment and the highest classification of information that is stored, processed or communicated by that system.

6.1.8.R.03. Rationale

Depending on the scope and subject of the information security review, agencies may gather information on areas including:

- agency priorities, business requirements and/or concept of operations;
- threat data;
- risk likelihood and consequence estimates;
- effectiveness of existing counter-measures;
- other possible counter-measures;
- changes to standards, policies and guidelines;
- recommended good practices; and
- significant system incidents and changes.

6.1.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD review the components detailed in the table below.

Component	Review
Information security documentation	The SecPol, SRMPs, SecPlans, SitePlan, SOPs and the IRP.
Dispensations	Prior to the identified expiry date.
Operating environment	When an identified threat emerges or changes, an agency gains or loses a function or the operation of functions are moved to a new physical environment.
Procedures	After an information security incident or test exercise.
System security	Items that could affect the security of the system on a regular basis.
Threats	Changes in threat environment and risk profile.
NZISM	Changes to baseline or other controls

6.2. Vulnerability Analysis

OBJECTIVE

6.2.1. Exploitable information system weaknesses can be identified by vulnerability analyses and inform risks to systems.

CONTEXT

Scope

6.2.2. This section covers information on conducting vulnerability assessments on systems as part of the suite of good IT governance activities.

Changes as a result of a vulnerability analysis

6.2.3. It is important that normal change management processes are followed where changes are necessary in order to address security risks identified in a vulnerability analysis.

RATIONALE & CONTROLS

6.2.4. Vulnerability analysis strategy

6.2.4.R.01. Rationale

Vulnerabilities may be unintentionally introduced and new vulnerabilities are constantly identified, presenting ongoing risks to information systems security.

6.2.4.R.02. Rationale

While agencies are encouraged to monitor the public domain for information related to vulnerabilities that could affect their systems, they should not remain complacent if no specific vulnerabilities relating to deployed products are disclosed.

6.2.4.R.03. Rationale

In some cases, vulnerabilities can be introduced as a result of poor information security practices or accidental activities within an agency. As such, even if no new public domain vulnerabilities in deployed products have been disclosed, there is still value to be gained from regular vulnerability analysis activities.

6.2.4.R.04. Rationale

Furthermore, monitoring vulnerabilities, conducting analysis and being aware of industry and product changes and advances, including NZISM requirements, provides an awareness of other changes which may adversely impact the security risk profile of the agency's systems.

6.2.4.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD implement a vulnerability analysis strategy by:

- monitoring public domain information about new vulnerabilities in operating systems and application software;
- considering the use of automated tools to perform vulnerability assessments on systems in a controlled manner;
- running manual checks against system configurations to ensure that only allowed services are active and that disallowed services are prevented;
- using security checklists for operating systems and common applications; and
- examining any significant incidents on the agency's systems.

6.2.5. Conducting vulnerability assessments

6.2.5.R.01. Rationale

A baseline or known point of origin is the basis of any comparison and allows measurement of changes and improvements when further information security monitoring activities are conducted.

6.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD conduct vulnerability assessments in order to establish a baseline:

- before a system is first used;
- after any significant incident;
- after a significant change to the system;
- after changes to standards, policies and guidelines; and/or
- as specified by an ITSM or the system owner.

6.2.6. Resolving vulnerabilities

6.2.6.R.01. Rationale

Vulnerabilities may occur as a result of poorly designed or implemented information security practices, accidental activities or malicious activities, and not just as the result of a technical issue.

6.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD analyse and treat all vulnerabilities and subsequent security risks to their systems identified during a vulnerability assessment.

6.3. Change Management

OBJECTIVE

6.3.1. To ensure information security is an integral part of the change management process, it should be incorporated into the agency's IT governance and management activities.

CONTEXT

Scope

6.3.2. This section covers information on identifying and managing routine and urgent changes to systems.

Identifying the need for change

6.3.3. The need for change can be identified in various ways, including:

- system users identifying problems or enhancements;
- vendors notifying of upgrades to software or IT equipment;
- vendors notifying of the end of life to software or IT equipment;
- advances in technology in general;
- implementing new systems that necessitate changes to existing systems;
- identifying new tasks requiring updates or new systems;
- organisational change;
- business process or concept of operation change;
- standards evolution;
- government policy or Cabinet directives;
- threat or vulnerability notification; and
- other incidents or continuous improvement activities.

Types of system change

6.3.4. A proposed change to a system could involve:

- an upgrade to, or introduction of, IT equipment;
- an upgrade to, or introduction of, software;
- environment or infrastructure change; or
- major changes to access controls.

RATIONALE & CONTROLS

6.3.5. Change management

6.3.5.R.01. Rationale

A considered and accountable process requires consultation with all stakeholders before any changes are implemented. In the case of changes that will affect the security or accreditation status of a system, the Accreditation Authority is a key stakeholder and will need to be consulted and grant approval for the proposed changes.

6.3.5.R.02. Rationale

Change management processes are most likely to be bypassed or ignored when an urgent change needs to be made to a system. In these cases it is essential that the agency's change management process strongly enforces appropriate actions to be taken before and after an urgent change is implemented.

6.3.5.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST ensure that for routine and urgent changes:

- the change management process, as defined in the relevant information security documentation, is followed;
- the proposed change is approved by the relevant authority;
- any proposed change that could impact the security or accreditation status of a system is submitted to the Accreditation Authority for approval; and
- all associated information security documentation is updated to reflect the change.

6.3.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that for routine and urgent changes:

- the change management process, as defined in the relevant information security documentation, is followed;
- the proposed change is approved by the relevant authority;
- any proposed change that could impact the security of a system or accreditation status is submitted to the Accreditation Authority for approval; and
- all associated information security documentation is updated to reflect the change.

6.3.6. Change management process

6.3.6.R.01. Rationale

Uncontrolled changes pose risks to information systems as well as the potential to cause operational disruptions. A change management process is fundamental to ensure a considered and accountable approach with appropriate approvals. Furthermore, the change management process provides an opportunity for the security impact of the change to be considered and if necessary, reaccreditation processes initiated.

6.3.6.C.01. Control: System Classification(s): TS; Compliance: MUST

An agency's change management process MUST define appropriate actions to be followed before and after urgent changes are implemented.

6.3.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

An agency's change management process SHOULD define appropriate actions to be followed before and after urgent changes are implemented.

6.3.6.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD follow this change management process outline:

- produce a written change request;
- submit the change request to all stakeholders for approval;
- document the changes to be implemented;
- test the approved changes;
- notification to user of the change schedule and likely effect or outage;
- implement the approved changes after successful testing;
- update the relevant information security documentation including the SRMP, SecPlan and SOPs
- notify and educate system users of the changes that have been implemented as close as possible to the time the change is applied; and
- continually educate system users in regards to changes.

6.3.7. Changes impacting the security of a system

6.3.7.R.01. Rationale

The accreditation of a system accepts residual security risk relating to the operation of that system. Changes may impact the overall security risk for the system. It is essential that the Accreditation Authority is consulted and accepts the changes and any changes to risk.

6.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

When a configuration change impacts the security of a system and is subsequently assessed as having changed the overall security risk for the system, the agency MUST reaccredit the system.

6.4. Business Continuity and Disaster Recovery

OBJECTIVE

6.4.1. To ensure business continuity and disaster recovery processes are established to assist in meeting the agency's business requirements, minimise any disruption to the availability of information and systems, and assist recoverability.

CONTEXT

Scope

6.4.2. This section covers information on business continuity and disaster recovery relating specifically to systems.

REFERENCES

6.4.3. Additional information relating to business continuity is contained in:

Reference	Title	Source
ISO/IEC_22301:2012	Societal Security – Business Continuity Management Systems - Requirements.	http://www.iso.org http://www.standards.co.nz
ISO/IEC 27001:2013	Information Technology – Security Techniques - Information Security Management Systems - Requirements	http://www.iso27001security.com/html/27001.html http://www.standards.co.nz
SAA/SNZ HB 221:2004	Business Continuity Management.	http://www.standards.co.nz
ISO/IEC_27002:2013	Information Technology – Security Techniques – Code of Practice for Information Security Controls	http://www.iso27001security.com/html/27002.html http://www.standards.co.nz
ISO/IEC_27005:2011	Information Technology – Security Techniques - Information Security Risk Management	http://www.iso27001security.com/html/27005.html http://www.standards.co.nz
ISO/IEC_27031:2011	Information Technology – Security Techniques - Guidelines for Information and Communication Technology readiness for Business Continuity	http://www.iso27001security.com/html/27031.html http://www.standards.co.nz

RATIONALE & CONTROLS

6.4.4. Availability requirements

6.4.4.R.01. Rationale

Availability and recovery requirements will vary based on each agency's business needs and are likely to be widely variable across government. Agencies will determine their own availability and recovery requirements and implement appropriate measures to achieve them as part of their risk management and governance processes.

6.4.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST determine availability and recovery requirements for their systems and implement appropriate measures to support them.

6.4.5. Backup strategy

6.4.5.R.01. Rationale

Having a backup strategy in place is a fundamental part of business continuity planning. The backup strategy ensures that critical business information is recoverable if lost. Vital records are defined as any information, systems data, configurations or equipment requirements necessary to restore normal operations.

6.4.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- Identify vital records;
- backup all vital records;
- store backups of critical information, with associated documented recovery procedures, at a remote location secured in accordance with the requirements for the highest classification of the information; and
- test backup and restoration processes regularly to confirm their effectiveness.

6.4.6. Business Continuity plan

6.4.6.R.01. Rationale

It is important to develop a business continuity plan to assist in ensuring that critical systems and data functions can be maintained when the system is operating under constraint, for example, when bandwidth is limited.

6.4.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop and document a business continuity plan.

6.4.7. Disaster recovery plan

6.4.7.R.01. Rationale

Developing and documenting a disaster recovery plan will reduce the time between a disaster occurring and critical functions of systems being restored.

6.4.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop and document a disaster recovery plan.

7. INFORMATION SECURITY INCIDENTS

7.1. Detecting Information Security Incidents

OBJECTIVE

7.1.1. To ensure that appropriate tools, processes and procedures are implemented to detect information security incidents, to minimise impact and as part of the suite of good IT governance activities.

CONTEXT

Scope

7.1.2. This section covers information relating to detecting information security incidents. Detecting physical and personnel security incidents is out of scope of this section.

7.1.3. Additional information relating to detecting information security incidents, and topics covered in this section, can be found in the following sections of this manual:

- Section 6.1 - Information Security Reviews;
- Section 6.2 - Vulnerability Analysis;
- Section 9.1 - Information Security Awareness and Training;
- Section 16.5 - Event Logging and Auditing; and
- Section 18.4 - Intrusion Detection and Prevention.

RATIONALE & CONTROLS

7.1.4. Preventing and detecting information security incidents

7.1.4.R.01. Rationale

Processes for the detection of information security incidents will assist in mitigating the most common vectors used to exploit systems.

7.1.4.R.02. Rationale

Many potential information security incidents are noticed by personnel rather than automated or other software tools. Personnel should be well trained and aware of information security issues and indicators of possible information security incidents.

7.1.4.R.03. Rationale

Agencies may consider some of the tools described in the table below for detecting potential information security incidents.

Tool	Description
Network and host Intrusion Detection Systems (IDSs)	Monitor and analyse network and host activity, usually relying on a list of known attack signatures to recognise/detect malicious activity and potential information security incidents.
Anomaly detection systems	Monitor network and host activities that do not conform to normal system activity.
Intrusion Prevention Systems (IPS) and Host Based Intrusion Prevention Systems (HIPS)	Some IDSs are combined with functionality to counter detected attacks or anomalous activity (IDS/IPS).
System integrity verification and integrity checking	Used to detect changes to critical system components such as files, directories or services. These changes may alert a system administrator to unauthorised changes that could signify an attack on the system and inadvertent system changes that render the system open to attack.
Log analysis	Involves collecting and analysing event logs using pattern recognition to detect anomalous activities.
White Listing	Lists the authorised activities and applications and permits their usage.
Black Listing	Lists the non-authorised activities and applications and prevents their usage.
Data Loss Prevention (DLP)	Data Egress monitoring and control.

7.1.4.R.04. Rationale

Automated tools are only as good as the level of analysis they perform. If tools are not configured to assess all areas of potential security risk then some vulnerabilities will not be detected. In addition, if tools are not regularly updated, including updates for new vulnerabilities and attack methods, their effectiveness will be reduced.

7.1.4.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies **MUST** develop, implement and maintain tools and procedures covering the detection of potential information security incidents, incorporating:

- counter-measures against malicious code;
- intrusion detection strategies;
- data egress monitoring & control;
- audit analysis;
- system integrity checking; and
- vulnerability assessments.

7.1.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies **SHOULD** develop, implement and maintain tools and procedures covering the detection of potential information security incidents, incorporating:

- counter-measures against malicious code;
- intrusion detection strategies;
- data egress monitoring & control;
- audit analysis;
- system integrity checking; and
- vulnerability assessments.

7.1.4.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies **SHOULD** use the results of the security risk assessment to determine the appropriate balance of resources allocated to prevention versus detection of information security incidents.

7.2. Reporting Information Security Incidents

OBJECTIVE

7.2.1. Reporting information security incidents, assists in maintaining an accurate threat environment picture for government systems, particularly all of government or multi-agency systems.

CONTEXT

Scope

7.2.2. This section covers information relating specifically to the reporting of information security incidents. It does not cover the reporting of physical or personnel security incidents.

Information security incidents and outsourcing

7.2.3. The requirement to lodge a information security incident report still applies when an agency has outsourced some or all of its information technology functions and services.

Categories of information security incidents

7.2.4. Incident categories, incident types and resolution types are defined in the Incident Object Description Exchange Format (IODEF) standard. IODEF is currently a recommended e-GIF standard.

REFERENCES

7.2.5. Additional information relating to information security incidents is contained in:

Title	Publisher	Source
The Incident Object Description Exchange Format, RFC 5070, December 2007	The Internet Engineering Taskforce	http://www.ietf.org/rfc/rfc5070.txt
Expert Review for Incident Object Description Exchange Format (IODEF) Extensions in IANA XML Registry, ISSN: 2070-1721, RFC 6685, July 2012	IETF	http://tools.ietf.org/html/rfc6685
Detect, SHARE, Protect Solutions for Improving Threat Data Exchange among CERTs, October 2013	ENISA	http://www.enisa.europa.eu/activities/cert/support/data-sharing/detect-share-protect-solutions-for-improving-threat-data-exchange-among-certs
Computer Security Incident Handling Guide, Special Publication 800-61: Revision 2, August 2012	NIST	http://www.csrc.nist.gov/publications/nistpubs/800-61rev2/SP800-61rev2.pdf
NIST Special Publication 800-60 Volume I Revision 1, Guide for Mapping Types of Information and Information Systems to Security Categories	NIST	http://www.csrc.nist.gov/publications/nistpubs/800-60-rev1/SP800-60_Vol1-Rev1.pdf
NIST Special Publication 800-60 Volume II Revision 1, Guide for Mapping Types of Information and Information Systems to Security Categories, Volume II: Appendices	NIST	http://www.csrc.nist.gov/publications/nistpubs/800-60-rev1/SP800-60_Vol2-Rev1.pdf
The National Cyber Security Centre Voluntary Cyber Security Standards for Industrial Control Systems v1.0	GCSB NCSC	http://www.gcsb.govt.nz/newsroom/reports-publications.html http://www.ncsc.govt.nz/resources/
The New Zealand Security Incident Management Guide for Computer Security Incident Response Teams (CIRSTs)	NCSC	http://www.ncsc.govt.nz/resources/

RATIONALE & CONTROLS

7.2.6. Reporting information security incidents

7.2.6.R.01. Rationale

Reporting information security incidents provides management with a means to assess and minimise damage to a system and to take remedial actions. Incidents should be reported to an ITSM, as soon as possible who may seek advice from GCSB, if necessary.

7.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST direct personnel to report information security incidents to an ITSM as soon as possible after the information security incident is discovered in accordance with agency procedures.

7.2.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- encourage personnel to note and report any observed or suspected security weaknesses in, or threats to, systems or services;
- establish and follow procedures for reporting software malfunctions;
- put mechanisms in place to enable the types, volumes and costs of information security incidents and malfunctions to be quantified and monitored; and
- deal with the violation of agency information security policies and procedures by personnel through a formal disciplinary process.

7.2.7. Responsibilities when reporting an information security incident

7.2.7.R.01. Rationale

The CISO is required to keep the Agency Head informed of information security incidents within their agency. The ITSM actively manages information security incidents and MUST ensure the CISO has sufficient awareness of and information on any information security incidents within an agency.

7.2.7.R.02. Rationale

Reporting on low-level incidents can be adequately managed through periodic (at least monthly) reports. Serious incidents will require more immediate attention.

7.2.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The ITSM MUST keep the CISO fully informed of information security incidents within an agency.

7.2.8. Reporting significant information security incidents to National Cyber Security Centre (NCSC)

7.2.8.R.01. Rationale

The NCSC uses significant information security incident reports as the basis for identifying and responding to information security events across government. Reports are also used to develop new policy, procedures, techniques and training measures to prevent the recurrence of similar information security incidents across government.

7.2.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The Agency ITSM, MUST report significant information security incidents, or incidents related to multi-agency or government systems, to the NCSC (see 7.2.10 below).

7.2.9. Reporting non-significant information security incidents to National Cyber Security Centre (NCSC)

7.2.9.R.01. Rationale

The NCSC uses non-significant information security incident reports as the basis for identifying trends in information security incident occurrences and for developing new policy, procedures, techniques and training measures to prevent the recurrence of similar information security incidents across government.

7.2.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD, through an ITSM, report non-significant information security incidents to the NCSC.

7.2.10. How to report information security incidents to National Cyber Security Centre (NCSC)

7.2.10.R.01. Rationale

Reporting of information security incidents to the NCSC through the appropriate channels ensures that appropriate and timely assistance can be provided to the agency. In addition, it allows the NCSC to maintain an accurate threat environment picture for government systems.

7.2.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD formally report information security incidents using the New Zealand e-GIF adoption of the IODEF standard.

7.2.11. Outsourcing and information security incidents

7.2.11.R.01. Rationale

In the case of outsourcing of information technology services and functions, the agency is still responsible for the reporting of all information security incidents. As such, the agency **MUST** ensure that the service provider informs them of all information security incidents to allow them to formally report these to the NCSC.

7.2.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies that outsource their information technology services and functions **MUST** ensure that the service provider consults with the agency when an information security incident occurs.

7.2.12. Cryptographic keying material

7.2.12.R.01. Rationale

Reporting any information security incident involving the loss or misuse of cryptographic keying material is particularly important. Systems users in this situation are those that rely on the use of cryptographic keying material for the confidentiality and integrity of their secure communications.

7.2.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies **MUST** notify all system users of any suspected loss or compromise of keying material.

7.2.13. High Grade Cryptographic Equipment (HGCE) keying material

7.2.13.R.01. Rationale

For information security incidents involving the suspected loss or compromise of HGCE keying material, GCSB will investigate the possibility of compromise, and where possible, initiate action to reduce the impact of the compromise.

7.2.13.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies **MUST** notify GCSB of any suspected loss or compromise of keying material associated with HGCE.

7.3. Managing Information Security Incidents

OBJECTIVE

7.3.1. To identify and implement processes for incident analysis and selection of appropriate remedies which will assist in preventing future information security incidents.

CONTEXT

Scope

7.3.2. This section covers information relating primarily to managing information security incidents. The management of physical and personnel security incidents is considered to be out of scope unless it directly impacts on the protection of systems (e.g. the breaching of physical protection for a server room).

REFERENCES

7.3.3. Additional information relating to the management of ICT evidence is contained in:

Reference	Title	Source
ISO/IEC_27037	Information Technology – Security Techniques – Guidelines for identification, collection, acquisition and preservation of digital evidence.	http://www.iso27001security.com/html/27037.html http://www.standards.co.nz
HB 171:2003	Guidelines for the Management of Information Technology Evidence	http://www.standards.co.nz
	The New Zealand Security Incident Management Guide for Computer Security Incident Response Teams (CIRSTs)	http://www.ncsc.govt.nz/resources/

RATIONALE & CONTROLS

7.3.4. Information security incident management documentation

7.3.4.R.01. Rationale

Ensuring responsibilities and procedures for information security incidents are documented in relevant SecPlan, SOPs and IRP will ensure that when a information security incident does occur, agency personnel can respond in an appropriate manner. In addition, ensuring that system users are aware of reporting procedures will assist in identifying any information security incidents that an ITSM, or system owner fail to notice.

7.3.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST detail information security incident responsibilities and procedures for each system in the relevant SecPlan, SOPs and IRP.

7.3.5. Recording information security incidents

7.3.5.R.01. Rationale

The purpose of recording information security incidents within a register is to highlight the nature and frequency of information security incidents so that corrective action can be taken. This information can subsequently be used as an input into future security risk assessments of systems.

7.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST follow the NZ implementation of the IODEF Standard (an e-GIF Standard) and SHOULD include the following information in their register:

- the date the information security incident was discovered;
- the date the information security incident occurred;
- a description of the information security incident, including the personnel, systems and locations involved;
- the action taken;
- to whom the information security incident was reported; and
- the file reference.

7.3.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that all information security incidents are recorded in a register.

7.3.5.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use their register as a reference for future security risk assessments.

7.3.6. Handling data spills

7.3.6.R.01. Rationale

A data spill is defined as the unauthorised or unintentional release, transmission or transfer of data. If there is a possibility that classified information may be compromised as a result of an information security incident, agencies MUST be able to respond in a timely fashion to limit damage and contain the incident.

7.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST implement procedures and processes to detect data spills.

7.3.6.C.02. Control: System Classification(s): All Classifications; Compliance: MUST
When a data spill occurs agencies MUST assume that data at the highest classification held on or processed by the system, has been compromised.

7.3.6.C.03. Control: System Classification(s): All Classifications; Compliance: MUST
Agency SOPs MUST include procedure for:

- all personnel with access to systems;
- notification to the ITSM of any data spillage; and
- notification to the ITSM of access to any data which they are not authorised to access.

7.3.6.C.04. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST document procedures for dealing with data spills in their IRP.

7.3.6.C.05. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST treat any data spill as an information security incident and follow the IRP to deal with it.

7.3.6.C.06. Control: System Classification(s): All Classifications; Compliance: MUST
When a data spill occurs agencies MUST report the details of the data spill to the information owner.

7.3.7. Containing data spills

7.3.7.R.01. Rationale

The spillage of classified information onto a system not accredited to handle the information is considered a significant information security incident.

7.3.7.R.02. Rationale

Isolation may include disconnection from other systems and any external connections. In some cases system isolation may not be possible for architectural or operational reasons.

7.3.7.R.03. Rationale

Segregation may be achieved by isolation, enforcing separation of key elements of a virtual system, removing network connectivity to the relevant device or applying access controls to prevent or limit access.

7.3.7.R.04. Rationale

It is important to note that powering off a system can destroy information that may be useful in forensics analysis or other investigative work.

7.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

When classified information is introduced onto a system not accredited to handle the information, the following actions MUST be followed:

1. Immediately seek the advice of an ITSM;
2. Segregate or isolate the affected system and/or data spill;
3. Personnel MUST NOT delete the higher classified information unless specifically authorised by an ITSM.

7.3.7.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

When classified information is introduced onto a system not accredited to handle the information, personnel MUST NOT copy, view, print or email the information.

7.3.7.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

When a data spill occurs and systems cannot be *segregated* or *isolated* agencies SHOULD *immediately* contact the GCSB for further advice.

7.3.8. Handling malicious code infection

7.3.8.R.01. Rationale

The guidance for handling malicious code infections is provided to assist in preventing the spread of the infection and to prevent reinfection. Important details include:

- the infection date of the machine;
- the possibility that system records and logs could be compromised; and
- the period of infection.

7.3.8.R.02. Rationale

A complete operating system reinstallation, or an extensive comparison of checksums or other characterisation information, is the only reliable way to ensure that malicious code is eradicated.

7.3.8.R.03. Rationale

Agencies SHOULD be aware that some malicious code infections may be categorised as Advanced Persistent Threats (APTs) which may have been present for some time before detection. Specialist assistance may be required to deal with APTs.

7.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD follow the steps described below when malicious code is detected:

- isolate the infected system;
- decide whether to request assistance from GCSB;
- if such assistance is requested and agreed to, delay any further action until advised by GCSB;
- scan all previously connected systems and any media used within a set period leading up to the information security incident, for malicious code;
- isolate all infected systems and media to prevent reinfection;
- change all passwords and key material stored or potentially accessed from compromised systems, including any websites with password controlled access;
- advise system users of any relevant aspects of the compromise, including a recommendation to change all passwords on compromised systems;
- use up-to-date antivirus software to remove the infection from the systems or media;
- monitor network traffic for malicious activity;
- report the information security incident and perform any other activities specified in the IRP; and
- in the worst case scenario, rebuild and reinitialise the system.

7.3.9. Allowing continued attacks**7.3.9.R.01. Rationale**

Agencies allowing an attacker to continue an attack against a system to seek further information or evidence will need to establish with their legal advisor(s) whether the actions are breaching the Telecommunications (Interception Capability and Security) Act 2013.

7.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies considering allowing an attacker to continue some actions under controlled conditions for the purpose of seeking further information or evidence SHOULD seek legal advice.

7.3.10. Integrity of evidence

7.3.10.R.01. Rationale

While gathering evidence it is important to maintain the integrity of the information and the chain of evidence. Even though in most cases an investigation does not directly lead to a police prosecution, it is important that the integrity of evidence such as manual logs, automatic audit trails and intrusion detection tool outputs be protected.

7.3.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- transfer a copy of raw audit trails and other relevant data onto media for secure archiving, as well as securing manual log records for retention; and
- ensure that all personnel involved in the investigation maintain a record of actions undertaken to support the investigation.

7.3.11. Seeking assistance

7.3.11.R.01. Rationale

If the integrity of evidence relating to an information security incident is compromised, it reduces GCSB's ability to assist agencies. As such, GCSB requests that no actions which could affect the integrity of the evidence are carried out prior to GCSB's involvement.

7.3.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that any requests for GCSB assistance are made as soon as possible after the information security incident is detected and that no actions which could affect the integrity of the evidence are carried out prior to GCSB's involvement.

8. PHYSICAL SECURITY

8.1. Facilities

OBJECTIVE

8.1.1. Physical security measures are applied to facilities protect systems and their infrastructure.

CONTEXT

Scope

8.1.2. This section covers information on the physical security of facilities. Information on physical security controls for servers and network devices, network infrastructure and IT equipment can be found in the following sections of this chapter.

Physical security requirements for storing classified information

8.1.3. Many of the physical controls in this manual are derived from the physical security protocol of the Protective Security Manual (PSM). In particular from the minimum standard for security containers, secure rooms or lockable commercial cabinets needed for storing classified information.

Secured and unsecured spaces

8.1.4. In the context of this manual a secured space may be a single room or a facility that has security measures in place for the processing of classified information, or may encompass an entire building. Secured spaces can be constructed with assistance from GCSB. The PSM should be consulted.

Physical security certification authorities

8.1.5. The certification of an agency's physical security measures is undertaken by the DSO and/or the ITSM for areas processing up to SECRET information, and by GCSB for TOP SECRET SCIFs.

Facilities located outside of New Zealand

8.1.6. Agencies operating sites in located outside of New Zealand can contact GCSB to determine any additional requirements which may exist such as technical surveillance and oversight counter-measures and testing.

REFERENCES

8.1.7. High-level information relating to physical security is also contained in:

Title	Publisher	Source
PSM Protective Security Manual	NZSIS	http://www.nzsis.govt.nz
ISO/IEC 27002:2013, Section 11 - Physical and Environmental Security	ISO /IEC Standards NZ	http://www.iso27001security.com/html/27002.html http://www.standards.co.nz

RATIONALE & CONTROLS

8.1.8. Facility physical security

8.1.8.R.01. Rationale

The application of defence-in-depth to the protection of systems and infrastructure is enhanced through the use of successive layers of physical security.

Typically the layers of security are:

- site;
- building;
- room;
- racks;
- approved containers;
- operational hours; and
- manning levels.

8.1.8.R.02. Rationale

All layers are designed to control and limit access to those with the appropriate authorisation for the site, infrastructure and system. Deployable platforms need to meet physical security certification requirements as with any other system. Physical security certification authorities dealing with deployable platforms may have specific requirements that supersede the requirements of this manual and as such security personnel should contact their appropriate physical security certification authority to seek guidance.

8.1.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that any facility containing a system or its associated infrastructure, including deployable systems, are certified against minimum physical security requirements as stated in the PSM.

8.1.9. Preventing observation by unauthorised people

8.1.9.R.01. Rationale

Agency facilities without sufficient perimeter security are often exposed to the potential for observation through windows or open doors. This is sometimes described as the risk of oversight. Ensuring classified information on desks and computer screens is not visible will assist in reducing this security risk.

8.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD prevent unauthorised people from observing systems, in particular desks, screens and keyboards.

8.1.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD position desks, screens and keyboards so that they cannot be seen by unauthorised people, or fix blinds or drapes to the inside of windows and away from doorways.

8.1.10. Bringing non-agency owned devices into secured spaces

8.1.10.R.01. Rationale

No non-agency owned devices are to be brought into TOP SECRET areas without their prior approval of the Accreditation Authority (for TS, the GCSB).

8.1.10.C.01. Control: System Classification(s): TS; Compliance: MUST NOT

Agencies MUST NOT permit non-agency owned devices to be brought into TOP SECRET areas without prior approval from the Accreditation Authority (the GCSB).

8.1.11. Technical surveillance counter-measure testing

8.1.11.R.01. Rationale

Technical surveillance counter-measure testing is conducted as part of the physical security certification to ensure that facilities do not have any unauthorised listening devices or other surveillance devices installed and that physical security measures are compatible with technical controls. Further testing may also be necessary after uncleared access to the secure facility, such as contractors or visitors.

8.1.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that technical surveillance counter-measure tests are conducted as a part of the physical security certification.

8.2. Servers And Network Devices

OBJECTIVE

8.2.1. Secured server and communications rooms provide appropriate physical security for servers and network devices.

CONTEXT

Scope

8.2.2. This section covers the physical security of servers and network devices. Information relating to network infrastructure and IT equipment can be found in other sections of this chapter.

Secured server and communications rooms

8.2.3. Agencies may choose to certify the physical security of a server or communications room to the requirements of the physical security protocol of the PSM to provide an additional layer of physical security for their servers and network devices. In doing so agencies may reduce the storage requirements, as specified in the PSM.

8.2.4. Agencies choosing not to use a server or communications room, or using a server or communications room that does not meet the requirements of the PSM, will still need to meet the storage requirements as set out in the PSM based on the physical security certification of the surrounding facility.

RATIONALE & CONTROLS

8.2.5. Securing servers and network devices

8.2.5.R.01. Rationale

When an agency chooses to implement a security container for a server or network device in a non-secured server or communications room, or outside a server or communications room, they need to be compliant with the requirements of the PSM. However, when an agency stores a server or network device within a secured server or communications room the storage requirements for the server or network device can be lowered in some situations where there are multiple layers of physical security.

8.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that servers and network devices are secured within cabinets as shown in the tables below.

Classification	Grade 1	Grade II	Grade III: Occasional Storage	Grade III: Regular Storage
TOP SECRET	3A	2A	1A	Not acceptable
SECRET	4A	3A	2A	Not advisable, but 2A where unavoidable
CONFIDENTIAL	4CI	4C	4C	3A
RESTRICTED and all other classifications	In an office environment, this material should be held in a lockable storage area or cabinet. In a storage facility, this material should be protected through controlled access to the areas and by a secure physical environment.			

Note: The container requirement is determined by both the classification of the media and the physical security standard of the area where the security container or room is located. The number and letter combinations (eg. 3A) refer to the group of security container and the category of lock respectively. See the PSM for definitions and more detail.

8.2.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use a secured server or communications room within a secured facility.

8.2.6. Securing server rooms, communications rooms and security containers

8.2.6.R.01. Rationale

If personnel decide to leave server rooms, communications rooms or security containers with keys in locks, unlocked or with security functions disabled it negates the purpose of providing security in the first place. Such activities will compromise the security efforts of the agencies and should not be permitted by the agency.

8.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that keys or equivalent access mechanisms to server rooms, communications rooms and security containers are appropriately controlled.

8.2.6.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT leave server rooms, communications rooms or security containers in an unsecured state unless the server room is occupied by authorised personnel.

8.2.7. Administrative measures

8.2.7.R.01. Rationale

Site security plans (SitePlan), the physical security equivalent of the SecPlan and SOPs for systems, are used to document all aspects of physical security for systems. Formally documenting this information ensures that standards, controls and procedures can easily be reviewed by security personnel.

8.2.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop a Site Security Plan (SitePlan) for each server and communications room. Information to be covered includes, but is not limited to:

- a summary of the security risk review for the facility the server or communications room is located in;
- roles and responsibilities of facility and security personnel;
- the administration, operation and maintenance of the electronic access control system or security alarm system;
- key management, the enrolment and removal of system users and issuing of personal identification number codes and passwords;
- personnel security clearances, security awareness training and regular briefings;
- regular inspection of the generated audit trails and logs;
- end of day checks and lockup;
- reporting of information security incidents; and
- what activities to undertake in response to security alarms.

8.2.8. No-lone-zones

8.2.8.R.01. Rationale

Areas containing particularly sensitive materials or IT equipment can be provided with additional security through the use of a designated no-lone-zone. The aim of this designation is to enforce two-person integrity, where all actions are witnessed by at least one other person.

8.2.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies operating no-lone-zones MUST suitably signpost the area and have all entry and exit points appropriately secured.

8.3. Network Infrastructure

OBJECTIVE

8.3.1. Network infrastructure is protected by secured facilities and the use of encryption technologies.

CONTEXT

Scope

8.3.2. This section covers information relating to the physical security of network infrastructure. Information relating to servers, network devices and IT equipment can be found in other sections of this chapter. Additionally, information on using encryption for infrastructure in unsecured spaces can be found in Section 17.1 - Cryptographic Fundamentals.

RATIONALE & CONTROLS

8.3.3. Network infrastructure in secured spaces

8.3.3.R.01. Rationale

Network infrastructure is considered to process information being communicated across it and as such needs to meet the minimum physical security requirements for processing classified information as specified in the PSM.

8.3.3.R.02. Rationale

The physical security requirements for network infrastructure can be lowered if encryption is being applied to classified information communicated over the infrastructure (i.e. data in transit encryption). Note this does NOT change the classification of the data itself, only the physical protection requirements.

8.3.3.R.03. Rationale

It is important to note that physical controls do not provide any protection against malicious software or other malicious entities that may be residing on or have access to the system.

8.3.3.R.04. Rationale

If classified information being communicated over the infrastructure is not encrypted the malicious entry can capture, corrupt or modify the traffic to assist in furthering any attempts to exploit the network and the information being communicated across it.

8.3.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST certify the physical security of facilities containing network infrastructure to the highest classification of information being communicated over the network infrastructure.

8.3.3.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies communicating classified information over infrastructure in secured spaces SHOULD encrypt their information with at least an Approved Cryptographic Protocol. See Section 17.3 – Approved Cryptographic Protocols.

8.3.4. Protecting network infrastructure

8.3.4.R.01. Rationale

In order to prevent tampering with patch panels, fibre distribution panels and structured wiring, any such enclosures need to be placed within at least lockable commercial cabinets. Furthermore, keys for such cabinets should not remain in locks as this defeats the purpose of using lockable commercial cabinets in the first place.

8.3.4.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST locate patch panels, fibre distribution panels and structured wiring enclosures within at least lockable commercial cabinets.

8.3.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD locate patch panels, fibre distribution panels and structured wiring enclosures within at least lockable commercial cabinets.

8.3.5. Network infrastructure in unsecured spaces

8.3.5.R.01. Rationale

As agencies lose control over classified information when it is communicated over unsecured public network infrastructure or over infrastructure in unsecured spaces they MUST ensure that it is encrypted to a sufficient level that if it was captured that it would be sufficiently difficult to determine the original information from the encrypted information.

8.3.5.R.02. Rationale

Encryption does not change the class level of the information itself but allows reduced handling requirements to be applied.

8.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies communicating classified information over public network infrastructure or over infrastructure in unsecured spaces MUST use encryption to lower the handling instructions to be equivalent to those for unclassified networks.

8.4. IT Equipment

OBJECTIVE

8.4.1. IT equipment is secured outside of normal working hours, is non-operational or when work areas are unoccupied.

CONTEXT

Scope

8.4.2. This section covers information relating to the physical security of IT equipment containing media. This includes but is not limited to workstations, printers, photocopiers, scanners and multi-function devices (MFDs).

8.4.3. Additional information relating to IT equipment and media can be found in the following chapters and sections of this manual:

- Section 11.2 - Fax Machines, Multifunction Devices and Network Printers;
- Chapter 12 - Product Security; and
- Chapter 13 – Decommissioning and Disposal.

Handling IT equipment containing media

8.4.4. During non-operational hours agencies need to store media containing classified information that resides within IT equipment in accordance with the requirements of the PSM. Agencies can comply with this requirement by undertaking one of the following processes:

- ensuring IT equipment always reside in an appropriate class of secure room;
- storing IT equipment during non-operational hours in an appropriate class of security container or lockable commercial cabinet;
- using IT equipment with removable non-volatile media which is stored during non-operational hours in an appropriate class of security container or lockable commercial cabinet as well as securing its volatile media;
- using IT equipment without non-volatile media as well as securing its volatile media;
- using an encryption product to reduce the physical storage requirements of the non-volatile media as well as securing its volatile media; or
- configuring IT equipment to prevent the storage of classified information on the non-volatile media when in use and enforcing scrubbing of temporary data at logoff or shutdown as well as securing its volatile media.

8.4.5. The intent of using cryptography or preventing the storage of classified information on non-volatile media is to enable agencies to treat the media within IT equipment in accordance with the storage requirements of a lower classification, as specified in the PSM, during non-operational hours. Temporary data should be deleted at log off or shut down and volatile media secured.

8.4.6. As the process of using cryptography and preventing the storage of classified information on non-volatile media does not constitute the sanitisation and reclassification of the media, the media retains its classification for the purposes of reuse, reclassification, declassification, sanitisation, destruction and disposal requirements as specified in this manual.

IT equipment using hybrid hard drives or solid state drives

8.4.7. The process of preventing the storage of classified information on non-volatile media, and enforcing deletion of temporary data at logoff or shutdown, is NOT approved as a method of lowering the storage requirements, as specified in the PSM, when hybrid hard drives or solid state drives are used.

RATIONALE & CONTROLS

8.4.8. Accounting for IT equipment

8.4.8.R.01. Rationale

Ensuring that IT equipment containing media is accounted for by using asset registers, equipment registers, operational & configuration records and regular audits will assist in preventing loss or theft, or in the cases of loss or theft, alerting appropriate authorities to its loss or theft.

8.4.8.R.02. Rationale

Asset registers may not provide a complete record as financial limits may result in smaller value items not being recorded. In such cases other registers and operational information can be utilised to assist in building a more complete record.

8.4.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST account for all IT equipment containing media.

8.4.9. Processing requirements

8.4.9.R.01. Rationale

As the media within IT equipment takes on the classification of the information it is processing, the area that it is used within needs to be certified to a level that is appropriate for the classification of that information.

8.4.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST certify the physical security of facilities containing IT equipment to the highest classification of information being processed, stored or communicated by the equipment within the facilities.

8.4.10. Storage requirements

8.4.10.R.01. Rationale

The PSM states that either Class C, B or A secure rooms or Class C, B or A security containers or lockable commercial cabinets can be used to meet physical security requirements for the storage of IT equipment containing media. The class of secure room or security container will depend on the physical security certification of the surrounding area and the classification of the information.

8.4.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that when non-operational or when work areas are unoccupied IT equipment with media is secured in accordance with the minimum physical security requirements for storing classified information as specified in the PSM.

8.4.11. Securing non-volatile media for storage

8.4.11.R.01. Rationale

The use of techniques to prevent the storage of classified information on non-volatile media and processes to delete temporary data at logoff or shutdown may sound secure but there is no guarantee that they will always work effectively or will not be bypassed in unexpected circumstances such as a loss of power. As such, agencies need to consider these risks when implementing such a solution.

8.4.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies choosing to prevent the storage of classified information on non-volatile media and enforcing scrubbing of temporary data at logoff or shutdown SHOULD:

- assess the security risks associated with such a decision; and
- specify the processes and conditions for their application within the system's SecPlan.

8.4.12. Securing volatile media for storage

8.4.12.R.01. Rationale

If agencies need to conduct a security risk assessment as part of the procedure for storing IT equipment containing media during non-operation hours, they should consider security risks such as:

- an attacker gaining access to the IT equipment immediately after power is removed and accessing the contents of volatile media to recover encryption keys or parts thereof. This is sometimes described as a data remanence attack;
- extreme environmental conditions causing data to remain in volatile media for extended periods after the removal of power; and
- the physical security of the locations in which the IT equipment will reside.

8.4.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies securing volatile media for IT equipment during non-operational hours SHOULD:

- disconnect power from the equipment the media resides within;
- assess the security risks if not sanitising the media; and
- specify any additional processes and controls that will be applied within the system's SecPlan.

8.4.13. Encrypting media within IT equipment

8.4.13.R.01. Rationale

Current industry best practice is to encrypt all media within IT equipment. Newer operating systems provide this functionality and older operating systems can be supported with the use of open source or proprietary applications.

8.4.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD encrypt media within IT equipment with an Approved Cryptographic Algorithm. See Section 17.2 - Approved Cryptographic Algorithms.

8.5. Tamper Evident Seals

OBJECTIVE

8.5.1. Tamper evident seals and associated auditing processes identify attempts to bypass the physical security of systems and their infrastructure.

CONTEXT

Scope

8.5.2. This section covers information on tamper evident seals that can be applied to assets.

RATIONALE & CONTROLS

8.5.3. Recording seal usage

8.5.3.R.01. Rationale

Recording information about seals in a register and on which asset they are used assists in reducing the security risk that seals could be substituted without security personnel being aware of the change.

8.5.3.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST record the usage of seals in a register that is appropriately secured.

8.5.3.C.02. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST record in a register, information on:

- issue and usage details of seals and associated tools;
- serial numbers of all seals purchased; and
- the location or asset on which each seal is used.

8.5.3.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD record the usage of seals in a register that is appropriately secured.

8.5.3.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD record in a register information on:

- issue and usage details of seals and associated tools;
- serial numbers of all seals purchased; and
- the location or asset on which each seal is used.

8.5.4. Purchasing seals

8.5.4.R.01. Rationale

Using uniquely numbered seals ensures that a seal can be uniquely mapped to an asset. This assists security personnel in reducing the security risk that seals could be replaced without anyone being aware of the change.

8.5.4.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD consult with the seal manufacturer to ensure that, if available, any purchased seals and sealing tools display a unique identifier or image appropriate to the agency.

8.5.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Seals and any seal application tools SHOULD be secured when not in use..

8.5.4.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT allow contractors to independently purchase seals and associated tools on behalf of the government.

8.5.5. Reviewing seal usage

8.5.5.R.01. Rationale

Users of assets with seals should be encouraged to randomly check the integrity of the seals and to report any concerns to security personnel. In addition, conducting at least annual reviews will allow for detection of any tampering to an asset and ensure that the correct seal is located on the correct asset.

8.5.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD review seals for differences with a register at least annually. At the same time seals SHOULD be examined for any evidence of tampering.

9. PERSONNEL SECURITY

9.1. Information Security Awareness and Training

OBJECTIVE

9.1.1. A security culture is fostered through induction training and ongoing security education tailored to roles, responsibilities, changing threat environment and sensitivity of information, systems and operations.

CONTEXT

Scope

9.1.2. This section covers information relating specifically to information security awareness and training.

RATIONALE & CONTROLS

9.1.3. Information security awareness and training responsibility

9.1.3.R.01. Rationale

Agency management is responsible for ensuring that an appropriate information security awareness and training program is provided to personnel. Without management support, security personnel might not have sufficient resources to facilitate awareness and training for other personnel.

9.1.3.R.02. Rationale

Awareness and knowledge degrades over time without ongoing refresher training and updates.. Providing ongoing information security awareness and training will assist in keeping personnel aware of issues and their responsibilities.

9.1.3.R.03. Rationale

Methods that can be used to continually promote awareness include logon banners, system access forms and departmental bulletins and memoranda.

9.1.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agency management MUST ensure that all personnel who have access to a system have sufficient information security awareness and training.

9.1.4. Information security awareness and training

9.1.4.R.01. Rationale

Information security awareness and training programs are designed to help system users:

- become familiar with their roles and responsibilities;
- understand any legislative or regulatory mandates and requirements;
- understand any national or agency policy mandates and requirements;
- understand and support security requirements;
- assist in maintaining security; and
- learn how to fulfil their security responsibilities.

9.1.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST provide ongoing information security awareness and training for personnel on topics such as responsibilities, legislation and regulation, consequences of non-compliance with information security policies and procedures, and potential security risks and counter-measures.

9.1.4.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST provide information security awareness training as part of their employee induction programmes.

9.1.5. Degree and content of information security awareness and training

9.1.5.R.01. Rationale

The detail, content and coverage of information security awareness and training will depend on the objectives of the organisation. Personnel with responsibilities beyond that of a general user should have tailored training to meet their needs.

9.1.5.R.02. Rationale

As part of the guidance provided to system users, there should be sufficient emphasis placed on the activities that are NOT allowed on systems. The minimum list of content will also ensure that personnel are sufficiently exposed to issues that could cause an information security incident through lack of awareness or through lack of knowledge.

9.1.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD align the detail, content and coverage of information security awareness and training to system user responsibilities.

9.1.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that information security awareness and training includes information on:

- the purpose of the training or awareness program;
- any legislative or regulatory mandates and requirements;
- any national or agency policy mandates and requirements;
- agency security appointments and contacts;
- the legitimate use of system accounts, software and classified information;
- the security of accounts, including shared passwords;
- authorisation requirements for applications, databases and data;
- the security risks associated with non-agency systems, particularly the Internet;
- reporting any suspected compromises or anomalies;
- reporting requirements for information security incidents, suspected compromises or anomalies;
- classifying, marking, controlling, storing and sanitising media;
- protecting workstations from unauthorised access;
- informing the support section when access to a system is no longer needed;
- observing rules and regulations governing the secure operation and authorised use of systems; and
- supporting documentation such as SOPs and user guides.

9.1.5.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that information security awareness and training includes advice to system users not to attempt to:

- tamper with the system;
- bypass, strain or test information security mechanisms;
- introduce or use unauthorised IT equipment or software on a system;
- replace items such as keyboards, pointing devices and other peripherals with personal equipment;
- assume the roles and privileges of others;
- attempt to gain access to classified information for which they have no authorisation; or
- relocate equipment without proper authorisation.

9.1.6. System familiarisation training**9.1.6.R.01. Rationale**

A TOP SECRET system needs increased awareness by personnel. Ensuring familiarisation with information security policies and procedures, the secure operation of the system and basic information security training, will provide them with specific knowledge relating to these types of systems.

9.1.6.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST provide all system users with familiarisation training on the information security policies and procedures and the secure operation of the system before being granted unsupervised access to the system.

9.1.7. Disclosure of information while on courses**9.1.7.R.01. Rationale**

Government personnel attending courses with non-government personnel may not be aware of the consequences of disclosing information relating to the security of their agency's systems. Raising awareness of such consequences in personnel will assist in preventing disclosures that could lead to a targeted attack being launched against an agency's systems.

9.1.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD advise personnel attending courses along with non-government personnel not to disclose any details that could be used to compromise agency security.

9.2. Authorisations, Security Clearances And Briefings

OBJECTIVE

9.2.1. Only appropriately authorised, cleared and briefed personnel are allowed access to systems.

CONTEXT

Scope

9.2.2. This section covers information relating to the authorisations, security clearances and briefings required by personnel to access systems. Information on the technical implementation of access controls for systems can be found in Section 16.2 - System Access.

Security clearances – New Zealand and foreign

9.2.3. Where this manual refers to security clearances, the reference applies to New Zealand security clearances or security clearances from a foreign country which is recognised by New Zealand under a multilateral or bilateral security agreement.

REFERENCES

9.2.4. Additional policy and information on granting and maintaining security clearances can be found in:

Title	Publisher	Source
PSM Protective Security Manual	NZSIS	http://www.nzsis.govt.nz
NZ Government Personnel Security Requirements	NZSIS	http://www.nzsis.govt.nz

RATIONALE & CONTROLS

9.2.5. Documenting authorisations, security clearance and briefing requirements

9.2.5.R.01. Rationale

Ensuring that the requirements for access to a system are documented and agreed upon will assist in determining if system users have appropriate authorisations, security clearances and need-to-know to access the system.

9.2.5.R.02. Rationale

Types of system users for which access requirements will need to be documented include general users, privileged users, system administrators, contractors and visitors.

9.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST specify in the System Security Plan (SecPlan) any authorisations, security clearances and briefings necessary for system access.

9.2.6. Authorisation and system access

9.2.6.R.01. Rationale

Personnel seeking access to a system will need to have a genuine business requirement to access the system as verified by their supervisor or manager. Once a requirement to access a system is established, the system user should be given only the privileges that they need to undertake their duties. Providing all system users with privileged access when there is no such requirement can cause significant security vulnerabilities in a system.

9.2.6.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST:

- limit system access on a need-to-know/need-to-access basis;
- provide system users with the least amount of privileges needed to undertake their duties; and
- have any requests for access to a system authorised by the supervisor or manager of the system user.

9.2.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- limit system access on a need-to-know/need to access basis;
- provide system users with the least amount of privileges needed to undertake their duties; and
- have any requests for access to a system authorised by the supervisor or manager of the system user.

9.2.7. Recording authorisation for personnel to access systems

9.2.7.R.01. Rationale

In many cases, the requirement to maintain a secure record of all personnel authorised to access a system, their user identification, who provided the authorisation and when the authorisation was granted, can be met by retaining a completed system account request form signed by the supervisor or manager of the system user.

9.2.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- maintain a secure record of:
 - all authorised system users;
 - their user identification;
 - why access is required;
 - role and privilege level,
 - who provided the authorisation to access the system;
 - when the authorisation was granted; and
- maintain the record, for the life of the system or the length of employment whichever is the longer, to which access is granted.

9.2.8. Security clearance for system access

9.2.8.R.01. Rationale

Information classified as CONFIDENTIAL and above requires personnel to have been granted a formal security clearance before access is granted. Refer to the New Zealand Government Personnel Security Management Requirements – Agency Personnel Security.

9.2.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

System users MUST NOT be granted access to systems or information classified CONFIDENTIAL or above unless vetting procedures have been completed and formal security clearance granted.

9.2.8.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

All system users MUST:

- hold a security clearance at least equal to the system classification; or
- have been granted access in accordance with the requirements in this manual for limited higher access or emergency access.

9.2.9. System access briefings

9.2.9.R.01. Rationale

Some systems process caveated or compartmented information. As such, unique briefings may exist that system users need to receive before being granted access to the system. All system users will require a briefing on their responsibilities on access to and use of the system to which they have been granted access to avoid inadvertent errors and security breaches. Specialised system training may also be required.

9.2.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

All system users MUST have received any necessary briefings before being granted access to compartmented or caveated information or systems.

9.2.10. Access by foreign nationals to NZEO systems

9.2.10.R.01. Rationale

NZEO information is restricted to New Zealand nationals.

9.2.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Where systems process, store or communicate unprotected NZEO information, agencies MUST NOT allow foreign nationals, including seconded foreign nationals, to have access to the system.

9.2.10.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Where agencies protect NZEO information on a system by implementing controls to ensure that NZEO information is not passed to, or made accessible to, foreign nationals, agencies MUST NOT allow foreign nationals, including seconded foreign nationals, to have access to the system.

9.2.11. Access by foreign nationals to New Zealand systems

9.2.11.R.01. Rationale

When information from foreign nations is entrusted to the New Zealand Government, care needs to be taken to ensure that foreign nationals do not have access to such information unless it has also been released to their country.

9.2.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Where systems process, store or communicate classified information with nationality releasability markings, agencies MUST NOT allow foreign nationals, including seconded foreign nationals, to have access to such information that is not marked as releasable to their nation.

9.2.12. Granting limited higher access

9.2.12.R.01. Rationale

Under exceptional circumstances, temporary access to systems classified RESTRICTED and below may be granted.

9.2.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT permit limited higher access for systems and information classified CONFIDENTIAL or above.

9.2.12.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies granting limited higher access to information or systems MUST ensure that:

- the requirement to grant limited higher access is temporary in nature and is an exception rather than the norm;
- an ITSM has recommended the limited higher access;
- a cessation date for limited higher access has been set;
- the access period does not exceed two months;
- the limited higher access is granted on an occasional NOT non-ongoing basis;
- the system user is not granted privileged access to the system;
- the system user's access is formally documented; and
- the system user's access is approved by the CISO.

9.2.13. Controlling limited higher access

9.2.13.R.01. Rationale

When personnel are granted access to a system under the provisions of limited higher access they need to be closely supervised or have their access controlled such that they have access only to that information they require to undertake their duties.

9.2.13.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies granting limited higher access to a system MUST ensure that:

- effective controls are in place to restrict access to only classified information that is necessary to undertake the system user's duties; or
- the system user is continually supervised by another system user who has the appropriate security clearances to access the system.

9.2.14. Granting emergency access

9.2.14.R.01. Rationale

Emergency access to a system may be granted where there is an immediate and critical need to access information for which personnel do not have the appropriate security clearances. Such access will need to be granted by the agency head or their delegate and be formally documented.

9.2.14.R.02. Rationale

It is important that appropriate debriefs take place at the conclusion of any emergency in order to manage the ongoing security of information and systems and to identify “lessons learned”.

9.2.14.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Emergency access MUST NOT be granted unless personnel have a security clearance to at least CONFIDENTIAL level.

9.2.14.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Emergency access MUST NOT be used on reassignment of duties while awaiting completion of full security clearance procedures.

9.2.14.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies granting emergency access to a system MUST ensure that:

- the requirements to grant emergency access is due to an immediate and critical need to access classified information and there is insufficient time to complete clearance procedures;
- the agency head or their delegate has approved the emergency access;
- the system user’s access is formally documented;
- the system user’s access is reported to the CISO;
- appropriate briefs and debriefs for the information and system are conducted;
- access is limited to information and systems necessary to deal with the particular emergency and is governed by strict application of the “need to know” principle;
- emergency access is limited to ONE security clearance level higher than the clearance currently held; and
- the security clearance process is completed as soon as possible.

9.2.14.C.04. Control: System Classification(s): C, S, TS; Compliance: MUST

Personnel granted emergency access MUST be debriefed at the conclusion of the emergency.

9.2.15. Accessing caveated or compartmented information

9.2.15.R.01. Rationale

Limited higher access or emergency access to systems processing, storing or communicating caveated or compartmented information is not permitted. Refer to the New Zealand Government Personnel Security Management Requirements – Agency Personnel Security.

9.2.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT grant limited higher access or emergency access to systems that process, store or communicate caveated or compartmented information.

9.3. Using The Internet

OBJECTIVE

9.3.1. Personnel use Internet services in a responsible and security conscious manner, consistent with agency policies.

CONTEXT

Scope

9.3.2. This section covers information relating to personnel using Internet services such as the Web, Web-based email, news feeds, subscriptions and other services. Whilst this section does not address Internet services such as IM, IRC, IPT and video conferencing, agencies need to remain aware that unless applications using these communications methods are evaluated and approved by GCSB they are NOT approved for communicating classified information over the Internet.

9.3.3. Additional information on using applications that can be used with the Internet can be found in the Section 14.3 - Web Applications and Section 15.1 - Email Applications.

RATIONALE & CONTROLS

9.3.4. Using the Internet

9.3.4.R.01. Rationale

Agencies will need to determine what constitutes suspicious activity, questioning or contact in relation to their own work environment. Suspicious activity, questioning or contact may relate to the work duties of personnel or the specifics of projects being undertaken by personnel within the agency.

9.3.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure personnel are instructed to report any suspicious activity, questioning or contact when using the Internet, to an ITSM.

9.3.5. Awareness of Web usage policies

9.3.5.R.01. Rationale

Users MUST be familiar with and formally acknowledge agency Web usage policies for system users in order to follow the policy and guidance.

9.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST make their system users aware of the agency's Web usage policies.

9.3.5.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Personnel MUST formally acknowledge and accept agency Web usage policies.

9.3.6. Monitoring Web usage

9.3.6.R.01. Rationale

Agencies may choose to monitor compliance with aspects of Web usage policies, such as access attempts to blocked websites, pornographic and gambling websites, as well as compiling a list of system users that excessively download and/or upload data without an obvious or known legitimate business requirement.

9.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement measures to monitor their personnel, visitor and contractor compliance with their Web usage policies.

9.3.7. Posting information on the Web

9.3.7.R.01. Rationale

Personnel need to take special care not to accidentally post information on the Web, especially in forums and blogs. Even Official Information or UNCLASSIFIED information that appears to be benign in isolation could, in aggregate, have a considerable security impact on the agency, government sector or wider government.

9.3.7.R.02. Rationale

To ensure that personal opinions of agency personnel are not interpreted as official policy or associated with an agency, personnel will need to maintain separate professional and personal accounts when using websites, especially when using online social networks.

9.3.7.R.03. Rationale

Accessing personal accounts from an agency's systems is discouraged.

9.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure personnel are instructed to take special care when posting information on the Web.

9.3.7.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure personnel posting information on the Web maintain separate professional accounts from any personal accounts they have for websites.

9.3.7.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD monitor websites where personnel post information and if necessary remove or request the removal of any inappropriate information.

9.3.7.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Accessing personal accounts from agency systems SHOULD be discouraged.

9.3.8. Posting personal information on the Web

9.3.8.R.01. Rationale

Personnel need to be aware that any personal interest or other information they post on websites can be used to develop a detailed profile of their families, lifestyle, interest and hobbies in order to attempt to build a trust relationship with them or others. This relationship could then be used to attempt to elicit information from them or implant malicious software on systems by inducing them to, for instance, open emails or visit websites with malicious content.

9.3.8.R.02. Rationale

Profiling is a common marketing and targeting technique facilitated by the internet.

9.3.8.R.03. Rationale

Individuals who work for high-interest agencies, who hold security clearances or who are involved in high-profile projects are of particular interest to profilers, cyber criminals and other users of this information.

9.3.8.R.04. Rationale

The following is of particular interest to profilers:

- photographs;
- past and present employment details;
- personal details, including DOB, family members, birthdays, address and contact details;
- schools and institutions;
- clubs, hobbies and interests;
- educational qualifications;
- current work duties;
- details of work colleagues and associates; and
- work contact details.

9.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that personnel are informed of the security risks associated with posting personal information on websites, especially for those personnel holding higher level security clearances.

9.3.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Personnel SHOULD be encouraged to use privacy settings for websites to restrict access to personal information they post to only those they authorise to view it.

9.3.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Personnel SHOULD be encouraged to undertake a Web search of themselves to determine what personal information is available and contact an ITSM if they need assistance in determining if the information is appropriate to be viewed by the general public or potential adversaries.

9.3.9. Peer-to-peer applications**9.3.9.R.01. Rationale**

Personnel using peer-to-peer file sharing applications are often unaware of the extent of files that are being shared from their workstation. In most cases peer-to-peer file sharing applications will scan workstations for common file types and share them automatically for sharing or public consumption. Examples of peer-to-peer file sharing applications include Shareaza, KaZaA, Ares, Limewire, eMule and uTorrent.

9.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT allow personnel to use peer-to-peer applications over the Internet.

9.3.10. Receiving files via the Internet**9.3.10.R.01. Rationale**

When personnel receive files via peer-to-peer file sharing, IM or IRC applications they are often bypassing security mechanisms put in place by the agency to detect and quarantine malicious code. Personnel should be encouraged to send files via established methods such as email, to ensure they are appropriately scanned for malicious code.

9.3.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT allow personnel to receive files via peer-to-peer, IM or IRC applications.

9.4. Escorting Uncleared Personnel

OBJECTIVE

9.4.1. Uncleared personnel are escorted within secured areas.

CONTEXT

Scope

9.4.2. This section covers information relating to the escorting of uncleared personnel without security clearances in secured spaces.

RATIONALE & CONTROLS

9.4.3. Unescorted access

9.4.3.R.01. Rationale

Ensuring that personnel have correct security clearances to access sensitive areas and that access by escorted personnel is recorded for auditing purposes is widely considered a standard security practice.

9.4.3.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST ensure that all personnel with unescorted access to TOP SECRET areas have appropriate security clearances and briefings.

9.4.4. Maintaining an unescorted access list

9.4.4.R.01. Rationale

Maintaining an unescorted access list reduces the administrative overhead of determining if personnel can enter a TOP SECRET area without an escort. Personnel with approval for unescorted access must be able to verify their identity at all times while within the secure area.

9.4.4.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST maintain an up to date list of personnel entitled to enter a TOP SECRET area without an escort.

9.4.4.C.02. Control: System Classification(s): TS; Compliance: MUST

Personnel MUST display identity cards at all times while within the secure area.

9.4.5. Displaying the unescorted access list

9.4.5.R.01. Rationale

Displaying an unescorted access list allows staff to quickly verify if personnel are entitled to be in a TOP SECRET area without an escort. Care should be taken not to reveal the contents of the access list to non-cleared personnel.

9.4.5.C.01. Control: System Classification(s): TS; Compliance: SHOULD

Agencies SHOULD display within a TOP SECRET area, an up to date list of personnel entitled to enter the area without an escort.

9.4.5.C.02. Control: System Classification(s): TS; Compliance: SHOULD NOT

The unescorted access list SHOULD NOT be visible from outside of the secure area.

9.4.6. Visitors

9.4.6.R.01. Rationale

Visitors to secure areas should be carefully supervised to ensure the need-to-know principle is strictly adhered to.

9.4.6.C.01. Control: System Classification(s): TS; Compliance: SHOULD

Visitors SHOULD be carefully supervised to ensure they do not gain access to or have oversight of information above the level of their clearance or outside of their need-to-know.

9.4.7. Recording visits in a visitor log

9.4.7.R.01. Rationale

Recording visitors to a TOP SECRET area ensures that the agency has a record of visitors should an investigation into an incident need to take place in the future.

9.4.7.C.01. Control: System Classification(s): TS; Compliance: MUST NOT

Agencies MUST NOT permit personnel not on the unescorted access list to enter a TOP SECRET area unless their visit is recorded in a visitor log and they are escorted by a person on the unescorted access list.

9.4.8. Content of the visitor log

9.4.8.R.01. Rationale

The contents of the visitor log ensure that security personnel have sufficient details to conduct an investigation into an incident if required.

9.4.8.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST, at minimum, record the following information in a visitor log for each entry:

- name;
- organisation;
- person visiting;
- contact details for person visiting; and
- date and time in and out.

9.4.9. Separate visitor logs

9.4.9.R.01. Rationale

Maintaining a separate visitor log for TOP SECRET areas assists in enforcing the need-to-know principle. General visitors do not need-to-know of personnel that have visited TOP SECRET areas.

9.4.9.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies with a TOP SECRET area within a larger facility MUST maintain a separate log from any general visitor log.

10. INFRASTRUCTURE

10.1. Cable Management Fundamentals

OBJECTIVE

10.1.1. Cable management systems are implemented to allow easy integration of systems across government and minimise the opportunity for tampering or unauthorised change.

CONTEXT

Scope

10.1.2. This section covers information relating to cable distribution systems used in facilities within New Zealand. When designing cable management systems, Cable Labelling and Registration (Section 10.5) and Cable Patching (Section 10.6) of this chapter also apply.

Applicability of controls within this section

10.1.3. The controls within this section are applicable only to communications infrastructure located within facilities in New Zealand. For deployable platforms or facilities outside of New Zealand Emanation Security Threat Assessments (Section 10.7) of this chapter of this manual MUST be consulted.

Common implementation scenarios

10.1.4. This section provides common requirements for non-shared facilities. Specific requirements for facilities shared between agencies and facilities shared with non-government entities can be found in subsequent sections of this chapter.

Red/Black Concept and Cable Separation

10.1.5. Black is the designation applied to information systems and networks where information IS NOT encrypted using HGCE. Conversely Red is the designation applied to information systems and networks where information IS encrypted using HGCE. In general terms systems accredited for classifications RESTRICTED and below are BLACK and CONFIDENTIAL and above are RED.

10.1.6. All cables with metal conductors (the signal carrier, the strengthening member or an armoured outer covering) can act as fortuitous signal conductors allowing signals to escape or to cross-contaminate other cables and signals. This provides a path for the exploitation of signals, data and information.

10.1.7. The Red/Black concept is the separation of electrical and electronic circuits, devices, equipment cables, connectors and systems that transmit store or process national security information (Red) from non-national security information (Black).

10.1.8. An important control is the separation of cables and related equipment with sufficient distance between them to prevent cross-contamination.

Fibre optic cabling

10.1.9. Fibre optic cabling does not produce, and is not influenced by, electromagnetic emanations; as such it offers the highest degree of protection from electromagnetic emanation effects.

10.1.10. Fibre cabling is more difficult to tap than copper cabling. Many more fibres can be run per cable diameter than wired cables thereby reducing cable infrastructure costs. Fibre Optic cable is usually constructed with a glass core, cladding on the core and a further, colour coded coating. Multiple cores can be bundled into a single cable and multiple cables can be bundled into a high capacity cable. These are illustrated in Figures 1 and 2 in section 10.1.19 below. Cables also have a central strength member of mylar or some similar high strength, non-conductive material

10.1.11. Fibre cable is considered the best method to future proof against unforeseen threats.

Armoured Fibre optic cabling

10.1.12. Some fibre optic cable also includes conductive metal cable strengtheners and conductive metal armoured sheaths which may be wire-wound or stainless steel mesh for external cable protection and steel wire cores as core strength members. This strengthening and armouring is conductive and specialist advice may be needed to avoid earth loops, cross-coupling, inductive coupling or the introduction of other compromising signals and currents. Fibre optic cable with metal cable strengtheners or conductive armoured sheaths is considered *unsuitable* for secure installations.

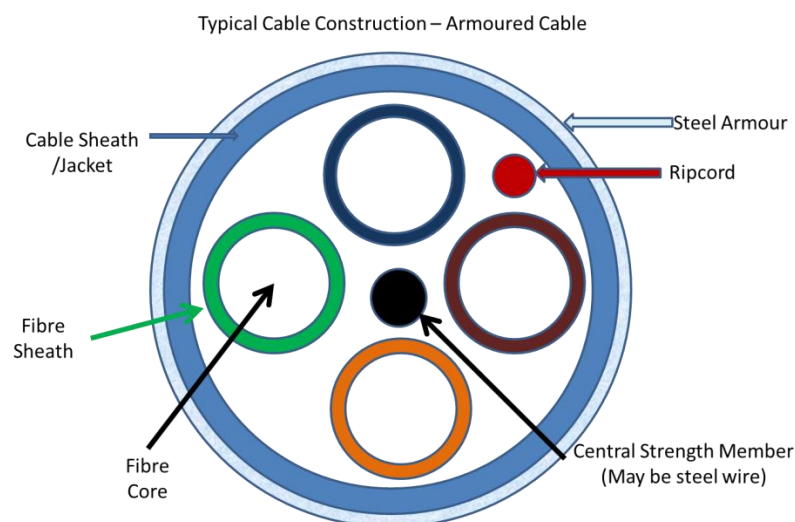


Figure 1

Backbone

10.1.13. A backbone or core is the central cabling that connects the infrastructure (servers, databases, gateways, equipment and telecommunication rooms etc.) to local areas networks, workstations and other devices, such as MFD's. Smaller networks may also be connected to the backbone.

10.1.14. A backbone can span a geographic area of any size including an office, a single building, multi-story buildings, campus, national and international infrastructure. In the context of the NZISM the term backbone generally refers to the central cabling within a building or a campus.

10.1.15. Backbones can be defined in terms of six criteria:

- transmission media;
- topology;
- security required;
- access control;
- transmission technique;
- transmission speed and capability.

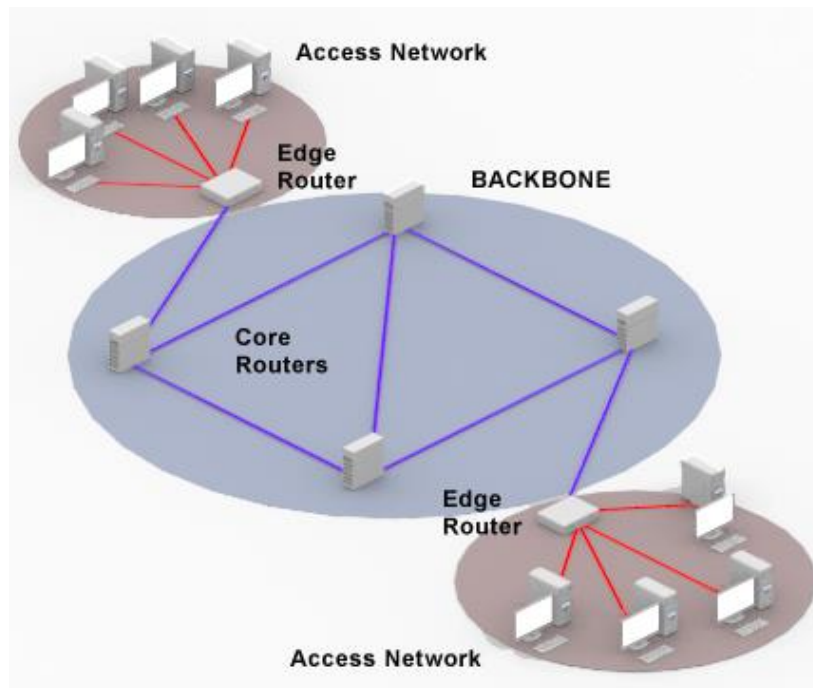


Figure 2

TOP SECRET cabling

10.1.16. For TOP SECRET cabling the cable's non-conductive protective sheath IS NOT considered to be a conduit. For TOP SECRET fibre optic cables with sub-units, the cable's outer protective sheath IS considered to be a conduit.

REFERENCES

Title	Publisher	Source
NZCSS 400: New Zealand Communications Security Standard No 400 (Document classified CONFIDENTIAL)	GCSB	GCSB RESTRICTED document available on application to authorised personnel
AS/NZS 3000:2007/Amdt 2:2012 - Electrical Installations (Known as the Australia/New Zealand Wiring Rules,	Standards NZ	Standards New Zealand http://www.standards.co.nz/
ANSI/TIA-568-C.3 – Optical Fiber Cabling Components	American National Standards Institute (ANSI)	http://www.ansi.org/
IEEE 802 – Local and Metropolitan Area Networks: Overview and Architecture	Institute of Electrical and Electronics Engineers (IEEE)	http://standards.ieee.org/getieee802/download/802b-2004.pdf

RATIONALE & CONTROLS

10.1.17. Backbone

10.1.17.R.01. Rationale

The design of a backbone requires consideration of a number of criteria including the capacity of the cable to carry the predicted volume of data at acceptable speeds. An element of “future proofing” is also required as re-cabling to manage capacity issues can be costly. Fibre optic cable provides a convenient means of securing and “future proofing” backbones.

10.1.17.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST use fibre optic cable for backbone infrastructures and installations.

10.1.17.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use fibre optic cable for backbone infrastructures and installations.

10.1.18. Use of Fibre Optic Cable

10.1.18.R.01. Rationale

Fibre optic cable is considered more secure than copper cables and provides electrical isolation of signals. Fibre will also provide higher bandwidth and speed to allow a degree of future-proofing in network design.

10.1.18.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use fibre optic cabling.

10.1.18.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD consult with the GCSB where fibre optic cable incorporating conductive metal strengtheners or sheaths is specified.

10.1.18.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD consult with the GCSB where copper cables are specified.

10.1.18.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT use fibre optic cable incorporating conductive metal strengtheners or sheaths except where essential for cable integrity.

10.1.19. Cabling Standards

10.1.19.R.01. Rationale

Unauthorised personnel could inadvertently or deliberately access system cabling. This could result in loss or compromise of classified information. Non-detection of covert tampering or access to system cabling may result in long term unauthorised access to classified information by a hostile entity.

10.1.19.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST install all cabling in accordance with the relevant New Zealand standards as directed by AS/NZS 3000:2007 and NZCSS400.

10.1.20. Cable colours

10.1.20.R.01. Rationale

To facilitate cable management, maintenance and security cables and conduit should be colour-coded to indicate the classification of the data carried and/or classification of the compartmented data.

10.1.20.R.02. Rationale

Cables and conduit may be the distinguishing colour for their entire length or display a distinguishing label marking and colour at each end and at a maximum of two metre intervals along the cable.

10.1.20.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST comply with the cable and conduit colours specified in the following table.

Classification	Cable colour
Compartmented Information (SCI)	Orange/Yellow/Teal or other colour
TOP SECRET	Red
SECRET	Blue
CONFIDENTIAL	Green
RESTRICTED and all lower classifications	Black

10.1.20.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Additional colours may be used to delineate special networks and compartmented information of the same classification. These networks MUST be labelled and covered in the agency's SOPs.

10.1.21. Cable colours for foreign systems in New Zealand facilities

10.1.21.R.01. Rationale

Foreign systems should be segregated and separated from other agency systems for security purposes. Colour-coding will facilitate installation, maintenance, certification and accreditation.

10.1.21.C.01. Control: System Classification(s): TS; Compliance: MUST

The cable colour to be used for foreign systems MUST be agreed between the host agency, the foreign system owner and the Accreditation Authority.

10.1.21.C.02. Control: System Classification(s): TS; Compliance: MUST NOT

Agencies MUST NOT allow cable colours for foreign systems installed in New Zealand facilities to be the same colour as cables used for New Zealand systems.

10.1.21.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The cable colour to be used for foreign systems SHOULD be agreed between the host agency, the foreign system owner and the Accreditation Authority.

10.1.21.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT allow cable colours for foreign systems installed in New Zealand facilities to be the same colour as cables used for New Zealand systems.

10.1.22. Cable groupings

10.1.22.R.01. Rationale

Grouping cables provides a method of sharing conduits and cable reticulation systems in the most efficient manner. These conduits and reticulation system must be inspectable and cable separations must be obvious.

10.1.22.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST contact GCSB for advice when combining the cabling of special networks.

10.1.22.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT deviate from the approved fibre cable combinations for shared conduits and reticulation systems as indicated below.

Group	Approved combination
1	UNCLASSIFIED
	RESTRICTED
2	CONFIDENTIAL
	SECRET
3	TOP SECRET
	Other Special Networks

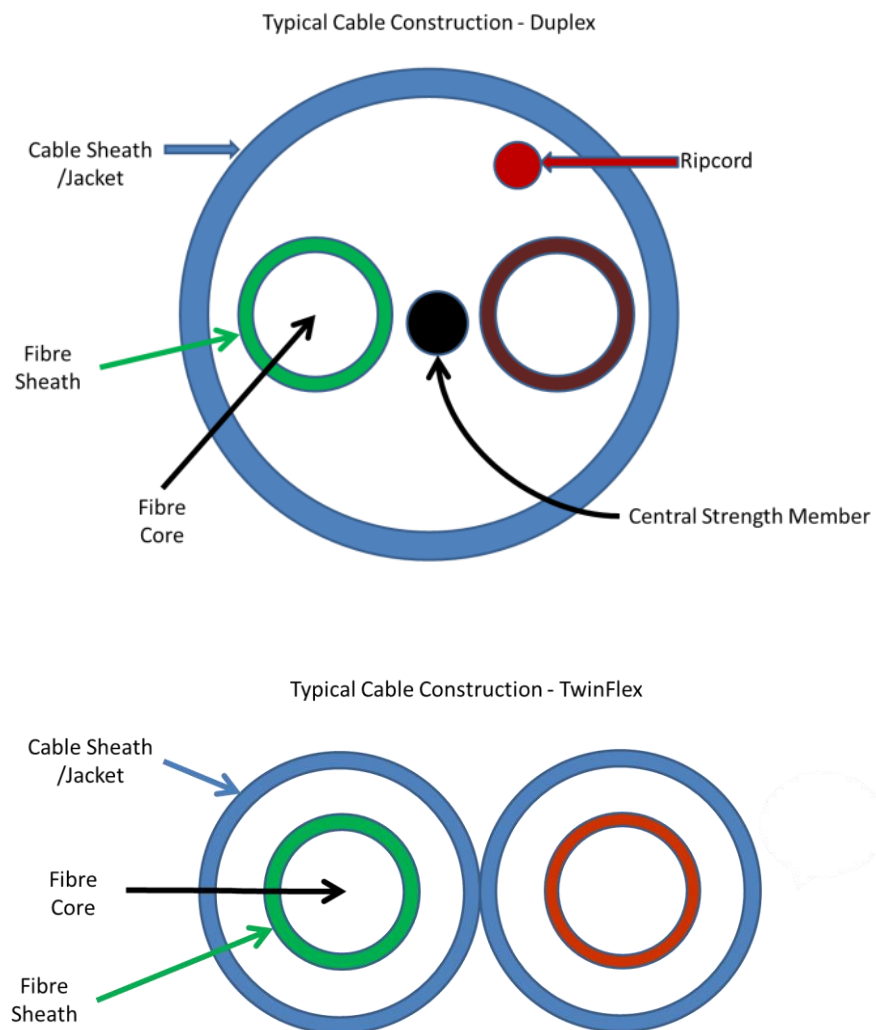
10.1.23. Fibre optic cables sharing a common conduit

10.1.23.R.01. Rationale

The use of multi-core fibre optic cables can reduce installation costs. The principles of separation and containment of cross-talk and leakage must be adhered to.

10.1.23.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

With fibre optic cables the arrangements of fibres within the cable sheath, as illustrated in Figure 3, MUST carry a single classification only.



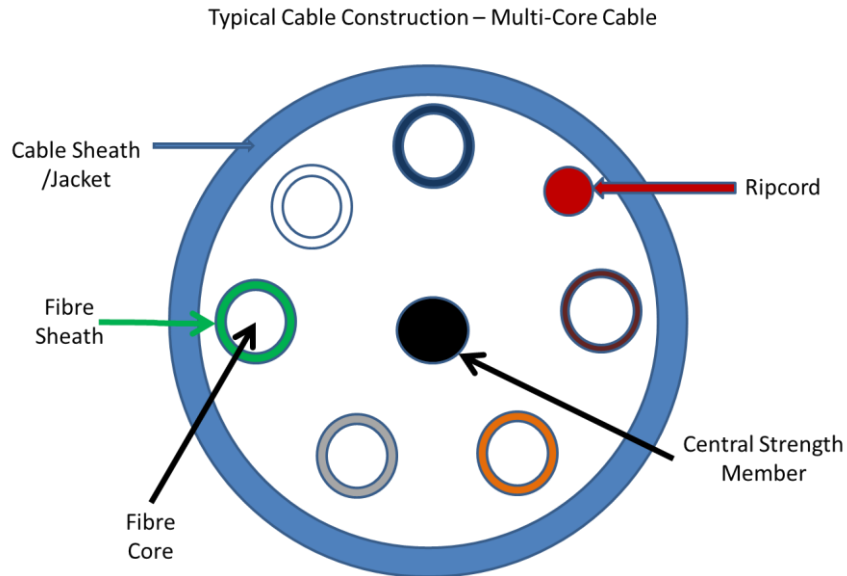


Figure 3

10.1.23.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

If a fibre optic cable contains subunits, as shown in Figure 4, each subunit **MUST** carry only a single classification.

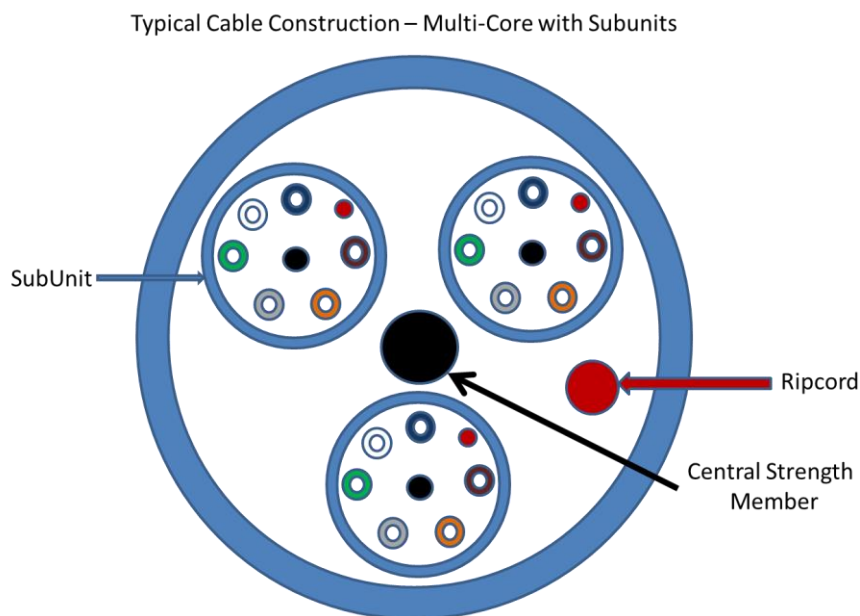


Figure 4

10.1.23.C.03. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies **MUST NOT** mix classifications up to RESTRICTED with classifications of CONFIDENTIAL and above in a single cable.

10.1.24. Audio secure spaces

10.1.24.R.01. Rationale

Audio secure spaces are designed to prevent audio conversation from being heard outside the walls. Penetrating an audio secure space in an unapproved manner can degrade this. Consultation with GCSB needs to be undertaken before any modifications are made to audio secure spaces.

10.1.24.C.01. Control: System Classification(s): TS; Compliance: MUST

When penetrating an audio secured space, agencies MUST comply with all directions provided by GCSB.

10.1.25. Wall outlet terminations

10.1.25.R.01. Rationale

Wall outlet boxes are the preferred method of connecting cable infrastructure to workstations and other equipment. They allow the management of cabling and can utilise a variety of connector types for allocation to different classifications.

10.1.25.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Cable groups sharing a wall outlet MUST use different connectors for systems of different classifications.

10.1.25.C.02. Control: System Classification(s): TS; Compliance: MUST

In areas containing outlets for both TOP SECRET systems and systems of other classifications, agencies MUST ensure that the connectors for the TOP SECRET systems are different to those of the other systems.

10.1.25.C.03. Control: System Classification(s): C, S, TS; Compliance: MUST

Cable outlets MUST be labelled with the system classification and connector type.

10.1.25.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Cable outlets SHOULD be labelled with the system classification and connector type.

10.2. Cable Management for Non-Shared Government Facilities

OBJECTIVE

10.2.1. Cable management systems in non-shared government facilities are implemented in a secure and easily inspectable and maintainable way.

CONTEXT

Scope

10.2.2. This section provides specific requirements for cabling installed in facilities solely occupied by a single agency. This section is to be applied in addition to common requirements for cabling as outlined in the Section 10.1 - Cable Management Fundamentals.

Applicability of controls within this section

10.2.3. The controls within this section are only applicable to communications infrastructure located within facilities in New Zealand. For deployable platforms or facilities outside of New Zealand, Emanation Security Threat Assessments (Section 10.7) of this chapter of this manual will need to be consulted.

REFERENCES

Title	Publisher	Source
NZCSS 400: New Zealand Communications Security Standard No 400 (Document classified CONFIDENTIAL)	GCSB	GCSB RESTRICTED document available on application to authorised personnel
AS/NZS 3000:2007/Amdt 2:2012 - Electrical Installations (Known as the Australia/New Zealand Wiring Rules,	Standards NZ	http://www.standards.co.nz

RATIONALE & CONTROLS

10.2.4. Cabling Inspection

10.2.4.R.01. Rationale

Regular inspections of cable installations are necessary to detect any unauthorised or malicious tampering or cable degradation.

10.2.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

In TOP SECRET areas or zones, all cabling MUST be inspectable at a minimum of five-metre intervals.

10.2.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Cabling SHOULD be inspectable at a minimum of five-metre intervals.

10.2.5. Cables sharing a common reticulation system

10.2.5.R.01. Rationale

Laying cabling in a neat and controlled manner, observing separation requirements, allows for inspections and reduces the need for individual cable trays for each classification.

10.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Approved cable groups may share a common reticulation system but SHOULD have either a dividing partition or a visible gap between the differing cable groups or bundles.

10.2.6. Cabling in walls

10.2.6.R.01. Rationale

Cabling run correctly in walls allows for neater installations while maintaining separation and inspectability requirements.

10.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Flexible or plastic conduit SHOULD be used in walls to run cabling from cable trays to wall outlets.

10.2.7. Cabinet separation

10.2.7.R.01. Rationale

Having a definite gap between cabinets allows for ease of inspections for any unauthorised or malicious cabling or cross patching.

10.2.7.C.01. Control: System Classification(s): TS; Compliance: SHOULD

TOP SECRET cabinets SHOULD have a visible gap of at least 400mm between themselves and lower classified cabinets.

10.3. Cable Management for Shared Government Facilities

OBJECTIVE

10.3.1. Cable management systems in shared government facilities are implemented in a secure and easily inspectable and maintainable way.

CONTEXT

Scope

10.3.2. This section provides specific requirements for cabling installed in facilities shared exclusively by agencies. This section is to be applied in addition to common requirements for cabling as outlined in the Section 10.1 - Cable Management Fundamentals.

Applicability of controls within this section

10.3.3. The controls within this section are applicable only to communications infrastructure located within facilities in New Zealand. For deployable platforms or facilities outside of New Zealand, Emanation Security Threat Assessments (Section 10.7) of this chapter of this manual will need to be consulted.

RATIONALE & CONTROLS

10.3.4. Use of fibre optic cabling

10.3.4.R.01. Rationale

Fibre optic cabling does not produce and is not influenced by electromagnetic emanations; as such it offers the highest degree of protection from electromagnetic emanation effects especially in a shared facility where you do not have total control over other areas of the facility.

10.3.4.R.02. Rationale

It is more difficult to tap than copper cabling.

10.3.4.R.03. Rationale

Many more fibres can be run per cable diameter than wired cables thereby reducing cable infrastructure costs.

10.3.4.R.04. Rationale

Fibre cable is the best method to future proof against unforeseen threats.

10.3.4.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD use fibre optic cabling.

10.3.5. Cabling inspection

10.3.5.R.01. Rationale

In a shared facility it is important that cabling systems are inspected for illicit tampering and damage on a regular basis and have stricter controls than a non-shared facility.

10.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Cabling SHOULD be inspectable at a minimum of five-metre intervals.

10.3.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
In TOP SECRET areas, cables SHOULD be fully inspectable for their entire length.

10.3.6. Cables sharing a common reticulation system

10.3.6.R.01. Rationale

In a shared facility with another government agency, tighter controls may be required for sharing reticulation systems. Note also the red/black separation requirements in paragraph 10.1.5.

10.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Approved cable groups SHOULD have either a dividing partition or a visible gap between the individual cable groups. If the partition or gap exists, cable groups may share a common reticulation system.

10.3.7. Enclosed cable reticulation systems

10.3.7.R.01. Rationale

In a shared facility with another government agency, TOP SECRET cabling is enclosed in a sealed reticulation system to restrict access and control cable management.

10.3.7.C.01. Control: System Classification(s): TS; Compliance: SHOULD

The front covers of conduits, ducts and cable trays in floors, ceilings and of associated fittings that contain TOP SECRET cabling, SHOULD be clear plastic.

10.3.8. Cabling in walls

10.3.8.R.01. Rationale

In a shared facility with another government agency, cabling run correctly in walls allows for neater installations while maintaining separation and inspectability requirements. Controls are slightly more stringent than in a non-shared facility.

10.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Cabling from cable trays to wall outlets SHOULD run in flexible or plastic conduit.

10.3.9. Wall penetrations

10.3.9.R.01. Rationale

Wall penetrations by cabling, requires the integrity of the classified space to be maintained. All cabling is encased in conduit with no gaps in the wall around the conduit. This prevents any visual access to the secure space.

10.3.9.C.01. Control: System Classification(s): TS; Compliance: SHOULD

For wall penetrations that exit into a lower classified space, cabling SHOULD be encased in conduit with all gaps between the conduit and the wall filled with an appropriate sealing compound.

10.3.10. Power reticulation

10.3.10.R.01. Rationale

In a shared facility with lesser-classified systems, it is important that TOP SECRET systems have control over the power system to prevent denial of service by deliberate or accidental means.

10.3.10.C.01. Control: System Classification(s): TS; Compliance: SHOULD

TOP SECRET facilities SHOULD have a power distribution board, separately reticulated, located within the TOP SECRET area and supply UPS power to all equipment.

10.3.11. Power Filters

10.3.11.R.01. Rationale

Power filters are used to provide a filtered (clean) power supply and reduce opportunity for technical attacks.

10.3.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Power filters SHOULD be used to provide a filtered power supply and reduce opportunity for technical attacks.

10.3.12. Cabinet separation

10.3.12.R.01. Rationale

Having a visible gap between cabinets facilitates inspection for any unauthorised, malicious or cross patch cabling.

10.3.12.C.01. Control: System Classification(s): TS; Compliance: SHOULD

TOP SECRET cabinets SHOULD have a visible gap to separate them from lower classified cabinets.

10.4. Cable Management for Shared Non-Government Facilities

OBJECTIVE

10.4.1. Cable management systems are implemented in shared non-government facilities to minimise risks to data and information.

CONTEXT

Scope

10.4.2. This section provides specific requirements for cabling installed in facilities shared by agencies and non-government organisations. This section is to be applied in addition to common requirements for cabling as outlined in Section 10.1 - Cable Management Fundamentals section.

Applicability of controls within this section

10.4.3. The controls within this section are applicable only to communications infrastructure located within facilities in New Zealand. For deployable platforms or facilities outside New Zealand, Emanation Security Threat Assessments (Section 10.7) of this chapter of this manual MUST be consulted.

RATIONALE & CONTROLS

10.4.4. Use of fibre optic cabling

10.4.4.R.01. Rationale

Fibre optic cabling is essential in a shared non-government facility. Fibre optic cabling does not produce and is not influenced by electromagnetic emanations; as such it offers the highest degree of protection from electromagnetic emanation effects especially in a shared non-government facility where an agency's controls may have a limited effect outside the agency controlled space.

10.4.4.R.02. Rationale

Fibre optic cable is more difficult to tap than copper cabling and anti-tampering monitoring can be employed to detect tampering.

10.4.4.R.03. Rationale

Many more fibres can be run per cable diameter than wired cables, reducing cable infrastructure costs.

10.4.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

In TOP SECRET areas, agencies MUST use fibre optic cabling.

10.4.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use fibre optic cabling.

10.4.5. Cabling inspection

10.4.5.R.01. Rationale

In a shared non-government facility, it is imperative that cabling systems be inspectable for tampering and damage on a regular basis particularly where higher threat levels exist or where threats are unknown.

10.4.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

In TOP SECRET areas, cables MUST be fully inspectable for their entire length.

10.4.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Cabling SHOULD be inspectable at a minimum of five-metre intervals.

10.4.6. Cables sharing a common reticulation system

10.4.6.R.01. Rationale

In a shared non-government facility, tighter controls are placed on sharing reticulation systems as the threats attributable to tampering and damage are increased.

10.4.6.C.01. Control: System Classification(s): TS; Compliance: MUST

In TOP SECRET areas, approved cable groups can share a common reticulation system but MUST have either a dividing partition or a visible gap between the differing cable groups.

10.4.6.C.02. Control: System Classification(s): TS; Compliance: MUST

TOP SECRET cabling MUST run in a non-shared, enclosed reticulation system.

10.4.6.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Approved cable groups can share a common reticulation system but SHOULD have either a dividing partition or a visible gap between the differing cable groups.

10.4.7. Enclosed cable reticulation systems

10.4.7.R.01. Rationale

In a shared non-government facility, TOP SECRET cabling is enclosed in a sealed reticulation system to prevent access and control cable management.

10.4.7.C.01. Control: System Classification(s): TS; Compliance: MUST

In TOP SECRET areas, the front covers for conduits and cable trays in floors, ceilings and of associated fittings MUST be clear plastic or be inspectable and have tamper proof seals fitted.

10.4.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The front covers of conduits, ducts and cable trays in floors, ceilings and of associated fittings SHOULD be clear plastic or be inspectable and have tamper proof seals fitted.

10.4.8. Cabling in walls or party walls

10.4.8.R.01. Rationale

In a shared non-government facility, cabling run correctly in walls allows for neater installations facilitating separation and inspectability. Controls are more stringent than in a non-shared facility or a shared government facility.

10.4.8.R.02. Rationale

A party wall is a wall shared with an unclassified space where there is no control over access. In a shared non-government facility, cabling is not allowed in a party wall. An inner wall can be used to run cabling where the space is sufficient for inspection of the cabling.

10.4.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT
Cabling MUST NOT run in a party wall.

10.4.9. Sealing reticulation systems

10.4.9.R.01. Rationale

In a shared non-government facility, where the threats of access to cable reticulation systems is increased, GCSB endorsed anti-tamper seals are required to provide evidence of any tampering or illicit access.

10.4.9.R.02. Rationale

In a shared non-government facility, all conduit joints and wall penetrations are sealed with a visible smear of glue or sealant to prevent access to cabling.

10.4.9.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST use GCSB endorsed tamper evident seals to seal all removable covers on reticulation systems, including:

- conduit inspection boxes;
- outlet and junction boxes; and
- T-pieces.

10.4.9.C.02. Control: System Classification(s): TS; Compliance: MUST

Tamper evident seals MUST be uniquely identifiable and a register kept of their unique number and location.

10.4.9.C.03. Control: System Classification(s): TS; Compliance: MUST

Conduit joints MUST be sealed with glue or sealant.

10.4.9.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Conduit joints SHOULD be sealed with glue or sealant.

10.4.10. Wall penetrations

10.4.10.R.01. Rationale

A cable wall penetration into a lesser-classified space requires the integrity of the classified space be maintained. All cabling is encased in conduit with no gaps in the wall around the conduit. This prevents any visual access to the secure space.

10.4.10.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Wall penetrations that exit into a lower classified space, cabling MUST be encased in conduit with all gaps between the conduit and the wall filled with an appropriate sealing compound.

10.4.11. Power reticulation

10.4.11.R.01. Rationale

In a shared non-government facility, it is important that TOP SECRET systems have control over the power system to prevent denial of service by deliberate or accidental means. The addition of a UPS is required to maintain availability of the TOP SECRET systems.

10.4.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Secure facilities MUST have a power distribution board located within the secure area and supply UPS power all equipment.

10.4.12. Power Filters

10.4.12.R.01. Rationale

Power filters should be used to provide filtered (clean) power and reduce opportunity for technical attacks. Consult the GCSB for technical advice.

10.4.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Power filters MUST be used to provide filtered (clean) power and reduce opportunity for technical attacks.

10.4.13. Equipment Cabinet separation

10.4.13.R.01. Rationale

A visible gap between equipment cabinets will make any cross-cabling obvious and will simplify inspections for unauthorised or compromising changes.

10.4.13.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Equipment cabinets MUST have a visible gap or non-conductive isolator between cabinets of different classifications.

10.4.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

There SHOULD be a visible gap or non-conductive isolator between equipment cabinets of different classifications.

10.5. Cable Labelling and Registration

OBJECTIVE

10.5.1. To facilitate cable management, and identify unauthorised additions or tampering.

CONTEXT

Scope

10.5.2. This section covers information relating to the labelling of cabling infrastructure installed in secured spaces.

Applicability of controls within this section

10.5.3. The controls within this section are applicable only to communications infrastructure located within facilities in New Zealand. For deployable platforms or facilities outside New Zealand, Emanation Security Threat Assessments (Section 10.7) of this chapter of this manual **MUST** be consulted.

RATIONALE & CONTROLS

10.5.4. Conduit label specifications

10.5.4.R.01. Rationale

Conduit labelling of a specific size and colour will facilitate identifying secure conduits.

10.5.4.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**
Agencies **MUST** comply with the conduit label colours specified in the following table.

Classification	Cable colour
Compartmented Information (SCI)	Orange/Yellow/Teal or other colour
TOP SECRET	Red
SECRET	Blue
CONFIDENTIAL	Green
RESTRICTED and all lower classifications	Black

10.5.5. Installing conduit labelling

10.5.5.R.01. Rationale

Conduit labelling in public or reception areas should not draw undue attention to the level of classified processing or any other agency capability.

10.5.5.C.01. Control: System Classification(s): All Classifications; Compliance: **SHOULD NOT**
Conduit labels installed in public or visitor areas **SHOULD NOT** be labelled in such a way as to draw attention to or reveal classification of data processed or other agency capability.

10.5.6. Labelling wall outlet boxes

10.5.6.R.01. Rationale

Clear labelling of wall outlet boxes reduces the possibility of incorrectly attaching IT equipment of a lesser classification to the wrong outlet.

10.5.6.C.01. Control: System Classification(s): C, S,TS; Compliance: **MUST**
Wall outlet boxes **MUST** denote the classification, cable and outlet numbers.

10.5.6.C.02. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Wall outlet boxes **SHOULD** denote the classification, cable and outlet numbers.

10.5.7. Standard operating procedures

10.5.7.R.01. Rationale

Recording labelling conventions in SOPs facilitates maintenance and fault finding.

10.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The SOPs SHOULD record the site conventions for labelling and registration.

10.5.8. Labelling cables

10.5.8.R.01. Rationale

Labelling cables with the correct socket number, equipment type, source or destination minimises the likelihood of improperly cross connecting equipment and can assist in fault finding and configuration management.

10.5.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST label cables at each end, with sufficient information to enable the physical identification and inspection of the cable.

10.5.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD label cables at each end, with sufficient information to enable the physical identification and inspection of the cable.

10.5.9. Cable register

10.5.9.R.01. Rationale

Cable registers provide a source of information that assessors can view to verify compliance.

10.5.9.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST maintain a register of cables.

10.5.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD maintain a register of cables.

10.5.10. Cable register contents

10.5.10.R.01. Rationale

Cable registers allow installers and assessors to trace cabling for inspection, tampering or accidental damage. It tracks all cable management changes through the life of the system.

10.5.10.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

The cable register MUST record at least the following information:

- cable identification number;
- classification;
- socket number, equipment type, source or destination site/floor plan diagram; and
- seal numbers if applicable.

10.5.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The cable register SHOULD record at least the following information:

- cable identification number;
- classification;
- socket number, equipment type, source or destination site/floor plan diagram; and
- seal numbers if applicable.

10.5.11. Cable inspections

10.5.11.R.01. Rationale

Regular cable inspections, are a method of checking the cable management system against the cable register as well as detecting tampering, damage, breakages or other anomalies.

10.5.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD inspect cables for inconsistencies with the cable register in accordance with the frequency defined in the SecPlan.

10.6. Cable Patching

OBJECTIVE

10.6.1. Communications systems are designed to prevent cross-connecting or cross-patching systems of differing classifications.

CONTEXT

Scope

10.6.2. This section covers information relating to the configuration and installation of patch panels, patch cables and fly leads associated with communications systems.

Applicability of controls within this section

10.6.3. The controls within this section are applicable only to communications infrastructure located within facilities in New Zealand. For deployable platforms or facilities outside New Zealand the Emanation Security Threat Assessments (Section 10.7) of this chapter of this manual MUST be consulted.

Exception for patch cable and fly lead connectors

10.6.4. For patch cables, the same connectors can be used for different classifications if the length of the higher classified patch cables is less than the distance between the higher classified patch panel and any patch panel of a lower classification.

RATIONALE & CONTROLS

10.6.5. Terminations to patch panels

10.6.5.R.01. Rationale

Cross-connecting a system to another system of a lesser classification through a patch panel may result in a data spill. A data spill could result in the following issues:

- inadvertent or deliberate access to information and systems by non-cleared personnel; and/or
- information spilling to a system of another classification.

10.6.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that only approved cable groups terminate on a patch panel.

10.6.6. Patch cable and fly lead connectors

10.6.6.R.01. Rationale

Cables equipped with connectors specific to a classification will prevent inadvertent cross-connection.

10.6.6.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

In areas containing cabling for multiple classifications, agencies MUST ensure that the connectors for each classification are distinct and different to those of the other classifications.

10.6.6.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

In areas containing cabling for multiple classifications, agencies MUST document the selection of connector types for each classification.

10.6.6.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

In areas containing cabling for systems of different classifications, agencies SHOULD ensure that the connectors for each system are different to those of the other systems.

10.6.6.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

In areas containing cabling for systems of different classifications, agencies SHOULD document the selection of connector types.

10.6.7. Physical separation of patch panels

10.6.7.R.01. Rationale

Appropriate physical separation between a TOP SECRET system and a system of a lesser classification will:

- reduce or eliminate the chances of cross patching between the systems; and
- reduce or eliminate the possibility of unauthorised personnel or personnel gaining access to TOP SECRET system elements.

10.6.7.C.01. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Agencies SHOULD physically separate patch panels of different classifications by installing them in separate cabinets.

10.6.7.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Where spatial constraints demand patch panels of different classification are located in the same cabinet, agencies MUST:

- provide a physical barrier within the cabinet to separate patch panels;
- ensure that only personnel cleared to the highest classification of the circuits in the panel have access to the cabinet; and
- obtain approval from the relevant Accreditation Authority prior to installation.

10.6.8. Fly lead installation

10.6.8.R.01. Rationale

Keeping the lengths of fly leads to a minimum prevents clutter around desks, prevents damage to fibre optic cabling and reduces the chance of cross patching and tampering. If lengths become excessive then agencies will need to treat the cabling as infrastructure and run it in conduit or fixed infrastructure such as desk partitioning.

10.6.8.C.01. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Agencies SHOULD ensure that the fibre optic fly leads used to connect wall outlets to IT equipment either:

- do not exceed 5m in length; or
- if they exceed 5m in length:
 - are run in the facility's fixed infrastructure in a protective and easily inspected pathway;
 - are clearly labelled at the equipment end with the wall outlet designator; and
 - are approved by the Accreditation Authority.

10.7. Emanation Security Threat Assessments

OBJECTIVE

10.7.1. In order to minimise compromising emanations or the opportunity for a technical attack, a threat assessment is used to determine appropriate countermeasures.

CONTEXT

Scope

10.7.2. This section relates to emanation security threat assessment advice and identification of appropriate countermeasures to minimise the loss of classified information through compromising emanations or a technical attack.

10.7.3. This section is applicable to:

- agencies located outside New Zealand;
- secure facilities within New Zealand; and
- mobile platforms and deployable assets that process classified information.

REFERENCES

10.7.4. Information on conducting an emanation security threat assessment and additional information on cabling and separation standards, as well as the potential dangers of operating RF transmitters in proximity to classified systems, is documented in:

Title	Publisher	Source
NZCSS400 Installation Engineering	GCSB	CONFIDENTIAL document available on application to authorised personnel
NZCSI 403B TEMPEST Threat and Countermeasures Assessment	GCSB	CONFIDENTIAL document available on application to authorised personnel
NZCSI 420 Laboratory Tempest Test Standard for Equipment in Controlled Environments	GCSB	CONFIDENTIAL document available on application to authorised personnel

RATIONALE & CONTROLS

10.7.5. Emanation security threat assessments within New Zealand

10.7.5.R.01. Rationale

Obtaining the current threat advice from GCSB on potential adversaries and threats and applying the appropriate countermeasures is vital in maintaining the confidentiality of classified systems from an emanation security attack.

10.7.5.R.02. Rationale

Failing to implement recommended countermeasures against an emanation security attack can lead to compromise. Having a good cable infrastructure and installation methodology will provide a strong backbone that will not need updating if the threat increases. Infrastructure is very expensive and time consuming to retro-fit.

10.7.5.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies designing and installing systems with RF transmitters within or co-located with their facility MUST:

- contact GCSB for guidance on conducting an emanation security threat assessment; and
- install cabling and equipment in accordance with this manual plus any specific installation criteria derived from the emanation security threat assessment.

10.7.5.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies designing and installing systems with RF transmitters that co-locate with systems of a classification CONFIDENTIAL and above MUST:

- contact GCSB for guidance on conducting an emanation security threat assessment; and
- install cabling and equipment in accordance with this manual plus any specific installation criteria derived from the emanation security threat assessment.

10.7.6. Emanation security threat assessment outside New Zealand

10.7.6.R.01. Rationale

Fixed sites and deployed military platforms are more vulnerable to emanation security attack and require a current threat assessment and countermeasure implementation. Failing to implement recommended countermeasures and standard operating procedures to reduce threats could result in the platform emanating compromising signals which, if intercepted and analysed, could lead to platform compromise with serious consequences.

10.7.6.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies deploying systems overseas in temporary, mobile or fixed locations MUST:

- contact GCSB for assistance with conducting an emanation security threat assessment; and
- install cabling and equipment in accordance with this manual plus any specific installation criteria derived from the emanation security threat assessment.

10.7.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies deploying systems overseas SHOULD:

- contact GCSB for assistance with conducting an emanation security threat advice; and
- install cabling and equipment in accordance with this document plus any specific installation criteria derived from the emanation security threat assessment.

10.7.7. Early identification of emanation security issues**10.7.7.R.01. Rationale**

The identification of emanation security controls that need to be implemented for a system at an early stage in the project lifecycle. This can significantly affect project costs. Costs are invariably greater where changes are necessary once the system had been designed or has been implemented.

10.7.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD conduct an emanation security threat assessment as early as possible in project lifecycles.

10.7.8. IT equipment in SECURE areas**10.7.8.R.01. Rationale**

Not all equipment within a secure facility in New Zealand requires certification to TEMPEST standards. However, all equipment must conform to applicable industry and government standards, including NZCSI 420; Laboratory Tempest Test Standard for Equipment in Controlled Environments.

10.7.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that IT equipment within secure areas meet industry and government standards relating to electromagnetic interference/electromagnetic compatibility.

11. COMMUNICATIONS SYSTEMS AND DEVICES

11.1. Radio Frequency and Infrared Devices

OBJECTIVE

11.1.1. To maintain the integrity of secured areas, only approved radio frequency (RF) and infrared devices (IR) are brought into secured areas.

CONTEXT

Scope

11.1.2. This section covers information relating to the use of RF and infrared devices in secured spaces. Information on the use of RF devices outside secured spaces can be found in Chapter 20 - Working Off-Site.

11.1.3. RF devices include any transmitter on any frequency, including mobile phones, cordless phones, Bluetooth, WiFi, RFID and other similar devices.

Exemptions for the use of infrared and laser devices

11.1.4. An infrared device and laser device can be used in a secured space provided it does not have the potential to communicate classified information.

Exemptions for the use of RF devices

11.1.5. The following devices, *at the discretion of the Accreditation Authority*, can be exempted from the controls associated with RF transmitters:

- pagers that can only receive messages;
- garage door openers;
- car lock/alarm keypads;
- medical and exercise equipment that uses RF to communicate between sub-components;
- access control sensors; and
- laser pointers

RATIONALE & CONTROLS

11.1.6. Pointing devices

11.1.6.R.01. Rationale

Wireless RF pointing devices can pose an emanation security risk. They are not to be used in secure areas unless within a RF screened building.

11.1.6.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Wireless RF pointing devices MUST NOT be used in secure areas unless used within a RF screened building or RF mitigations are implemented.

11.1.7. Infrared keyboards

11.1.7.R.01. Rationale

When using infrared keyboards with CONFIDENTIAL or SECRET systems, drawn opaque curtains are an acceptable method of protecting windows and managing line of sight and reflected transmissions.

11.1.7.R.02. Rationale

When using infrared keyboards with a TOP SECRET system, windows with curtains that can be opened are NOT acceptable as a method of permanently blocking infrared transmissions. While infrared transmissions are generally designed for short range (5 to 10 metres) manufacturing and design variations and some environmental conditions can amplify and reflect infrared over much greater distances.

11.1.7.C.01. Control: System Classification(s): C, S; Compliance: MUST NOT

Agencies using infrared keyboards MUST NOT allow:

- line of sight and reflected communications travelling into an unsecured space;
- multiple infrared keyboards at different classifications in the same area;
- other infrared devices to be brought into line of sight of the keyboard or its receiving device/port; and
- infrared keyboards to be operated in areas with unprotected windows.

11.1.7.C.02. Control: System Classification(s): TS; Compliance: MUST NOT

Agencies using infrared keyboards MUST NOT allow:

- line of sight and reflected communications travelling into an unsecured space;
- multiple infrared keyboards at different classifications in the same area;
- other infrared devices within the same area; and
- infrared keyboards in areas with windows that have not had a permanent method of blocking infrared transmissions applied to them.

11.1.7.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies using infrared keyboards SHOULD ensure that infrared ports are positioned to prevent line of sight and reflected communications travelling into an unsecured space.

11.1.8. Bluetooth and wireless keyboards

11.1.8.R.01. Rationale

As the Bluetooth protocol provides little security and wireless keyboards often provide no security, they cannot be relied upon for the protection of classified information. As with infrared transmissions Bluetooth transmissions can reach considerable distances.

11.1.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST complete a technical evaluation of the secure area before the use of Bluetooth keyboards or other Bluetooth devices are permitted.

11.1.8.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies using Bluetooth keyboards or other Bluetooth devices MUST NOT allow:

- line of sight and reflected communications travelling into an unsecured space;
- multiple keyboards or other devices at different classifications in the same area;
- other Bluetooth infrared devices to be brought into range of the keyboard or its receiving device/port; and
- Bluetooth keyboards or other devices to be operated in areas with unprotected windows.

11.1.8.C.03. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT use Bluetooth or wireless keyboards unless within a RF screened building.

11.1.9. RF devices in secured spaces

11.1.9.R.01. Rationale

RF devices pose security threat as they are capable of picking up and transmitting classified background conversations. Furthermore, many RF devices can connect to IT equipment and act as unauthorised data storage devices or bridge “air gaps”.

11.1.9.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST prevent RF devices from being brought into secure areas unless authorised by the Accreditation Authority.

11.1.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD prevent RF devices from being brought into secured spaces unless authorised by the Accreditation Authority.

11.1.10. Detecting RF devices in secured spaces

11.1.10.R.01. Rationale

As RF devices are prohibited in secure areas, agencies should deploy technical measures to detect and respond to the unauthorised use of such devices.

11.1.10.C.01. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Agencies SHOULD deploy measures to detect and respond to active RF devices within secured spaces.

11.1.11. RF controls

11.1.11.R.01. Rationale

Minimising the output power of wireless devices and using RF shielding on facilities will assist in limiting the wireless communications to areas under the control of the agency.

11.1.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD limit the effective range of communications outside the agency's area of control by:

- minimising the output power level of wireless devices;
- RF shielding; and
- Physical layout and separation.

11.2. Fax Machines, Multifunction Devices and Network Printers

OBJECTIVE

11.2.1. Fax machines, multifunction devices (MFD's) and network printers are used in a secure manner.

CONTEXT

Scope

11.2.2. This section covers information relating to fax machines, MFDs and network printers connected to either the ISDN, PSTN, HGCE or other networks. Further information on MFDs communicating via network gateways can be found in Section 19.5 - Data Import and Export.

RATIONALE & CONTROLS

11.2.3. Fax machine, MFD and network printer usage policy

11.2.3.R.01. Rationale

Fax machines, MFDs and network printers are capable of communicating classified information, and are a potential source of information security incidents. It is therefore essential that agencies develop a policy governing their use.

11.2.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop a policy governing the use of fax machines, MFDs, and network printers.

11.2.4. Sending fax messages

11.2.4.R.01. Rationale

Once a fax machine or MFD has been connected to cryptographic equipment and used to send a classified fax message it can pose risks if subsequently connected directly to unsecured telecommunications infrastructure or the public switched telephone network (PSTN). For example, if a fax machine fails to send a classified fax message the device will continue attempting to send the fax message even if it has been disconnected from the cryptographic device and connected directly to the public switched telephone network. In such cases the fax machine could then send the classified fax message in the clear causing an information security incident.

11.2.4.R.02. Rationale

Non-encrypted communications may be exposed in transmission and, if incorrectly addressed or an incorrect recipient number is entered, may cause a data breach.

11.2.4.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies sending classified fax messages MUST ensure that the fax message is encrypted to an appropriate level when communicated over unsecured telecommunications infrastructure or the public switched telephone network.

11.2.4.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST have separate fax machines or MFDs for sending classified fax messages and messages classified RESTRICTED and below.

11.2.5. Sending fax messages using HGCE

11.2.5.R.01. Rationale

The establishment and use of appropriate procedures for sending a classified fax message will ensure that it is sent securely to the correct recipient.

11.2.5.R.02. Rationale

Using the correct memory erase procedure will prevent a classified fax message being communicated in the clear.

11.2.5.R.03. Rationale

Implementing the correct procedure for establishing a secure call will prevent sending a classified fax message in the clear.

11.2.5.R.04. Rationale

Overseeing the receipt and transmission of fax messages, clearing equipment memory after use and then powering off the equipment will prevent unauthorised access to this information.

11.2.5.R.05. Rationale

Ensuring fax machines and MFDs are not connected to unsecured phone lines will prevent accidentally sending classified messages stored in memory

11.2.5.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies intending to use fax machines or MFDs to send classified information MUST comply with additional requirements. Contact the GCSB for further details.

11.2.6. Receiving fax messages

11.2.6.R.01. Rationale

Whilst the communications path between fax machines and MFDs may be appropriately protected, personnel need to remain cognisant of the need-to-know of the information that is being communicated. As such it is important that fax messages are collected from the receiving fax machine or MFD as soon as possible. Furthermore, if an expected fax message is not received it may indicate that there was a problem with the original transmission or the fax message has been taken by an unauthorised person.

11.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The sender of a fax message SHOULD make arrangements for the receiver to:

- collect the fax message as soon as possible after it is received; and
- notify the sender immediately if the fax message does not arrive when expected.

11.2.7. Connecting MFDs to telephone networks

11.2.7.R.01. Rationale

When a MFD is connected to a computer network and a telephone network the device can act as a bridge between the networks. As such the telephone network needs to be accredited to the same classification as the computer network the MFD is connected to.

11.2.7.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT enable a direct connection from a MFD to a telephone network unless the telephone network is accredited to at least the same classification as the computer network to which the device is connected.

11.2.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT enable a direct connection from a MFD to a telephone network unless the telephone network is accredited to at least the same classification as the computer network to which the device is connected.

11.2.8. Connecting MFDs to computer networks

11.2.8.R.01. Rationale

As network connected MFDs are considered to be devices that reside on a computer network they need to be able to process the same classification of information that the network is capable of processing.

11.2.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Where MFDs connected to computer networks have the ability to communicate via a gateway to another network, agencies MUST ensure that:

- each MFD applies user identification, authentication and audit functions for all classified information communicated by that device;
- these mechanisms are of similar strength to those specified for workstations on that network; and
- each gateway can identify and filter the classified information in accordance with the requirements for the export of data through a gateway.

11.2.9. Copying documents on MFDs

10.2.9.R.01. Rationale

As networked MFDs are capable of sending scanned or copied documents across a connected network, personnel need to be aware that if they scan or copy documents at a classification higher than that of the network the device is connected to they could be causing a data spill onto the connected network.

11.2.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT permit MFDs connected to computer networks to be used to copy classified documents above the classification of the connected network.

11.2.10. Observing fax machine and MFD use

11.2.10.R.01. Rationale

Placing fax machines and MFDs in public areas can assist in reducing the likelihood that any suspicious use of fax machines and MFDs by personnel will go unnoticed.

11.2.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that fax machines and MFDs are located in an area where their use can be observed.

11.2.11. Servicing and Maintenance

11.2.11.R.01. Rationale

Network and MFD printers invariably use hard disk drives, flash drives or other reusable storage which can contain copies of classified information. Any maintenance or servicing should be conducted under supervision or by cleared personnel.

11.2.11.R.02. Rationale

Copiers and laser printers may use electrostatic drums as part of the reproduction and printing process. These drums can retain a “memory” of recent documents which can be recovered. Any storage devices or drums replaced during maintenance should follow the prescribed media disposal and destruction processes (See Chapter 13 – Decommissioning and Disposal).

11.2.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Any maintenance or servicing MUST be conducted under supervision or by cleared personnel.

11.2.11.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Any storage devices or drums removed during maintenance or servicing MUST be disposed of following the processes prescribed in Chapter 13 - Decommissioning and Disposal.

11.2.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Any maintenance or servicing SHOULD be conducted under supervision or by cleared personnel.

11.2.11.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Any storage devices or drums removed during maintenance or servicing SHOULD be disposed of following the processes prescribed in Chapter 13 - Decommissioning and Disposal.

11.2.12. USB Devices**11.2.12.R.01. Rationale**

MFD's may also be equipped with USB ports for maintenance and software updates. It is possible to copy data from installed storage devices to USB devices. Any use of USB capabilities must be carefully managed.

11.2.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

The use of any USB capability MUST be conducted under supervision or by cleared personnel.

11.2.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The use of any USB capability SHOULD be conducted under supervision or by cleared personnel.

11.2.13. Decommissioning and Disposal**11.2.13.R.01. Rationale**

The use of storage media and the characteristics of electrostatic drums allow the recovery of information from such devices and components. To protect the information, prescribed disposal procedures should be followed.

11.2.13.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Any storage devices, drums or other components that may contain data or copies of documents MUST be disposed of following the processes prescribed in Chapter 13 - Decommissioning and Disposal.

11.2.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Any storage devices, drums or other components that may contain data or copies of documents SHOULD be disposed of following the processes prescribed in Chapter 13 - Decommissioning and Disposal.

11.3. Telephones and Telephone Systems

OBJECTIVE

11.3.1. Telephone systems are prevented from communicating unauthorised classified information.

CONTEXT

Scope

11.3.2. This section covers information relating to the secure use of fixed, including cordless, telephones, as well as the systems they use to communicate information.

11.3.3. Information regarding Voice over Internet Protocol (VoIP) and encryption of data in transit is covered in Section 18.3 – Video & Telephony Conferencing and Internet Protocol Telephony and Section 17.1 - Cryptographic Fundamentals.

11.3.4. It MUST be noted that VOIP and cellular phones have some of the same vulnerabilities as wired and cordless phones.

RATIONALE & CONTROLS

11.3.5. Telephones and telephone systems usage policy

11.3.5.R.01. Rationale

All non-secure telephone networks are subject to interception. The level of expertise needed to do this varies greatly. Accidentally or maliciously revealing classified information over a public telephone networks can lead to interception.

11.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop a policy governing the use of telephones and telephone systems.

11.3.6. Personnel awareness

11.3.6.R.01. Rationale

There is a high risk of unintended disclosure of classified information when using telephones. It is important that personnel are made aware of what levels of classified information they discuss on particular telephone systems as well as the audio security risk associated with the use of telephones.

11.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST advise personnel of the maximum permitted classification for conversations using both internal and external telephone connections.

11.3.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD advise personnel of the audio security risk posed by using telephones in areas where classified conversations can occur.

11.3.7. Visual indication

11.3.7.R.01. Rationale

When single telephone systems are approved to hold conversations at different classifications, alerting the user to the classification level they can speak at when using their phone will assist in the reducing the risk of unintended disclosure of classified information.

11.3.7.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies permitting different levels of conversation for different types of connections MUST use telephones that give a visual indication of the classification of the connection made.

11.3.8. Use of telephone systems

11.3.8.R.01. Rationale

When classified conversations are to be held using telephone systems, the conversation needs to be appropriately protected through the use of encryption measures.

11.3.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies intending to use telephone systems for the transmission of classified information MUST ensure that:

- the system has been accredited for the purpose; and
- all classified traffic that passes over external systems is appropriately encrypted.

11.3.9. Cordless telephones

11.3.9.R.01. Rationale

Cordless telephones have little or no effective transmission security, therefore should not be used for classified or sensitive communications. They also operate in an unlicensed part of the radio spectrum used for a wide range of other devices.

11.3.9.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT use cordless telephones for classified conversations.

11.3.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT use cordless telephones for classified or sensitive conversations.

11.3.10. Cordless telephones with secure telephony devices

11.3.10.R.01. Rationale

As the data between cordless handsets and base stations is not secure, cordless telephones MUST NOT be used for classified communications even if the device is connected to a secure telephony device.

11.3.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT use cordless telephones in conjunction with secure telephony devices.

11.3.11. Speakerphones

11.3.11.R.01. Rationale

Speakerphones are designed to pick up and transmit conversations in the vicinity of the device they should not be used in secure areas as the audio security risk is extremely high.

11.3.11.R.02. Rationale

If the agency is able to reduce the audio security risk through the use of appropriate countermeasures then an exception may be approved by the Accreditation Authority.

11.3.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

If a speakerphone is to be used on a secure telephone system within a secure area, agencies MUST apply the following controls:

- it is located in a room rated as audio secure;
- the room is audio secure during any conversations;
- only cleared personnel involved in discussions are present in the room; and
- ensure approval for this exception is granted by the Accreditation Authority.

11.3.12. Off-hook audio protection**11.3.12.R.01. Rationale**

Providing off-hook security minimises the chance of accidental classified conversation being coupled into handsets and speakerphones. Limiting the time an active microphone is open limits this threat.

11.3.12.R.02. Rationale

Simply providing an off-hook audio protection feature is not, in itself, sufficient. To ensure that the protection feature is used appropriately personnel will need to be made aware of the protection feature and trained in its proper use.

11.3.12.R.03. Rationale

Many new digital desk phones control these functions through software, rather than a mechanical switch.

11.3.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that off-hook audio protection features are used on all telephones that are not accredited for the transmission of classified information in areas where such information could be discussed.

11.3.12.C.02. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Agencies SHOULD use push-to-talk handsets to meet the requirement for off-hook audio protection.

11.3.12.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that off-hook audio protection features are used on all telephones that are not accredited for the transmission of classified information in areas where such information could be discussed.

11.4. Mobile Telephony

OBJECTIVE

11.4.1. Mobile telephone systems and devices are prevented from communicating unauthorised classified information.

CONTEXT

Scope

11.4.2. This section covers information relating to the secure use of mobile telephones, tablets and other mobile, voice communication capable devices, as well as the systems they use to communicate information.

11.4.3. Mobile devices use RF in various parts of the spectrum to communicate including Wi-Fi, cellular, satellite, RFID, and NFC frequencies. All such mobile devices are considered to be transmitters.

11.4.4. Mobile devices with cellular capability will regularly “poll” for the strongest signal and base or relay station. Monitoring such activity can be used for later interception of transmissions.

11.4.5. Information regarding Voice over Internet Protocol (VoIP) and encryption of data in transit is covered in Section 18.3 – Video & Telephony Conferencing and Internet Protocol Telephony and Section 17.1 - Cryptographic Fundamentals.

11.4.6. It is important to note that VoIP phones have some of the same vulnerabilities as the mobile devices discussed in this section.

11.4.7. Mobile devices can be equipped with a variety of capabilities including internet connectivity, cameras, speakerphones, recording and remote control. Such devices are also susceptible to Internet malware and exploits. All risks related to the use of the Internet will apply to mobile devices with 3G/4G capability.

RATIONALE & CONTROLS

11.4.8. Mobile device usage policy

11.4.8.R.01. Rationale

All mobile devices are subject to interception. The required level of expertise needed varies greatly. Accidentally or maliciously revealing classified information over mobile devices can be intercepted leading to a security breach.

11.4.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop a policy governing the use of mobile devices.

11.4.9. Personnel awareness

11.4.9.R.01. Rationale

There is a high risk of unintended disclosure of classified information when using mobile devices. It is important that personnel are aware of what levels of classified information they discuss as well as the wide range of security risks associated with the use of mobile devices.

11.4.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST advise personnel of the maximum permitted classification for conversations using both internal and external mobile devices.

11.4.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD advise personnel of all known security risks posed by using mobile devices in areas where classified conversations can occur.

11.4.10. Use of mobile devices

11.4.10.R.01. Rationale

When classified conversations are to be held using mobile devices the conversation needs to be appropriately protected through the use of encryption measures and a secure network.

11.4.10.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies intending to use mobile devices for the transmission of classified information MUST ensure that:

- the network has been certified and accredited for the purpose;
- all classified traffic that passes over mobile devices is appropriately encrypted; and
- users are aware of the area, surroundings, potential for overhearing and for oversight when using the device.

11.4.11. Mobile Device Physical Security

11.4.11.R.01. Rationale

Mobile devices are invariably software controlled and are subject to malware or other means of compromise. No “off-hook” or “power off” security can be effectively provided, vulnerabilities for secure areas. Secure areas are defined in Chapter 1 at 1.1.34.

11.4.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Mobile devices MUST be prevented from entering secure areas.

11.4.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD provide a storage area or lockers where mobile devices can be stored before personnel enter secure or protected areas.

12. PRODUCT SECURITY

12.1. Product Selection and Acquisition

OBJECTIVE

12.1.1. Products providing security functions for the protection of classified information are formally evaluated in order to provide a degree of assurance over the integrity and performance of the product.

CONTEXT

Scope

12.1.2. This section covers information on the selection and acquisition of any product that provide security functionality for the protection of information. It DOES NOT provide information on the selection or acquisition of products that do not provide security functionality or physical security products.

Selecting products without security functions

12.1.3. Agencies selecting products that do not provide a security function or selecting products that will not use their security functions are free to follow their own agency or departmental acquisition guidelines.

Product specific requirements

12.1.4. Where consumer guides exist for evaluated products, agencies should identify and assess any potential conflicts with this manual. Where further advice is required, consult the GCSB.

Convergence

12.1.5. Convergence is the integration of a number of discrete technologies into one product. Converged solutions can include the advantages and disadvantages of each discrete technology.

12.1.6. Most products will exhibit some element of convergence. When products have converged elements, agencies will need to comply with the relevant areas of this manual for the discrete technologies when deploying the converged product.

12.1.7. As an example, when agencies choose to use evaluated media, such as encrypted flash memory media, the requirements for evaluated products, media and cryptographic security apply.

Evaluated Products List

12.1.8. The Evaluated Products List (EPL) records products that have been, or are in the process of being, evaluated through one or more of the following schemes:

- Common Criteria;
- high assurance evaluation; or
- an Australasian Information Security Evaluation Program (AISEP) approved evaluation.

12.1.9. The AISEP Evaluated Products List (EPL) is maintained by the Australian Signals Directorate (ASD) (<http://www.asd.gov.au/infosec/epl/index.php>) and provides a listing of approved products for the protection of classified information. Other EPL's are available through the Common Criteria website.

Evaluation level mapping

12.1.10. The Information Technology Security Evaluation Criteria (ITSEC) and Common Criteria (CC) assurance levels used in the EPL are similar, but not identical, in their relationship. The table below shows the relationship between the two evaluation criteria.

12.1.11. This manual refers only to Common Criteria Evaluation Assurance Levels (EALs). The table below maps ITSEC evaluation assurance levels to Common Criteria EALs.

Criteria	Assurance level							
	N/A	EAL1	EAL2	EAL3	EAL4	EAL5	EAL6	EAL7
Common Criteria	N/A	EAL1	EAL2	EAL3	EAL4	EAL5	EAL6	EAL7
ITSEC	E0	N/A	E1	E2	E3	E4	E5	E6

Recognition arrangements

12.1.12. The AISEP programme has a number of recognition arrangements regarding evaluated products. Before choosing a product that has **not** been evaluated by the AISEP, agencies are encouraged to contact the GCSB to enquire whether the product will be recognised for New Zealand use once it has complete evaluation in a foreign scheme.

12.1.13. Two such recognition arrangements are for the Common Criteria Recognition Arrangement up to the assurance level of EAL4 with the lifecycle flaw remediation augmentation and for degausser products listed on the National Security Agency/Central Security Service's EPLD.

Australasian Information Security Evaluation Program (AISEP)

12.1.14. The AISEP exists to ensure that a range of evaluated products are available to meet the needs of Australian and New Zealand Government agencies.

12.1.15. The AISEP performs the following functions:

- evaluation and certification of products using the Common Criteria;
- continued maintenance of the assurance of evaluated products; and
- recognition of products evaluated by a foreign scheme with which the AISEP has a mutual recognition agreement (generally the Common Criteria Recognition Agreement – CCRA).

Protection Profiles

12.1.16. A Protection Profile (PP) describes the security functionality that must be included in a Common Criteria evaluation to meet a range of defined threats. PPs also define the activities to be taken to assess the security functions of a product. Agencies can have confidence that a product evaluated against an AISEP or GCSB approved PP address the defined threats. Approved PPs are published on the AISEP Evaluated Product List.

12.1.17. The introduction of PP's is to reduce the time required for evaluation, compared with the traditional approach to allow the AISEP to keep pace with the rapid evolution, production and release of security products and updates. Cryptographic security functionality is included in the scope of evaluation against an approved Protection Profile.

12.1.18. To facilitate the transition to AISEP approved Protection Profiles, a cap of Evaluation Assurance Level (EAL) 2 applies for all traditional AISEP (EAL based evaluations), including for technologies with no existing approved Protection Profile. EAL 2 is considered to represent a sensible trade-off between completion time and meaningful security assurance gains.

12.1.19. Evaluations conducted in other nations' Common Criteria schemes will continue to be recognised by the GCSB under the AISEP.

12.1.20. Some High Assurance evaluations continue to be conducted in European Approved Testing Facilities and continue to use the EAL rating scheme.

12.1.21. It is important that Agencies check the evaluation has examined the security enforcing functions by reviewing the target of evaluation/security target and other testing documentation.

12.1.22. The UK utilises several product evaluation schemes such as the CESG Assisted Products Service (CAPS), CESG Assured Service (CAS) and IT Security Evaluation Criteria (ITSEC). Agencies should consult the GCSB if further clarity on the utilisation of these evaluation schemes and products is required.

PRODUCT SELECTION

12.1.23. The diagram in Figure 5 below summarises the product selection process described in this chapter.

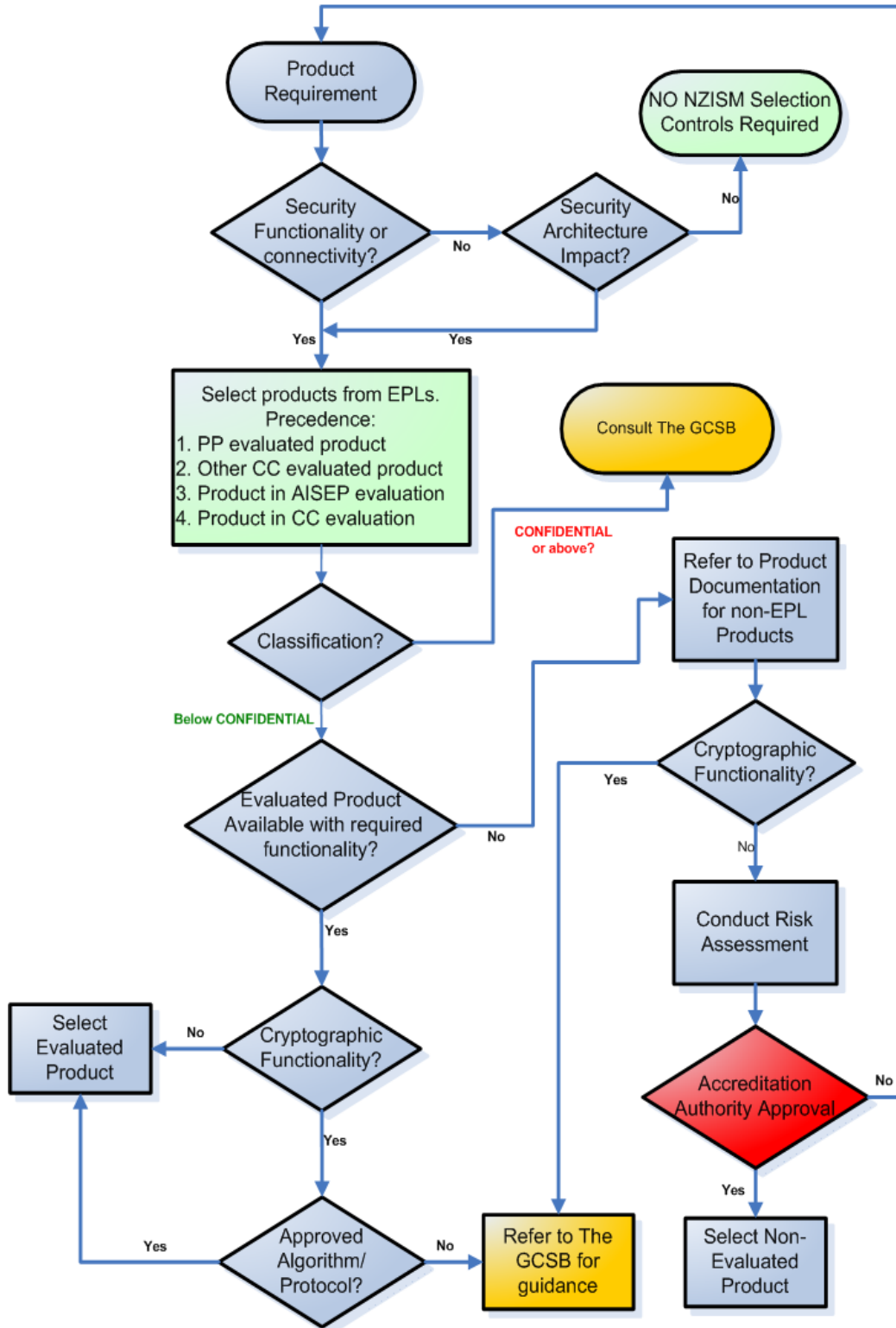


Figure 5 – Product Selection Guide

REFERENCES

Topic	Publisher	Source
Evaluated Products List (EPL)	ASD	http://www.asd.gov.au/infosec/epl/index.php
Australian Information Security Evaluation Program (AISEP)	ASD	http://www.asd.gov.au/infosec/aisep/index.htm
Common Criteria	CC	http://www.commoncriteriaportal.org
CESG Service Catalogue	CESG	https://www.cesg.gov.uk/servicecatalogue/Pages/index.aspx

RATIONALE & CONTROLS

12.1.24. Evaluated product selection preference order

12.1.24.R.01. Rationale

In selecting products for use, agencies should note that completed evaluations provide greater assurance than those products that are still undergoing evaluation or have not completed any formal evaluation activity. This assurance gradation is reflected in the preference order for selecting security products. If an agency selects a product that is ranked lower in the preference order, the justification for this decision **MUST** be recorded.

12.1.24.R.02. Rationale

For products that are currently in evaluation, agencies should select those that are undergoing evaluation through AISEP in preference to those being conducted in a recognised foreign scheme. If a major vulnerability is found during the course of an AISEP evaluation, the GCSB may advise agencies on appropriate risk reduction strategies.

12.1.24.R.03. Rationale

It is important to recognise that a product that is under evaluation has not, and might never, complete all relevant evaluation processes.

12.1.24.R.04. Rationale

Agencies should be aware that while this section provides a product selection preference order, policy stated elsewhere in this manual, or product specific advice from the GCSB, could override this standard by specifying more rigorous requirements for particular functions and device use.

12.1.24.R.05. Rationale

Additionally, where an EAL rating is mandated for a product to perform a cryptographic function for the protection of data at rest or in transit, as specified within Chapter 17 – Cryptography, products that have not completed an Approved Evaluation do not satisfy the requirement.

12.1.24.C.01. Control: **System Classification(s): C, S, TS; Compliance: MUST**

Agencies **MUST** select products in the following order of preference:

- a protection profile (PP) evaluated product;
- products having completed an evaluation through the AISEP or recognised under the Common Criteria Recognition Arrangement (CCRA);
- products in evaluation in the AISEP;
- products in evaluation in a scheme where the outcome will be recognised by the GCSB when the evaluation is complete; or
- If products do not fall within any of these categories, contact the GCSB.

12.1.24.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

When choosing a product, agencies MUST document the justification for any decision to choose a product that is still in evaluation and accept any security risk introduced by the use of such a product.

12.1.24.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD select products in the following order of preference:

- a protection profile (PP) evaluated product;
- products having completed an evaluation through the AISEP or recognised under the Common Criteria Recognition Arrangement (CCRA);
- products in evaluation in the AISEP;
- products in evaluation in a scheme where the outcome will be recognised by the GCSB when the evaluation is complete; or
- If products do not fall within any of these categories, normal selection criteria (such as functionality and security) will apply.

12.1.25. Evaluated product selection**12.1.25.R.01. Rationale**

A product listed on the EPL might not meet the security requirements of an agency. This could occur for a number of reasons, including that the scope of the evaluation is inappropriate for the intended use or the operational environment differs from that assumed in the evaluation. As such, an agency should ensure that a product is suitable by reviewing all available documentation. In the case of Common Criteria certified products, this documentation includes the protection profile, target of evaluation, security target, certification report, consumer guide and any caveats contained in the entry on the EPL.

12.1.25.R.02. Rationale

Products that are in evaluation will not have a certification report and may not have a published security target. A protection profile will, as a rule, exist. A draft security target can be obtained from the GCSB for products that are in evaluation through AISEP. For products that are in evaluation through a foreign scheme, the vendor can be contacted directly for further information.

12.1.25.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD select products that have their desired security functionality within the scope of the product's evaluation and are applicable to the agency's intended environment.

12.1.26. Product specific requirements

12.1.26.R.01. Rationale

Whilst this manual may recommend a minimum level of assurance in the evaluation of a product's security functionality not all evaluated products may be found suitable for their intended purpose even if they pass their Common Criteria evaluation. Typically such products will have cryptographic functionality that is not covered in sufficient depth under the Common Criteria. Where products have specific usage requirements, in addition to this manual, or supersede requirements in this manual, they will be outlined in the product's consumer guide.

12.1.26.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST check consumer guides for products, where available, to determine any product specific requirements.

12.1.26.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Where product specific requirements exist in a consumer guide, agencies MUST comply with the requirements outlined in the consumer guide.

12.1.26.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies selecting high assurance products and HGCE MUST contact the GCSB and comply with any product specific requirements, before any purchase is made.

12.1.27. Sourcing non-evaluated software

12.1.27.R.01. Rationale

Software downloaded from websites on the Internet can contain malicious code or malicious content that is installed along with the legitimate software. Agencies need to confirm the integrity of the software they are installing before deploying it on a system to ensure that no unintended software is installed at the same time.

12.1.27.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- obtain software from verifiable sources and verify its integrity using vendor supplied checksums; and
- validate the software's interaction with the operating systems and network within a test environment prior to use on operational systems.

12.1.28. Delivery of evaluated products

12.1.28.R.01. Rationale

It is important that agencies ensure that the selected product is the actual product received. If the product differs from the evaluated version, then NO assurance can be gained from an evaluation being previously performed.

12.1.28.R.02. Rationale

For products evaluated under the ITSEC or the Common Criteria scheme at EAL2 or higher, delivery information is available from the developer in the delivery procedures document.

12.1.28.R.03. Rationale

For products that do not have evaluated delivery procedures, it is recommended that agencies assess whether the vendor's delivery procedures are sufficient to maintain the integrity of the product.

12.1.28.R.04. Rationale

Other factors that the assessment of the delivery procedures for products might consider include:

- the intended environment of the product;
- likely attack vectors;
- the types of attackers that the product will defend against;
- the resources of any potential attackers;
- the likelihood of an attack;
- the level of importance of maintaining confidentiality of the product purchase; and
- the level of importance of ensuring adherence to delivery timeframes.

12.1.28.R.05. Rationale

Delivery procedures can vary greatly from product to product. For most products the standard commercial practice for packaging and delivery can be sufficient for agencies requirements. More secure delivery procedures can include measures to detect tampering or masquerading. Some examples of specific security measures include tamper evident seals, cryptographic checksums and signatures, and secure transportation.

12.1.28.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies procuring high assurance products and HGCE MUST contact the GCSB and comply with any product specific delivery procedures.

12.1.28.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that products are delivered in a manner consistent with any delivery procedures defined in associated documentation.

12.1.29. Delivery of non-evaluated products

12.1.29.R.01. Rationale

When a non-evaluated product is purchased agencies should determine if the product has arrived in a state that they were expecting it to and that there are no obvious signs of tampering.

12.1.29.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that products purchased without the delivery assurances provided through the use of formally evaluated procedures are delivered in a manner that provides confidence that they receive the product that they expect to receive in an unaltered state, including checking:

- any labelling changes;
- any damage; and
- any signs of tampering.

12.1.30. Leasing arrangements

12.1.30.R.01. Rationale

Agencies should consider security and policy requirements when entering into a leasing agreement for IT equipment in order to avoid potential information security incidents during maintenance, repairs or disposal processes.

12.1.30.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that leasing agreements for IT equipment takes into account the:

- difficulties that could be encountered when the equipment needs maintenance;
- control of remote maintenance, software updates and fault diagnosis;
- if the equipment can be easily sanitised prior to its return; and
- the possible requirement for destruction if sanitisation cannot be performed.

12.1.31. Ongoing maintenance of assurance

12.1.31.R.01. Rationale

Developers that have demonstrated a commitment to ongoing maintenance or evaluation are more likely to be responsive to ensuring that security patches are independently assessed.

12.1.31.R.02. Rationale

A vendor's commitment to assurance continuity can be gauged through the number of evaluations undertaken and whether assurance maintenance has been performed on previous evaluations.

12.1.31.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD choose products from developers that have made a commitment to the ongoing maintenance of the assurance of their product.

12.2. Product Installation and Configuration

OBJECTIVE

12.2.1. Evaluated products use evaluated configurations.

CONTEXT

Scope

12.2.2. This section covers information on installing and configuring products providing security functionality. It does not provide information on the installation and configuration of general products or physical security products.

Evaluated configuration

12.2.3. A product is considered to be operating in its evaluated configuration if:

- functionality is used that was within the scope of the evaluation and implemented in the specified manner;
- only patches that have been assessed through a formal assurance continuity process have been applied; and
- the environment complies with assumptions or organisational security policies stated in the product's security target or similar document.

Unevaluated configuration

12.2.4. A product is considered to be operating in an unevaluated configuration when it does not meet the requirements of an evaluated configuration.

RATIONALE & CONTROLS

12.2.5. Installation and configuration of evaluated products

12.2.5.R.01. Rationale

An evaluation of products provides assurance that the product will work as expected with a clearly defined set of constraints. These constraints, defined by the scope of the evaluation, generally consist of what security functionality can be used, and how the products are configured and operated.

12.2.5.R.02. Rationale

Using an evaluated product in manner which it was not intended could result in the introduction of new threats and vulnerabilities that were not considered by the initial evaluation.

12.2.5.R.03. Rationale

For products evaluated under the Common Criteria and ITSEC, information is available from the developer in the product's installation, generation and startup documentation. Further information is also available in the security target and certification report.

12.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that high assurance products and HGCE are installed, configured, operated and administered in accordance with all product specific policy.

12.2.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD install, configure, operate and administer evaluated products in accordance with available documentation resulting from the product's evaluation.

12.2.6. Use of evaluated products in unevaluated configurations

12.2.6.R.01. Rationale

To ensure that a product will still provide the assurance desired by the agency when used in a manner for which it was not intended, a security risk assessment MUST be conducted upon the altered configuration. The further that a product deviates from its evaluated configuration, the less assurance can be gained from the evaluation.

12.2.6.R.02. Rationale

Given the potential threat vectors and the value of the classified information being protected, high assurance products and HGCE MUST be configured in accordance with the GCSB's guidelines.

12.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies wishing to use a product in an unevaluated configuration MUST undertake a security risk assessment including:

- the necessity of the unevaluated configuration;
- testing of the unevaluated configuration; and
- the environment in which the unevaluated product is to be used.

12.2.6.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

High assurance products and HGCE MUST NOT be used in unevaluated configurations.

12.3. Product Classifying and Labelling

OBJECTIVE

12.3.1. IT equipment is classified and appropriately labelled.

CONTEXT

Scope

12.3.2. This section covers information relating to the classification and labelling of both evaluated and non-evaluated IT equipment.

Non-essential labels

12.3.3. Non-essential labels are labels other than classification and asset labels.

RATIONALE & CONTROLS

12.3.4. Classifying IT equipment

12.3.4.R.01. Rationale

Much of today's technology incorporates an internal data storage capability. When media is used in IT equipment there is no guarantee that the equipment has not automatically accessed classified information from the media and stored it locally to the device, without the knowledge of the system user. As such, the IT equipment needs to be afforded the same degree of protection as that of the associated media.

12.3.4.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies MUST classify IT equipment based on the highest classification of information the equipment and any associated media within the equipment, are approved for processing, storing or communicating.

12.3.5. Labelling IT equipment

12.3.5.R.01. Rationale

The purpose of applying protective markings to all assets in a secure area is to reduce the likelihood that a system user will accidentally input classified information into another system residing in the same area that is of a lower classification than the information itself.

12.3.5.R.02. Rationale

Applying protective markings to assets also assists in determining the appropriate usage, sanitisation, disposal or destruction requirements of the asset based on its classification. This is of particular importance in data centres and computer rooms.

12.3.5.C.01. Control: **System Classification(s): C, S, TS; Compliance: MUST**

Agencies MUST clearly label all IT equipment capable of storing or processing classified information, with the exception of HGCE, with the appropriate protective marking.

12.3.5.C.02. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies MUST clearly label all IT equipment in data centres or computer rooms with an asset identification and the level of classification to which that equipment has been accredited.

12.3.6. Labelling high assurance products

12.3.6.R.01. Rationale

High assurance products often have tamper-evident seals placed on their external surfaces. To assist system users in noticing changes to the seals, and to prevent functionality being degraded, agencies **MUST** limit the use of non-essential labels.

12.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies **MUST NOT** have any non-essential labels applied to external surfaces of high assurance products.

12.3.7. Labelling HGCE

12.3.7.R.01. Rationale

HGCE often have tamper-evident seals placed on their external surfaces. To assist system users in noticing changes to the seals, and to prevent functionality being degraded, agencies **MUST** only place seals on equipment with GCSB approval.

12.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies **SHOULD** seek GCSB authorisation before applying labels to external surfaces of HGCE.

12.4. Product Patching and Updating

OBJECTIVE

12.4.1. To ensure security patches are applied in a timely fashion to manage software and firmware corrections, vulnerabilities and performance risks.

CONTEXT

Scope

12.4.2. This section covers information on patching both evaluated and non-evaluated software and IT equipment.

RATIONALE & CONTROLS

12.4.3. Vulnerabilities and patch availability awareness

12.4.3.R.01. Rationale

It is important that agencies monitor relevant sources for information about new vulnerabilities and security patches. This way, agencies can take pro-active steps to address vulnerabilities in their systems.

12.4.3.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD monitor relevant sources for information about new vulnerabilities and security patches for software and IT equipment used by the agency.

12.4.4. Patching vulnerabilities in products

12.4.4.R.01. Rationale

The assurance provided by an evaluation is related to the date at which the results were issued. Over the course of a normal product lifecycle, patches are released to address known security vulnerabilities. Applying these patches should be considered as part of an agency's overall risk management strategy.

12.4.4.R.02. Rationale

Given the potential threat vectors and the value of the classified information being protected, high assurance products MUST NOT be patched by an agency without specific direction from the GCSB. If a patch is released for a high assurance product, the GCSB will conduct an assessment of the patch and might revise the product's usage guidance. Likewise, for patches released for HGCE, the GCSB will subsequently conduct an assessment of the cryptographic vulnerability and might revise usage guidance in the consumer guide for the product.

12.4.4.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST apply all critical security patches as soon as possible and within two (2) days of the release of the patch or update.

12.4.4.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST implement a patch management strategy, including an evaluation or testing process.

12.4.4.C.03. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT patch high assurance products or HGCE without the patch being approved by the GCSB.

12.4.4.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies MUST apply all critical security patches as soon as possible and preferably within two (2) days of the release of the patch or update.

12.4.4.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD apply all non-critical security patches as soon as possible.

12.4.4.C.06. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD ensure that security patches are applied through a vendor recommended patch or upgrade process.

12.4.5. When security patches are not available

12.4.5.R.01. Rationale

When a security patch is not available for a known vulnerability, there are a number of approaches to reducing the risk to a system. This includes resolving the vulnerability through alternative means, preventing exploitation of the vulnerability, containing the exploit or implementing measures to detect attacks attempting to exploit the vulnerability.

12.4.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where known vulnerabilities cannot be patched, or security patches are not available, agencies SHOULD implement:

- controls to resolve the vulnerability such as:
 - disable the functionality associated with the vulnerability through product configuration;
 - ask the vendor for an alternative method of managing the vulnerability;
 - install a version of the product that does not have the identified vulnerability;
 - install a different product with a more responsive vendor; or
 - engage a software developer to correct the software.
- controls to prevent exploitation of the vulnerability including:
 - apply external input sanitisation (if an input triggers the exploit);
 - apply filtering or verification on the software output (if the exploit relates to an information disclosure);
 - apply additional access controls that prevent access to the vulnerability; or
 - configure firewall rules to limit access to the vulnerable software.
- controls to contain the exploit including:
 - apply firewall rules limiting outward traffic that is likely in the event of an exploitation;
 - apply mandatory access control preventing the execution of exploitation code; or
 - set filesystem permissions preventing exploitation code from being written to disk;
 - white and blacklisting to prevent code execution; and

- controls to detect attacks including:
 - deploy an IDS;
 - monitor logging alerts; or
 - use other mechanisms as appropriate for the detection of exploits using the known vulnerability.
- controls to prevent attacks including:
 - deploy an IPS or HIPS; or
 - use other mechanisms as appropriate for the diversion of exploits using the known vulnerability, such as honey pots and Null routers.

12.4.6. Firmware updates

12.4.6.R.01. Rationale

As firmware provides the underlying functionality for hardware it is essential that the integrity of any firmware images or updates are maintained.

12.4.6.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies **MUST** ensure that any firmware updates are performed in a manner that verifies the integrity and authenticity of the source and of the updating process.

12.4.7. Unsupported products

12.4.7.R.01. Rationale

Once a cessation date for support is announced for software or IT equipment, agencies will increasingly find it difficult to protect against vulnerabilities found in the software or IT equipment as no security patches will be made available by the manufacturer. Once a cessation date for support is announced agencies should investigate new solutions that will be appropriately supported and establish a plan to implement the new solution.

12.4.7.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies **SHOULD** assess the security risk of using software or IT equipment when a cessation date for support is announced or when the product is no longer supported by the developer.

12.5. Product Maintenance and Repairs

OBJECTIVE

12.5.1. Products are repaired by cleared or appropriately escorted personnel.

CONTEXT

Scope

12.5.2. This section covers information on maintaining and repairing both evaluated and non-evaluated IT equipment.

RATIONALE & CONTROLS

12.5.3. Maintenance and repairs

12.5.3.R.01. Rationale

Making unauthorised repairs to high assurance products or HGCE can impact the integrity of the product or equipment.

12.5.3.R.02. Rationale

Using cleared technicians on-site at an agency's facilities is considered the most desired approach to maintaining and repairing IT equipment. This ensures that if classified information is disclosed during the course of maintenance or repairs, the technicians are aware of the protection requirements for the information.

12.5.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST seek GCSB approval before undertaking any repairs to high assurance products or HGCE.

12.5.3.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Maintenance and repairs of IT equipment containing media SHOULD be carried out on-site by an appropriately cleared technician.

12.5.4. Maintenance and repairs by an uncleared technician

12.5.4.R.01. Rationale

Agencies choosing to use uncleared technicians to maintain or repair IT equipment on-site at an agency's facilities, or off-site at a company's facilities, should be aware of the requirement for cleared personnel to escort the uncleared technicians during maintenance or repair activities.

12.5.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

If an uncleared technician is used to undertake maintenance or repairs of IT equipment, the technician MUST be escorted by someone who:

- is appropriately cleared and briefed;
- takes due care to ensure that classified information is not disclosed;
- takes all responsible measures to ensure the integrity of the equipment; and
- has the authority to direct the technician.

12.5.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

If an uncleared technician is used to undertake maintenance or repairs of IT equipment, agencies SHOULD sanitise and reclassify or declassify the equipment and associated media before maintenance or repair work is undertaken.

12.5.4.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that the ratio of escorts to uncleared technicians allows for appropriate oversight of all activities.

12.5.4.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

If an uncleared technician is used to undertake maintenance or repairs of IT equipment, the technician SHOULD be escorted by someone who is sufficiently familiar with the product to understand the work being performed.

12.5.5. Off-site maintenance and repairs**12.5.5.R.01. Rationale**

Agencies choosing to have IT equipment maintained or repaired off-site need to be aware of requirements for the company's off-site facilities to be approved to process and store the products at the appropriate classification.

Agencies choosing to have IT equipment maintained or repaired off-site can sanitise, declassify or lower the classification of the product prior to transport and subsequent maintenance or repair activities, to lower the physical transfer, processing and storage requirements.

12.5.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies having IT equipment maintained or repaired off-site MUST ensure that the physical transfer, processing and storage requirements are appropriate for the classification of the product and are maintained at all times.

12.5.6. Maintenance and repair of IT equipment from secured spaces**12.5.6.R.01. Rationale**

Where equipment is maintained or repaired offsite, agencies should identify any co-located equipment of a higher classification. This higher classification equipment may be at risk of compromise from modifications or repairs to the lower classification equipment.

12.5.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Offsite repairs and maintenance SHOULD treat all equipment in accordance with the requirements for the highest classification of information processed, stored or communicated in the area that the equipment will be returned to.

12.5.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD conduct or arrange to have technical inspections conducted on all equipment returned to the secure area after maintenance or repair.

12.6. Product Sanitisation and Disposal

OBJECTIVE

12.6.1. IT equipment is sanitised and disposed of in an approved manner.

CONTEXT

Scope

12.6.2. This section covers information on sanitising and disposing of both evaluated and non-evaluated IT equipment. Additional information on the sanitisation, destruction and disposal of media can be found in Chapter 13 – Decommissioning and Disposal.

12.6.3. Media typically found within IT equipment are electrostatic memory devices such as laser printer cartridges and photocopier drums, non-volatile magnetic memory such as hard disks, non-volatile semi-conductor memory such as flash cards and volatile memory such as RAM cards.

RATIONALE & CONTROLS

12.6.4. Sanitisation or destruction of IT equipment

12.6.4.R.01. Rationale

In order to prevent the disclosure of classified information into the public domain agencies will need to ensure that IT equipment is either sanitised or destroyed before being declassified and authorised for release into the public domain.

12.6.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST sanitise or destroy, then declassify, IT equipment containing media before disposal.

12.6.4.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

IT equipment and associated media that have processed or stored NZEO information, and cannot be sanitised, MUST be returned to New Zealand for sanitisation or destruction, declassification and disposal.

12.6.5. Disposal of IT equipment

12.6.5.R.01. Rationale

When disposing of IT equipment, agencies need to sanitise or destroy and subsequently declassify any media within the product that are capable of storing classified information. Once the media have been removed from the product it can be considered sanitised. Following subsequent approval for declassification from the owner of the information previously processed by the product, it can be disposed of by the agency.

12.6.5.R.02. Rationale

The GCSB provides specific advice on how to securely dispose of high assurance products, HGCE and TEMPEST rated equipment. There are a number of security risks that can occur due to improper disposal, including providing an attacker with an opportunity to gain insight into government capabilities.

12.6.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST have a documented process for the disposal of IT equipment.

12.6.5.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST contact the GCSB and comply with any requirements for the disposal of high assurance products.

12.6.5.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST contact the GCSB and comply with any requirements for the disposal of HGCE.

12.6.5.C.04. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST contact GCSB and comply with any requirements for the disposal of TEMPEST rated IT equipment or if the equipment is non-functional.

12.6.5.C.05. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST formally sanitise and then authorise the disposal of IT equipment, or waste, into the public domain.

12.6.6. Sanitising printer cartridges and copier drums

12.6.6.R.01. Rationale

Electrostatic drums can retain an image of recently printed documents providing opportunity for unauthorised access to information. Some printer cartridges may have integrated drums. Printing random text with no blank areas on each colour printer cartridge or drum ensures that no residual information will be kept on the drum or cartridge.

12.6.6.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST print at least three pages of random text with no blank areas on each colour printer cartridge with an integrated drum or separate copier drum.

12.6.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD print at least three pages of random text with no blank areas on each colour printer cartridge with an integrated drum or separate copier drum.

12.6.7. Destroying printer cartridges and copier drums

12.6.7.R.01. Rationale

When printer cartridges with integrated copier drums or discrete drums cannot be sanitised due to a hardware failure, or when they are empty, there is no other option available but to destroy them.

12.6.7.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies unable to sanitise printer cartridges with integrated copier drums or discrete copier drums, MUST destroy the cartridge or drum.

12.6.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies unable to sanitise printer cartridges with integrated copier drums or discrete copier drums, SHOULD destroy the cartridge or drum.

12.6.8. Disposal of televisions and monitors

12.6.8.R.01. Rationale

Turning up the brightness to the maximum level on video screens will allow agencies to easily determine if information has been burnt in or persists upon the screen.

12.6.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST visually inspect video screens by turning up the brightness to the maximum level to determine if any classified information has been burnt into or persists on the screen.

12.6.9. Sanitising televisions and monitors

12.6.9.R.01. Rationale

All types of video screens are capable of retaining classified information on the screen if appropriate mitigation measures are not taken during the lifetime of the screen. CRT monitors and plasma screens can be affected by burn-in whilst LCD screens can be affected by image persistence.

12.6.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST attempt to sanitise video screens with minor burn-in or image persistence by displaying a solid white image on the screen for an extended period of time.

12.7. Supply Chain

OBJECTIVE

12.7.1. Technology supply chains are established and managed to ensure continuity of supply and protection of sensitive related information.

CONTEXT

12.7.2. A supply chain is the movement of materials as they move from their source (raw materials) through manufacture to the end customer. A supply chain can include materials acquisition, purchasing, design, manufacturing, warehousing, transportation, customer service, and supply chain management. It requires people, information and resources to move a product from manufacturer to supplier to customer. Every supply chain carries some risk which may include product protection; counterfeit products and goods and defective products. ICT supply chains are invariably global and complex.

12.7.3. Relationships with external service providers are established in a variety of ways, for example, through joint ventures, business partnerships, outsourcing arrangements (e.g. through supply contracts, interagency agreements, lines of business arrangements, service-level agreements), licensing agreements, and/or supply chain exchanges. The growing use of external service providers and new relationships being established with those providers present new and difficult challenges for organisations, especially in the area of information system security. These challenges include:

- Defining the types of external information system services provided to organisations;
- Describing how those external services are protected; and
- Obtaining the necessary assurances that the risks to organisational operations and assets, individuals, other organisations, and national security arising from the use of the external services are acceptable.

12.7.4. The degree of confidence that the risk from using external services is at an acceptable level depends on the assurance external organisations provide and trust that organisations place in external service providers. In some cases, the level of trust is based on the amount of direct control organisations are able to exert on external service providers in the use of security controls and assurance on the effectiveness of those controls.

12.7.5. The level of control is usually established by the terms and conditions of the contracts or service-level agreements with the external service providers and can range from extensive control (e.g., negotiating contracts or agreements that specify detailed security requirements for the providers) to very limited control (e.g., using contracts or service-level agreements to obtain commodity services such as commercial telecommunications services).

12.7.6. From an Information Assurance viewpoint, there are five key aspects to supply chain risk:

1. Protection of sensitive information and systems;
2. Continuity of supply;
3. Product assurance;
4. Security validation; and
5. National Procurement Policy

Protection of Sensitive Information and Systems

12.7.7. This relates to the security of the supply chain, products and information relating to the intended use, purchaser, location and type of equipment.

Continuity of Supply

12.7.8. This is the traditional set of risks associated with supply chain. As supply chains have globalised and components are sourced from a number of countries, a disruption to supply may have a global effect.

Product Assurance

12.7.9. This relates to assurance that the product, technology or device performs as designed and specified and includes the provenance of the product, equipment, or device.

Security Validation

12.7.10. Security validation checks the performance and security of the equipment. The security design elements and features of the equipment or product will need to be separately considered from any operational drivers.

National Procurement Policy

12.7.11. All agencies are required to follow the guidance of the Government Rules of Procurement. Some exemptions are permitted under Rule 13 including that of security, “essential security interests: Measures necessary for the protection of essential security interests, procurement indispensable for national security or for national defence...”. Care must be taken to follow these rules wherever possible.

Scope

12.7.12. This manual provides additional guidance for managing supply chain security risks associated with the acquisition (lease or purchase) of ICT equipment or services for use in NZ Government systems.

REFERENCES

12.7.13. While NOT an exhaustive list, further information on procurement and supply chain can be found at:

Title	Publisher	Source
Government Use of Offshore Information and Communication Technologies (ICT) Service Providers - Advice on Risk Management April 2009	State Services Commission	http://ict.govt.nz/assets/ICT-System-Assurance/offshore-ICT-service-providers-april-2009.pdf
The new Government Rules of Sourcing	Procurement.govt.NZ	http://www.business.govt.nz/procurement/for-agencies/key-guidance-for-agencies/the-new-government-rules-of-sourcing
Government Rules of Sourcing - Rules for planning your procurement, approaching the market and contracting	Ministry of Business Innovation and Employment	http://www.business.govt.nz/procurement/pdf-library/agencies/rules-of-sourcing/government-rules-of-sourcing-April-2013.pdf
Special Publication 800-161, Supply Chain Risk Management	Computer Security Division, Information Technology Laboratory, National Institute of Standards and Technology (NIST)	http://csrc.nist.gov/publications/drafts/800-161/sp800_161_draft.pdf
Special Publication 800-53 Revision 4, Security and Privacy Controls for Federal Information Systems and Organizations	NIST	http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r4.pdf
NISTIR 7622, Notional Supply Chain Risk Practices for Federal Information Systems	NIST	http://nvlpubs.nist.gov/nistpubs/ir/2012/NIST.IR.7622.pdf
Commercial Procurement & Relationships	UK Cabinet Office	https://www.gov.uk/government/organisations/cabinet-office
CIO Council Government ICT Offshoring (International Sourcing) Guidance	UK Cabinet Office	https://www.gov.uk/government/publications/government-ict-offshoring-international-sourcing-guidance

Reference	Publisher	Source
Commonwealth Procurement Rules	Department of Finance and Deregulation (Financial Management Group)	http://www.finance.gov.au/procurement/docs/cpr_commonwealth_procurement_rules_july_2012.pdf
ISO 31000:2009 , Risk management – Principles and guidelines	ISO / IEC Standards NZ	http://www.iso.org http://www.standards.co.nz
HB 231:2004, Information Security Risk Management Guidelines.	Standards NZ	http://www.standards.co.nz
ISO Guide 73:2009 , Risk management - Vocabulary	ISO / IEC Standards NZ	http://www.iso.org http://www.standards.co.nz
ISO/IEC 31010:2009 , Risk management – Risk assessment techniques	ISO / IEC Standards NZ	http://www.iso.org http://www.standards.co.nz
ISO/IEC_27002:2013, Information technology – Security techniques – Code of practice for information security controls	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27002.html http://www.standards.co.nz
ISO/IEC_27005:2012 Information Technology – Security Techniques - Information Security Risk Management	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27005.html http://www.standards.co.nz
ISO 28000 supply chain security management system standard	ISO / IEC Standards NZ	http://www.iso.org http://www.standards.co.nz

RATIONALE & CONTROLS

12.7.14. Risk Management

12.7.14.R.01. Rationale

ICT supply chains can introduce particular risks to an agency. In order to manage these risks, in addition to other identified ICT risks, supply chain risks are incorporated into an agency's assessment of risk and the Security Risk Management Plan (SRMP). Identified risks are managed through the procurement process and through technical checks and controls (See Section 4.3 – Security Risk Management Plans and Chapter 5 – System Certification and Accreditation).

12.7.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD incorporate the consideration of supply chain risks into an organisation-wide risk assessment and management process.

12.7.14.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD monitor supply chain risks on an ongoing basis and adjust mitigations and controls appropriately.

12.7.14.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD follow the Government Rules of Procurement.

12.7.15. Contractor or Supplier Capability

12.7.15.R.01. Rationale

Agencies can assess the capability of a contractor and any subcontractors to meet their security of information, supply and product requirements.

12.7.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD require tenderers and contractors to provide information:

- identifying any restrictions on the disclosure, transfer or use of technology arising out of export controls or security arrangements; and
- demonstrating that their supply chains comply with the security of supply requirements set out in the contract documents.

12.7.15.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD request information from contractors and subcontractors to assess their ability to protect information.

12.7.16. Security of Information

12.7.16.R.01. Rationale

After conducting a risk assessment, agencies and suppliers have the means and capability to protect classified information throughout the tendering and contracting process

12.7.16.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST include contractual obligations on all contractors and subcontractors to safeguard information throughout the tendering and contracting procedure.

12.7.16.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD include contractual obligations to safeguard information throughout the tendering and contracting procedure.

12.7.16.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD reject contractors and subcontractors where they do not possess the necessary reliability to exclude risks to national security; or have breached obligations relating to security of information during a previous contract in circumstances amounting to grave misconduct.

12.7.17. Continuity of Supply

12.7.17.R.01. Rationale

You can also require suppliers to provide commitments on the continuity of supply. These can include commitments from the supplier to ensure:

- delivery time;
- stock levels;
- visibility of the supply chain; and
- supply chain resilience.

12.7.17.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that changes in their supply chain during the performance of the contract will not adversely affect the continuity of supply requirements.

12.7.18. Product Assurance

12.7.18.R.01. Rationale

In addition to the product selection and acquisition guidance in this section, agencies are able to identify and mitigate risks through supply chain visibility, provenance, security validation and pre-installation tests and checks.

12.7.18.R.02. Rationale

Agencies, with the cooperation of their suppliers, should establish the provenance of any products and equipment. Provenance is defined as a record of the origin, history, specification changes and supply path of the products or equipment.

12.7.18.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST require suppliers and contractors to provide the provenance of any products or equipment.

12.7.18.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD require suppliers and contractors to provide the provenance of any products or equipment.

12.7.19. Security validation

12.7.19.R.01. Rationale

Validation of the performance and security of the equipment is a vital part of the ongoing integrity and security of agency systems. The security design elements and features of the equipment or product will need to be separately considered from any operational drivers. Where compromises in security performance, capability or functionality are apparent, additional risk mitigation, controls and countermeasures may be necessary.

12.7.19.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD validate the security of the equipment against security performance, capability and functionality requirements.

12.7.19.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where deficiencies in security performance, capability and functionality are identified, agencies SHOULD implement additional risk mitigation measures.

12.7.20. Pre-Installation Tests and Checks

12.7.20.R.01. Rationale

An essential part of quality and security assurance is the delivery inspection, pre-installation and functional testing of any equipment. In particular, large systems that integrate equipment from different suppliers or that have specialised configuration and operational characteristics may require additional testing to provide assurance that large scale disruptions and security compromises are avoided.

12.7.20.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST consult with the GCSB on pre-installation, security verification and related tests before the equipment is used in an operational system.

12.7.20.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD inspect equipment on receipt for any obvious signs of tampering, relabelling or damage.

12.7.20.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD inspect equipment on receipt and test the operation before installation.

12.7.20.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD conduct installation verification and related tests before the equipment is used in an operational system.

12.7.20.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where any software, firmware or other forms of programme code are required for the initialisation, operation, servicing or maintenance of the equipment, malware checks SHOULD be conducted before the equipment is installed in an operational system.

12.7.21. Equipment Servicing**12.7.21.R.01. Rationale**

Some larger or complex systems can have dependencies on particular infrastructures, equipment, software or configurations. Although these types of systems can be less flexible in responding to the rapid changes in technologies, the risks are outweighed by the functionality of the system. In such cases, the continuing support and maintenance of essential components is vital.

12.7.21.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

For equipment that is expected to have an extended operational life in a critical system, agencies SHOULD provide for the acquisition of necessary licences and information to produce spare parts, components, assemblies, testing equipment and technical assistance agreements in the event that the supplier is no longer able to supply the equipment, products and essential spares.

13. DECOMMISSIONING AND DISPOSAL

13.1. System Decommissioning

OBJECTIVE

13.1.1. To ensure systems are safely decommissioned and that software, system logic and data are properly transitioned to new systems or archived in accordance with agency, legal and statutory requirements.

CONTEXT

Scope

13.1.2. This section discusses the retirement and safe decommissioning of systems. Specific requirements on media handling, usage, sanitisation, destruction and disposal are discussed later in this chapter. System decommissioning is the retirement or termination of a system and its operations. System decommissioning does NOT deal with the theft or loss of equipment.

Definitions

13.1.3. A system decommissioning will have the one or more of the following characteristics:

- Ending a capability completely i.e. no migration, redevelopment or new version of a capability occurs;
- Combining parts of existing capabilities services into a new, different system;
- As part of wider redesign, where a capability is no longer provided and is decommissioned or merged with other capabilities or systems.

13.1.4. ICT requirements evolve as business needs change and technology advances. In some cases this will lead to the retirement and decommissioning of obsolete systems or systems surplus to requirements.

13.1.5. Security requires a structured approach to decommissioning in order to cease information system operations in a planned, orderly and secure manner. It is also important that the approach for decommissioning systems is consistent and coordinated. Sanitisation is important to eliminate any remnant data that could be retrieved by unauthorised parties. These procedures include the following:

- A migration plan;
- A decommissioning plan;
- Archiving;
- Safe disposal of equipment and media; and
- Audit and final signoff.

13.1.6. As a final step, a review of the decommissioning should be undertaken to ensure no important elements, data or equipment have been overlooked.

REFERENCES

Title	Publisher	Source
Risk Management And Accreditation Of Information Systems Also Released As HMG Infosec Standard No. 2, August 2005	UK Centre for the Protection of National Infrastructure (CPNI)	http://www.cpni.gov.uk/Documents/Publications/2005/2005003-Risk_management.pdf
NIST Special Publication 800-88 Guidelines for Media Sanitization, draft Rev.1, September, 2012	National Institute of Standards and Technology (NIST), U.S. Department of Commerce	http://csrc.nist.gov/publications/PubsDrafts.html#SP-800-88-Rev.%201
Better Practice Checklist – Decommissioning Government Websites, March 2011	Australian Government Information Management Office (AGIMO)	http://agict.gov.au/policy-guides-procurement/better-practice-checklists-guidance/bpc-decommissioning

RATIONALE AND CONTROLS

13.1.7. Agency Policy

13.1.7.R.01. Rationale

Information systems are often supported by service and supply contracts and may also be subject to obligations to provide a service, capability or information. Decommissioning of a system will require the termination of these contracts and service obligations. Other aspects of system decommissioning may be subject to security, regulatory or legislative requirements. An Agency policy will provide a comprehensive approach to system decommissioning from the inception of a system, thus facilitating the termination of supply contracts and service obligations while managing any risks to the Agency.

13.1.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

When the Information System reaches the end of its service life in an organisation, policy and procedures SHOULD be in place to ensure secure decommissioning and transfer or disposal, in order to satisfy corporate, legal and statutory requirements.

13.1.8. Migration plan

13.1.8.R.01. Rationale

Once the decision to decommission a system has been taken, it is important to migrate processes, data, users and licences to replacement systems or to cease activities in an orderly fashion. It is also important to carefully plan the decommissioning process in order to avoid disruption to other systems, ensure business continuity, ensure security, protect privacy and meet any archive and other regulatory and legislative requirements. The basis of a decommissioning plan is a risk assessment.

13.1.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD undertake a risk assessment with consideration given to proportionality in respect of scale and impact of the processes, data, users and licences system and service to be migrated or decommissioned.

13.1.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

The risk assessment SHOULD include the following elements:

- Evaluation of the applications inventory and identification of any redundancies;
- Identification of data owners and key stakeholders;
- Identification of types of information (Active or Inactive) processed and stored;
- Identification of software and other (including non-transferable) licences;
- Identification of access rights to be transferred or cancelled;
- Identification of any emanation control equipment or security enhancements;
- Consideration of short and long term reporting requirements;
- Assessment of equipment and hardware for redeployment or disposal; and
- User re-training.

13.1.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD consider the need for a Privacy Impact Assessment.

13.1.8.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD identify relevant service and legal agreements and arrange for their termination.

13.1.9. Decommissioning plan

13.1.9.R.01. Rationale

The decommissioning of a system can be a complex process. A decommissioning plan is an important tool in properly managing the safe decommissioning of a system and in providing reasonable assurance that due process and agency policy has been followed.

13.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The decommissioning plan will be based on the migration plan and SHOULD incorporate the following elements:

- An impact analysis;
- Issue of notification to service providers, users and customers;
- Issue of notification of decommissioning to all relevant interfaces and interconnections;
- Timeframe, plan and schedule;
- Data integrity and validation checks before archiving;
- Transfer or redeployment of equipment and other assets;
- Transfer or cancellation of licences;
- Removal of redundant equipment and software;
- Removal of redundant cables and termination equipment;
- Removal of any emanation control equipment or security enhancements;
- Return or safe disposal of any emanation control equipment or security enhancements;
- Updates to systems configurations (switches, firewalls etc.);
- Equipment and media sanitisation (discussed later in this chapter);
- Equipment and media disposal (discussed later in this chapter);
- Any legal considerations for supply or service contract terminations;
- Asset register updates; and
- Retraining for, or redeployment of, support staff.

13.1.10. Archiving

13.1.10.R.01. Rationale

Availability and integrity requirements in respect of information may persist for legal and other statutory or compliance reasons and require transfer to other ownership or custodianship for archive purposes. This will also require assurance that the data can continue to be accessed when required (availability) and assurance that it remains unchanged (integrity).

13.1.10.R.02. Rationale

Confidentiality requirements must also be considered. If an information system has been processing sensitive information or contains sensitive security components, which attract special handling requirements, it will require robust purging and overwrites or destruction. There are a number of methods and proprietary products available for such purposes.

13.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD Agencies SHOULD identify data retention policies, regulation and legislation.

13.1.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD Agencies SHOULD ensure adequate system documentation is archived.

13.1.10.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD Agencies SHOULD archive essential software, system logic, and other system data to allow information to be recovered from archive to ensure adequate system documentation is archived.

13.1.11. Audit and Final signoff

13.1.11.R.01. Rationale

Update the organisation's tracking and management systems to identify the specific information system components that are being removed from the inventory. To comply with governance, asset management and audit requirements, the Agency's Accreditation Authority will certify that appropriate processes have been followed. This demonstrates good governance and avoids privacy breaches.

13.1.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD The Agency's Accreditation Authority SHOULD confirm IA compliance on decommissioning and disposal.

13.1.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD The Agency's Accreditation Authority SHOULD confirm secure equipment and media disposal.

13.1.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD The Agency's Accreditation Authority SHOULD confirm asset register updates.

13.1.11.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Once all security relevant activities associated with decommissioning and disposal have been completed and verified, a Security Decommissioning Compliance Certificate SHOULD be issued by the Agency's Accreditation Authority.

13.1.12. Final Review**13.1.12.R.01. Rationale**

As a final step, a review of the decommissioning should be undertaken to ensure no important elements, data, equipment, contractual or legislative, obligations have been overlooked.

13.1.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD undertake a post-decommissioning review.

13.2. Media Handling

OBJECTIVE

13.2.1. Media is properly classified, labelled and registered in order to clearly indicate the required handling instructions and degree of protection to be applied.

CONTEXT

Scope

13.2.2. This section covers information relating to classifying, labelling and registering media. Information relating to classifying and labelling IT equipment can be found in Section 12.3 - Product Classifying and Labelling.

Exceptions for labelling and registering media

13.2.3. Labels are not needed for internally mounted fixed media if the IT equipment containing the media is labelled. Likewise fixed media does not need to be registered if the IT equipment containing the media is registered.

REFERENCES

13.2.4. Additional information relating to media handling is contained in:

Title	Publisher	Source
ISO/IEC 27001:2013 10.7, Media Handling	ISO / IEC	http://www.iso27001security.com/html/27001.html
	Standards NZ	http://www.standards.co.nz

RATIONALE & CONTROLS

13.2.5. Reclassification and declassification procedures

13.2.5.R.01. Rationale

When reclassifying or declassifying media the process is based on an assessment of risk, including:

- the classification of the media and associated handling instructions;
- the effectiveness of any sanitisation or destruction procedure used;
- the planned redeployment; and
- the intended destination of the media.

13.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST document procedures for the reclassification and declassification of media.

13.2.6. Classifying media storing information

13.2.6.R.01. Rationale

Media that is not classified or not correctly classified may be stored, identified and handled inappropriately.

13.2.6.R.02. Rationale

Incorrect or no classification may result in access by a person or persons without the appropriate security clearance.

13.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST classify media to the highest classification of data stored on the media.

13.2.7. Classifying media connected to systems of higher classifications

13.2.7.R.01. Rationale

Unless connected through a data diode or similar infrastructure, there is no guarantee that classified information was not copied to the media while it was connected to a system of higher classification than the classification level of the media itself.

13.2.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST classify any media connected to a system of a higher classification at the higher system classification until confirmed not to be the case.

13.2.8. Classifying media below that of the system

13.2.8.R.01. Rationale

When sufficient assurance exists that information cannot be written to media that is used with a system, then the media can be treated in accordance with the handling instructions of the classification of the information it stores rather than the classification of the system it is connected to or used with.

13.2.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies intending to classify media below the classification of the system to which it is connected to MUST ensure that:

- the media is read-only;
- the media is inserted into a read-only device; or
- the system has a mechanism through which read-only access can be assured such as approved data diodes, write-blockers or similar infrastructure.

13.2.9. Reclassifying media to a lower classification

13.2.9.R.01. Rationale

Agencies must follow the reclassification process as illustrated in Section 13.6 – Media Disposal.

13.2.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies wishing to reclassify media to a lower classification MUST ensure that:

- a formal decision is made to reclassify, or redeploy the media; and
- the reclassification of all information on the media has been approved by the originator, or the media has been appropriately sanitised or destroyed.

13.2.10. Reclassifying media to a higher classification

13.2.10.R.01. Rationale

The media will always need to be protected in accordance with the classification of the information it stores. As such, if the classification of the information on the media changes, then so will the classification of the media.

13.2.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST reclassify media if:

- information copied onto the media is of a higher classification; or
- information contained on the media is subjected to a classification upgrade.

13.2.11. Labelling media

13.2.11.R.01. Rationale

Labelling helps all personnel to identify the classification of media and ensure that they afford the media the correct protection measures.

13.2.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST label media with a marking that indicates the maximum classification and any caveats applicable to the information stored.

13.2.11.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that the classification of all media is easily visually identifiable.

13.2.11.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

When using non-textual (colour, symbol) protective markings for operational security reasons, agencies MUST document the labelling scheme and train personnel appropriately.

13.2.11.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD label media with a marking that indicates the maximum classification and any caveats applicable to the information stored.

13.2.12. Labelling sanitised media

13.2.12.R.01. Rationale

It is not possible to effectively sanitise and subsequently reclassify SECRET or TOP SECRET non-volatile media to a classification lower than SECRET. Media of other classifications may be reclassified (See Section 13.6 – Media Disposal).

13.2.12.C.01. Control: System Classification(s): S, TS; Compliance: MUST

Agencies MUST label non-volatile media that has been sanitised and reclassified for redeployment with a notice similar to:

Warning: media has been sanitised and reclassified from [classification] to [classification]. Further lowering of classification only via destruction.

13.2.13. Registering media

13.2.13.R.01. Rationale

If agencies fail to register media with an appropriate identifier they will not be able to effectively keep track of their classified media and there will be a greater likelihood of unauthorised disclosure of classified information.

13.2.13.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST register all media with a unique identifier in an appropriate register.

13.2.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD register all media with a unique identifier in an appropriate register.

13.3. Media Usage

OBJECTIVE

13.3.1. Media is used with systems in a controlled and accountable manner.

CONTEXT

Scope

13.3.2. This section covers information on using media with systems. Further information on using media to transfer data between systems can be found in Section 18.6 - Data Transfers.

RATIONALE & CONTROLS

13.3.3. Using media with systems

13.3.3.R.01. Rationale

To prevent classified data spills agencies will need to prevent classified media from being connected to, or used with, systems of a lesser classification than the protective marking of the media.

13.3.3.R.02. Rationale

Where media is used for backup purposes, the media will be certified for use at the highest level of classification to be backed-up. Refer also to Section 6.4 – Business Continuity and Disaster Recovery.

13.3.3.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT use media containing classified information with a system that has a classification lower than the classification of the media.

13.3.4. Storage of media

13.3.4.R.01. Rationale

The security requirements for storage and physical transfer of classified information and IT equipment are specified in the PSM.

13.3.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that storage facilities for media containing classified information meets the minimum physical security storage requirements as specified in the PSM.

13.3.5. Connecting media to systems

13.3.5.R.01. Rationale

Some operating systems provide functionality to automatically execute or read certain types of programs that reside on optical media and flash memory media when connected. While this functionality was designed with a legitimate purpose in mind, such as automatically loading a graphical user interface for the system user to browse the contents of the media, or to install software residing on the media, it can also be used for malicious purposes.

13.3.5.R.02. Rationale

An attacker can create a file on optical media or a connectable device that the operating system will attempt to automatically execute. When the operating system executes the file, it can have the same effect as when a system user explicitly executes malicious code. The operating system executes the file without asking the system user for permission.

13.3.5.R.03. Rationale

Some operating systems will cache information on media to improve performance. As such, inserting media of a higher classification into a system of a lower classification could cause data to be read and saved from the device without user intervention.

13.3.5.R.04. Rationale

Using device access control software will prevent unauthorised media from being attached to a system. Using a whitelisting approach allows security personnel greater control over what can, and what cannot, be connected to the system.

13.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST disable any automatic execution features within operating systems for connectable devices and media.

13.3.5.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST prevent unauthorised media from connecting to a system via the use of:

- device access control software;
- seals;
- physical means; or
- other methods approved by the Accreditation Authority.

13.3.5.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

When writable media is connected to a writable communications port or device, agencies SHOULD implement controls to prevent the unintended writing of data to the media.

13.3.6. IEEE 1394 (FIREWIRE) interface connections

13.3.6.R.01. Rationale

Known vulnerabilities have been demonstrated where attackers can connect a FireWire capable device to a locked workstation and modify information in RAM to gain access to encryption keys. Furthermore, as FireWire provides direct access to the system memory, an attacker can read or write directly to memory.

13.3.6.R.02. Rationale

The best defence against this vulnerability is to disable access to FireWire ports using either software controls or physically disabling the FireWire ports so that devices cannot be connected. Alternatively select equipment without FireWire capability.

13.3.6.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST disable IEEE 1394 interfaces.

13.3.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD disable IEEE 1394 interfaces.

13.3.7. Transferring media

13.3.7.R.01. Rationale

As media is often transferred through areas not certified to process the level of classified information on the media, additional protection mechanisms need to be implemented.

13.3.7.R.02. Rationale

Applying encryption to media may reduce the requirements for storage and physical transfer as outlined in the PSM. The reduction of any requirements is based on the original classification of information residing on the media and the level of assurance in the cryptographic product being used to encrypt the media.

13.3.7.R.03. Rationale

Further information on reducing storage and physical transfer requirements can be found in Section 17.1 - Cryptographic Fundamentals.

13.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that processes for transferring media containing classified information meets the minimum physical transfer requirements as specified in the PSM.

13.3.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD encrypt data stored on media with at least an Approved Cryptographic Algorithm (See Section 17.2 – Approved Cryptographic Algorithms) if it is to be transferred to another area or location.

13.3.8. Using media for data transfers

13.3.8.R.01. Rationale

Agencies transferring data between systems of different security domains or classifications are strongly encouraged to use media such as write-once CDs and DVDs. This will limit opportunity for information from the higher classified systems to be accidentally transferred to lower classified systems. This procedure will also make each transfer a single, auditable event.

13.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Data transfers between systems of different classification SHOULD be logged in an auditable log or register.

13.3.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies transferring data manually between two systems of different security domains or classifications SHOULD NOT use rewriteable media.

13.3.9. Media in secured areas

13.3.9.R.01. Rationale

Certain types of media including USB, FireWire and eSATA capable devices **MUST** be disabled or explicitly approved as an exception by the Accreditation Authority for a TOP SECRET environment (the GCSB). This provides an additional level of system user awareness and security.

13.3.9.R.02. Rationale

This practice should be used in addition to device access control software on workstations in case system users are unaware of, or choose to ignore, security requirements for media.

13.3.9.C.01. Control: System Classification(s): TS; Compliance: MUST NOT

Agencies **MUST NOT** permit any media that uses external interface connections within a TOP SECRET area without prior written approval from the Accreditation Authority.

13.4. Media Sanitisation

OBJECTIVE

13.4.1. Media that is to be redeployed or is no longer required is sanitised.

CONTEXT

Scope

13.4.2. This section covers information relating to sanitising media. Information relating to sanitising IT equipment can be found in Section 12.6 - Product Sanitisation and Disposal.

Definition

13.4.3. Sanitisation is defined as the process of removal of data and information from the storage device such that data recovery using any known technique or analysis is prevented or made unfeasible. The process includes the removal of all useful data from the storage device, including metadata, as well as the removal of all labels, markings, classifications and activity logs. Methods vary depending upon the nature, technology used and construction of the storage device or equipment and may include degaussing, incineration, shredding, grinding, knurling or embossing and chemical immersion.

Sanitising media

13.4.4. The process of sanitisation does not automatically change the classification of the media, nor does sanitisation necessarily involve the destruction of media.

Product selection

13.4.5. Agencies are permitted to use non-evaluated products to sanitise media. However, the product will still need to meet the specifications and achieve the requirements for sanitising media as outlined in this section.

Hybrid hard drives, Solid State Drives and Flash Memory Devices

13.4.6. Hybrid hard drives, solid state drives and flash memory devices are difficult or impossible to sanitise effectively. In most cases safe disposal will require destruction. The sanitisation and post sanitisation treatment requirements for redeployment of such devices should be carefully observed.

New Zealand Eyes Only (NZEO) Materials

13.4.7. NZEO caveated material requires additional protection at every level of classification. In general terms, media containing NZEO material should be sanitised and redeployed or sanitised and destroyed in accordance with the procedures in this section. Media that has contained NZEO material must not be disposed of to e-recyclers or sold to any third party.

REFERENCES

Title	Publisher	Source
Data Remanence in Semiconductor Devices	Peter Gutmann IBM T.J.Watson Research Center	http://www.cypherpunks.to/~peter/senix01.pdf
RAM testing tool memtest86+		http://www.memtest.org
MemtestG80 and MemtestCL: Memory Testers for CUDA- and OpenCL-enabled GPUs	Symbios project funded by the National Institutes of Health	https://simtk.org/home/memtest
HDDease Capable of calling the ATA secure erase command for non-volatile magnetic hard disks. It is also capable of resetting host protected area and device configuration overlay table information on the media.	A freeware tool developed by the Center for Magnetic Recording Research at the University of California San Diego.	http://cmrr.ucsd.edu/people/hughes/Secure-Erase.html
AISEP Evaluated Products List (EPL)	Australasian Information Security Evaluation Program	http://www.asd.gov.au/infosec/epl/index.php
ATA Secure Erase	ATA ANSI specifications	http://www.ansi.org
Data Sanitisation - Flash Based Storage Version 0.3	CESG, UK	http://www.cesg.gov.uk/publications/Documents/data_sanitisation_flash_based_storage.pdf
Reliably Erasing Data From Flash-Based Solid State Drives	Wei, Grupp, Spada and Swanson Department of Computer Science and Engineering, University of California, San Diego	https://www.usenix.org/legacy/event/fast11/tech/full_papers/Wei.pdf

Title	Publisher	Source
The 2012 Analysis of Information Remaining on Computer Hard Disks Offered for Sale on the Second Hand Market in the UAE	Edith Cowan University Research Online. Australian Digital Forensics Conference	http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=1110&context=adf
2010 Zombie Hard disks - Data from the Living Dead	Edith Cowan University Research Online. Australian Digital Forensics Conference	http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=1085&context=adf
The 2009 Analysis of Information Remaining on Disks Offered for Sale on the Second Hand Market	Edith Cowan University Research Online. Australian Digital Forensics Conference	http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=1079&context=adf
NSA/CSS Storage Device Declassification Manual December 2007	NSA	http://www.nsa.gov/ia/files/government/MDG/NSA_CSS_Storage_Device_Declassification_Manual.pdf

RATIONALE & CONTROLS

13.4.8. Sanitisation procedures

13.4.8.R.01. Rationale

Sanitising media prior to reuse in a different environment ensures that classified information is not inadvertently accessed by an unauthorised individual or inadequately protected.

13.4.8.R.02. Rationale

Using approved sanitisation methods provides a high level of assurance that no remnant data is on the media.

13.4.8.R.03. Rationale

The procedures used in this manual are designed not only to prevent common attacks that are currently feasible, but also to protect from threats that could emerge in the future.

13.4.8.R.04. Rationale

When sanitising media, it is necessary to read back the contents of the media to verify that the overwrite process completed successfully.

13.4.8.R.05. Rationale

If the sanitising process cannot be successfully completed, destruction will be necessary.

13.4.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST document procedures for the sanitisation of media.

13.4.9. Media that cannot be sanitised

13.4.9.R.01. Rationale

Some types of media cannot be sanitised and therefore MUST be destroyed. It is not possible to use these types of media while maintaining a high level of assurance that no previous data can be recovered.

13.4.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST destroy the following media types prior to disposal, as they cannot be effectively sanitised:

- microfiche;
- microfilm;
- optical discs;
- printer ribbons and the impact surface facing the platen;
- programmable read-only memory (PROM, EPROM, EEPROM);
- flash memory and solid state or hybrid data storage devices;
- read-only memory; and
- faulty media that cannot be successfully sanitised.

13.4.10. Volatile media sanitisation

13.4.10.R.01. Rationale

When sanitising volatile media, the specified time to wait following removal of power is based on applying a safety factor to research on recovering the contents of volatile media.

13.4.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST sanitise volatile media by:

- overwriting all locations of the media with an arbitrary pattern;
- followed by a read back for verification; and
- removing power from the media for at least 10 minutes.

13.4.11. Treatment of volatile media following sanitisation

13.4.11.R.01. Rationale

There is published literature that supports the existence of short-term data remanence effects in volatile media. Data retention time is reported to range from minutes (at normal room temperatures) to hours (in extreme cold), depending on the temperature of the volatile media. Further, published literature has shown that some volatile media can suffer from long-term data remanence effects resulting from physical changes to the media due to continuous storage of static data for an extended period of time. It is for these reasons that TOP SECRET volatile media MUST always remain at this classification, even after sanitisation.

13.4.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Following sanitisation, volatile media MUST be treated as indicated in the table below.

Pre-sanitisation classification	Post-sanitisation classification
New Zealand Eyes Only (NZEO) Caveat	NZEO
TOP SECRET	TOP SECRET
SECRET	SECRET
CONFIDENTIAL	UNCLASSIFIED
RESTRICTED and all lower classifications	UNCLASSIFIED

13.4.12. Non-volatile magnetic media sanitisation

13.4.12.R.01. Rationale

Both the host protected area and device configuration overlay table of non-volatile magnetic hard disks are normally not visible to the operating system or the computer's BIOS. Hence any sanitisation of the readable sectors on the media will not overwrite these hidden sectors leaving any classified information contained in these locations untouched. Some sanitisation programs include the ability to reset devices to their default state removing any host protected areas or device configuration overlays. This allows the sanitisation program to see the entire contents of the media during the subsequent sanitisation process.

13.4.12.R.02. Rationale

Modern non-volatile magnetic hard disks automatically reallocate space for bad sectors at a hardware level. These bad sectors are maintained in what is known as the growth defects table or 'g-list'. If classified information was stored in a sector that is subsequently added to the g-list, sanitising the media will not overwrite these non-addressable bad sectors, and remnant data will exist in these locations. Whilst these sectors may be considered bad by the device quite often this is due to the sectors no longer meeting expected performance norms for the device and not due to an inability to read/write to the sector.

13.4.12.R.03. Rationale

The ATA secure erase command is built into the firmware of post-2001 devices and is able to access sectors that have been added to the g-list. Modern non-volatile magnetic hard disks also contain a primary defects table or 'p-list'. The p-list contains a list of bad sectors found during post-production processes. No information is ever stored in sectors on the p-list for a device as they are inaccessible before the media is used for the first time.

13.4.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST sanitise non-volatile magnetic media by:

- if pre-2001 or under 15GB: overwriting the media at least three times in its entirety with an arbitrary pattern followed by a read back for verification; or
- if post-2001 or over 15GB: overwriting the media at least once in its entirety with an arbitrary pattern followed by a read back for verification.

13.4.12.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST boot from separate media to the media being sanitised when undertaking sanitisation.

13.4.12.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD reset the host protected area and drive configuration overlay table of non-volatile magnetic hard disks prior to overwriting the media.

13.4.12.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD attempt to overwrite the growth defects table (g-list) on non-volatile magnetic hard disks.

13.4.12.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use the ATA security erase command for sanitising non-volatile magnetic hard disks instead of using block overwriting software.

13.4.13. Treatment of non-volatile magnetic media following sanitisation**13.4.13.R.01. Rationale**

Highly classified non-volatile magnetic media cannot be sanitised below its original classification because of concerns with the sanitisation of the host protected area, device configuration overlay table and growth defects table.

13.4.13.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Following sanitisation, non-volatile magnetic media MUST be treated as indicated in the table below.

Pre-sanitisation classification	Post-sanitisation classification
New Zealand Eyes Only (NZEO) Caveat	NZEO
TOP SECRET	TOP SECRET
SECRET	SECRET
CONFIDENTIAL	UNCLASSIFIED
RESTRICTED	UNCLASSIFIED

13.4.14. Non-volatile EPROM media sanitisation**13.4.14.R.01. Rationale**

When erasing non-volatile EPROM, the manufacturer's specified ultraviolet erasure time is multiplied by a factor of three to provide an additional level of certainty in the process. Verification is provided by read-back.

13.4.14.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST sanitise non-volatile EPROM media by erasing as per the manufacturer's specification, increasing the specified ultraviolet erasure time by a factor of three, then overwriting the media at least once in its entirety with a pseudo random pattern, followed by a read back for verification.

13.4.15. Non-volatile EEPROM media sanitisation

13.4.15.R.01. Rationale

A single overwrite with a pseudo random pattern is considered best practice for sanitising non-volatile EEPROM media.

13.4.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST sanitise non-volatile EEPROM media by overwriting the media at least once in its entirety with a pseudo random pattern, followed by a read back for verification.

13.4.16. Treatment of non-volatile EPROM and EEPROM media following sanitisation

13.4.16.R.01. Rationale

As little research has been conducted on the ability to recover data on non-volatile EPROM or EEPROM media after sanitisation, highly classified media retains its original classification.

13.4.16.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Following sanitisation, non-volatile EPROM and EEPROM media MUST be treated as indicated in the table below.

Pre-sanitisation classification	Post-sanitisation classification
New Zealand Eyes Only (NZE) Caveat	NZE
TOP SECRET	TOP SECRET
SECRET	SECRET
CONFIDENTIAL	UNCLASSIFIED
RESTRICTED	UNCLASSIFIED

13.4.17. Non-volatile flash memory media sanitisation

13.4.17.R.01. Rationale

Wear levelling ensures that writes are distributed evenly across each memory block in flash memory. Flash memory SHOULD be overwritten with a pseudo random pattern twice, rather than once, as this helps to ensure that all memory blocks are overwritten during sanitisation. Verification is provided by read-back.

13.4.17.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST sanitise non-volatile flash memory media by overwriting the media at least twice in its entirety with a pseudo random pattern, followed by a read back for verification.

13.4.18. Treatment of non-volatile flash memory media following sanitisation

13.4.18.R.01. Rationale

Owing to the use of wear levelling in flash memory, it is possible that not all physical memory locations are written to when attempting to overwrite the media. Classified information can therefore remain on the media. It is for these reasons that TOP SECRET, SECRET and CONFIDENTIAL flash memory media MUST always remain at their respective classification, even after sanitisation.

13.4.18.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Following sanitisation, non-volatile flash memory media MUST be treated as indicated in the table below.

Pre-sanitisation classification	Post-sanitisation classification
New Zealand Eyes Only (NZE) Caveat	NZE
TOP SECRET	TOP SECRET
SECRET	SECRET
CONFIDENTIAL	CONFIDENTIAL
RESTRICTED	UNCLASSIFIED

13.4.19. Sanitising solid state drives

13.4.19.R.01. Rationale

Solid state drives operate a Flash Translation Layer (FTL) to interface with the storage devices – usually NAND chips. Current sanitation techniques address the FTL, rather than destroying the underlying data. It is possible to bypass the FTL, thus accessing the underlying data. With current technology, there is no effective means of sanitising solid state drives.

13.4.19.R.02. Rationale

Solid state drives also use wear equalisation or levelling techniques which can also leave data remnants.

13.4.19.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Solid state drives MUST be destroyed before disposal.

13.4.19.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Solid state drives MUST be sanitised using ATA Secure Erase sanitation software before redeployment.

13.4.19.C.03. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Solid state drives MUST NOT be redeployed in a lower classification environment.

13.4.20. Hybrid Drives

13.4.20.R.01. Rationale

Hybrid drives combine solid state memory devices with magnetic disk technologies. As such they are subject to the same difficulties in effective sanitisation as solid state devices.

13.4.20.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Hybrid drives MUST be treated as solid state drives for sanitisation purposes.

13.4.21. Sanitising media prior to reuse

13.4.21.R.01. Rationale

Sanitising media prior to reuse at the same or higher classification assists with enforcing the need-to-know principle within the agency. This includes any material with an NZEO caveat.

13.4.21.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD sanitise all media prior to reuse at the same or higher classification.

13.4.22. Verifying sanitised media

13.4.22.R.01. Rationale

Verifying the sanitisation of media with a different product to the one conducting the sanitisation process provides an independent level of assurance that the sanitisation process was conducted correctly.

13.4.22.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD verify the sanitisation of media using a different product from the one used to perform the initial sanitisation.

13.5. Media Destruction

OBJECTIVE

13.5.1. Media that cannot be sanitised is destroyed before disposal.

CONTEXT

Scope

13.5.2. This section covers information relating to the destruction of media. Information relating to the destruction of IT equipment can be found in Section 12.6 - Product Sanitisation and Disposal.

New Zealand Eyes Only (NZEO) Materials

13.5.3. NZEO caveated material requires additional protection at every level of classification.

13.5.4. In general terms, media containing NZEO material should be sanitised and redeployed or sanitised and destroyed in accordance with the procedures in this section. Media that has contained NZEO material must not be disposed of to e-recyclers or sold to any third party.

RATIONALE & CONTROLS

13.5.5. Destruction procedures

13.5.5.R.01. Rationale

Documenting procedures for media destruction will ensure that media destruction is carried out in an appropriate and consistent manner within the agency.

13.5.5.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies MUST document procedures for the destruction of media.

13.5.6. Media destruction

13.5.6.R.01. Rationale

The destruction methods given are designed to ensure that recovery of data is impossible or impractical. Health and safety training and the use of safety equipment may be required with these methods.

13.5.6.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

To destroy media, agencies MUST:

- break up the media;
- heat the media until it has either burnt to ash or melted; or
- degauss the media and then physically destroy the media.

13.5.6.C.02. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies MUST use at least one of the methods shown in the following table.

Item	Destruction methods					
	Furnace/ Incinerator	Hammer mill	Disintegrator	Grinder/ Sander	Cutting	Degausser
Magnetic floppy disks	Yes	Yes	Yes	No	Yes	Yes
Magnetic hard disks	Yes	Yes	Yes	Yes	No	Yes
Magnetic tapes	Yes	Yes	Yes	No	Yes	Yes
Optical disks	Yes	Yes	Yes	Yes	Yes	No
Electrostatic memory devices	Yes	Yes	Yes	Yes	No	No
Semi-conductor memory	Yes	Yes	Yes	No	No	No

13.5.7. Media destruction equipment

13.5.7.R.01. Rationale

A variety of equipment for media destruction exists. Evaluated products will provide assurance that the product will be effective. Approved products are listed in the PSM.

13.5.7.R.02. Rationale

Where a product is not an evaluated product or is NOT listed in the PSM. Consult the GCSB for advice.

13.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST employ equipment approved by the GCSB, for the purpose of media destruction.

13.5.8. Storage and handling of media waste particles

13.5.8.R.01. Rationale

Following destruction, normal accounting and auditing procedures do not apply for media items. As such, it is essential that when an item is recorded as being destroyed, destruction is assured.

13.5.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST, at minimum, store and handle the resulting media waste for all methods, except for furnace/incinerator and degausser, as for the classification given in the table below.

Initial media classification	Screen aperture size particles can pass through			
	Less than or equal to 3mm	Less than or equal to 6mm	Less than or equal to 9mm	Less than or to 12mm
TOP SECRET	UNCLASSIFIED	RESTRICTED	CONFIDENTIAL	SECRET
SECRET	UNCLASSIFIED	UNCLASSIFIED	RESTRICTED	CONFIDENTIAL
CONFIDENTIAL	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	RESTRICTED
RESTRICTED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED

13.5.9. Degaussers

13.5.9.R.01. Rationale

Coercivity varies between media types and between brands and models of the same type. Care is needed when determining the desired coercivity as a degausser of insufficient strength will not be effective. The National Security Agency/Central Security Service's EPLD contains a list of common types of media and their associated coercivity ratings.

13.5.9.R.02. Rationale

Since 2006 perpendicular magnetic media have become available. Some degaussers are only capable of sanitising longitudinal magnetic media. As such, care needs to be taken to ensure that a suitable degausser is used when sanitising perpendicular magnetic media.

13.5.9.R.03. Rationale

Some degaussers will have product specific requirements. Agencies will need to comply with any directions provided by the GCSB to ensure that degaussers are being used in the correct manner to achieve an effective destruction outcome.

13.5.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST use a degausser of sufficient field strength for the coercivity of the media.

13.5.9.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST use a degausser which has been evaluated as capable for the magnetic orientation (longitudinal or perpendicular) of the media.

13.5.9.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST comply with any product specific directions provided by the GCSB.

13.5.10. Supervision of destruction

13.5.10.R.01. Rationale

To ensure that classified media is appropriately destroyed it will need to be supervised to the point of destruction and have its destruction overseen by at least one person cleared to the highest classification of the media being destroyed. To provide accountability and traceability, a destruction register should be maintained.

13.5.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST perform the destruction of media under the supervision of at least one person cleared to the highest classification of the media being destroyed.

13.5.10.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Personnel supervising the destruction of media MUST:

- supervise the handling of the media to the point of destruction; and
- ensure that the destruction is completed successfully.

13.5.10.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

The Destruction Register SHOULD record:

- Date of destruction;
- Operator and witness;
- Media classification; and
- Media type, characteristics and serial number.

13.5.11. Supervision of accountable material destruction**13.5.11.R.01. Rationale**

As accountable material is more sensitive than standard classified media, it needs to be supervised by at least two personnel and have a destruction certificate signed by the personnel supervising the process. This includes any NZEO material.

13.5.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST perform the destruction of accountable material under the supervision of at least two personnel cleared to the highest classification of the media being destroyed.

13.5.11.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Personnel supervising the destruction of accountable media MUST:

- supervise the handling of the material to the point of destruction;
- ensure that the destruction is completed successfully;
- sign a destruction certificate; and
- complete the relevant entries in the destruction register.

13.5.12. Outsourcing media destruction**13.5.12.R.01. Rationale**

Agencies may wish to outsource media destruction for efficiency and cost reasons.

13.5.12.C.01. Control: System Classification(s): TS; Compliance: MUST NOT

Agencies MUST NOT outsource the destruction of TOP SECRET or NZEO media or other accountable material to a non-government entity or organisation.

13.5.12.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies outsourcing the destruction of media to a commercial facility MUST use an approved facility.

13.5.13. Transporting media for offsite destruction

13.5.13.R.01. Rationale

Requirements on the safe handling and physical transfer of media between agencies or to commercial facilities can be found in the PSM.

13.5.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD sanitise media prior to transporting it to an offsite location for destruction.

13.6. Media Disposal

OBJECTIVE

13.6.1. Media is declassified and approved by the CISO, or his delegate, for release before disposal into the public domain.

CONTEXT

Scope

13.6.2. This section covers information relating to the disposal of media. Information relating to the disposal of IT equipment can be found in Section 12.6 - Product Sanitisation and Disposal.

13.6.3. NZEO caveated material requires additional protection at every level of classification.

13.6.4. In general terms, media containing NZEO material should be sanitised and redeployed or sanitised and destroyed in accordance with the procedures in this section. Media that has contained NZEO material must not be disposed of, to e-recyclers or sold to any third party.

RATIONALE & CONTROLS

13.6.5. Declassification prior to disposal

13.6.5.R.01. Rationale

Prior to its disposal, media needs to be declassified to ensure that classified information is not accidentally released into the public domain.

13.6.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST declassify all media prior to disposing of it into the public domain.

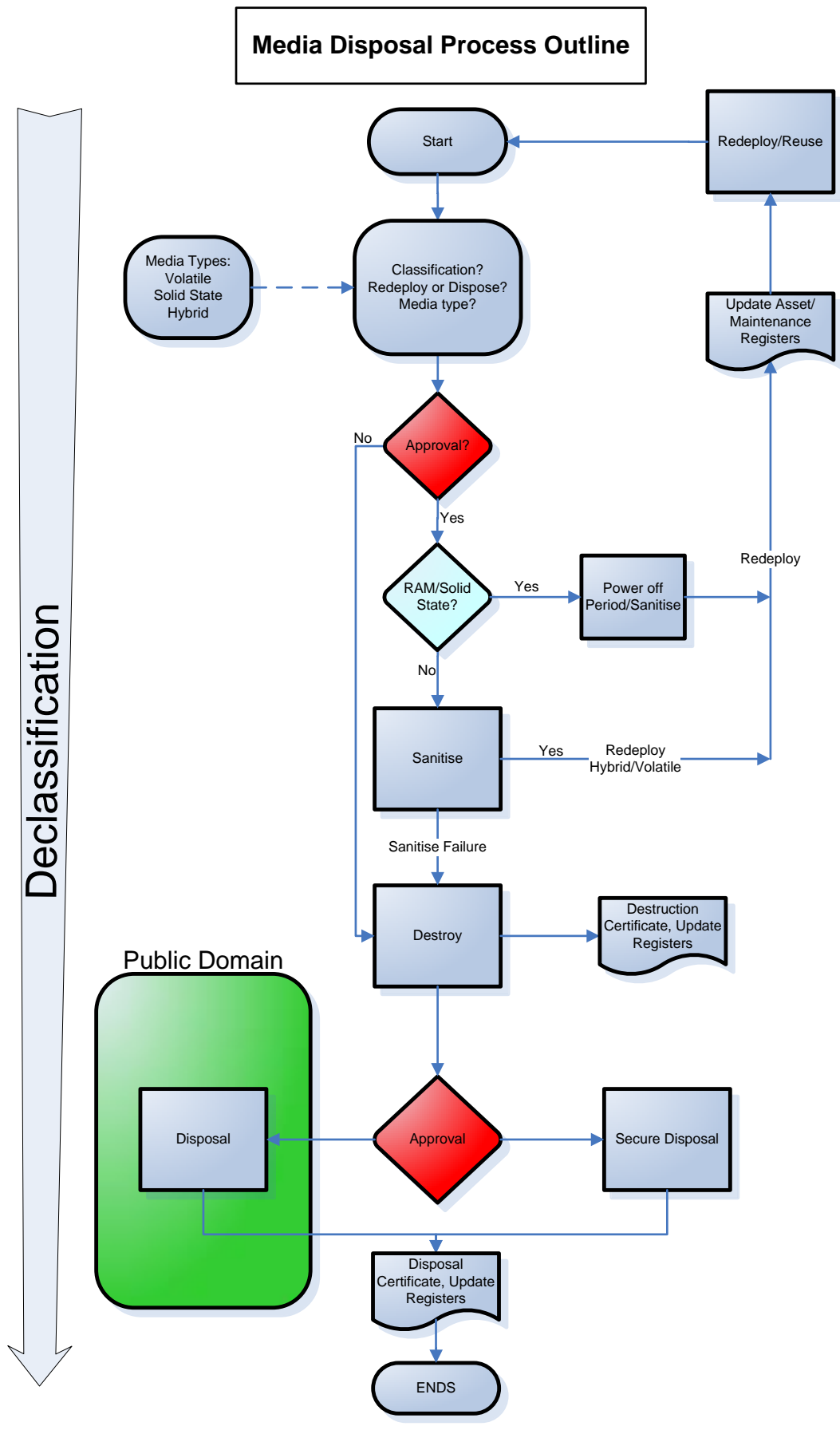
13.6.6. Disposal procedures

13.6.6.R.01. Rationale

The following diagram illustrates the mandated disposal process. Note declassification describes the entire process, including any reclassifications, approvals and documentation, before media and media waste can be released into the public domain.

13.6.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST document procedures for the disposal of media.



13.6.7. Declassifying media

13.6.7.R.01. Rationale

The process of reclassifying, sanitising or destroying media does not provide sufficient assurance for media to be declassified and released into the public domain. In order to declassify media, formal administrative approval is required before releasing the media or waste into the public domain.

13.6.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies declassifying media MUST ensure that:

- the reclassification of all classified information on the media has been approved by the originator, or the media has been appropriately sanitised or destroyed; and
- formal approval is granted before the media is released into the public domain.

13.6.8. Disposal of media

13.6.8.R.01. Rationale

Disposing of media in a manner that does not draw undue attention ensures that media that was previously classified is not subjected to additional scrutiny over that of regular waste.

13.6.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST dispose of media in a manner that does not draw undue attention to its previous classification.

13.6.9. New Zealand Eyes Only (NZEO) Materials

13.6.9.R.01. Rationale

NZEO caveated material requires additional protection at every level of classification and creates a special case in the destruction and disposal process.

13.6.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Media that has contained NZEO material MUST be sanitised and redeployed or sanitised and destroyed in accordance with the procedures in this chapter.

13.6.9.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Media that has contained NZEO material MUST NOT be disposed of to e-recyclers or sold to any third party.

14. SOFTWARE SECURITY

14.1. Standard Operating Environments

OBJECTIVE

14.1.1. Standard Operating Environments (SOE) are hardened in order to minimise known vulnerabilities and attack vectors.

CONTEXT

Scope

14.1.2. This section covers information on the hardening of software used on workstations and servers.

Characterisation

14.1.3. Characterisation is a technique used to analyse and record a system's configuration. It is important as it can be used as a baseline to verify the system's integrity at a later date. It is also important that the baseline has high levels of integrity and assurance to avoid re-infecting systems or reintroducing compromises when restoring from baselines.

14.1.4. In virtual environments a baseline is usually a "snapshot" or image taken at a point in time. If the image or snapshot is infected, then restoring from that image can result in further compromise. See also Section 21.2 – Virtualisation and 21.3 – Virtual Local Area Networks.

14.1.5. Methods of characterising files and directories include:

- performing a cryptographic checksum on the files/directories when they are known to be virus/contaminant free;
- documenting the name, type, size and attributes of legitimate files and directories, along with any changes to this information expected under normal operating conditions; or
- for a Windows system, taking a system difference snapshot.

REFERENCES

Title	Publisher	Source
ISO/IEC 27001:2013, A.12.4.1 Control of Operational Software	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27001.html http://www.standards.co.nz
ISO/IEC 27001:2013, A.12.6.1 Control of Technical Vulnerabilities	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27001.html http://www.standards.co.nz
Independent testing of different antivirus software and their effectiveness	AV Comparatives	http://www.av-comparatives.org/

RATIONALE & CONTROLS

14.1.6. Developing hardened SOEs

14.1.6.R.01. Rationale

Antivirus software, while important, can be defeated by malicious code that has yet to be identified by antivirus vendors. This can include targeted attacks, where a new virus is engineered or an existing one modified to defeat the signature-based detection schemes.

14.1.6.R.02. Rationale

The use of antivirus software, while adding value to the defence of workstations, cannot be relied solely upon to protect the workstation. As such agencies still need to deploy appropriately hardened SOEs to assist with the protection of workstations against a broader range of security risks.

14.1.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop a hardened SOE for workstations and servers, covering:

- removal of unneeded software and operating system components;
- removal or disabling of unneeded services, ports and BIOS settings;
- disabling of unused or undesired functionality in software and operating systems;
- implementation of access controls on relevant objects to limit system users and programs to the minimum access required;
- installation of antivirus software;
- installation of software-based firewalls limiting inbound and outbound network connections;
- configuration of either remote logging or the transfer of local event logs to a central server; and
- protection of audit and other logs through the use of a one way pipe to reduce likelihood of compromise key transaction records.

14.1.7. Maintaining hardened SOEs

14.1.7.R.01. Rationale

Whilst a SOE can be sufficiently hardened when it is deployed, its security will progressively degrade over time. Agencies can address the degradation of the security of a SOE by ensuring that patches are continually applied, system users are not able to disable or bypass security functionality and antivirus and other security software is appropriately maintained with the latest signatures.

14.1.7.R.02. Rationale

End Point Agents monitor traffic and apply security policies on applications, storage interfaces and data in real-time. Administrators actively block or monitor and log policy breaches. The End Point Agent can also create forensic monitoring to facilitate incident investigation.

14.1.7.R.03. Rationale

End Point Agents can also monitor user activity, such as the cut, copy, paste, print, print screen operations and copying data to external drives and other devices. The Agent can then apply policies to limit such activity.

14.1.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that for all servers and workstations:

- a technical specification is agreed for each platform with specified controls;
- a standard configuration created and updated for each operating system type and version;
- system users do not have the ability to install or disable software without approval; and
- installed software and operating system patching is up to date.

14.1.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that for all servers and workstations:

- virus detection heuristics are set to a high level;
- virus pattern signatures are checked for updates on at least a daily basis;
- virus pattern signatures are updated as soon as possible after vendors make them available;
- all disks and systems are regularly scanned for malicious code; and
- the use of End Point Agents is considered.

14.1.8. Default passwords and accounts

14.1.8.R.01. Rationale

Default passwords and accounts for operating systems are often exploited by attackers as they are well documented in product manuals and can be easily checked in an automated manner with little effort required.

14.1.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST reduce potential vulnerabilities in their SOEs by:

- removing unused accounts;
- renaming or deleting default accounts; and
- replacing default passwords before or during the installation process.

14.1.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD reduce potential vulnerabilities in their SOEs by:

- removing unused accounts;
- renaming or deleting default accounts; and
- replacing default passwords, before or during the installation process.

14.1.9. Server separation

14.1.9.R.01. Rationale

Servers with a high security risk can include Web, email, file, Internet Protocol Telephony (IPT) servers and Mobile Device Manager (MDM) servers. It is important to clearly identify all services and connections to design a complete and secure server separation architecture. Refer also to Chapter 19 – Gateway Security.

14.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where servers with a high security risk have connectivity to unsecured public networks, agencies SHOULD:

- use appropriately rated gateways;
- consider the use of cross-domain solutions;
- segment networks;
- maintain effective functional segregation between servers allowing them to operate independently;
- minimise communications between servers at both the network and file system level as appropriate; and
- limit system users and programs to the minimum access needed to perform their duties.

14.1.10. Characterisation

14.1.10.R.01. Rationale

There are known techniques for defeating basic characterisations, therefore other methods of intrusion detection are also needed, particularly in situations where it is impractical to use a trusted environment for the generation of the characterisation data. Characterisation is very useful in post-intrusion forensic investigations where an infected disk can be compared to stored characterisation data in order to determine what files have been changed or introduced.

14.1.10.R.02. Rationale

Characterisation is also directly related to business continuity and disaster recovery and is influenced by Business Impact Analyses and Risk Assessments. Grouping elements by business applications and setting priority and criticality of the elements to the business may assist in determining the most appropriate and useful characterisations.

14.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- characterise all servers whose functions are critical to the agency, and those identified as being at a high security risk of compromise;
- store the characterisation information securely off the server in a manner that maintains integrity;
- update the characterisation information after every legitimate change to a system as part of the change control process;
- as part of the agency's ongoing audit schedule, compare the stored characterisation information against current characterisation information to determine whether a compromise, or a legitimate but incorrectly completed system modification, has occurred;
- perform the characterisation from a trusted environment rather than the standard operating system wherever possible; and
- resolve any detected changes in accordance with the agency's information security incident management procedures.

14.1.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use an Approved Cryptographic Algorithm to perform cryptographic checksums for characterisation purposes.

14.1.10.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD consider characterisations in the context of a BCP or DRP and any related Business Impact Analyses and Risk Assessments.

14.1.11. Automated outbound connections by software

14.1.11.R.01. Rationale

Applications that include beaconing functionality include those that initiate a connection to the vendor site over the Internet and inbound remote management.

14.1.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD review all software applications to determine whether they attempt to establish any unauthorised or unplanned external connections.

14.1.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

If automated outbound connection functionality is included, agencies SHOULD make a business decision to determine whether to permit or deny these connections, including an assessment of the security risks involved in doing so.

14.1.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

If automated outbound connection functionality is included, Agencies SHOULD consider the implementation of Data Loss Prevention (DLP) technologies.

14.1.12. Knowledge of software used on systems

14.1.12.R.01. Rationale

Information about installed software, that could be disclosed outside the agency, can include:

- user agent on Web requests disclosing the Web browser type;
- network and email client information in email headers; and
- email server software headers.

This information could provide a malicious entity with knowledge of how to tailor attacks to exploit vulnerabilities in the agency's systems.

14.1.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD limit information that could be disclosed outside the agency about what software, and software versions are installed on their systems.

14.2. Application Whitelisting

OBJECTIVE

14.2.1. Only approved applications are used on operating systems.

CONTEXT

Scope

14.2.2. This section covers information on the use of technical controls to restrict the specific applications that can be accessed by a user or group of users.

REFERENCES

14.2.3. Further information on application whitelisting as implemented by Microsoft can be found at:

Title	Publisher	Source
Using Software Restriction Policies to Protect Against Unauthorized Software	MICROSOFT	http://technet.microsoft.com/en-us/library/bb457006.aspx

RATIONALE & CONTROLS

14.2.4. Application whitelisting

14.2.4.R.01. Rationale

Application whitelisting can be an effective mechanism to prevent the successful compromise of an agency system resulting from the exploitation of a vulnerability in an application or the execution of malicious code.

14.2.4.R.02. Rationale

Defining a list of trusted executables, a whitelist, is a practical and secure method of securing a system rather than relying on a list of bad executables (black list) to be prevented from running.

14.2.4.R.03. Rationale

Application whitelisting is considered only one part of a defence-in-depth strategy in order to prevent a successful attack, or to help mitigate consequences arising from an attack.

14.2.4.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement application whitelisting as part of the SOE for workstations, servers and any other network device.

14.2.5. System user permissions

14.2.5.R.01. Rationale

An average system user requires access to only a few applications, or groups of applications, in order to conduct their work. Restricting the system user's permissions to execute code to this limited set of applications reduces the attack surface of the system.

14.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that a system user cannot disable the application whitelisting mechanism.

14.2.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD prevent a system user from running arbitrary executables.

14.2.5.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD restrict a system user's rights in order to permit them to only execute a specific set of predefined executables as required for them to complete their duties.

14.2.5.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that application whitelisting does not replace the antivirus software within a system.

14.2.6. System administrator permissions

14.2.6.R.01. Rationale

Since the consequences of running malicious code as a privileged user are much more severe than an unprivileged user, an application whitelisting implementation should also be enforced for system administrators.

14.2.6.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD ensure that system administrators are not automatically exempt from application whitelisting policy.

14.2.7. Application whitelisting configuration

14.2.7.R.01. Rationale

A decision to execute a routine, application, or other programme should be made based on a validated cryptographic hash as it is more secure than a decision based on the executable's signature, path or parent folder.

14.2.7.R.02. Rationale

In order for application whitelisting to be effective an agency MUST initially gather information on necessary executables and applications in order to ensure that the implementation is fully effective.

14.2.7.R.03. Rationale

Different application whitelisting controls, such as restricting execution based on cryptographic hash, filename, pathname or folder, have various advantages and disadvantages. Agencies need to be aware of this when implementing application whitelisting.

14.2.7.R.04. Rationale

Application whitelisting based on parent folder or executable path is futile if access control list permissions allow a system user to write to the folders or overwrite permitted executables.

14.2.7.R.05. Rationale

Adequate logging information can allow system administrators to further refine the application whitelisting implementation and detect a pattern of deny decisions for a system user.

14.2.7.R.06. Rationale

An example of relevant information that could be included in logs for application whitelisting implementations would be decisions to deny execution incorporating information that would present a reviewer with evidence of misuse.

14.2.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD ensure that the default policy is to deny the execution of software.

14.2.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD ensure that application whitelisting is used in addition to a strong access control list model and the use of limited privilege accounts.

14.2.7.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD plan and test application whitelisting mechanisms and processes thoroughly prior to implementation.

14.2.7.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD restrict the decision whether to run an executable based on the following, in the order of preference shown:

1. validates cryptographic hash;
2. executable absolute path;
3. digital signature; and
4. parent folder.

14.2.7.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD restrict the process creation permissions of any executables which are permitted to run by the application whitelisting controls.

14.2.7.C.06. Control: System Classification(s): All Classifications; Compliance: SHOULD
Logs from the application whitelisting implementation SHOULD include all relevant information.

14.3. Web Applications

OBJECTIVE

14.3.1. Access to Web content is implemented in a secure and accountable manner.

CONTEXT

Scope

14.3.2. This section covers information on Web browsers, plug-ins and active content including the development and implementation of appropriate use policies. The requirements in this section apply equally to the Web accessed via the Internet as well as websites accessed on an agency intranet.

REFERENCES

14.3.3. A Web whitelisting software application that allows for the management of whitelists can be obtained from:

Title	Publisher	Source
Dynamic Web Whitelisting for Squid	SourceForge	http://whitetrash.sourceforge.net/

14.3.4. Examples of client-side JavaScript controls are available at:

Title	Publisher	Source
NoScript Firefox extension	Inform Action	http://noscript.net

RATIONALE & CONTROLS

14.3.5. Web usage policy

14.3.5.R.01. Rationale

If agencies allow system users to access the Web they will need to define the extent of Web access that is granted. This can be achieved through the development, and awareness raising amongst system users, of a Web usage policy.

14.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop and implement a policy governing appropriate Web usage.

14.3.6. Web proxy

14.3.6.R.01. Rationale

Web proxies provide valuable information in determining if malicious code is performing regular interactions over Web traffic. Web proxies also provide usable information if system users are violating agency Web usage policies.

14.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use a Web proxy for all Web browsing activities.

14.3.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

An agency's Web proxy SHOULD authenticate system users and provide logging that includes at least the following details about websites accessed:

- address (uniform resource locator);
- time/date;
- system user;
- internal IP address; and
- external IP address.

14.3.6.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT permit downloading of executable files from external websites unless there is a demonstrable and approved business requirement.

14.3.7. Applications and plug-ins

14.3.7.R.01. Rationale

Web browsers can be configured to allow the automatic launching of downloaded files. This can occur with or without the system user's knowledge thus making the workstation vulnerable to attack.

14.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD disable the automatic launching of files downloaded from external websites.

14.3.8. SSL/TLS filtering

14.3.8.R.01. Rationale

As SSL/TLS encrypted Web traffic travelling over HTTPS connections can deliver content without any filtering, agencies can reduce this security risk by using SSL/TLS inspection so that the Web traffic can be filtered.

An alternative of using a whitelist for HTTPS websites can allow websites that have a low security risk of delivering malicious code and have a high privacy requirement like Web banking, to continue to have end-to-end encryption.

14.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies permitting SSL/TLS through their gateways SHOULD implement:

- a solution that decrypts and inspects the SSL/TLS traffic as per content filtering requirements; or
- a whitelist specifying the addresses (uniform resource locators) to which encrypted connections are permitted, with all other addresses blocked.

14.3.9. Inspection of SSL/TLS traffic

14.3.9.R.01. Rationale

Encrypted SSL/TLS traffic may contain personally identifiable information. Agencies should seek legal advice on whether inspecting such traffic is in breach of the Privacy Act or other legislation. User policies should incorporate an explanation of the security drivers and acknowledgement from users on the policy contents and requirements. Refer to Chapter 9 – Personnel Security and Chapter 15 – Email Security.

14.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD seek legal advice regarding the inspection of encrypted SSL/TLS traffic by their gateways.

14.3.10. Whitelisting websites

14.3.10.R.01. Rationale

Defining a whitelist of permitted websites and blocking all unlisted websites limits one of the most common data delivery and exfiltration techniques used by malicious code. However, if agency personnel have a legitimate requirement to access a numerous and rapidly changing list of websites, agencies will need to consider the practicality and costs of such an implementation. In such cases black listing is a limited but none-the-less effective measure.

14.3.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement whitelisting for all HTTP traffic being communicated through their gateways.

14.3.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies using a whitelist on their gateways to specify the external addresses, to which encrypted connections are permitted, SHOULD specify whitelist addresses by domain name or IP address.

14.3.10.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

If agencies do not whitelist websites they SHOULD blacklist websites to prevent access to known malicious websites.

14.3.10.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies blacklisting websites SHOULD update the blacklist on a frequent basis to ensure that it remains effective.

14.3.11. Client-side active content

14.3.11.R.01. Rationale

Software that runs on agency systems SHOULD be controlled by the agency. Active content delivered through websites should be constrained so that it cannot arbitrarily access system users' files or deliver malicious code. Unfortunately the implementations of Web browsers regularly contain flaws that permit such activity.

14.3.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD block client-side active content, such as Java and ActiveX, which are assessed as having a limited business impact.

14.3.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- use client-side controls that allow JavaScript on a per website basis; and
- add JavaScript functions used only for malicious purposes to the agency Web content filter or IDS/IPS.

14.3.12. Web content filter

14.3.12.R.01. Rationale

Using a Web proxy provides agencies with an opportunity to filter potentially harmful information to system users and their workstations.

14.3.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use the Web proxy to filter content that is potentially harmful to system users and their workstations.

14.3.13. Website Passwords

14.3.13.R.01. Rationale

Some websites require the use of a userID and password as the authentication mechanism. The management of passwords on these websites is often insecure and there are numerous examples of compromises where tens of thousands, and sometimes millions of passwords are compromised in a single incident. Where the same password is used on multiple websites, an incident can potentially compromise the user's account on *every* website using that password. It is important to treat these websites as insecure and manage passwords appropriately.

14.3.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Users SHOULD NOT store web site authentication credentials (userID and password) on workstations, remote access devices (such as laptops) or BYO devices.

14.3.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Users SHOULD NOT use the same password for multiple websites.

14.4. Software Application Development

OBJECTIVE

14.4.1. Secure programming methods and testing are used for application development in order to minimise the number of coding errors and security vulnerabilities.

CONTEXT

Scope

14.4.2. This section covers information relating to the development, upgrade and maintenance of application software used on agency systems.

REFERENCES

14.4.3. Additional information relating to software development is contained in:

Title	Publisher	Source
ISO/IEC 27001:2013, A.12.5, Security in Development and Support Processes	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27001.html http://www.standards.co.nz

RATIONALE & CONTROLS

14.4.4. Software development environments

14.4.4.R.01. Rationale

Recognised good practice, segregates development, testing and production environments to limit the spread of malicious code and minimise the likelihood of faulty code being put into production.

Limiting access to development and testing environments will reduce the information that can be gained by an internal attacker.

14.4.4.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that software development environments are configured such that:

- there are at least three separate environments covering:
 - development;
 - testing; and
 - production.
- information flow between the environments is strictly limited according to a defined and documented policy, with access granted only to system users with a clear business requirement;
- new development and modifications only take place in the development environment; and
- write access to the authoritative source for the software (source libraries & production environment) is disabled.

14.4.5. Secure programming

14.4.5.R.01. Rationale

Designing software to use the lowest privilege level needed to achieve its task will limit the privileges an attacker could gain in the event they subvert the software security.

14.4.5.R.02. Rationale

Validating all inputs will ensure that the input is within expected ranges, reducing the chance that malicious or erroneous input causes unexpected results.

14.4.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that software developers use secure programming practices when writing code, including:

- designing software to use the lowest privilege level needed to achieve its task;
- denying access by default;
- checking return values of all system calls; and
- validating all inputs.

14.4.6. Software testing

14.4.6.R.01. Rationale

Software reviewing and testing will reduce the possibility of introducing vulnerabilities into a production environment.

14.4.6.R.02. Rationale

Using an independent party for software testing will limit any bias that can occur when a developer tests their own software.

14.4.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Software SHOULD be reviewed or tested for vulnerabilities before it is used in a production environment.

14.4.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Software SHOULD be reviewed or tested by an independent party as well as the developer.

14.4.6.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Software development SHOULD follow secure coding practices and agency development standards.

14.5. Web Application Development

OBJECTIVE

14.5.1. Security mechanisms are incorporated into all Web applications by design and implementation.

CONTEXT

Scope

14.5.2. This section covers the deployment of agency Web applications and websites.

Protecting Web servers

14.5.3. Even though Web servers may contain only information authorised for release into the public domain, there still remains a need to protect the integrity and availability of the information. As such, Web servers are to be treated in accordance with the requirements of the classification of the system they are connected to.

Web application components

14.5.4. Web application components at a high level consist of a Web server for presentation, a Web application for processing and a database for content storage. There can be more or fewer components, however in general there is a presentation layer, application layer and database layer.

REFERENCES

14.5.5. Further information on Web application security is available from the Open Web Application Security Project at:

Title	Publisher	Source
The Open Web Application Security Project (OWASP) - Reference	OWASP	http://www.owasp.org

RATIONALE & CONTROLS

14.5.6. Agency website content

14.5.6.R.01. Rationale

Reviewing active content on agency Web servers will assist in identifying and mitigating information security issues.

14.5.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD review all active content on their Web servers for known information security issues.

14.5.7. Segregation of Web application components

14.5.7.R.01. Rationale

Web applications are typically very exposed services that provide complex interactions with system users. This greatly increases the security risk of being compromised. By segregating components the impact of potential application flaws or attacks is limited.

14.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD minimise connectivity and access between each Web application component.

14.5.8. Web applications

14.5.8.R.01. Rationale

The Open Web Application Security Project guide provides a comprehensive resource to consult when developing Web applications.

14.5.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD follow the documentation provided in the Open Web Application Security Project guide to building secure Web applications and Web services.

14.6. Databases

OBJECTIVE

14.6.1. Database content is protected from personnel without a need-to-know.

CONTEXT

Scope

14.6.2. This section covers information relating to databases and interfaces to databases such as search engines.

RATIONALE & CONTROLS

14.6.3. Data labelling

14.6.3.R.01. Rationale

Protective markings can be applied to records, tables or to the database as a whole, depending on structure and use. Query results will often need a protective marking to reflect the aggregate of the information retrieved.

14.6.3.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST ensure that all classified information stored within a database is associated with an appropriate protective marking if the information:

- could be exported to a different system; or
- contains differing classifications or different handling requirements.

14.6.3.C.02. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST ensure that protective markings are applied with a level of granularity sufficient to clearly define the handling requirements for any classified information retrieved or exported from a database.

14.6.3.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that all classified information stored within a database is associated with an appropriate protective marking if the information:

- could be exported to a different system; or
- contains differing classifications or different handling requirements.

14.6.3.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that protective markings are applied with a level of granularity sufficient to clearly define the handling requirements for any classified information retrieved or exported from a database.

14.6.4. Database files

14.6.4.R.01. Rationale

Even though a database may provide access controls to stored data, the database files themselves MUST also be protected.

14.6.4.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST protect database files from access that bypasses the database's normal access controls.

14.6.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD protect database files from access that bypass normal access controls.

14.6.5. Accountability

14.6.5.R.01. Rationale

If system users' interactions with databases are not logged and audited, agencies will not be able to appropriately investigate any misuse or compromise of database content.

14.6.5.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST enable logging and auditing of system users' actions.

14.6.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that databases provide functionality to allow for auditing of system users' actions.

14.6.6. Search engines

14.6.6.R.01. Rationale

Even if a search engine restricts viewing of classified information that a system user does not have sufficient security clearances to access, the associated metadata can contain information above the security clearances of the system user. In such cases, restricting access to, or sanitising, this metadata effectively controls the possible release of information the system user is not cleared to view.

14.6.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

If results from database queries cannot be appropriately filtered, agencies MUST ensure that all query results are appropriately sanitised to meet the minimum security clearances of system users.

14.6.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that system users who do not have sufficient security clearances to view database contents cannot see or interrogate associated metadata in a list of results from a search engine query.

15. EMAIL SECURITY

15.1. Email Applications

OBJECTIVE

15.1.1. Email messages have appropriate protective markings to facilitate the application of handling instructions.

CONTEXT

Scope

15.1.2. This section covers information on email policy and usage as it applies to content and protective markings. Information on email infrastructure is located in Section 15.2 - Email Infrastructure.

Automatically generated emails

15.1.3. The requirements for emails within this section equally apply to automatically and manually generated emails.

Exceptions for receiving unmarked email messages

15.1.4. Where an agency receives unmarked non-government emails as part of its business practice the application of protective markings can be automated.

REFERENCES

Title	Publisher	Source
NIST publication SP 800-45 v2, Guidelines on Electronic Mail Security	NIST	http://csrc.nist.gov/publications/nistpubs/800-45-version2/SP800-45v2.pdf
Detecting socially engineered emails August 2012	ASD	http://www.asd.gov.au/publications/cso/cprotect/Socially_Engineered_Email.pdf

RATIONALE & CONTROLS

15.1.5. Email usage policy

15.1.5.R.01. Rationale

There are many security risks associated with the non-secure nature of email that are often overlooked. Documenting them will inform information owners about these security risks and how they might affect business operations.

15.1.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop and implement a policy governing the use of email.

15.1.6. Email distribution

15.1.6.R.01. Rationale

Often the membership, clearance level and nationality of members of email distribution lists is unknown. As such, personnel sending sensitive emails with NZEO or other nationality releasability marked information could be accidentally causing an information security incident by sending such information to distribution lists.

15.1.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that emails containing NZEO or other nationality releasability marked information are sent only to named recipients.

15.1.6.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT transmit emails or other documents, containing NZEO or other nationality releasability marks, to groups or distribution lists unless the nationality of all members of the distribution lists can be confirmed.

15.1.7. Protective marking standard

15.1.7.R.01. Rationale

Applying markings that reflect the protective requirements of an email informs the recipient on how to appropriately handle the email and any related documents.

15.1.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD comply with the national classification system for the application of protective markings.

15.1.8. Marking tools

15.1.8.R.01. Rationale

Requiring system user intervention in the marking of system user-generated emails assures a conscious decision by the system user, lessening the chance of incorrectly marked emails.

15.1.8.R.02. Rationale

Limiting the protective markings a system user is allowed to choose, to those for which the system is accredited lessens the chance that a system user inadvertently over-classifies an email and reminds them of the maximum classification of information that is permitted on the system.

15.1.8.R.03. Rationale

Gateway filters usually check only the most recent protective marking. Care **MUST** be taken when changing protective markings to a classification lower than that of the original email as this can result in emails being forwarded to systems or individuals **NOT** authorised and cleared to receive them. The instructions in the classification system on changing classifications **MUST** be observed to avoid a security breach.

15.1.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT
Agencies **MUST NOT** allow system users to select protective markings that the system has not been accredited to process, store or communicate.

15.1.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT
Agencies **SHOULD NOT** allow a protective marking to be inserted into system user generated emails without their intervention.

15.1.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT
Agencies **SHOULD NOT** permit system users replying to or forwarding an email to select a protective marking that indicates that the classification of the email is lower than a previous classification used for the email.

15.1.9. Marking classified and unclassified emails

15.1.9.R.01. Rationale

As with paper-based information all electronic-based information should be marked with an appropriate protective marking in accordance with the classification system. This ensures that appropriate security measures are applied to the information and also assists in preventing the inadvertent release of information into the public domain.

15.1.9.R.02. Rationale

When a protective marking is applied to an email it is important that it reflects the highest classification in the body of the email and any attachments within the email.

15.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

All classified and unclassified emails MUST have a protective marking.

15.1.9.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Email protective markings MUST accurately reflect the highest classification of all elements in an email, including any attachments.

15.1.9.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD include protective markings in the email subject line or header to facilitate early identification of the classification.

15.1.10. Emails from outside the government

15.1.10.R.01. Rationale

If an email is received from outside government the system user has an obligation to determine the appropriate protective measures for the email if it is to be responded to, forwarded on or printed out.

15.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Where an unmarked email has originated outside the government, the agency MUST assess the information and determine how it is to be handled in accordance with the classification system.

15.1.11. Marking personal emails

15.1.11.R.01. Rationale

Applying protective markings to personal emails may create system overheads and will be misleading.

15.1.11.R.02. Rationale

Personal emails can be marked as “PERSONAL” or “UNOFFICIAL” to avoid confusion with Official or Classified information.

15.1.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Where an email is of a personal nature and does not contain government information, protective markings for classified or UNCLASSIFIED information SHOULD NOT be used.

15.1.12. Receiving unmarked emails

15.1.12.R.01. Rationale

If an email is received from a New Zealand or overseas government agency without a protective marking the system user has an obligation to contact the originator to seek clarification on the appropriate protection measures for the email or follow established protocols and policy for protective markings.

15.1.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an unmarked email has originated from a New Zealand or overseas government agency, personnel SHOULD contact the originator to determine how it is to be handled.

15.1.13. Receiving emails with unknown protective markings**15.1.13.R.01. Rationale**

If an email is received with a protective marking that the system user is not familiar with they have an obligation to contact the originator to seek clarification on the protective marking and the appropriate protection measures for the email.

15.1.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an email is received with an unknown protective marking from a New Zealand or overseas government agency, personnel SHOULD contact the originator to determine appropriate protection measures.

15.1.14. Printing**15.1.14.R.01. Rationale**

The PSM requires that paper-based information have the classification of the information placed at the top and bottom of each piece of paper, in CAPITALS and appearing as the first and last item on each page.

15.1.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD configure systems so that the protective markings appear at the top and bottom of every page when the email is printed, in CAPITALS and appearing as the first and last item on each page.

15.1.15. Active Web addresses within emails**15.1.15.R.01. Rationale**

Spoofed emails often contain an active Web address directing personnel to a malicious website to either elicit information or infect their workstation with malicious code. In order to reduce the success rate of such attacks agencies can choose to educate their personnel to neither send emails with active Web addresses or to click on Web addresses in emails that they receive.

15.1.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Personnel SHOULD NOT send emails that contain active Web addresses or click on active Web addresses within emails they receive.

15.1.16. Awareness of email usage policies

15.1.16.R.01. Rationale

In order to protect information and systems, system users will need to be familiar with email usage policies.

15.1.16.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**
Agencies **MUST** make their system users aware of the agency's email usage policies.

15.1.17. Monitoring email usage

15.1.17.R.01. Rationale

Agencies may choose to monitor compliance with aspects of email usage policies such as attempts to send prohibited file types or executables, attempts to send excessive sized attachments or attempts to send classified information without appropriate protective markings.

15.1.17.C.01. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Agencies **SHOULD** implement measures to monitor their personnel's compliance with email usage policies.

15.1.17.C.02. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Agencies **SHOULD** enforce the use of approved government email systems such as SEEMAIL.

15.1.18. Public Web-based email services

15.1.18.R.01. Rationale

Using public Web-based email services may allow personnel to bypass security measures that agencies will have put in place to protect against malicious code or phishing attempts distributed via email. Web based email services may also by-pass agency context filtering mechanisms.

15.1.18.C.01. Control: System Classification(s): All Classifications; Compliance: **SHOULD NOT**
Agencies **SHOULD NOT** allow personnel to use public Web-based email services, for processing, receiving or sending emails or attachments for official business.

15.2. Email Infrastructure

OBJECTIVE

15.2.1. Email infrastructure is hardened, email is secured and protective marking of email messages is enforced.

CONTEXT

Scope

15.2.2. This section covers information on email infrastructure security. Information on using email applications can be found in Section 15.1 - Email Applications and Section 9.3 - Using the Internet.

REFERENCES

15.2.3. Further information on email security is available from the following sources:

Title	Publisher	Source
RFC 3207, SMTP Service Extension for Secure SMTP over Transport Layer Security	IETF	http://www.ietf.org/rfc/rfc3207.txt
RFC 4408, Sender Policy Framework	IETF	http://www.ietf.org/rfc/rfc4408.txt
RFC 4686, Analysis of Threats Motivating DomainKeys Identified Mail	IETF	http://www.ietf.org/rfc/rfc4686.txt
RFC 4871, DomainKeys Identified Mail Signatures	IETF	http://www.ietf.org/rfc/rfc4871.txt
RFC 5617, DomainKeys Identified Mail (DKIM) Author Domain Signing Practices (ADSP)	IETF	http://tools.ietf.org/html/rfc5617
NIST publication SP 800-45 v2, Guidelines on Electronic Mail Security	NIST	http://csrc.nist.gov/publications/nistpubs/800-45-version2/SP800-45v2.pdf
Mitigating spoofed emails – Sender Policy Framework explained	ASD	http://www.asd.gov.au/publications/csocprotect/Spoof Email Sender Policy Framework.pdf
CPA Security Characteristic Desktop Email Encryption Version 1.0	CESG	http://www.cesg.gov.uk/publications/Documents/desktop_email_encryption_sc.pdf
Sender Policy Framework Project		www.openspf.org

RATIONALE & CONTROLS

15.2.4. Filtering suspicious emails and attachments

15.2.4.R.01. Rationale

The intent of blocking specific types of emails is to reduce the likelihood of phishing emails and emails or attachments containing malicious code entering the agency's networks.

15.2.4.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD configure the following gateway filters:

- inbound and outbound email, including any attachments, that contain:
 - malicious code;
 - content in conflict with the agency's email policy;
 - content that cannot be identified;
 - blacklisted or unauthorised filetypes; and
 - encrypted content, when that content cannot be inspected for malicious code or authenticated as originating from a trusted source;
- emails addressed to internal email aliases with source addresses located from outside the domain; and
- all emails arriving via an external connection where the source address uses an internal agency domain name.

15.2.5. Active web addresses (URL) embedded in emails

15.2.5.R.01. Rationale

Spoofed emails often contain an active (embedded) email address directing users to a malicious website in order to infect the workstation or agency systems with malicious code.

15.2.5.R.02. Rationale

An effective defence is to strip and replace active addresses and hyperlinks with text only versions.

15.2.5.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Email servers SHOULD be configured to strip active addresses and URL's and replace them with text only versions.

15.2.6. Preventing unmarked or inappropriately marked emails

15.2.6.R.01. Rationale

Unmarked or inappropriately marked emails can be blocked at two points, the workstation or the email server. The email server is often the preferred location to block emails as it is a single location under the control of system administrators that can enforce the requirement for the entire network. In addition email servers can apply controls for emails generated by applications.

15.2.6.R.02. Rationale

Whilst blocking at the email server is considered the most appropriate control there is an advantage in also blocking at the workstation. This approach adds an extra layer of security and will also reduce the likelihood of a data spill occurring on the email server.

15.2.6.R.03. Rationale

For classified systems it is important to note that all emails containing classified information **MUST** have an appropriate classification. This requirement is outlined in Section 15.1 - Email Applications.

15.2.6.C.01. Control: System Classification(s): C, S, TS; Compliance: **MUST**

Agencies **MUST** prevent unmarked and inappropriately marked emails being sent to intended recipients by blocking the email at the email server, originating workstation or both.

15.2.6.C.02. Control: System Classification(s): C, S, TS; Compliance: **MUST**

Agencies **MUST** enforce classification marking of emails so that checking and filtering can take place.

15.2.6.C.03. Control: System Classification(s): All Classifications; Compliance: **SHOULD**

Agencies **SHOULD** prevent unmarked and inappropriately marked emails being sent to intended recipients by blocking the email at the originating workstation.

15.2.6.C.04. Control: System Classification(s): All Classifications; Compliance: **SHOULD**

Agencies **SHOULD** prevent unmarked and inappropriately marked emails being sent to intended recipients by blocking the email at the email server.

15.2.7. Blocking of outbound emails

15.2.7.R.01. Rationale

Blocking an outbound email with a valid protective marking or caveat (e.g. NZEO) that indicates the email exceeds the classification of the communication path, stops data spills.

15.2.7.R.02. Rationale

Agencies may remove protective markings from emails destined for private citizens and businesses once they have been approved for release from the agency's gateways.

15.2.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST configure systems to block any outbound emails with a protective marking or caveat indicating that the content of the email exceeds the classification of the communication path.

15.2.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD configure systems to log every occurrence of a blocked email.

15.2.8. Blocking of inbound emails

15.2.8.R.01. Rationale

Blocking an inbound email with a valid protective marking that indicates the email or its attachment exceeds the classification the receiving system is accredited to process will prevent a data spill from occurring on the receiving system.

15.2.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST configure email systems to reject, log and report inbound emails with protective markings indicating that the content of the email exceeds the accreditation of the receiving system.

15.2.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD notify the intended recipient of any blocked emails.

15.2.9. Undeliverable messages

15.2.9.R.01. Rationale

Undeliverable or “bounce” emails are commonly sent by email servers to the original sender when the email cannot be delivered, often because the destination address is invalid. Because of the common spamming practice of spoofing sender addresses, this can result in a large amount of bounce emails being sent to an innocent third party. Sending bounces only to senders that can be verified via the Sender Policy Framework (SPF) or other trusted means avoids contributing to this problem and allows other government agencies and trusted parties to receive legitimate bounce messages.

15.2.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD send notification of undeliverable, bounced or blocked emails to senders that can be verified via SPF or other trusted means.

15.2.10. Automatic forwarding of emails

15.2.10.R.01. Rationale

Unsecured automatic forwarding of emails can pose a serious risk to the unauthorised disclosure of classified information, for example, a system user may set up a server-side rule to automatically forward all emails to a personal email account. This can result in classified emails being forwarded to the personal email account.

15.2.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that the requirements for blocking unmarked and outbound emails are also applied to automatically forwarded emails.

15.2.11. Open relay email servers

15.2.11.R.01. Rationale

An open relay email server (or open mail relay) is a server that is configured to allow anyone on the Internet to send emails through the server. Such configurations are highly undesirable as they allow spammers and worms to exploit this functionality to send emails through the server.

15.2.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD disable open email relaying so that email servers will only relay messages destined for the agency's domain(s) and those originating from within that domain.

15.2.12. Email server maintenance activities

15.2.12.R.01. Rationale

Email servers perform a critical business function for many agencies; as such it is important that agencies perform regular email server auditing, security reviews and vulnerability analysis activities.

15.2.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD perform regular email server auditing, security reviews and vulnerability analysis activities.

15.2.13. Centralised email gateways

15.2.13.R.01. Rationale

Without a centralised email gateway it is exceptionally difficult to deploy Sender Policy Framework (SPF), DomainKeys Identified Mail (DKIM) and outbound email protective markings verification.

Attackers will almost invariably avoid using the primary email server when sending malicious emails. This is because the backup or alternative gateways are often poorly maintained with out-of-date blacklists and content filtering.

15.2.13.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**

Where an agency has system users that send email from outside the agency's network, an authenticated and encrypted channel **MUST** be configured to allow email to be sent via the centralised email gateway.

15.2.13.C.02. Control: System Classification(s): All Classifications; Compliance: **SHOULD**

Agencies **SHOULD** route email through a centralised email gateway.

15.2.13.C.03. Control: System Classification(s): All Classifications; Compliance: **SHOULD**

Where backup or alternative email gateways are in place, additional email gateways **SHOULD** be maintained at the same standard as the primary email gateway.

15.2.14. Transport Layer Security (TLS)

15.2.14.R.01. Rationale

Email can be intercepted anywhere between the originating email server and the destination email server. Enabling TLS on the originating and accepting email server will defeat passive attacks on the network, with the exception of cryptanalysis against email traffic. TLS encryption between email servers will not interfere with email content filtering schemes. Email servers will remain compatible with other email servers as IETF's RFC 3207 specifies the encryption as opportunistic.

15.2.14.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**

Agencies **MUST** enable opportunistic TLS encryption as defined in IETF's RFC 3207 on email servers that make incoming or outgoing email connections over public infrastructure.

15.2.14.C.02. Control: System Classification(s): All Classifications; Compliance: **SHOULD**

Agencies **SHOULD** implement TLS between email servers where significant volumes of classified information are passed via email to other agencies.

15.2.15. Sender Policy Framework (SPF)

15.2.15.R.01. Rationale

The Sender Policy Framework (SPF) is an open standard specifying a technical method to prevent sender address forgery.

An SPF-protected domain is less attractive to spammers and phishers because the forged e-mails are more likely to be caught in spam filters which check the SPF record. Because an SPF-protected domain is less attractive as a spoofed address, it is less likely to be blacklisted by spam filters and so is less disruptive to email traffic.

15.2.15.R.02. Rationale

Having a proper Sender Policy Framework (SPF) record increases the chances people will get emails you send. Without one, your email has a greater chance of being marked as Spam.

15.2.15.R.03. Rationale

SPF and alternatives such as Sender ID aid in the detection of spoofed email server address domains. The SPF record specifies a list of IP addresses or domains that are allowed to send mail from a specific domain. If the email server that transmitted the email is not in the list, the verification fails (there are a number of different fail types available).

15.2.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST:

- specify mail servers using SPF or Sender ID; and
- mark, block or identify incoming emails that fail SPF checks for notification to the email recipient.

15.2.15.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- use a hard fail SPF record when specifying email servers; and
- use SPF or Sender ID to verify the authenticity of incoming emails.

15.2.15.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD refer to the SPF recommendations in IETF's RFC 4408.

15.2.16. DomainKeys Identified Mail (DKIM)**15.2.16.R.01. Rationale**

DKIM enables a method of determining spoofed email content. The DKIM record specifies a public key that will sign the content of the message. If the signed digest in the email header doesn't match the signed content of the email the verification fails.

15.2.16.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD enable DKIM signing on all email originating from their domain.

15.2.16.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use DKIM in conjunction with SPF.

15.2.16.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD verify DKIM signatures on emails received, taking into account that email distribution list software typically invalidates DKIM signatures.

15.2.16.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where agencies operate email distribution list software used by external senders, agencies SHOULD configure the software so that it does not impair the validity of the sender's DKIM signature.

16. ACCESS CONTROL

16.1. Identification and Authentication

OBJECTIVE

16.1.1. Identification and authentication requirements are implemented in order to provide a secure means of access to information and systems.

CONTEXT

Scope

16.1.2. This section covers information on the identification and authentication of all system users.

16.1.3. Access Control is any mechanism by which an individual, system or application grants or revokes the right to access some location, system, data, or perform some action. Access Control must be supported by an appropriate organisational policy.

16.1.4. In Information Technology, a user will usually register an identity supported by some evidence of identity. This will be accompanied by an authority to access information, usually from a manager or other executive. The authentication system will then issue credentials, usually user ID and password, but may also include tokens or use biometrics. The credentials are the means by which a user accesses an information technology system and are verified each time a user logs onto a system.

16.1.5. Access Control systems manage access rights, including:

- Physical access to locations;
- File system permissions, including physical documents and files, such as create, read, edit or delete data;
- Program permissions, such as the right to execute a programme;
- Data rights, such as the right to retrieve, print or update information in a database.

Methods for user identification and authentication

16.1.6. Authentication is the process by which a claimed identity is verified and access permissions are confirmed before access is granted.

16.1.7. User authentication can be achieved by various means, including biometrics, cryptographic tokens, software tokens, passphrases, passwords and smartcards. Where this manual refers to passwords it equally applies to passphrases.

16.1.8. Authentication mechanisms are invariably described in terms of factors of authentication as follows:

1. Something you have (preferably NOT the device itself but a SEPARATE authentication device such as a token, RFID card or smartcard). This is also known as the *possession* factor;
2. Something you know such as a PIN, One-Time Password (OTP), reusable password, pattern or other component of a standard authentication mechanism. This is also described as the *knowledge* factor;
3. Something you are (biometrics of various types). This is also described as the *inherence* factor.

16.1.9. Commonly used two factor authentication schemes are a token and PIN/Password. Biometrics are less commonly used on mobile or remote systems.

Software Tokens

16.1.10. Software Tokens, Soft Tokens or “softtokens” are typically applications that run on mobile devices such as smart phones, tablets, laptops other workstations. They are sometimes also known as “virtual tokens”. When soft tokens are used the device itself then becomes the “possession factor”. Functionality may include:

- Transfer between devices by the user.
- Use of Quick Response (QR) codes to facilitate deployment.
- Manages international time zones changes when travelling.

16.1.11. The soft token (secret) is vulnerable to any attacker that can gain full access to the device through theft, loss or download of malware. This is not as secure as a *separate* hardware token which is more resistant to attack and tampering.

REFERENCES

16.1.12. Additional information relating to Access Control and User Authentication can be found at:

Title	Publisher	Source
ISO/IEC 27002:2013, Section 11, User Password Management Password Use User Identification and Authentication	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27001.html http://www.standards.co.nz
Evidence of Identity	DIA	http://www.dia.govt.nz/DIAWebsite.nsf/wpg_URL/Resource-material-Evidence-of-Identity-Standard-Index?OpenDocument
The NZ Government Authentication Standard	GCIO	http://ict.govt.nz/guidance-and-resources/standards-compliance/authentication-standards/
The NZ Government Authentication Standard Appendix A – Definitions	GCIO	http://ict.govt.nz/guidance-and-resources/standards-compliance/authentication-standards/guide-authentication-standards-online-services/appendix-def
Special Publication 800-63-1 Electronic Authentication Guideline	NIST	http://csrc.nist.gov/publications/nistpubs/800-63-1/SP-800-63-1.pdf
Draft Special Publication 800-63-2 - Electronic Authentication Guideline	NIST	http://csrc.nist.gov/publications/drafts/800-63-2/sp800_63_2_draft.pdf
The academic paper The Adoption of Single Sign-On and Multifactor Authentication in Organisations – A Critical Evaluation Using TOE Framework Issues in Informing Science and Information Technology Volume 7, 2010	Issues in Informing Science and Information Technology (IISIT)	http://iisit.org/Vol7/IISITv7p161-189DCosta788.pdf

Title	Publisher	Source
Multi-factor Authentication January 2012	ASD	http://www.asd.gov.au/publications/cs/ocprotect/Multi_Factor_Authentication.pdf
Mitigating the use of stolen credentials to access agency information – August 2012	ASD	http://www.asd.gov.au/publications/cs/ocprotect/Stolen_Credentials.pdf

RATIONALE & CONTROLS

16.1.13. Policies and procedures

16.1.13.R.01. Rationale

Developing policies and procedures will ensure consistency in identification, authentication and authorisation, across agency systems and with relevant standards.

16.1.13.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST:

- develop and maintain a set of policies and procedures covering system users':
 - identification;
 - authentication;
 - authorisation; and
- make their system users aware of the agency's policies and procedures.

16.1.14. System user identification

16.1.14.R.01. Rationale

Having uniquely identifiable system users ensures accountability.

16.1.14.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that all system users are:

- uniquely identifiable; and
- authenticated on each occasion that access is granted to a system.

16.1.15. Shared accounts

16.1.15.R.01. Rationale

Sharing passwords and UserIDs (credentials) may be convenient but invariably hampers efforts to identify a specific user and attribute actions to a specific person or system. While agencies and users find convenience in sharing credentials, doing so is highly risky. Shared credentials can defeat accountability and the attribution and non-repudiation principles of access control. This is particularly important where administrative access to networks and servers or access to classified information is provided through shared credentials.

16.1.15.C.01. Control: System Classification(s): TS; Compliance: MUST NOT

Agencies MUST NOT use shared credentials to access accounts.

16.1.15.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT use shared credentials to access accounts.

16.1.16. System user identification for shared accounts

16.1.16.R.01. Rationale

Agencies may have a compelling business reason for the use of shared accounts. These may include Anonymous, Guest and Temporary Employee (such as relieving a receptionist) credentials. It may not be possible to attribute the use of such accounts to a specific person.

16.1.16.R.02. Rationale

As shared accounts are non user-specific, agencies will need to determine an appropriate method of attributing actions undertaken by such accounts to specific personnel. For example, a logbook may be used to document the date and time that a person takes responsibility for using a shared account and the actions logged against the account by the system.

16.1.16.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

If agencies choose to allow shared, non user-specific accounts they MUST ensure that an independent means of determining the identification of the system user is implemented.

16.1.17. Methods for system user identification and authentication

16.1.17.R.01. Rationale

A personal identification number is typically short in length and employs a small character set, making it susceptible to brute force attacks.

16.1.17.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT use a numerical password (or personal identification number) as the sole method of authenticating a system user to access a system.

16.1.17.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that they combine the use of multiple methods when identifying and authenticating system users.

16.1.18. Protecting stored authentication information

16.1.18.R.01. Rationale

Limiting the storage of unprotected authentication information reduces the possibility of an attacker finding and using the information to access a system under the guise of a valid system user.

16.1.18.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT allow storage of unprotected authentication information that grants system access, or decrypts an encrypted device, to be located on, or with the system or device, to which the authentication information grants access.

16.1.19. Protecting authentication data in transit

16.1.19.R.01. Rationale

Secure transmission of authentication information will reduce the risk of interception and subsequent use of the authentication information by an attacker to access a system under the guise of a valid system user.

16.1.19.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that system authentication data is protected when in transit on agency networks or All of Government systems.

16.1.20. Identification of foreign nationals

16.1.20.R.01. Rationale

Where systems contain NZEO or other nationality releasability marked information, and foreign nationals have access to such systems, it is important that agencies implement appropriate security measures to assist in identifying users that are foreign nationals. Such measures will assist in preventing the release of sensitive information to those not authorised to access it.

16.1.20.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Where systems contain NZEO or other nationality releasability marked information, agencies MUST provide a mechanism that allows system users and processes to identify users who are foreign nationals, including seconded foreign nationals.

16.1.20.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies using NZEO systems SHOULD ensure that identification includes specific nationality for all foreign nationals, including seconded foreign nationals.

16.1.21. Password selection policy

16.1.21.R.01. Rationale

Passwords are the primary authentication mechanism for almost all information systems and are fundamental part of access and authentication processes and mechanisms. While there are some limitations in the use of passwords, they remain the most cost effective means available with current technology.

16.1.21.R.02. Rationale

Passwords are subject to three principal groups of risks:

1. Intentional password sharing;
2. Password theft, loss or compromise; and
3. Password guessing and cracking.

16.1.21.R.03. Rationale

Associated with these risk group are four principal methods of attacking passwords:

1. Interactive attempts including password guessing, brute force attacks or some knowledge of the user or agency.
2. Obtaining the password through social engineering or phishing.
3. Compromising the password through oversight, observation, use of keyloggers, cameras etc.
4. Cracking through network traffic interception, misconfiguration, malware, data capture etc. For example a simple eight-letter password can today be brute-forced in minutes by software freely available on the Internet.

16.1.21.R.04. Rationale

Password controls are designed to manage these risks and attack methods using the controls specified in this section. For example, passwords with at least ten characters utilising upper and lower case, numbers and special characters have a much greater resistance to brute force attacks. When use in combination with controls such as password history and regular password change, passwords can present high resistance to known attack methods.

16.1.21.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST implement a password policy enforcing:

- a minimum password length of ten characters, consisting of at least three of the following character sets:
 - lowercase characters (a-z);
 - uppercase characters (A-Z);
 - digits (0-9); and
 - punctuation and special characters.

16.1.21.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement a password policy enforcing either:

- a minimum password length of 16 characters with no complexity requirement; or
- a minimum password length of ten characters, consisting of at least three of the following character sets:
 - lowercase characters (a-z);
 - uppercase characters (A-Z);
 - digits (0-9); and
 - punctuation and special characters.

16.1.22. Password management

16.1.22.R.01. Rationale

Changing a password at least every 90 days will limit the time period in which a disclosed password could be used by an unauthorised system user.

16.1.22.R.02. Rationale

Preventing a system user from changing their password more than once a day will stop the system user from immediately changing their password back to their old password.

16.1.22.R.03. Rationale

Checking passwords for compliance with the password selection policy will allow system administrators to detect unsafe password selection and ensure that the system user changes it.

16.1.22.R.04. Rationale

Requiring a system user to change a password on account reset will ensure that the system user has a password known only to that user and is more easily remembered.

16.1.22.R.05. Rationale

Disallowing predictable reset passwords will reduce the security risk of brute force attacks and password guessing attacks.

16.1.22.R.06. Rationale

Using different passwords when resetting multiple accounts will prevent a system user whose account has been recently reset from logging into another such account.

16.1.22.R.07. Rationale

Disallowing passwords from being reused within eight changes will prevent a system user from cycling between a small subset of passwords.

16.1.22.R.08. Rationale

Disallowing sequential passwords will reduce the security risk of an attacker easily guessing a system user's next password based on their knowledge of the system user's previous password.

16.1.22.C.01. Control: **System Classification(s): C, S, TS; Compliance: MUST**

Agencies MUST:

- ensure that passwords are changed at least every 90 days;
- prevent system users from changing their password more than once a day;
- check passwords for compliance with their password selection policy where the system cannot be configured to enforce complexity requirements; and
- force the system user to change an expired password on initial logon or if reset.

16.1.22.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT:

- allow predictable reset passwords;
- reuse passwords when resetting multiple accounts;
- store passwords in the clear on the system;
- allow passwords to be reused within eight password changes; and
- allow system users to use sequential passwords.

16.1.22.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- ensure that passwords are changed at least every 90 days;
- prevent system users from changing their password more than once a day;
- check passwords for compliance with their password selection policy where the system cannot be configured to enforce complexity requirements; and
- force the system user to change an expired password on initial logon or if the password is reset.

16.1.22.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT:

- allow predictable reset passwords;
- reuse passwords when resetting multiple accounts;
- store passwords in the clear on the system;
- allow passwords to be reused within eight password changes; and
- allow system users to use sequential passwords.

16.1.23. Resetting passwords

16.1.23.R.01. Rationale

To reduce the likelihood of social engineering attacks aimed at service desks, agencies will need to ensure that system users provide sufficient evidence to verify their identity when requesting a password reset for their system account.

This evidence could be in the form of:

- the system user physically presenting themselves and their security pass to service desk personnel who then reset their password;
- physically presenting themselves to a known colleague who uses an approved online tool to reset their password; or
- establishing their identity by responding correctly to a number of questions before resetting their own password.

16.1.23.R.02. Rationale

Issuing complex reset passwords maintains the security of the user account during the reset process. This can also present an opportunity to demonstrate the selection of strong passwords.

16.1.23.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure system users provide sufficient evidence to verify their identity when requesting a password reset for their system account.

16.1.24. Password authentication

16.1.24.R.01. Rationale

LAN Manager's authentication mechanism uses a very weak hashing algorithm known as the LAN Manager hash algorithm. Passwords hashed using the LAN Manager hash algorithm can easily be compromised using rainbow tables or brute force attacks.

16.1.24.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD disable LAN Manager for password authentication on workstations and servers.

16.1.25. Session termination

16.1.25.R.01. Rationale

Developing a policy to automatically logout and shutdown workstations after an appropriate time of inactivity will assist in preventing the compromise of an unattended workstation that contains classified or sensitive information. Such a policy will also reduce the power consumption requirements of the agency during non-operational hours.

16.1.25.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop and implement a policy to automatically logout and shutdown workstations after an appropriate time of inactivity.

16.1.26. Session and screen locking

16.1.26.R.01. Rationale

Screen and session locking will prevent access to an unattended workstation.

16.1.26.R.02. Rationale

Ensuring that the screen does not appear to be turned off while in the locked state will prevent system users from forgetting they are still logged in and will prevent other system users from mistakenly thinking there is a problem with a workstation and resetting it.

16.1.26.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST:

- configure systems with a session or screen lock;
- configure the lock to activate:
 - after a maximum of 10 minutes of system user inactivity; or
 - if manually activated by the system user;
- configure the lock to completely conceal all information on the screen;
- ensure that the screen is not turned off or enters a power saving state before the screen or session lock is activated;
- have the system user reauthenticate to unlock the system; and
- deny system users the ability to disable the locking mechanism.

16.1.26.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- configure systems with a session or screen lock;
- configure the lock to activate:
 - after a maximum of 15 minutes of system user inactivity; or
 - if manually activated by the system user;
- configure the lock to completely conceal all information on the screen;
- ensure that the screen is not turned off or enters a power saving state before the screen or session lock is activated;
- have the system user reauthenticate to unlock the system; and
- deny system users the ability to disable the locking mechanism.

16.1.27. Suspension of access

16.1.27.R.01. Rationale

Locking a system user account after a specified number of failed logon attempts will reduce the risk of brute force attacks.

16.1.27.R.02. Rationale

Removing a system user account when it is no longer required will prevent personnel from accessing their old account and reduce the number of accounts that an attacker can target.

16.1.27.R.03. Rationale

Suspending inactive accounts after a specified number of days will reduce the number of accounts that an attacker can target.

16.1.27.R.04. Rationale

Investigating repeated account lockouts will reduce the security risk of any ongoing brute force logon attempts and allow security management to act accordingly.

16.1.27.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST:

- Record all successful and failed logon attempts;
- lock system user accounts after three failed logon attempts;
- have a system administrator reset locked accounts;
- remove or suspend system user accounts as soon as possible when personnel no longer need access due to changing roles or leaving the agency; and
- remove or suspend inactive accounts after a specified number of days.

16.1.27.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- lock system user accounts after three failed logon attempts;
- have a system administrator reset locked accounts;
- remove or suspend system user accounts as soon as possible when personnel no longer need access due to changing roles or leaving the agency; and
- remove or suspend inactive accounts after a specified number of days.

16.1.28. Investigating repeated account lockouts**16.1.28.R.01. Rationale**

Repeated account lockouts may be an indication of malicious activity being directed towards compromising a particular account.

16.1.28.C.01. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Agencies SHOULD ensure that repeated account lockouts are investigated before reauthorising access.

16.1.29. Logon banner**16.1.29.R.01. Rationale**

A logon banner for a system serves to remind system users of their responsibilities when using the system.

16.1.29.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD have a logon banner that requires a system user to acknowledge and accept their security responsibilities before access to the system is granted.

16.1.29.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD seek legal advice on the exact wording of logon banners.

16.1.29.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agency logon banners SHOULD cover issues such as:

- the system's classification;
- access only being permitted to authorised system users;
- the system user's agreement to abide by relevant security policies;
- the system user's awareness of the possibility that system usage is being monitored;
- the definition of acceptable use for the system; and
- legal ramifications of violating the relevant policies.

16.1.30. Displaying when a system user last logged in

16.1.30.R.01. Rationale

Displaying when a system user has last logged onto a system will assist system users in identifying any unauthorised use of their account. Accordingly, when any case of unauthorised use of an account is identified, it should be reported to an ITSM immediately for investigation.

16.1.30.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD configure systems to display the date and time of the system user's previous login during the login process.

16.2. System Access

OBJECTIVE

16.2.1. Access to information on systems is controlled in accordance with agency policy and this manual.

CONTEXT

Scope

16.2.2. This section covers information on accessing systems for all system users. Additional information on privileged users can be found in Section 16.3 - Privileged Access and additional information on security clearance, briefing and authorisation requirements can be found in Section 9.2 - Authorisations, Security Clearances and Briefings.

RATIONALE & CONTROLS

16.2.3. Access from foreign controlled systems and facilities

16.2.3.R.01. Rationale

If a New Zealand system is to be accessed overseas it will need to be from at least a facility owned by a country that New Zealand has a multilateral or bilateral agreement with. NZEO systems can be accessed only from facilities under the sole control of the government of New Zealand and by New Zealand citizens.

16.2.3.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST NOT**
Agencies **MUST NOT** allow access to NZEO information from systems and facilities not under the sole control of the government of New Zealand and New Zealand citizens.

16.2.3.C.02. Control: System Classification(s): All Classifications; Compliance: **SHOULD NOT**
Unless a multilateral or bilateral security agreement is in place, agencies **SHOULD NOT** allow access to classified information from systems and facilities not under the sole control of the government of New Zealand and New Zealand citizens.

16.2.4. Enforcing authorisations on systems

16.2.4.R.01. Rationale

Enforcing authorisations of system users through the use of access controls on a system will assist in enforcing the need-to-know principle.

16.2.4.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**
Agencies **MUST** have authorisation of system users enforced by access controls.

16.2.5. Protecting compartmented information on systems

16.2.5.R.01. Rationale

Compartmented information is particularly sensitive and as such extra measures need to be put in place on systems to restrict access to those with sufficient authorisation, briefings and a demonstrated need-to-know or need- to access.

16.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**
Agencies **MUST** restrict access to compartmented information. Such restriction **MUST** be enforced by the system.

16.2.6. Developing an access control list

16.2.6.R.01. Rationale

A process is described for developing an access control list to assist agencies in the consistent development of access control lists for their systems.

16.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD follow the process in the table below for developing an access control list.

Stage	Description
1	Establish groups of all system resources based on similar security objectives.
2	Determine the information owner for each group of resources.
3	Obtain agreement from system owners.
4	Establish groups encompassing all system users based on similar functions or security objectives.
5	Determine the group owner or manager for each group of system users.
6	Determine the degree of access to the resource for each system user group.
7	Decide on the level of access for security administration, based on the internal security policy.
8	Identify any classification restrictions, (such as NZEO or compartmented information).

16.3. Privileged Access

OBJECTIVE

16.3.1. Only trusted personnel are granted privileged access to systems.

CONTEXT

Scope

16.3.2. This section covers information relating specifically to personnel that are granted privileged access to systems.

Privileged access

16.3.3. Within this section, privileged access is considered to be access which can give a system user:

- the ability to change key system configurations;
- the ability to change control parameters;
- access to audit and security monitoring information;
- the ability to circumvent security measures;
- access to all data, files and accounts used by other system users, including backups and media; or
- special access for troubleshooting the system.

REFERENCES

16.3.4. Additional information relating to privileged and system accounts, including monitoring, is contained in:

Title	Publisher	Source
ISO/IEC 27001:2013, A.11.2.2 Privilege Management	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27001.html http://www.standards.co.nz
NZISM– Section 6.3 Change Management	GCSB	http://www.gcsb.govt.nz
Minimising administrative privileges explained Dec 2012	ASD	http://www.asd.gov.au/publications/csoc_protect/Minimising_Admin_Privileges.pdf
DNSSEC Practice Statement	NZ Registry Services	http://www.nzrs.net.nz

RATIONALE & CONTROLS

16.3.5. Use of privileged accounts

16.3.5.R.01. Rationale

Inappropriate use of any feature or facility of a system that enables a privileged user to override system or application controls can be a major contributory factor to failures, information security incidents, or system breaches.

16.3.5.R.02. Rationale

Privileged access rights allow for system wide changes to be made and as such an appropriate and effective mechanism to log privileged users and strong change management practices will provide greater accountability and auditing capability.

16.3.5.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST:

- ensure strong change management practices are implemented;
- ensure that the use of privileged accounts is controlled and accountable;
- ensure that system administrators are assigned and consistently use, an individual account for the performance of their administration tasks;
- keep privileged accounts to a minimum; and
- allow the use of privileged accounts for administrative work only.

16.3.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- ensure strong change management practices are implemented;
- ensure that the use of privileged accounts is controlled and accountable;
- ensure that system administrators are assigned an individual account for the performance of their administration tasks;
- keep privileged accounts to a minimum; and
- allow the use of privileged accounts for administrative work only.

16.3.6. Privileged system access by foreign nationals

16.3.6.R.01. Rationale

As privileged users may have the ability to bypass controls on a system it is strongly encouraged that foreign nationals are not given privileged access to systems processing particularly sensitive information.

16.3.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT allow foreign nationals, including seconded foreign nationals, to have privileged access to systems that process, store or communicate NZEO information.

16.3.6.C.02. Control: System Classification(s): All Classifications; Compliance: **SHOULD NOT**
Agencies **SHOULD NOT** allow foreign nationals, including seconded foreign nationals, to have privileged access to systems that process, store or communicate classified information.

16.3.7. Security clearances for privileged users

16.3.7.R.01. Rationale

When frequent data transfers occur between systems of different classifications, having privileged users from the lesser system cleared to the classification of the higher system will assist in any actions that need to be taken resulting from any data spill.

16.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Agencies involved in frequent transfers of data from another system to their system with a lesser classification **SHOULD** clear at least one privileged user to the classification of the higher system.

16.4. Remote Access

OBJECTIVE

16.4.1. Remote access to systems is minimised , controlled, authorised and authenticated.

CONTEXT

Scope

16.4.2. This section covers information relating to the methods used by personnel to access an agency system from a remote location.

Remote access

16.4.3. Remote access is defined as user access to agency systems originating outside an agency network. It does not include web-based access to DMZ resources. Further information on working off-site can be found in Chapter 20 – Working Off-site. The requirements for using multi-factor authentication are described in the Identification and Authentication section of this chapter.

Remote privileged access

16.4.4. Remote access by a privileged user to an agency system via a less trusted security domain (for example, the Internet) may present additional risks. Controls in this section are designed to prevent escalation of user privileges from a compromised remote access account.

16.4.5. Remote privileged access does **not** include privileged access across disparate physical sites that are within the same security domain or privileged access across remote sites that are connected via trusted infrastructure. Privileged access of this nature faces different threats to those discussed above. Ensuring robust processes and procedures are in place within an agency to monitor and detect the threat of a malicious insider are the most important measure for this scenario.

Encryption

16.4.6. Cryptography is used to provide confidentiality and preserve integrity of data transmitted over networks where it may be intercepted or examined and is outside the control of the sender and recipient.

16.4.7. The use of approved cryptographic algorithms to encrypt authentication, session establishment and data for all remote access connections is considered good practice (See Chapter 17 - Cryptography and Chapter 20 - Working Off-Site).

RATIONALE & CONTROLS

16.4.8. Authentication

16.4.8.R.01. Rationale

Authenticating remote system users and devices ensures that only authorised system users and devices are allowed to connect to agency systems.

16.4.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST authenticate each remote connection and user prior to permitting access to an agency system.

16.4.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD authenticate both the remote system user and device during the authentication process.

16.4.9. Remote privileged access

16.4.9.R.01. Rationale

A compromise of remote access to a system can be limited by preventing the use of remote privileged access from an untrusted domain.

16.4.9.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT allow the use of remote privileged access from an untrusted domain, including logging in as an unprivileged system user and then escalating privileges.

16.4.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT allow the use of remote privileged access from an untrusted domain, including logging in as an unprivileged system user and then escalating privileges.

16.4.10. VPNs

16.4.10.R.01. Rationale

Virtual Private Networks (VPN's) use a tunnelling protocol to create a secure connection over an intermediate (public) network such as the internet. A VPN uses techniques such as encryption, authentication, authorisation and access control to achieve a secure connection.

16.4.10.R.02. Rationale

A VPN can connect remote or mobile workers or remote locations to a private (agency) network.

16.4.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD establish VPN connections for all remote access connections.

16.5. Event Logging and Auditing

OBJECTIVE

16.5.1. Information security related events are logged and audited for accountability, incident management, forensic and system monitoring purposes.

CONTEXT

Scope

16.5.2. This section covers information on the automatic logging of information relating to network activities. Information regarding manual logging of system management activities can be found in Section 16.3 - Privileged Access. See also Chapter 7 - Information Security Incidents.

16.5.3. A security event is a change to normal or expected behaviour of a network, network component, system, device or user. Event logging helps improve the security posture of a system by increasing the accountability of all user actions, thereby improving the chances that malicious behaviour will be detected.

16.5.4. It is important that sufficient details are recorded in order for the logs to be useful when reviewed or when an investigation is in progress. Retention periods are also important to ensure sufficient log history is available. Conducting audits of event logs is an integral part of the security and maintenance of systems, since they will help detect and attribute any violations of information security policy, including cyber security incidents, breaches and intrusions.

REFERENCES

16.5.5. Additional information relating to event logging is contained in:

Title	Publisher	Source
ISO/IEC 27001:2013 Monitoring	ISO / IEC Standards NZ	http://www.iso27001security.com/html/27001.html http://www.standards.co.nz
Standard Time for a New Zealand Network	Measurement Standards Laboratory	http://msl.irl.cri.nz/services/time-and-frequency/ntp-server-information

RATIONALE & CONTROLS

16.5.6. Maintaining system management logs

16.5.6.R.01. Rationale

Having comprehensive information on the operations of a system can assist system administration, support information security and assist incident investigation and management. In some cases forensic investigations will rely on the integrity, continuity and coverage of system logs.

16.5.6.R.02. Rationale

It will be impractical and costly to store all system logs indefinitely. An agency retention policy may consider:

- Legislative and regulatory requirements;
- Ensure adequate retention for operational support and efficiency;
- Minimise costs and storage requirements; and
- An adequate historical archive is maintained.

Care should be taken to ensure that these considerations are properly balanced.

Some practices dictate retention periods, for example good DNSSEC practice requires log information is stored in log servers for 4 months, then archived and retained for at least 2 years.

16.5.6.C.01. Control: System Classification(s): TS; Compliance: MUST

Agencies MUST maintain system management logs for the life of a system.

16.5.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD determine a policy for the retention of system management logs.

16.5.7. Content of system management logs

16.5.7.R.01. Rationale

Comprehensive system management logs will assist in logging key management activities conducted on systems.

16.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

A system management log SHOULD record the following minimum information:

- all system start-up and shutdown;
- service, application, component or system failures;
- maintenance activities;
- backup and archival activities;
- system recovery activities; and
- special or out of hours activities.

16.5.8. Logging requirements

16.5.8.R.01. Rationale

Event logging can help raise the security posture of a system by increasing the accountability for all system user actions.

16.5.8.R.02. Rationale

Event logging can increase the chances that malicious behaviour will be detected by logging the actions of a malicious party.

16.5.8.R.03. Rationale

Well configured event logging allows for easier and more effective auditing and forensic examination if an information security incident occurs.

16.5.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop and document logging requirements covering:

- the logging facility, including:
 - log server availability requirements; and
 - the reliable delivery of log information to the log server;
- the list of events associated with a system or software component to be logged; and
- event log protection and archival requirements.

16.5.9. Events to be logged

16.5.9.R.01. Rationale

The events to be logged are key elements in the monitoring of the security posture of systems and contributing to reviews, audits, investigations and incident management.

16.5.9.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST log, at minimum, the following events for all software components:

- logons;
- failed logon attempts;
- logoffs;
- date and time;
- all privileged operations;
- failed attempts to elevate privileges;
- security related system alerts and failures;
- system user and group additions, deletions and modification to permissions; and
- unauthorised or failed access attempts to systems and files identified as critical to the agency.

16.5.10. Additional events to be logged**16.5.10.R.01. Rationale**

The additional events to be logged can be useful for reviewing, auditing or investigating software components of systems.

16.5.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD log the events listed in the table below for specific software components.

Software component	Events to log
Database	System user access to the database.
	Attempted access that is denied.
	Changes to system user roles or database rights.
	Addition of new system users, especially privileged users.
	Modifications to the data.
	Modifications to the format or structure of the database.
Network/operating system	Successful and failed attempts to logon and logoff.
	Changes to system administrator and system user accounts.
	Failed attempts to access data and system resources.
	Attempts to use special privileges.
	Use of special privileges.
	System user or group management.
	Changes to the security policy.
	Service failures and restarts.
	System startup and shutdown.
	Changes to system configuration data.
	Access to sensitive data and processes.
Data import/export operations.	
Web application	System user access to the Web application.
	Attempted access that is denied.
	System user access to the Web documents.
	Search engine queries initiated by system users.

16.5.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD log, at minimum, the following events for all software components:

- user login;
- all privileged operations;
- failed attempts to elevate privileges;
- security related system alerts and failures;
- system user and group additions, deletions and modification to permissions; and
- unauthorised or failed access attempts to systems and files identified as critical to the agency.

16.5.11. Event log facility**16.5.11.R.01. Rationale**

The act of logging events is not enough in itself. For each event logged, sufficient detail needs to be recorded in order for the logs to be useful when reviewed. An authoritative external time source, a local **Time Source Master Clock or server or Co-ordinated Universal Time (UTC)** is essential for the time-stamping of events and later inspection or forensic examination. The NZ Interoperability Framework (e-GIF) recognises the time standard for New Zealand as UTC (MSL), with Network Time Protocol (NTP) v.4 as the delivery method over the Internet.

16.5.11.R.02. Rationale

New Zealand standard time is maintained by the Measurement Standards Laboratory of New Zealand (MSL), a part of Industrial Research Limited (IRL). New Zealand standard time is based on UTC, a worldwide open standard used by all modern computer operating systems. UTC (MSL) is kept within 200 nanoseconds of the international atomic time scale maintained by the Bureau International des Poids et Mesures (BIPM) in Paris.

16.5.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

For each event identified as needing to be logged, agencies MUST ensure that the log facility records at least the following details, where applicable:

- date and time of the event;
- relevant system user(s) or processes;
- event description;
- success or failure of the event;
- event source (e.g. application name); and
- IT equipment location/identification.

16.5.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD establish an authoritative time source.

16.5.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD synchronise all logging and audit trails with the time source to allow accurate time stamping of events.

16.5.12. Event log protection

16.5.12.R.01. Rationale

Effective log protection and storage (possibly involving the use of a dedicated event logging server) will help ensure the integrity and availability of the collected logs when they are audited.

16.5.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST
Event logs MUST be protected from:

- modification and unauthorised access; and
- whole or partial loss within the defined retention period.

16.5.12.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST
Agencies MUST configure systems to save event logs to separate secure servers as soon as possible after each event occurs.

16.5.12.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD ensure that:

- systems are configured to save event logs to a separate secure log server; and
- event log data be archived in a manner that maintains its integrity.

16.5.13. Event log archives

16.5.13.R.01. Rationale

It is important that agencies determine the appropriate length of time to retain DNS, proxy, event systems and other operational logs. Logs are an important information source in reviews, audits and investigations ideally these should be retained for the life of the system or longer.

16.5.13.R.02. Rationale

The Archives, Culture, and Heritage Reform Act 2000 the Public Records Act 2005 and the Official Information Act 1982 may determine or influence the length of time that logs need to be retained and if they should be archived.

16.5.13.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Event logs MUST be archived and retained for an appropriate period as determined by the agency.

16.5.13.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Disposal or archiving of DNS, proxy, event, systems and other operational logs MUST be in accordance with the provisions or the relevant legislation.

16.5.13.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD seek advice and determine if their logs are subject to legislation.

16.5.13.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD retain DNS, proxy and event logs for at least 18 months.

16.5.14. Event log auditing

16.5.14.R.01. Rationale

Conducting audits of event logs is seen as an integral part of the maintenance of systems, as they will assist in the detection and attribution of any violations of agency security policy, including information security incidents, breaches and intrusions.

16.5.14.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop and document event log audit requirements covering:

- the scope of audits;
- the audit schedule;
- action to be taken when violations are detected;
- reporting requirements; and
- roles and specific responsibilities.

17. CRYPTOGRAPHY

17.1. Cryptographic Fundamentals

OBJECTIVE

17.1.1. Cryptographic products, algorithms and protocols are approved by the GCSB for suitability before being used.

CONTEXT

Scope

17.1.2. This section covers information on the fundamentals of cryptography including the use of encryption to protect data at rest and in transit. Detailed information on algorithms and protocols approved to protect classified information can be found in the Approved Section 17.2 - Cryptographic Algorithms and Section 17.3 - Approved Cryptographic Protocols.

Purpose of cryptography

17.1.3. Encryption is primarily used to provide confidentiality protecting against the risk of information being exploited by an attacker. More broadly, cryptography can also provide authentication, non-repudiation and integrity.

17.1.4. The use of approved encryption will generally reduce the likelihood of an unauthorised party gaining access to the information contained within the encrypted data.

17.1.5. Cryptography is an important control for data protection and the encryption selected will depend on the classification of the data. Note that classification, in itself, provides no protection but is merely indicative of the degree of protection and care in handling required for that level of classification.

17.1.6. Care needs to be taken with encryption systems that do not encrypt the entire media content to ensure that either all of the classified data is encrypted or that the media is handled in accordance with the highest classification of the unencrypted data.

Using encryption

17.1.7. Encryption of data at rest can be used to reduce the physical storage and handling requirements of the media or systems.

17.1.8. Encryption of data in transit can be used to provide protection for information being communicated over insecure mediums and hence reduce the security requirements of the communication process.

17.1.9. When agencies use encryption for data at rest or in transit, they are not reducing the classification of the information. When encryption is used the potential disclosure of the information is reduced, and as such the protection requirements for a lower classification are considered to be more appropriate to that information.

17.1.10. As the classification of the information does not change, agencies cannot use the lowered storage, physical transfer or security requirements as a baseline to further lower requirements with an additional cryptographic product.

17.1.11. In general terms, the level of assurance of the encryption is defined in terms of Common Criteria, Protection Profiles or, in some cases, approved cryptographic evaluations. Note that evaluations of cryptographic protocols and algorithms are NOT universally conducted when security products are evaluated, relying rather on previous approved evaluations of cryptographic protocols and algorithms.

Product specific cryptographic requirements

17.1.12. This section provides requirements for the use of cryptography to protect classified information. Requirements, additional to those in this Manual, can exist in consumer guides for products once they have completed an approved evaluation. Vendor specifications supplement this manual and where conflict in controls occurs the product specific requirements take precedence. Any policy or compliance conflicts are to be incorporated into the risk assessment.

Exceptions for using cryptographic products

17.1.13. Where Agencies implement a product that uses an Approved Cryptographic Algorithm or Approved Cryptographic Protocol to provide protection of unclassified data at rest or in transit, that product does not require a separate, approved evaluation. Correct implementation of the cryptographic protocol is fundamental to the proper operation of the Approved Cryptographic Algorithm or Approved Cryptographic Protocol and is part of the checking conducted during system certification.

Federal Information Processing Standard 140

17.1.14. The FIPS 140 is a United States standard for the validation of both hardware and software cryptographic modules.

17.1.15. FIPS 140 is in its second iteration and is formally referred to as FIPS 140-2. This section refers to the standard as FIPS 140 but applies to both FIPS 140-1 and FIPS 140-2. The third iteration, FIPS 140-3, has been released in draft and this section also applies to that iteration.

17.1.16. FIPS 140 is not a substitute for an approved evaluation of a product with cryptographic functionality. FIPS 140 is concerned solely with the cryptographic functionality of a module and does not consider any other security functionality.

17.1.17. Cryptographic evaluations of products will normally be conducted by an approved agency. Where a product's cryptographic functionality has been validated under FIPS 140, the GCSB can, at its discretion, and in consultation with the vendor, reduce the scope of a cryptographic evaluation.

17.1.18. The GCSB will review the FIPS 140 validation report to confirm compliance with New Zealand National Cryptographic Policy.

New Zealand National Policy for High Grade Cryptographic Equipment and Key Management

17.1.19. The New Zealand National Standard for High Grade Cryptographic Equipment (HGCE) and related key management is contained in the New Zealand Communications Security Standard No. 300 – Control of COMSEC Material. This prescribes national doctrine for the control of COMSEC materials. Note this is a RESTRICTED document.

REFERENCES

Title	Publisher	Source
New Zealand Communications Security Standard No. 300 – Control of COMSEC Material	GCSB	Contact the GCSB RESTRICTED document available on application to authorised personnel
New Zealand Communications Security Standard No. 500 - Policy	GCSB	Contact the GCSB RESTRICTED document available on application to authorised personnel
FIPS140-2	NIST	http://www.csrc.nist.gov/publications/fips/fips140-2/fips1402.pdf
FIPS140-3 DRAFT	NIST	http://www.csrc.nist.gov/publications/fips/fips140-3/fips1403Draft.pdf
SP 800-57 Part 1, Recommendation for Key Management: Part 1: General (Revision 3), Jul 2012	NIST	SP 800-57 Part 1, Rev. 3
SP 800-57 Part 2, Recommendation for Key Management: Part 2: Best Practices for Key Management Organization, Aug 2005	NIST	SP 800-57 Part 2
SP 800-57 Part 3, Recommendation for Key Management, Part 3 Application-Specific Key Management Guidance, Dec 2009	NIST	SP 800-57 Part 3
The storage and physical transfer requirements for classified information	PSM	http://www.nzsis.govt.nz

RATIONALE & CONTROLS

17.1.20. Using cryptographic products

17.1.20.R.01. Rationale

No real-world product can ever be guaranteed to be free of vulnerabilities. The best that can be done is to increase the level of assurance in a product to a point that represents satisfactory risk management.

17.1.20.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using cryptographic functionality within a product for the protection of classified information MUST ensure that the product has completed a cryptographic evaluation recognised by the GCSB.

17.1.21. Data recovery

17.1.21.R.01. Rationale

It is important for continuity and operational stability that cryptographic products provide a means of data recovery to allow for the recovery of data in circumstances such as where the encryption key is unavailable due to loss, damage or failure. This includes production, storage, backup and virtual systems. This is sometimes described as “key escrow”.

17.1.21.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Cryptographic products MUST provide a means of data recovery to allow for recovery of data in circumstances where the encryption key is unavailable due to loss, damage or failure.

17.1.21.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Cryptographic products SHOULD provide a means of data recovery to allow for recovery of data in circumstances where the encryption key is unavailable due to loss, damage or failure.

17.1.22. Reducing storage and physical transfer requirements

17.1.22.R.01. Rationale

When encryption is applied to media or media residing within IT equipment it provides an additional layer of defence. Whilst such measures do not reduce or alter the classification of the information itself, physical storage, handling and transfer requirements may be reduced to those of a lesser classification for the media or equipment (but not the data itself).

17.1.22.R.02. Rationale

Approved Cryptographic Algorithms are discussed in section 17.2.

17.1.22.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Encryption used to reduce storage or physical handling protection requirements MUST be an approved cryptographic algorithm in an EAL2 (or higher) encryption product.

17.1.22.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

If an agency wishes to reduce the storage or physical transfer requirements for IT equipment or media that contains classified information, they **MUST** encrypt the classified information using High Grade Cryptographic Equipment (HGCE). It is important to note that the classification of the information itself remains unchanged.

17.1.22.C.03. Control: System Classification(s): C, S, TS; Compliance: MUST

If an agency wishes to use encryption to reduce the storage, handling or physical transfer requirements for IT equipment or media that contains classified information, they **MUST** use:

- full disk encryption; or
- partial disk encryption where the access control will allow writing only to the encrypted partition holding the classified information.

17.1.22.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

If an agency wishes to use encryption to reduce the storage or physical transfer requirements for IT equipment or media that contains classified information, they **SHOULD** use:

- full disk encryption; or
- partial disk encryption where the access control will only allow writing to the encrypted partition holding the classified information.

17.1.23. Encrypting NZEO information at rest

17.1.23.R.01. Rationale

NZEO information is particularly sensitive and it requires additional protection in the form of encryption, when at rest. This includes production, storage, backup and virtual systems.

17.1.23.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies **MUST** use an Approved Cryptographic Algorithm to protect NZEO information when at rest on a system.

17.1.24. Reducing network infrastructure requirements

17.1.24.R.01. Rationale

When encryption is applied to classified information being communicated over networks, less assurance needs to be placed in the physical protection of the communications infrastructure. In some cases, where no physical security can be applied to the communications infrastructure such as in the public domain, encryption of classified information is the only practical mechanism to prevent the information from potentially being compromised.

17.1.24.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST use HGCE if they wish to communicate classified information over UNCLASSIFIED, insecure or unprotected networks.

17.1.24.C.02. Control: System Classification(s): RESTRICTED/SENSITIVE; Compliance: MUST

Information classified RESTRICTED or SENSITIVE MUST be encrypted with an approved encryption algorithm and protocol if transmitted over any insecure or unprotected network such as the Internet.

17.1.24.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use an approved encryption product if they wish to communicate over insecure or unprotected networks such as the Internet.

17.1.25. IT equipment using Encryption

17.1.25.R.01. Rationale

In general terms, when IT equipment employing encryption functionality is turned on and authenticated all information becomes accessible to the system user. At such a time the IT equipment will need to be handled in accordance with the highest classification of information on the system. Special technology architectures and implementations exist where accessibility continues to be limited when first powered on. Agencies should consult the GCSB for further advice on special architectures and implementations.

17.1.25.R.02. Rationale

The classification of the equipment when powered off will depend on the equipment type, cryptographic algorithms and protocols used and whether cryptographic key has been removed. Agencies should consult the GCSB for further advice on treatment of specific products and usage.

17.1.25.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

When IT equipment storing encrypted information is turned on and authenticated, it MUST be treated as per the original classification of the information.

17.1.25.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agency MUST consult the GCSB for further advice on the powered off status and treatment of specific products and usage.

17.1.26. Encrypting NZEO information in transit**17.1.26.R.01. Rationale**

NZEO information is particularly sensitive and requires additional protection. It must be encrypted when in transit.

17.1.26.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

In addition to any encryption already in place for communication mediums, agencies MUST use an Approved Cryptographic Protocol and Algorithms to protect NZEO information when in transit.

17.1.27. Key Refresh and Retirement**17.1.27.R.01. Rationale**

All cryptographic keys have a limited useful life after which the key should be replaced or retired. Typically the useful life of the cryptographic key (cryptoperiod) is use, product and situation dependant. Product guidance is the best source of information on establishing cryptoperiods for individual products. A more practical control is the use of data, disk or volume encryption where key changes are more easily managed. Selection of cryptoperiods should be based on a risk assessment.

17.1.27.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD establish cryptoperiods for all keys and cryptographic implementations in their systems and operations.

17.1.27.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use risk assessment techniques and guidance to establish cryptoperiods.

17.1.27.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST consult with the GCSB for the key management requirements for HGCE.

17.2. Approved Cryptographic Algorithms

OBJECTIVE

17.2.1. Information is protected by a properly implemented, Approved Cryptographic Algorithm.

CONTEXT

Scope

17.2.2. This section covers cryptographic algorithms that the GCSB recognises as being approved for use within government. Implementations of the algorithms in this section need to have successfully completed an approved cryptographic evaluation before they can be approved to protect information. Correct implementations of cryptographic protocols are checked during system certification.

17.2.3. High grade cryptographic algorithms are **not** covered in this section.

Approved cryptographic algorithms

17.2.4. There is no guarantee or proof of security of an algorithm against presently unknown attacks. However, the algorithms listed in this section have been extensively scrutinised by government, industry and academic communities in a practical and theoretical setting and have not been found to be susceptible to any feasible attacks. There have been some cases where theoretically impressive vulnerabilities have been found, however these results are not considered to be feasible with current technologies and capabilities.

17.2.5. Where there is a range of possible key sizes for an algorithm, some of the smaller key sizes do not provide an adequate safety margin against attacks that might be found in the future. For example, future advances in number factorisation could render the use of smaller RSA moduli a security vulnerability.

17.2.6. The approved cryptographic algorithms fall into three categories: asymmetric/public key algorithms, hashing algorithms and symmetric encryption algorithms. Collectively these are known as SUITE B and were first promulgated in 2006.

17.2.7. The approved asymmetric/public key algorithms are:

- ECDH for agreeing on encryption session keys;
- ECDSA for digital signatures;
- DH for agreeing on encryption session keys for legacy systems only;
- DSA for digital signatures for legacy systems only;
- RSA for digital signatures and passing encryption session keys or similar keys for legacy systems only.

17.2.8. The approved hashing algorithms are:

- Secure Hashing Algorithm 2 (i.e. SHA-256, SHA-384 and SHA-512); and
- Secure Hashing Algorithm 1 (i.e. SHA-1) for legacy systems only.

17.2.9. The approved symmetric encryption algorithms are:

- AES using key lengths of at least 256 bits; and
- 3DES for legacy systems only.

17.2.10. SHA-1, 3DES, DH, DSA and RSA MUST NOT be used for new implementations but are approved only for current legacy systems already running these algorithms. It is important to note that the use of these older cryptographic algorithms has been deprecated in several countries including Australia and the US.

REFERENCES

17.2.11. The following references are provided for the approved asymmetric/public key algorithms, hashing algorithms and encryption algorithms. Note that Federal Information Processing Standards (FIPS) are standards and guidelines that are developed by the US National Institute of Standards and Technology (NIST) for US Federal computer systems.

Topic	Publisher	Reference
DH	IEEE	W. Diffie and M. E. Hellman, 'New Directions in Cryptography', IEEE Transactions on Information Theory, vol. 22, is. 6, pp. 644-654, November 1976
DSA Digital Signature Algorithm	NIST	FIPS 186-4 Digital Signature Standard (DSS) http://nvlpubs.nist.gov/nistpubs/FIPS/NIST.FIPS.186-4.pdf
AES Advanced Encryption Standard	NIST	FIPS 197 http://www.nist.gov/customcf/get_pdf.cfm?pub_id=901427
RSA	RSA Laboratories	Public Key Cryptography Standards #1

Topic	Publisher	Reference
ECDH	NIST	<p>NIST Special Publication 800-56A , March, 2007 - Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography</p> <p>http://csrc.nist.gov/publications/nistpubs/800-56A/SP800-56A_Revision1_Mar08-2007.pdf</p> <p>Also ANSI X9.63 and ANSI X9.42</p>
SHA	<p>NIST</p> <p>Standards Australia</p>	<p>FIPS PUB 180-4 - Secure Hash Standard (SHS)</p> <p>http://www.nist.gov/customcf/get_pdf.cfm?pub_id=910977</p> <p>Also Australian Standard AS 2805.13.3</p> <p>http://www.infostore.saiglobal.com</p>
3DES	<p>NIST</p> <p>ANSI Standards Australia</p>	<p>NIST Special Publication 800-67 Revision 1 Recommendation for the Triple Data Encryption Algorithm (TDEA) Block Cipher</p> <p>FIPS PUB 46-3 Data Encryption Standard (DES)(withdrawn)</p> <p>ANSI X9.52-1998 Triple Data Encryption Algorithm Modes of Operation (withdrawn)</p> <p>Also Australian Standard AS 2805.5.4</p> <p>http://www.infostore.saiglobal.com</p>
Cryptography Management	NIST	<p>Recommendation for Key Derivation through Extraction then Expansion, September 2010.</p> <p>http://csrc.nist.gov/publications/nistpubs/800-56C/SP-800-56C.pdf</p> <p>FIPS 140-3 - Security Requirements for Cryptographic Modules.</p>

RATIONALE & CONTROLS

17.2.12. Using Approved Cryptographic Algorithms

17.2.12.R.01. Rationale

Inappropriate configuration of a product using an Approved Cryptographic Algorithm can inadvertently select relatively weak implementations of the cryptographic algorithms. In combination with an assumed level of security confidence, this can represent a significant security risk.

17.2.12.R.02. Rationale

When configuring unevaluated products that implement an Approved Cryptographic Algorithm, agencies should disable any non-approved algorithms. A less effective control is to advise advising system users not to use them via a policy. Correct implementation of cryptographic protocols and disabling of unapproved algorithms is checked during system certification.

17.2.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using an unevaluated product that implements an Approved Cryptographic Algorithm MUST ensure that only Approved Cryptographic Algorithms can be used.

17.2.13. Approved asymmetric/public key algorithms

17.2.13.R.01. Rationale

Over the last decade DSA and DH cryptosystems have been subject to increasingly successful sub-exponential factorisation and index-calculus based attacks. ECDH and ECDSA offer more security per bit increase in key size than either DH or DSA and are considered more secure alternatives.

17.2.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use ECDH and ECDSA for all new systems, version upgrades and major system modifications.

17.2.14. Using DH (Legacy systems ONLY)

17.2.14.R.01. Rationale

A modulus of at least 1024 bits for DH is considered best practice by the cryptographic community.

17.2.14.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using DH, for the approved use of agreeing on encryption session keys, MUST use a modulus of at least 1024 bits.

17.2.15. Using DSA (Legacy systems ONLY)**17.2.15.R.01. Rationale**

A modulus of at least 1024 bits for DSA is considered best practice by the cryptographic community.

17.2.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using DSA, for the approved use of digital signatures, MUST use a modulus of at least 1024 bits.

17.2.16. Using ECDH**17.2.16.R.01. Rationale**

A field/key size of at least 160 bits for ECDH is considered best practice by the cryptographic community.

17.2.16.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using ECDH, for the approved use of agreeing on encryption session keys, MUST implement the curves P-256 and P-384 (prime moduli).

17.2.17. Using ECDSA**17.2.17.R.01. Rationale**

A field/key size of at least 160 bits for ECDSA is considered best practice by the cryptographic community.

17.2.17.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using ECDSA, for the approved use of digital signatures, MUST implement the curves P-256 and P-384 (prime moduli).

17.2.18. Using RSA (Legacy systems ONLY)**17.2.18.R.01. Rationale**

A modulus of at least 2048 bits for RSA is considered best practice by the cryptographic community.

17.2.18.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using RSA, for the approved use of digital signatures and passing encryption session keys or similar keys, MUST use a modulus of at least 1024 bits.

17.2.18.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using RSA, for the approved use of digital signatures and passing encryption session keys or similar keys, MUST ensure that the public keys used for passing encrypted session keys are different to the keys used for digital signatures.

17.2.19. Approved hashing algorithms**17.2.19.R.01. Rationale**

Recent research conducted by cryptographic community suggests that SHA-1 may be susceptible to collision attacks. While no practical collision attacks have been published for SHA-1, they may become feasible in the near future.

17.2.19.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**
Agencies **MUST** use the SHA-2 family before using SHA-1.

17.2.20. Approved symmetric encryption algorithms**17.2.20.R.01. Rationale**

The use of Electronic Code Book mode in block ciphers allows repeated patterns in plaintext to appear as repeated patterns in the ciphertext. Most cleartext, including written language and formatted files, contains significant repeated patterns. An attacker can use this to deduce possible meanings of ciphertext by comparison with previously intercepted data. In other cases they might be able to determine information about the key by inferring certain contents of the cleartext. The use of other modes such as Cipher Block Chaining, Cipher Feedback, Output Feedback or Counter prevents such attacks.

17.2.20.C.01. Control: System Classification(s): All Classifications; Compliance: **SHOULD NOT**
Agencies using AES or 3DES **SHOULD NOT** use electronic codebook mode.

17.2.21. Using 3DES (Legacy systems ONLY)**17.2.21.R.01. Rationale**

Using three distinct keys is the most secure option, while using two distinct keys in the order key 1, key 2, key 1 is also deemed secure for practical purposes. All other keying options are equivalent to single DES, which is not deemed secure for practical purposes.

17.2.21.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**
3DES **MUST** use either two distinct keys in the order key 1, key 2, key 1 or three distinct keys.

17.3. Approved Cryptographic Protocols

OBJECTIVE

17.3.1. Classified information in transit is protected by an Approved Cryptographic Protocol implementing an Approved Cryptographic Algorithm.

CONTEXT

Scope

17.3.2. This section covers information on the cryptographic protocols that the GCSB recognises as being approved for use within government. Implementations of the protocols in this section need to have successfully completed a GCSB recognised cryptographic evaluation before they can be approved for implementation.

17.3.3. High grade cryptographic protocols are **not** covered in this section.

Approved cryptographic protocols

17.3.4. In general, the GCSB only recognises the use of cryptographic products that have passed a formal evaluation. However, the GCSB may approve the use of some commonly available cryptographic protocols even though their implementations within specific products have not been formally evaluated. This approval is limited to cases where they are used in accordance with the requirements in this manual.

17.3.5. The Approved Cryptographic Protocols are:

- TLS;
- SSH;
- S/MIME;
- OpenPGP Message Format; and
- IPsec.

RATIONALE & CONTROLS

17.3.6. Using Approved Cryptographic Protocols

17.3.6.R.01. Rationale

If a product implementing an Approved Cryptographic Protocol has been inappropriately configured, it is possible that relatively weak cryptographic algorithms could be inadvertently selected. In combination with an assumed level of security confidence, this can represent a significant level of security risk.

17.3.6.R.02. Rationale

When configuring unevaluated products that implement an Approved Cryptographic Protocol, agencies can ensure that only the Approved Cryptographic Algorithm can be used by disabling the unapproved algorithms within the products (which is preferred) or advising system users not to use them via a policy.

17.3.6.R.03. Rationale

While many Approved Cryptographic Protocols support authentication, agencies should be aware that these authentication mechanisms are not foolproof. To be effective, these mechanisms **MUST** be securely implemented and protected.

This can be achieved by:

- providing an assurance of private key protection;
- ensuring the correct management of certificate authentication processes including certificate revocation checking; and
- using a legitimate identity registration scheme.

17.3.6.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies using a product that implements an Approved Cryptographic Protocol **MUST** ensure that only Approved Cryptographic Protocols can be used.

17.4. Secure Sockets Layer and Transport Layer Security

OBJECTIVE

17.4.1. Secure Sockets Layer and Transport Layer Security are implemented correctly as approved protocols.

CONTEXT

Scope

17.4.2. This section covers the conditions under which SSL and TLS can be used as approved cryptographic protocols. Additionally, as File Transfer Protocol over SSL is built on SSL/TLS it is also considered within scope.

17.4.3. When using a product that implements SSL/TLS, requirements for using approved cryptographic protocols will also need to be referenced in the Section 17.3 - Approved Cryptographic Protocols.

17.4.4. Further information on handling SSL/TLS traffic through gateways can be found in Section 14.3 - Web Applications.

Background

17.4.5 **Secure Sockets Layer (SSL)**, and **Transport Layer Security (TLS)** are cryptographic protocols designed to provide communication security when using the Internet. They use X.509 certificates and asymmetric cryptography for authentication purposes. This generates a session key. This session key is then used to encrypt data between the parties.

17.4.5. Encryption with the session key provides data and message confidentiality, and message authentication codes for message integrity.

17.4.6. Several versions of the SSL and TLS protocols are in widespread use in applications such as web browsing, electronic mail, Internet faxing, instant messaging, and voice-over-IP (VoIP).

17.4.7. Although common usage has been to use the terms TLS and SSL interchangeably, they are distinct protocols.

17.4.8. TLS is an Internet Engineering Task Force (IETF) protocol, first defined in 1999, updated in RFC 5246 (August 2008) and RFC 6176 (March 2011). It is based on the earlier SSL specifications (1994, 1995, 1996) developed by Netscape Communications for adding the HTTPS protocol to their Navigator web browser. A draft of TLS 1.3 was released in October 2014.

17.4.9. Microsoft announced in October 2014 that that it will disable Secure Sockets Layer (SSL) 3.0 support in its Internet Explorer browser and in its Online Services, from Dec. 1, 2014.

SSL 3.0 Vulnerability

17.4.10. A design vulnerability has been found in the way SSL 3.0 handles block cipher mode padding. The Padding Oracle On Downgraded Legacy Encryption (POODLE) attack demonstrates how an attacker can exploit this vulnerability to decrypt and extract information from an encrypted transaction.

17.4.11. The POODLE attack demonstrates this vulnerability using web browsers and web servers, which is one of the most likely exploitation scenarios. All systems and applications utilizing the Secure Socket Layer (SSL) 3.0 with cipher-block chaining (CBC) mode ciphers may be vulnerable.

SSL Superseded

17.4.12. SSL is now superseded by TLS, with the latest version being TLS 1.2 which was released in August 2008. The largely because of security flaws in the older SSL protocols.

17.4.13. Accordingly SSL is no longer an approved cryptographic protocol and it SHOULD be replaced by TLS.

REFERENCES

17.4.14. Further information on SSL and TLS can be found at:

Title	Publisher	Source
The SSL 3.0 specification	IETF	https://tools.ietf.org/html/draft-ietf-tls-ssl-version3-00
The TLS 1.2 specification	IETF	http://tools.ietf.org/html/rfc5246
The SSL 2.0 prohibition	IETF	http://tools.ietf.org/html/rfc6176
The Transport Layer Security (TLS) Protocol Version 1.3 draft-ietf-tls-tls13-03 October 2014	IETF	http://datatracker.ietf.org/doc/draft-ietf-tls-tls13/
Vulnerability Summary for CVE-2014-3566	NIST	http://web.nvd.nist.gov/view/vuln/detail?vulnId=CVE-2014-3566
Alert (TA14-290A) - SSL 3.0 Protocol Vulnerability and POODLE Attack	US-CERT	https://www.us-cert.gov/ncas/alerts/TA14-290A
This POODLE Bites: Exploiting The SSL 3.0 Fallback	Google September 2014	https://www.openssl.org/~bodo/ssl-poodle.pdf

RATIONALE & CONTROLS

17.4.15. Using SSL and TLS

17.4.15.R.01. Rationale

Whilst version 1.0 of SSL was never released, version 2.0 had significant security flaws leading to the development of SSL 3.0. SSL has since been superseded by TLS with the latest version being TLS 1.2 which was released in August 2008. SSL is no longer an approved cryptographic protocol.

17.4.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use the current version of TLS (version 1.2).

17.4.15.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT use any version of SSL.

17.5. Secure Shell

OBJECTIVE

17.5.1. Secure Shell (SSH) is implemented correctly as an Approved Cryptographic Protocol.

CONTEXT

Scope

17.5.2. SSH is software based on the Secure Shell protocol and enables a connection to a remote system.

17.5.3. This section covers information on the conditions under which commercial and open-source implementations of SSH can be used as an approved cryptographic protocol. Additionally, secure copy and Secure File Transfer Protocol use SSH and are therefore also covered by this section.

17.5.4. When using a product that implements SSH, requirements for using approved cryptographic protocols will also need to be referenced from the Section 17. 3 - Approved Cryptographic Protocols.

REFERENCES

Title	Publisher	Source
Further information on SSH can be found in the SSH specification	IETF	http://tools.ietf.org/html/rfc4252
Further information on Open SSH		http://www.openssh.org

RATIONALE & CONTROLS

17.5.5. Using SSH

17.5.5.R.01. Rationale

The configuration directives provided are based on the OpenSSH implementation of SSH. Agencies implementing SSH will need to adapt these settings to suit other SSH implementations.

17.5.5.R.02. Rationale

SSH version 1 is known to have vulnerabilities. In particular, it is susceptible to a man-in-the-middle attack, where an attacker who can intercept the protocol in each direction can make each node believe they are talking to the other. SSH version 2 does not have this vulnerability.

17.5.5.R.03. Rationale

SSH has the ability to forward connections and access privileges in a variety of ways. This means that an attacker who can exploit any of these features can gain unauthorised access to a potentially large amount of classified information.

17.5.5.R.04. Rationale

Host-based authentication requires no credentials (password, public key etc.) to authenticate although in some cases a host key can be used. This renders SSH vulnerable to an IP spoofing attack.

17.5.5.R.05. Rationale

An attacker who gains access to a system with system administrator privileges will have the ability to not only access classified information but to control that system completely. Given the clearly more serious consequences of this, system administrator login or administrator privilege escalation SHOULD NOT be permitted.

17.5.5.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The table below outlines the settings that SHOULD be implemented when using SSH.

Configuration description	Configuration directive
Disallow the use of SSH version 1	Protocol 2
On machines with multiple interfaces, configure the SSH daemon to listen only on the required interfaces	ListenAddress xxx.xxx.xxx.xxx
Disable connection forwarding	AllowTCPForwarding no
Disable gateway ports	Gatewayports no
Disable the ability to login directly as root	PermitRootLogin no
Disable host-based authentication	HostbasedAuthentication no
Disable rhosts-based authentication	RhostsAuthentication no
	IgnoreRhosts yes
Do not allow empty passwords	PermitEmptyPasswords no
Configure a suitable login banner	Banner/directory/filename
Configure a login authentication timeout of no more than 60 seconds	LoginGraceTime xx
Disable X forwarding	X11Forwarding no

17.5.6. Authentication mechanisms

17.5.6.R.01. Rationale

Public key-based systems have greater potential for strong authentication, but simply people are not able to remember particularly strong passwords. Password-based authentication schemes are also more susceptible to interception than public key-based authentication schemes.

17.5.6.R.02. Rationale

Passwords are more susceptible to guessing attacks, so if passwords are used in a system then countermeasures should be put into place to reduce the chance of a successful brute force attack.

17.5.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use public key-based authentication before using password-based authentication.

17.5.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies that allow password authentication SHOULD use techniques to block brute force attacks against the password.

17.5.7. Automated remote access

17.5.7.R.01. Rationale

If password-less authentication is enabled, allowing access from unknown IP addresses would allow untrusted parties to automatically authenticate to systems without needing to know the password.

17.5.7.R.02. Rationale

If port forwarding is not disabled or it is not configured securely, an attacker may be able to gain access to forwarded ports and thereby create a communication channel between the attacker and the host.

17.5.7.R.03. Rationale

If agent credential forwarding is enabled, an intruder could connect to the stored authentication credentials and then use them to connect to other trusted hosts or even intranet hosts, if port forwarding has been allowed as well.

17.5.7.R.04. Rationale

X11 is a computer software system and network protocol that provides a graphical user interface for networked computers. Failing to disable X11 display remoting could result in an attacker being able to gain control of the computer displays as well as keyboard and mouse control functions.

17.5.7.R.05. Rationale

Allowing console access allows every user who logs into the console to run programs that are normally restricted to the root user.

17.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD use parameter checking when using the ‘forced command’ option.

17.5.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies that use logins without a password for automated purposes SHOULD disable:

- access from IP addresses that do not need access;
- port forwarding;
- agent credential forwarding;
- X11 display remoting; and
- console access.

17.5.7.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies that use remote access without the use of a password SHOULD use the ‘forced command’ option to specify what command is executed.

17.5.8. SSH-agent

17.5.8.R.01. Rationale

SSH-agent or other similar key caching programs hold and manage private keys stored on workstations and respond to requests from remote systems to verify these keys. When an SSH-agent launches, it will request the user’s password. This password is used to unlock the user’s private key. Subsequent access to remote systems is performed by the agent and does not require the user to re-enter their password. Screenlocks and expiring key caches ensure that the user’s private key is not left unlocked for long periods of time.

17.5.8.R.02. Rationale

Agent credential forwarding is required when multiple SSH connections are chained to allow each system in the chain to authenticate the user.

17.5.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies that use SSH-agent or other similar key caching programs SHOULD:

- only use the software on workstation and servers with screenlocks;
- ensure that the key cache expires within four hours of inactivity; and
- ensure that agent credential forwarding is used when multiple SSH transversal is needed.

17.5.9. SSH-Versions

17.5.9.R.01. Rationale

Older versions contain known vulnerabilities which are regularly addressed or corrected by newer versions.

17.5.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Ensure that the latest implementation of SSH software is being used. Older versions contain known vulnerabilities.

17.6. Secure Multipurpose Internet Mail Extension

OBJECTIVE

17.6.1. Secure Multipurpose Internet Mail Extension (S/MIME) is implemented correctly as an approved cryptographic protocol.

CONTEXT

Scope

17.6.2. This section covers information on the conditions under which S/MIME can be used as an approved cryptographic protocol.

17.6.3. When using a product that implements S/MIME, requirements for using approved cryptographic protocols will also need to be referenced from Section 17.3 - Approved Cryptographic Protocols.

17.6.4. Information relating to the development of password selection policies and password requirements can be found in Section 16.1 - Identification and Authentication.

REFERENCES

17.6.5. Further information on S/MIME can be found at:

Title	Publisher	Source
The S/MIME charter	IETF	http://www.ietf.org/html.charters/smime-charter.html https://datatracker.ietf.org/wg/smime
NIST SP800-57, Recommendations for Key Management	NIST	http://csrc.nist.gov/publications/PubsSP5.html

RATIONALE & CONTROLS

17.6.6. Decommissioning

17.6.6.R.01. Rationale

Decommissioning MUST ensure any remanent data is destroyed or unrecoverable.

17.6.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Decommissioning of faulty or equipment to be replaced MUST comply with media sanitisation requirements described in Chapter 12 – Product Security.

17.6.7. Using S/MIME

17.6.7.R.01. Rationale

S/MIME 2.0 used weaker cryptography (40-bit keys) than is approved for use by the government. Version 3.0 was the first version to become an Internet Engineering Taskforce (IETF) standard.

17.6.7.R.02. Rationale

Agencies choosing to implement S/MIME should be aware of the inability of many content filters to inspect encrypted messages and any attachments for inappropriate content, and for server-based antivirus software to scan for viruses and other malicious code.

17.6.7.R.03. Rationale

Improper decommissioning and sanitisation presents opportunities for harvesting Private Keys. Products that hosted multiple Private Keys for the management of multiple identities should be considered points of aggregation with an increased “target value”. Where cloud based computing services have been employed, media sanitisation may be problematic and require the revocation and re-issue of new keys.

17.6.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT allow versions of S/MIME earlier than 3.0 to be used.

17.7. OpenPGP Message Format

OBJECTIVE

17.7.1. OpenPGP Message Format is implemented correctly as an Approved Cryptographic Protocol.

CONTEXT

Scope

17.7.2. This section covers information on the conditions under which the OpenPGP Message Format can be used as an approved cryptographic protocol. It applies to the protocol as specified in IETF's RFC 2440 and RFC 4880, which supercedes RFC 2440.

17.7.3. When using a product that implements the OpenPGP Message Format, requirements for using approved cryptographic protocols will also need to be referenced from the Section 17.3 - Approved Cryptographic Protocols.

17.7.4. Information relating to the development of password selection policies and password requirements can be found in the Section 16.1 - Identification and Authentication.

REFERENCES

17.7.5. Further information on the OpenPGP Message Format can be found at:

Title	Publisher	Source
OpenPGP Message Format specification	IETF	http://tools.ietf.org/html/rfc4880

RATIONALE & CONTROLS

17.7.6. Using OpenPGP Message Format

17.7.6.R.01. Rationale

If the private certificate and associated key used for encrypting messages is suspected of being compromised i.e. stolen, lost or transmitted over the Internet, then no assurance can be placed in the integrity of subsequent messages that are signed by that private key. Likewise no assurance can be placed in the confidentiality of a message encrypted using the public key as third parties could intercept the message and decrypt it using the private key.

17.7.6.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies **MUST** immediately revoke key pairs when a private certificate is suspected of being compromised or leaves the control of the agency.

17.8. Internet Protocol Security

OBJECTIVE

17.8.1. Internet Protocol Security (IPSEC) is correctly implemented.

CONTEXT

Scope

17.8.2. This section covers information on the conditions under which IPsec can be used as an Approved Cryptographic Protocol.

17.8.3. When using a product that implements IPsec, requirements for using approved cryptographic protocols will also need to be referenced from Section 17.3 Approved Cryptographic Protocols.

Modes of operation

17.8.4. IPsec can be operated in two modes: transport mode or tunnel mode.

Cryptographic algorithms

17.8.5. Most IPsec implementations can handle a number of cryptographic algorithms for encrypting data when the ESP protocol is used. These include 3DES and AES.

Key exchange

17.8.6. Most IPsec implementations handle a number of methods for sharing keying material used in hashing and encryption processes. Two common methods are manual keying and IKE using the ISAKMP. Both methods are considered suitable for use.

ISAKMP authentication

17.8.7. Most IPsec implementations handle a number of methods for authentication as part of ISAKMP. These can include digital certificates, encrypted nonces or pre-shared keys. All these methods are considered suitable for use.

ISAKMP modes

17.8.8. ISAKMP uses two modes to exchange information as part of IKE. These are main mode and aggressive mode.

REFERENCES

17.8.9. Further information on IPsec can be found at:

Title	Publisher	Source
Security Architecture for the IP overview	IETF	http://tools.ietf.org/html/rfc2401

RATIONALE & CONTROLS

17.8.10. Mode of operation

17.8.10.R.01. Rationale

The tunnel mode of operation provides full encapsulation of IP packets whilst the transport mode of operation only encapsulates the payload of the IP packet.

17.8.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD use tunnel mode for IPSec connections.

17.8.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies choosing to use transport mode SHOULD additionally use an IP tunnel for IPSec connections.

17.8.11. Protocol

17.8.11.R.01. Rationale

In order to provide a secure VPN style connection both authentication and encryption are needed. ESP is the only way of providing encryption yet AH and ESP can provide authentication for the entire IP packet and the payload respectively. ESP is generally preferred for authentication though as AH has inherent network address translation limitations.

17.8.11.R.02. Rationale

If however, maximum security is desired at the expense of network address translation functionality, then ESP can be wrapped inside of AH which will then authenticate the entire IP packet and not just the encrypted payload.

17.8.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD use the ESP protocol for IPSec connections.

17.8.12. ISAKMP modes

17.8.12.R.01. Rationale

Using main mode instead of aggressive mode provides greater security since all exchanges are protected.

17.8.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies using ISAKMP SHOULD disable aggressive mode for IKE.

17.8.13. Security association lifetimes**17.8.13.R.01. Rationale**

Using a secure association lifetime of four hours or 14400 seconds provides a balance between security and usability.

17.8.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use a security association lifetime of less than four hours or 14400 seconds.

17.8.14. HMAC algorithms**17.8.14.R.01. Rationale**

MD5 and SHA-1 are no longer approved Cryptographic Protocols. The approved algorithms that can be used with HMAC are HMAC-SHA256, HMAC-SHA384 and HMAC-SHA512.

17.8.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use HMAC-SHA256, HMAC-SHA384 or HMAC-SHA512 as the HMAC algorithm.

17.8.15. DH groups**17.8.15.R.01. Rationale**

Using a larger DH group provides more entropy for the key exchange.

17.8.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use the largest modulus size available for the DH exchange.

17.8.16. Perfect Forward Secrecy**17.8.16.R.01. Rationale**

Using Perfect Forward Secrecy reduces the impact of the compromise of a security association.

17.8.16.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use Perfect Forward Secrecy for IPSec connections.

17.8.17. IKE Extended Authentication**17.8.17.R.01. Rationale**

XAUTH using IKEv1 has documented vulnerabilities associated with its use.

17.8.17.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD disable the use of XAUTH for IPSec connections using IKEv1.

17.9. Key Management

OBJECTIVE

17.9.1. Cryptographic keying material is protected by key management procedures.

CONTEXT

Scope

17.9.2. This section covers information relating to the general management of cryptographic system material. Because there is a wide variety of cryptographic systems and technologies available, and there are varied security risks for each, detailed key management guidance is not provided in this manual.

17.9.3. If HGCE is being used agencies are advised to consult the respective NZCSI for the equipment.

Cryptographic systems

17.9.4. In general, the requirements specified in this manual for systems apply equally to cryptographic systems. Where the requirements for cryptographic systems are different, the variations are contained in this section, and take precedence over requirements specified elsewhere in this manual.

REFERENCES

17.9.5. Further information key management practices can be found in the following references:

Title	Publisher	Description & Source
ISO/IEC 11770-1:2010, Information Technology – Security Techniques – Key Management -- Part 1: Framework	ISO / IEC	This standard describes the concepts of key management and some concept models for key distribution. http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=53456
August 15, 2013: NIST Special Publication (SP) 800-130, A Framework for Designing Cryptographic Key Management Systems.	NIST	This publication contains a description of the topics to be considered and the documentation requirements to be addressed when designing a CKMS. http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-130.pdf
December 21, 2012: NIST Special Publication (SP) 800-133, Recommendation for Cryptographic Key Generation	NIST	This Recommendation discusses the generation of the keys to be used with approved cryptographic algorithms. http://dx.doi.org/10.6028/NIST.SP.800-133
July 9, 2012: Revision 3 of Special Publication (SP) 800-57, Part 1, Recommendation for Key Management, Part 1: General.	NIST	This publication contains basic key management guidance, including the security services that may be provided and the key types that may be employed in using cryptographic mechanisms, the functions involved in key management, and the protections and handling required for cryptographic keys. http://csrc.nist.gov/publications/nistpubs/800-57/sp800-57_part1_rev3_general.pdf
January 13, 2011: Special Publication (SP) 800-131A, Transitions: Recommendation for Transitioning the Use of Cryptographic Algorithms and Key Lengths.	NIST	This Recommendation provides the approach for transitioning from the use of one algorithm or key length to another. http://csrc.nist.gov/publications/nistpubs/800-131A/sp800-131A.pdf

Title	Publisher	Description & Source
SP 800-57 Part 2, Recommendation for Key Management - Part 2: Best Practices for Key Management Organizations	NIST	<p>This recommendation provides guidance for system and application owners for use in identifying appropriate organisational key management infrastructures, establishing organizational key management policies, and specifying organisational key management practices.</p> <p>http://csrc.nist.gov/publications/nistpubs/800-57/SP800-57-Part2.pdf</p>
SP 800-57, Part 3 Recommendation for Key Management - Part 3: Application-Specific Key Management Guidance.	NIST	<p>This Recommendation provides guidance when using the cryptographic features of current systems. It is intended to help system administrators and system installers adequately secure applications based on product availability and organizational needs, and to support organizational decisions about future procurements. The guide also provides information for end users regarding application options left under their control in the normal use of the application. Recommendations are given for a select set of applications, namely: PKI, IPsec, TLS, S/MIME, Kerberos, OTAR, DNSSEC and Encrypted File Systems.</p> <p>http://csrc.nist.gov/publications/nistpubs/800-57/sp800-57_PART3_key-management_Dec2009.pdf</p>

17.9.6. The NZCSI and NZCSS series of policy documents should be consulted for additional information on high grade cryptography.

Key Establishment		
June 5, 2013: SP 800-56A Revision 2: Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography	NIST	The revisions are made on the March 2007 version of this Recommendation. The major revisions are summarized in Appendix D. http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-56Ar2.pdf
August 27, 2009: SP 800-56B, Recommendation for Pair-Wise Key Establishment Schemes Using Integer Factorization Cryptography	NIST	This Recommendation provides the specifications of key establishment schemes that are based on a standard developed by the Accredited Standards Committee (ASC) X9, Inc.: ANS X9.44, Key Establishment using Integer Factorization Cryptography. SP 800-56B provides asymmetric-based key agreement and key transport schemes that are based on the Rivest Shamir Adleman (RSA) algorithm. http://csrc.nist.gov/publications/nistpubs/800-56B/sp800-56B.pdf
December 11, 2011: NIST SP 800-56C, Recommendation for Key Derivation through Extraction-then-Expansion	NIST	This Recommendation specifies techniques for the derivation of keying material from a shared secret established during a key establishment scheme defined in NIST Special Publications 800-56A or 800-56B through an extraction-then-expansion procedure. http://csrc.nist.gov/publications/nistpubs/800-56C/SP-800-56C.pdf
December 2012: NIST has published an ITL Bulletin that summarizes NIST SP 800-133: Recommendation for Cryptographic Key Generation.	NIST	http://csrc.nist.gov/publications/nistbul/itlbul/2012_12.pdf http://csrc.nist.gov/groups/ST/toolkit/key_management.html
NIST Special Publication 800-38F, December 2012 - Recommendation for Block Cipher Modes of Operation: Methods for Key Wrapping	NIST	http://dx.doi.org/10.6028/NIST.SP.800-38F

RATIONALE & CONTROLS

17.9.7. High grade cryptographic equipment

17.9.7.R.01. Rationale

The NZCSI series of documents provide product specific policy for HGCE.

17.9.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST comply with NZCSI when using HGCE.

17.9.8. Transporting commercial grade cryptographic equipment

17.9.8.R.01. Rationale

Transporting commercial grade cryptographic equipment in a keyed state exposes the equipment to the potential for interception and compromise of the key stored within the equipment. As such when commercial grade cryptographic equipment is transported in a keyed state it needs to be done so according to the requirements for the classification of the key stored in the equipment.

17.9.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Unkeyed commercial grade cryptographic equipment MUST be distributed and managed by a means approved for the transportation and management of government property.

17.9.8.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Keyed commercial grade cryptographic equipment MUST be distributed, managed and stored by a means approved for the transportation and management of government property based on the classification of the key within the equipment.

17.9.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT transport commercial grade cryptographic equipment in a keyed state.

17.9.9. Cryptographic system administrator access

17.9.9.R.01. Rationale

The cryptographic system administrator is a highly privileged position which involves granting privileged access to a cryptographic system. Therefore extra precautions need to be put in place surrounding the security and vetting of the personnel as well as the access control procedures for individuals designated as cryptographic system administrators.

17.9.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Before personnel are granted cryptographic system administrator access, agencies MUST ensure that they have:

- a demonstrated need for access;
- read and agreed to comply with the relevant KMP for the cryptographic system they are using;
- a security clearance at least equal to the highest classification of information processed by the cryptographic system;
- agreed to protect the authentication information for the cryptographic system at the highest classification of information it secures;
- agreed not to share authentication information for the cryptographic system without approval;
- agreed to be responsible for all actions under their accounts;
- agreed to report all potentially security related problems to the GCSB; and
- ensure relevant staff have received appropriate training.

17.9.10. Accounting

17.9.10.R.01. Rationale

As cryptographic equipment, and the keys they store, provide a significant security function for systems it is important that agencies are able to account for all cryptographic equipment.

17.9.10.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST be able to readily account for all transactions relating to cryptographic system material including identifying hardware and all software versions issued with the equipment and materials, including date and place of issue.

17.9.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD be able to readily account for all transactions relating to cryptographic system material including identifying hardware and all software versions issued with the equipment and materials, including date and place of issue.

17.9.11. Audits

17.9.11.R.01. Rationale

Cryptographic system audits are used as a process to account for cryptographic equipment.

17.9.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST conduct audits using two personnel with cryptographic system administrator access.

17.9.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD conduct audits of cryptographic system material:

- on handover/takeover of administrative responsibility for the cryptographic system;
- on change of personnel with access to the cryptographic system; and
- at least annually.

17.9.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD perform audits to:

- account for all cryptographic system material; and
- confirm that agreed security measures documented in the KMP are being followed.

17.9.12. Area security and access control**17.9.12.R.01. Rationale**

As cryptographic equipment contains particularly sensitive information additional physical security measures need to be applied to the equipment.

17.9.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Cryptographic system equipment SHOULD be stored in a room that meets the requirements for a server room of an appropriate level based on the classification of information the cryptographic system processes.

17.9.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Areas in which cryptographic system material is used SHOULD be separated from other areas and designated as a controlled cryptography area.

17.9.13. Developing Key Management Plans (KMPs) for commercial grade cryptographic systems**17.9.13.R.01. Rationale**

Most modern cryptographic systems are designed to be highly resistant to cryptographic analysis but it MUST be assumed that a determined attacker could obtain details of the cryptographic logic either by stealing or copying relevant material directly or by suborning an New Zealand national or allied national. Cryptographic system material is safeguarded by implementing strong personnel, physical, documentation and procedural security measures.

17.9.13.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST develop a KMP when they have implemented a cryptographic system using HGCE.

17.9.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop a KMP when they have implemented a cryptographic system using commercial grade cryptographic equipment.

17.9.14. Contents of KMPs**17.9.14.R.01. Rationale**

When agencies implement the recommended contents for KMPs they will have a good starting point for the protection of cryptographic systems and their material within their agencies.

17.9.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

The table below describes the minimum contents which SHOULD be documented in the KMP.

Topic	Content
Accounting	How accounting will be undertaken for the cryptographic system.
	What records will be maintained.
	How records will be audited.
Classification	Classification of the cryptographic system hardware.
	Classification of the cryptographic system software.
	Classification of the cryptographic system documentation.
Information security incidents	A description of the conditions under which compromise of key material should be declared.
	References to procedures to be followed when reporting and dealing with information security incidents.
Key management	Who generates keys.
	How keys are delivered.
	How keys are received.
	Key distribution, including local, remote and central.
	How keys are installed.
	How keys are transferred.
	How keys are stored.
	How keys are recovered.
	How keys are revoked.
How keys are destroyed.	

Topic	Content
Roles	Documents roles, including the COMSEC Custodian, record keeper and auditor.
Maintenance	Maintaining the cryptographic system software and hardware.
	Destroying equipment and media.
Objectives	Objectives of the cryptographic system and KMP, including organisational aims.
References	Relevant NZCSIs.
	Vendor documentation.
	Related policies.
System description	Maximum classification of information protected.
	The use of keys.
	The environment.
	Administrative responsibilities.
	Key algorithm.
	Key length.
	Key lifetime.
Topology	Diagram(s) and description of the cryptographic system topology including data flows.

17.9.14.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

The level of detail included in a KMP MUST be consistent with the criticality and classification of the information to be protected.

17.9.15. Access register

17.9.15.R.01. Rationale

Access registers can assist in documenting personnel that have privileged access to cryptographic systems along with previous accounting and audit activities for the system.

17.9.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST hold and maintain an access register that records cryptographic system information such as:

- details of personnel with system administrator access;
- details of those whose system administrator access was withdrawn;
- details of system documents;
- accounting activities; and
- audit activities.

17.10. Hardware Security Modules

OBJECTIVE

17.10.1. Hardware Security Modules are used where additional security of cryptographic functions is desirable.

CONTEXT

Scope

17.10.2. This section covers information relating to Hardware Security Modules (HSMs). Detailed key management guidance is provided section 17.9 – Key Management.

Hardware Security Module

17.10.3. Hardware Security Modules (HSMs) are defined as a hardware module or appliance which provides cryptographic functions. HSM's can be integrated into a design, installed in a host or be externally connected. HSM's can be packaged as discrete appliances, PCI cards, USB devices, smartcards or other form factors.

17.10.4. Functions include (but are not limited to) encryption, decryption, key generation, signing, hashing and cryptographic acceleration. The appliance usually also offers some level of physical tamper-resistance, has a user interface and a programmable interface for key management, configuration and firmware or software updates.

Usage

17.10.5. HSMs are used in high assurance security solutions that satisfy widely established and emerging standards of due care for cryptographic systems and practices—while also maintaining high levels of operational efficiency. Traditional use of HSMs is within automatic teller machines, electronic fund transfer, and point-of-sale networks. HSMs are also used to secure CA keys in PKI deployments, SSL acceleration and DNSSEC (DNS Security Extensions) implementations.

Physical Security

17.10.6. HSM's usually describe an encapsulated multi-chip module, device, card or appliance, rather than a single chip component or device. The nature of HSM's requires more robust physical security, including tamper resistance, tamper evidence, tamper detection, and tamper response.

Tamper Resistance

17.10.7. Tamper Resistance is designed to limit the ability to physically tamper with, break into or extract useful information from an HSM. Often the boards and components are encased in an epoxy-like resin that will destroy any encapsulated components when drilled, scraped or otherwise physically tampered with.

Tamper Evidence

17.10.8. The HSM is designed so that any attempts at tampering are evident. Many devices use seals and labels designed break or reveal a special message when physical tampering is attempted. Tamper evidence may require a regular inspection or audit mechanism.

17.10.9. HSMs can include features that detect and report tampering attempts. For example, embedding a conductive mesh within the epoxy-like package; internal circuitry monitored the electrical proper-ties of this mesh — properties which physical tamper would disrupt. Devices can also monitor for temperature extremes, radiation extremes, light, air and other unusual conditions.

Tamper Response

17.10.10. HSMs can include defensive features that activate when tampering is detected. For example, cryptographic keys and sensitive data are deleted or zeroised. A trade-off exists between availability and security as an effective tamper response essentially renders the HSM unusable.

REFERENCES

Title	Publisher	Source
Payment Card Industry (PCI) Hardware Security Module (HSM) - Security Requirements - Version 1.0, April 2009	PCI	https://www.pcisecuritystandards.org/documents/PCI%20HSM%20Security%20Requirements%20v1.0%20final.pdf
FIPS PUB 140-2 - Effective 15-Nov-2001 - Security Requirements for Cryptographic Modules	NIST	http://csrc.nist.gov/groups/STM/cmvp/standards.html

RATIONALE & CONTROLS

17.10.11. Hardware Security Modules

17.10.11.R.01.Rationale

Where high assurance or high security is required or high volumes of data are encrypted or decrypted, the use of an HSM should be considered when designing the network and security architectures.

17.10.11.C.01.Control: **Systems Classification(s): C, S, TS; Compliance: MUST**

Agencies **MUST** consider the use of HSMs when undertaking a security risk assessment or designing network and security architectures.

17.10.11.C.02.Control: **Systems Classification(s): C, S, TS; Compliance: MUST**

Agencies **MUST** follow the product selection guidance in this Manual (Chapter 12).

17.10.11.C.03.Control: **Systems Classification(s): All Classifications; Compliance: SHOULD**

Agencies **SHOULD** consider the use of HSMs when undertaking a security risk assessment or designing network and security architectures.

17.10.11.C.04.Control: **Systems Classification(s): All Classifications; Compliance: SHOULD**

Agencies **SHOULD** follow the product selection guidance in this Manual (Chapter 12).

18. NETWORK SECURITY

18.1. Network Management

OBJECTIVE

18.1.1. Any change to the configuration of networks is authorised and controlled through appropriate change management processes to ensure security, functionality and capability is maintained.

CONTEXT

Scope

18.1.2. This section covers information relating to the selection, management and documentation of network infrastructure.

Network diagrams

18.1.3. An agency's network diagrams should illustrate all network devices including firewalls, IDSs, IPSs, routers, switches, hubs, etc. It does not need to illustrate all IT equipment on the network, such as workstations or printers which can be collectively represented. The inclusion of significant devices such as MFD's and servers can aid interpretation.

Systems Documentation

18.1.4. Knowledge of systems design, equipment and implementation is a primary objective of those seeking to attack or compromise systems or to steal information. System documentation is a rich source allowing attackers to identify design weaknesses and vulnerabilities. The security of systems documentation is therefore important in preserving the security of systems.

18.1.5. Detailed network documentation and configuration details can contain information about IP addresses, port numbers, host names, services and protocols, software version numbers, patch status, security enforcing devices and information about information compartments and enclaves containing highly valuable information. This information can be used by a malicious actor to compromise an agency's network.

18.1.6. This information may be particularly exposed when sent to offshore vendors, consultants and other service providers. Encrypting this data will provide an important protective measure and assist in securing this data and information.

18.1.7. Reference should also be made to section 12.7 – Supply Chain.

RATIONALE & CONTROLS

18.1.8. Classification of Network Documentation

18.1.8.R.01. Rationale

To provide an appropriate level of protection to systems and network documentation, a number of security aspects should be considered. These include:

- the existence of the system;
- the intended use;
- the classification of the data to be carried or processed by this system;
- the connectivity and agencies connected;
- protection enhancements and modifications; and
- the level of detail included in the documentation.

High level conceptual diagrams and accompanying documentation should also be subject to these considerations.

18.1.8.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

Agencies MUST perform a security risk assessment before providing network documentation to a third party, such as a commercial provider or contractor.

18.1.8.C.02. Control: Systems Classification(s): C, S, TS; Compliance: MUST

Systems documentation and detailed network diagrams MUST be classified at least to the level of classification of the data to be carried on those systems.

18.1.8.C.03. Control: Systems Classification(s): All Classifications; Compliance: MUST

Network documentation provided to a third party, such as to a commercial provider or contractor, MUST contain only the information necessary for them to undertake their contractual services and functions, in line with the need-to-know principle.

18.1.8.C.04. Control: Systems Classification(s): All Classifications; Compliance: MUST NOT

Detailed network configuration information MUST NOT be published in tender documentation.

18.1.8.C.05. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Security aspects SHOULD be considered when determining the classification level of systems and network documentation.

18.1.9. Configuration management

18.1.9.R.01. Rationale

If the network is not centrally managed, there could be sections of the network that do not comply with the agency's security policies, and thus create a vulnerability.

18.1.9.R.02. Rationale

Changes should be authorised by a change management process, including representatives from all parties involved in the management of the network. This process ensures that changes are understood by all parties and reduces the likelihood of an unexpected impact on the network.

18.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD keep the network configuration under the control of a network management authority.

18.1.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

All changes to the configuration SHOULD be documented and approved through a formal change control process.

18.1.9.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD regularly review their network configuration to ensure that it conforms to the documented network configuration.

18.1.9.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD deploy an automated tool that compares the running configuration of network devices against the documented configuration.

18.1.10. Network diagrams

18.1.10.R.01. Rationale

As most decisions are made on the documentation that illustrates the network, it is important that:

- a network diagram exists;
- the security architecture is recorded;
- the network diagram is an accurate depiction of the network; and
- the network diagram indicates when it was last updated.

18.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

For each network an agency manages they MUST have:

- a high-level diagram showing all connections and gateways into the network; and
- a network diagram showing all communications equipment.

18.1.11. Updating network diagrams

18.1.11.R.01. Rationale

Because of the importance of the network diagram and decisions made based upon its contents, it should be updated as changes are made. This will assist system administrators to completely understand and adequately protect the network.

18.1.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

An agency's network diagrams MUST:

- be updated as network changes are made; and
- include a 'Current as at [date]' statement on each page.

18.1.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

An agency's network diagrams SHOULD:

- be updated as network changes are made; and
- include a 'Current as at [date]' statement on each page.

18.1.12. Limiting network access

18.1.12.R.01. Rationale

If an attacker has limited opportunities to connect to a given network, they have limited opportunities to attack that network. Network access controls not only prevent against attackers traversing a network but also prevent system users carelessly connecting a network to another network of a different classification. It is also useful in segregating sensitive or compartmented information for specific system users with a need-to-know.

This may include security architectural features such as segmented networks.

Although circumventing some network access controls can be trivial, their use is primarily aimed at the protection they provide against accidental connection to another network.

18.1.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST implement network access controls on all networks.

18.1.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement network access controls on all networks.

18.1.13. Management traffic

18.1.13.R.01 Rationale

Implementing protection measures specifically for management traffic provides another layer of defence on the network. This also makes it more difficult for an attacker to accurately define their target network.

18.1.13.C.01 Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement protection measures to minimise the risk of unauthorised access to network management traffic on a network.

18.1.14. Simple Network Management IT Protocol (SNMP)

18.1.14.R.01 Rationale

The Simple Network Management Protocol (SNMP) can be used to monitor the status of network devices such as switches, routers and wireless access points. Early versions of SNMP were insecure. SNMPv3 uses stronger authentication methods but continues to establish default SNMP community strings and promiscuous access. Encryption may be used as an additional assurance measure but this may create additional workload in investigating faults. An assessment of risk, threats and the agency's requirements may be required to determine an appropriate configuration.

18.1.14.C.01 Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT use SNMP unless a specific requirement exists.

18.1.14.C.02 Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement SNMPv3 where a specific SNMP requirement exists.

18.1.14.C.03 Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD change all default community strings in SNMP implementations.

18.1.14.C.04 Control: System Classification(s): All Classifications; Compliance: SHOULD

SNMP access SHOULD be configured as read-only.

18.2. Wireless Local Area Networks

OBJECTIVE

18.2.1. Wireless local area networks are deployed in a secure manner that does not compromise the security of classified information and systems.

CONTEXT

Scope

18.2.2. This section covers information on 802.11x WLANs. It does not cover other wireless communications. These communication methods are covered in Chapter 11 - Communications Systems and Devices. The description 802.11x referral to all versions and 802.11 standards.

18.2.3. Hardware Security Modules (HSMs) are defined as a hardware module or appliance and provides cryptographic functions. These functions include (but are not limited to) encryption, decryption, key generation, and hashing. The appliance usually also offers some level of physical tamper-resistance and has a user interface and a programmable interface. Refer also to Section 17.10 – Hardware Security Modules.

REFERENCES

Title	Publisher	Source
Wi-Fi Alliance certification programs	Wi-Fi Alliance	http://www.wi-fi.org/certification_programs.php
802.11-2007	IEEE	http://standards.ieee.org/getieee802/download/802.11-2007.pdf
EAP specification	IETF	http://tools.ietf.org/html/rfc5247
EAP-TLS specification	IETF	http://tools.ietf.org/html/rfc5216
EAP-TTLS specification	IETF	http://tools.ietf.org/html/rfc5281
Payment Card Industry (PCI) Hardware Security Module (HSM) - Security Requirements - Version 1.0, April 2009	PCI	https://www.pcisecuritystandards.org/documents/PCI%20HSM%20Security%20Requirements%20v1.0%20final.pdf
FIPS PUB 140-2 - Effective 15-Nov-2001 - Security Requirements for Cryptographic Modules	NIST	http://csrc.nist.gov/groups/STM/cmvp/standards.html

RATIONALE & CONTROLS

18.2.4. Bridging networks

18.2.4.R.01. Rationale

When connecting devices via Ethernet to an agency's fixed network, agencies need to be aware of the risks posed by active wireless functionality. Devices may automatically connect to any open wireless networks they have previously connected to, which a malicious actor can use to masquerade and establish a connection to the device. This compromised device could then be used as a bridge to access the agency's fixed network. Disabling wireless functionality on devices, preferably by a hardware switch, whenever connected to a fixed network can prevent this from occurring. Additionally, devices do not have to be configured to remember and automatically connect to open wireless networks that they have previously connected to.

18.2.4.C.01. Control: **Systems Classification(s): All Classifications; Compliance: SHOULD**

Wireless auto-connect functionality on devices SHOULD be disabled, preferably by a hardware switch, whenever connected to a fixed network.

18.2.4.C.02. Control: **Systems Classification(s): All Classifications; Compliance: MUST NOT**

Devices MUST NOT be configured to remember and automatically connect to any wireless networks that they have previously connected to.

18.2.5. Providing wireless communications for public access

18.2.5.R.01. Rationale

To ensure that a wireless network provided for public access cannot be used as a launching platform for attacks against an agency's system it MUST be segregated from all other systems. Security architectures incorporating segmented networks, DMZ's and other segregation mechanisms are useful in this regard.

18.2.5.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies deploying a wireless network for public access MUST segregate it from any other agency network.

18.2.6. Using wireless communications

18.2.6.R.01. Rationale

As the Accreditation Authority for TOP SECRET systems, GCSB has mandated that all agencies considering deploying a wireless TOP SECRET deployment seek approval from GCSB prior to initiating any networking projects.

18.2.6.C.01. Control: **System Classification(s): TS; Compliance: MUST NOT**

Agencies MUST NOT use wireless networks unless the security of the agency's wireless deployment has been approved by GCSB.

18.2.7. Selecting wireless access point equipment

18.2.7.R.01. Rationale

Wireless access points that have been certified in a Wi-Fi Alliance certification program provide an agency with assurance that they conform to wireless standards. Deploying wireless access points that are guaranteed to be interoperable with other wireless access points on a wireless network will limit incompatibility of wireless equipment and incorrect implementation of wireless devices by vendors.

18.2.7.C.01. Control: **Systems Classification(s): All Classifications; Compliance: MUST**

All wireless access points used for government wireless networks **MUST** be Wi-Fi Alliance certified.

18.2.8. 802.1X Authentication

18.2.8.R.01. Rationale

A number of Extensible Authentication Protocol (EAP) methods, supported by the Wi-Fi Protected Access 2 (WPA2) protocol, are available.

18.2.8.R.02. Rationale

Agencies deploying a secure wireless network can choose WPA2-Enterprise with EAP-Transport Layer Security (EAP-TLS), WPA2-Enterprise with EAP-Tunnelled Transport Layer Security (EAP-TTLS) or WPA2-Enterprise with Protected EAP (PEAP) to perform mutual authentication.

WPA2-Enterprise with EAP-TLS is considered one of the most secure EAP methods. With its inclusion in the initial release of the WPA2 standard, it enjoys wide support in wireless access points and in numerous operating systems such as Microsoft Windows, Linux and Apple OS X. EAP-TLS uses a public key infrastructure (PKI) to secure communications between devices and a Remote Access Dial In User Service (RADIUS) server through the use of X.509 certificates. While EAP-TLS provides strong mutual authentication, it requires an agency to have established a PKI. This involves either deploying their own certificate authority and issuing certificates, or purchasing certificates from a commercial certificate authority, for every device that accesses the wireless network. This can introduce additional costs and management overheads but the risk and security management advantages are significant.

The **EAP-TTLS/MSCHAPv2, or simply EAP-TTLS**, method used with WPA2-Enterprise is generally supported through the use of third party software. It has support in multiple operating systems and Microsoft Windows 8 but does **not** have native support in earlier versions of Microsoft Windows. EAP-TTLS is different to EAP-TLS in that devices do not authenticate to the server when the initial TLS tunnel is created. Only the server authenticates to devices. Once the TLS tunnel has been created, mutual authentication occurs through the use of another EAP method.

An advantage of EAP-TTLS over PEAP is that a username is never transmitted in the clear outside of the TLS tunnel. Another advantage of EAP-TTLS is that it provides support for many legacy EAP methods, while PEAP is generally limited to the use of EAP-MSCHAPv2.

PEAPv0/EAP-MSCHAPv2, or simply PEAP, is the second most widely supported EAP method after EAP-TLS. It enjoys wide support in wireless access points and in numerous operating systems such as Microsoft Windows, Linux and Apple OS X. PEAP operates in a very similar way to EAP-TTLS by creating a TLS tunnel which is used to protect another EAP method. PEAP differs from EAP-TTLS in that when the EAP-MSCHAPv2 method is used within the TLS tunnel, only the password portion is protected and not the username. This may allow an intruder to capture the username and replay it with a bogus password in order to lockout the user's account, causing a denial of service for that user. While EAP-MSCHAPv2 within PEAP is the most common implementation, Microsoft Windows supports the use of EAP-TLS within PEAP, known as PEAP-EAP-TLS. This approach is very similar in operation to traditional EAP-TLS yet provides increased protection, as parts of the certificate that are not encrypted with EAP-TLS are encrypted with PEAP-EAP-TLS. The downside to PEAP-EAP-TLS is its support is limited to Microsoft products.

18.2.8.R.03. Rationale

Ultimately, an agency's choice in authentication method will often be based on the size of their wireless deployment, their security requirements and any existing authentication infrastructure. If an agency is primarily motivated by security they can implement either PEAP-EAP-TLS or EAP-TLS. If they are primarily motivated by flexibility and legacy support they can implement EAP-TTLS. If they are primarily motivated by simplicity they can implement PEAP with EAP-MSCHAPv2.

18.2.8.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

WPA2-Enterprise with EAP-TLS, WPA2-Enterprise with PEAP-EAP-TLS, WPA2-Enterprise with EAP-TTLS or WPA2-Enterprise with PEAP MUST be used on wireless networks to perform mutual authentication.

18.2.9. Evaluation of 802.1X authentication implementation

18.2.9.R.01. Rationale

The security of 802.1X authentication is dependent on three main elements and their interaction. These three elements include supplicants (clients) that support the 802.1X authentication protocol, authenticators (wireless access points) that facilitate communication between supplicants and the authentication server, and the authentication server (RADIUS server) that is used for authentication, authorisation and accounting purposes. To provide assurance that these elements have been implemented appropriately, supplicants, authenticators and the authentication server used in wireless networks must have completed an appropriate product evaluation.

18.2.9.C.01. Control: Systems Classification(s): C, S, TS; Compliance: MUST

Supplicants, authenticators and the authentication server used in wireless networks MUST have completed an appropriate product evaluation.

18.2.9.C.02. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Supplicants, authenticators and the authentication server used in wireless networks SHOULD have completed an appropriate product evaluation.

18.2.10. Issuing certificates for authentication

18.2.10.R.01. Rationale

Certificates for authenticating to wireless networks can be issued to either or both devices and users. For assurance, certificates must be generated using a certificate authority product or hardware security module (HSM) that has completed an appropriate product evaluation.

18.2.10.R.02. Rationale

When issuing certificates to devices accessing wireless networks, agencies need to be aware of the risk that these certificates could be stolen by malicious software. Once compromised, the certificate could be used on another device to gain unauthorised access to the wireless network. Agencies also need to be aware that in only issuing a certificate to a device, any actions taken by a user will only be attributable to the device and not a specific user.

18.2.10.R.03. Rationale

When issuing certificates to users accessing wireless networks, they can either be in the form of a certificate that is stored on a device or a certificate that is stored within a smart card. Issuing certificates on smart cards provides increased security, but usually at a higher cost. Security is improved because a user is more likely to notice a missing smart card and alert their local security team, who is then able to revoke the credentials on the RADIUS server. This can minimise the time an intruder has access to a wireless network.

18.2.10.R.04. Rationale

In addition, to reduce the likelihood of a stolen smart card from being used to gain unauthorised access to a wireless network, two-factor authentication can be implemented through the use of Personal Identification Numbers (PINs) on smart cards. This is essential when a smart card grants a user any form of administrative access on a wireless network or attached network resource.

18.2.10.R.05. Rationale

For the highest level of security, unique certificates should be issued for both devices and users. In addition, the certificates for a device and user must not be stored on the same device. Finally, certificates for users accessing wireless networks should be issued on smart cards with access PINs and not stored with a device when not in use.

18.2.10.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

Agencies **MUST** generate certificates using a certificate authority product or hardware security module that has completed an appropriate product evaluation.

18.2.10.C.02. Control: Systems Classification(s): All Classifications; Compliance: MUST NOT

The certificates for both a device and user accessing a wireless network **MUST NOT** be stored on the same device.

18.2.10.C.03. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Agencies **SHOULD** use unique certificates for both devices and users accessing a wireless network.

18.2.10.C.04. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Certificates for users accessing wireless networks should be issued on smart cards with access PINs and not stored with a device when not in use.

18.2.10.C.05. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Certificates stored on devices accessing wireless networks SHOULD be protected by implementing full disk encryption on the devices.

18.2.11. Using commercial certification authorities for certificate generation**18.2.11.R.01. Rationale**

A security risk exists with EAP-TTLS and PEAP when a commercial certificate authority's certificates are automatically trusted by devices using vendor trusted certificate stores. This trust can be exploited by obtaining certificates from a commercial certificate authority under false pretences, as devices can be tricked into trusting their signed certificate. This will allow the capture of authentication credentials presented by devices, which in the case of EAP-MSCHAPv2 can be cracked using a brute force attack granting not only network access but most likely Active Directory credentials as well.

To reduce this risk, devices can be configured to:

- validate the server certificate;
- disable any trust for certificates generated by commercial certificate authorities that are not trusted;
- disable the ability to prompt users to authorise net servers or commercial certificate authorities; and
- set devices to enable identity privacy to prevent usernames being sent prior to being authenticated by the RADIUS server.

18.2.11.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

Devices MUST be configured to validate the server certificate, disable any trust for certificates generated by commercial certificate authorities that are not trusted and disable the ability to prompt users to authorise new servers or commercial certification authorities.

18.2.11.C.02. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Devices SHOULD be set to enable identity privacy.

18.2.12. Caching 802.1X authentication outcomes

18.2.12.R.01. Rationale

When 802.1X authentication is used, a shared secret key known as the Pairwise Master Key (PMK) is generated. Upon successful authentication of a device, the PMK can be cached to assist with fast roaming between wireless access points. When a device roams away from a wireless access point that it has authenticated to, it will not need to perform a full re-authentication should it roam back while the cached PMK remains valid. To further assist with roaming, wireless access points can be configured to pre-authenticate a device to other neighbouring wireless access points that the device might roam to. Although requiring full authentication for a device each time it roams between wireless access points is ideal, agencies can choose to use PMK caching and pre-authentication if they have a business requirement for fast roaming. If PMK caching is used, the PMK caching period should not be set to greater than 1440 minutes (24 hours).

18.2.12.C.01. Control: Systems Classification(s): All Classifications; Compliance: **SHOULD NOT** The PMK caching period **SHOULD NOT** be set to greater than 1440 minutes (24 hours).

18.2.13. Remote Authentication Dial-In User Service (RADIUS) authentication

18.2.13.R.01. Rationale

The RADIUS authentication process that occurs between wireless access points and the RADIUS server is distinct and a separate to the 802.1X authentication process. During the initial configuration of wireless networks using 802.1X authentication, a shared secret is entered into either the wireless access points or the RADIUS server. If configured on the wireless access points, the shared secret is sent to the RADIUS server via the RADIUS protocol, and vice versa if configured on the RADIUS server. This shared secret is used for both RADIUS authentication and confidentiality of RADIUS traffic.

18.2.13.R.02. Rationale

An intruder that is able to gain access to the RADIUS traffic sent between wireless access points and the RADIUS server may be able to perform a brute force or an offline dictionary attack to recover the shared secret. This in turn allows the intruder to decrypt all communications between wireless access points and the RADIUS server. To mitigate this security risk, communications between wireless access points and a RADIUS server must be encapsulated with an additional layer of encryption using an appropriate encryption product (See Chapter 17 – Cryptography).

18.2.13.C.01. Control: Systems Classification(s): All Classifications; Compliance: **MUST**

Communications between wireless access points and a RADIUS server **MUST** be encapsulated with an additional layer of encryption using an approved encryption product (See Chapter 17 – Cryptography).

18.2.14. Encryption

18.2.14.R.01. Rationale

As wireless transmissions are capable of radiating outside of secured areas into unsecured areas they need to be encrypted to the same level as classified information communicated over cabled infrastructure in unsecured areas.

18.2.14.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using wireless networks MUST ensure that classified information is protected by cryptography that meets the assurance level mandated for the communication of information over unclassified network infrastructure (See Suite B, Section 17.2).

18.2.15. Cipher Block Chaining Message Authentication Code Protocol (CCMP) Encryption

18.2.15.R.01. Rationale

As wireless transmissions are capable of radiating outside of secured areas, agencies cannot rely on the traditional approach of physical security to protect against unauthorised access to sensitive or classified information on wireless networks. Using the AES based Counter Mode with Cipher Block Chaining Message Authentication Code Protocol (CCMP) helps protect the confidentiality and integrity of all wireless network traffic.

18.2.15.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

CCMP MUST be used to protect the confidentiality and integrity of all wireless network traffic.

18.2.16. Temporal Key Integrity Protocol (TKIP) and Wireless Encryption Protocol (WEP)

18.2.16.R.01. Rationale

CCMP was introduced in WPA2 to address feasible attacks against the Temporal Integrity Key Protocol (TKIP) used by the Wi-Fi Protected Access (WPA) protocol as well as the original Wireless Encryption Protocol (WEP). A malicious actor seeking to exploit vulnerabilities in TKIP and WEP can attempt to connect to wireless access points using one of these protocols. By default, wireless access points will attempt to accommodate this request by falling back to a legacy protocol that the device supports. Disabling or removing TKIP and WEP support from wireless access points ensures that wireless access points do not fall back to an insecure encryption protocol.

18.2.16.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

TKIP and WEP support MUST be disabled or removed from wireless access points.

18.2.17. Wired Equivalent Privacy (WEP)

18.2.17.R.01. Rationale

WEP has serious flaws which allow it to be trivially compromised. A WEP network should be considered equivalent to an unprotected network.

18.2.17.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT
Agencies MUST NOT use WEP for wireless deployments.

18.2.18. Wi-Fi Protected Access (WPA)

18.2.18.R.01. Rationale

WPA has been superseded by WPA2. Agencies are strongly encouraged to deploy WPA2 wireless networks instead of unsecured, WEP or WPA based wireless networks.

18.2.18.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT
Agencies SHOULD NOT use Wi-Fi Protected Access (WPA) for wireless deployments.

18.2.19. Pre-shared keys

18.2.19.R.01. Rationale

The use of pre-shared keys is poor practise and not recommended for wireless authentication, in common with many authentication and encryption mechanisms, the greater the length of pre-shared keys the greater the security they provide.

18.2.19.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT
Agencies MUST NOT use pre-shared keys for wireless authentication.

18.2.19.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
If pre-shared keys are used, agencies SHOULD use random keys of the maximum allowable length.

18.2.19.C.03. Control: Systems Classification(s): All Classifications; Compliance: SHOULD NOT
Agencies SHOULD NOT use pre-shared keys for wireless authentication.

18.2.20. Administrative interfaces for wireless access points

18.2.20.R.01. Rationale

Administrative interfaces may allow users to modify the configuration and security settings of wireless access points. Often wireless access points by default allow users to access the administrative interface over methods such as fixed network connections, wireless network connections and serial connections directly on the device. Disabling the administrative interface on wireless access points will prevent unauthorised connections.

18.2.20.C.01. Control: Systems Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD disable the administrative interface on wireless access points for wireless connections.

18.2.21. Protecting management frames on wireless networks

18.2.21.R.01. Rationale

Effective DoS attacks can be performed on the 802.11 protocol by exploiting unprotected management frames using inexpensive commercial hardware. WPA2 provides no protection for management frames and therefore does not prevent spoofing or DoS attacks.

18.2.21.R.02. Rationale

The current release of the 802.11 standard provides no protection for management frames and therefore does not prevent spoofing or DoS attacks.

18.2.21.R.03. Rationale

However, 802.11w was ratified in 2009 and specifically addresses the protection of management frames on wireless networks. Wireless access points and devices should be upgraded to support the 802.11w amendment or any later amendment or version that includes a capability for the protection of management frames.

18.2.21.C.01. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Wireless access points and devices SHOULD be upgraded to support a minimum of the 802.11w amendment.

18.2.22. Default service set identifiers (SSIDs)

18.2.22.R.01. Rationale

All wireless access points are configured with a default Service Set Identifier (SSID). The SSID is commonly used to identify the *name* of a wireless network to users. As the default SSIDs of wireless access points are well documented on online forums, along with default accounts and passwords, it is important to change the default SSID of wireless access points.

18.2.22.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

Agencies MUST change the default SSID of wireless access points.

18.2.22.C.02. Control: Systems Classification(s): All Classifications; Compliance: MUST

Agencies MUST rename or remove default accounts and passwords.

18.2.23. Changing the SSID

18.2.23.R.01. Rationale

When changing the default SSID, it is important that it lowers the profile of an agency's wireless network. In doing so, the SSID of a wireless network should not be readily associated with an agency, the location of or within their premises, or the functionality of the network.

18.2.23.C.01. Control: **Systems Classification(s): All Classifications; Compliance: SHOULD NOT**

The SSID of a wireless network SHOULD NOT be readily associated with an agency, the premises, location or the functionality of the network.

18.2.24. SSID Broadcasting

18.2.24.R.01. Rationale

A common method to lower the profile of wireless networks is disabling SSID broadcasting. While this ensures that the existence of wireless networks are not broadcast overtly using beacon frames, the SSID is still broadcast in probe requests, probe responses, association requests and re-association requests for the network. Malicious actors can determine the SSID of wireless networks by capturing these requests and responses. By disabling SSID broadcasting agencies will make it more difficult for legitimate users to connect to wireless networks as legacy operating systems have only limited support for hidden SSIDs. Disabling SSID broadcasting infringes the design of the 802.11x standards.

18.2.24.R.02. Rationale

A further risk exists where an intruder can configure a wireless access point to broadcast the same SSID as the hidden SSID used by a legitimate wireless network. In this scenario devices will automatically connect to the wireless access point that is broadcasting the SSID they are configured to use *before* probing for a wireless access point that accepts the hidden SSID. Once the device is connected to the intruder's wireless access point the intruder can steal authentication credentials from the device to perform a man-in-the-middle attack to capture legitimate wireless network traffic or to later reuse to gain access to the legitimate wireless network.

18.2.24.R.03. Rationale

Disabling SSID broadcasting is not considered to be an effective control and may introduce additional risks.

18.2.24.C.01. Control: **Systems Classification(s): All Classifications; Compliance: SHOULD NOT**

Agencies SHOULD NOT disable SSID broadcasting on wireless networks.

18.2.25. Static addressing

18.2.25.R.01. Rationale

Rogue devices or Access Points (APs) are unauthorised Wireless Access Points operating outside of the control of an agency. Assigning static IP addresses for devices accessing wireless networks can prevent a rogue device when connecting to a network from being assigned a routable IP address. However, some malicious actors will be able to determine IP addresses of legitimate users and use this information to guess or spoof valid IP address ranges for wireless networks. Configuring devices to use static IP addresses introduces a management overhead without any tangible security benefit.

18.2.25.C.01. Control: **Systems Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD use the Dynamic Host Configuration Protocol (DHCP) for assigning IP addresses on wireless networks.

18.2.26. Media Access Control address filtering

18.2.26.R.01. Rationale

Devices that connect to wireless networks have a unique Media Access Control (MAC) address. It is possible to use MAC address filtering on wireless access points to restrict which devices can connect to wireless networks. While this approach will introduce a management overhead of configuring whitelists of approved MAC addresses, it can prevent rogue devices from connecting to wireless networks. However, some malicious actors will be able to determine valid MAC addresses of legitimate users already on wireless networks and use this information to spoof valid MAC addresses and gain access to a network. MAC address filtering introduces a management overhead without any real tangible security benefit.

18.2.26.C.01. Control: **Systems Classification(s): All Classifications; Compliance: SHOULD NOT**

MAC address filtering SHOULD NOT be used as a security mechanism to restrict which devices connect to a wireless network.

18.2.27. Documentation

18.2.27.R.01. Rationale

Wireless device driver and WAP vulnerabilities are very exposed to the threat environment and require specific attention as exploits can gain immediate unauthorised access to the network.

18.2.27.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Key generation, distribution and rekeying procedures SHOULD be documented in the SecPlan for the wireless network.

18.2.27.C.02. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Wireless device drivers and their versions SHOULD be documented in the SecPlan for the wireless network.

18.2.28. Non-agency devices connecting to agency controlled wireless networks

18.2.28.R.01. Rationale

As agencies have no control over the security of non-agency devices or knowledge of the security posture of such devices, allowing them to connect to agency controlled wireless networks poses a serious threat. Of particular concern is that non-agency devices may be infected with viruses, malware or other malicious code that could crossover onto the agency network. Furthermore, any non-agency devices connecting to agency controlled wireless networks will take on the classification of the network and will need to be appropriately sanitised and declassified before being released back to their owners.

18.2.28.R.02. Rationale

The practice of Bring Your Own Device (BYOD) is becoming more widespread but introduces a significant number of additional risks to agency systems. Refer to Section 20.4 for guidance on the use of BYOD.

18.2.28.C.01. Control: Systems Classification(s): All Classifications; Compliance: MUST

Where BYOD has been approved by an agency, any wireless network allowing BYOD connections MUST be segregated from all other agency networks, including any agency wireless networks.

18.2.28.C.02. Control: Systems Classification(s): All Classifications; Compliance: MUST

Any BYOD devices MUST comply with the policies and configuration described in Section 20.4–BYOD.

18.2.28.C.03. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT allow non-agency devices to connect to agency controlled wireless networks not intended or configured for BYOD devices or for public access.

18.2.29. Agency devices connecting to non-agency controlled wireless networks

18.2.29.R.01. Rationale

When agency devices connect to non-agency controlled wireless networks, particularly public wireless networks, the devices may be exposed to viruses, malware or other malicious code.

18.2.29.R.02. Rationale

If any agency device becomes infected and is later connected to an agency controlled wireless network then a crossover of viruses, malware or malicious code could occur.

18.2.29.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT allow agency devices to connect to non-agency controlled wireless networks.

18.2.30. Connecting wireless networks to fixed networks

18.2.30.R.01. Rationale

When an agency has a business requirement to connect a wireless network to a fixed network, it is important that they consider the security risks. While fixed networks can be designed with a certain degree of physical security, wireless networks are often easily accessible outside of the agency's controlled space. Treating connections between wireless networks and fixed networks in the same way agencies would treat connections between fixed networks and the Internet can help protect against an intrusion originating from a wireless network against a fixed network. For example, agencies can implement a gateway to inspect and control the flow of information between the two networks.

18.2.30.C.01. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Connections between wireless networks and fixed networks SHOULD be treated in the same way as connections between fixed networks and the Internet.

18.2.31. Wireless network footprint and Radio Frequency (RF) Controls

18.2.31.R.01. Rationale

Minimising the output power of wireless access points will reduce the footprint of wireless networks. Instead of deploying a small number of wireless access points that broadcast on high power, more wireless access points that use minimal broadcast power should be deployed to achieve the desired wireless network footprint. This has the added benefit of providing redundancy for a wireless network should a wireless access point become unserviceable. In such a case, the output power of other wireless access points can be temporarily increased to cover the footprint gap until the unserviceable wireless access point can be replaced.

18.2.31.C.01. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Instead of deploying a small number of wireless access points that broadcast on high power, more wireless access points that use minimal broadcast power SHOULD be deployed to achieve the desired wireless network footprint.

18.2.32. Radio Frequency (RF) Propagation & Controls

18.2.32.R.01. Rationale

An additional method to limit a wireless network's footprint is through the use of radio frequency (RF) shielding on an agency's premises. While expensive, this will limit the wireless communications to areas under the control of an agency. RF shielding on an agency's premises has the added benefit of preventing the jamming of wireless networks from outside of the premises in which wireless networks are operating.

18.2.32.C.01. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

The effective range of wireless communications outside an agency's area of control SHOULD be limited by:

- Minimising the output power level of wireless devices; and/or
- Implementing RF shielding within buildings in which wireless networks are used.

18.2.33. Interference between wireless networks

18.2.33.R.01. Rationale

Where multiple wireless networks are deployed in close proximity, there is the potential for RF interference to adversely impact the availability of the network, especially when networks are operating on commonly used default channels of 1 and 11. This interference is also apparent where a large number of wireless networks are in use in close proximity to the agency's premises.

18.2.33.R.02. Rationale

Sufficiently separating wireless networks through the use of channel separation can help reduce this risk. This can be achieved by using wireless networks that are configured to operate with at least one channel separation. For example, channels 1, 3 and 5 could be used to separate three wireless networks.

18.2.33.C.01. Control: Systems Classification(s): All Classifications; Compliance: SHOULD

Wireless networks SHOULD be sufficiently segregated through the use of channel separation.

18.3. Video & Telephony Conferencing and Internet Protocol Telephony

OBJECTIVE

18.3.1. Video & Telephony Conferencing (VTC), Internet Protocol telephony (IPT) and Voice over Internet Protocol (VoIP) systems are implemented in a secure manner that does not compromise security, information or systems and that they operate securely.

CONTEXT

Scope

18.3.2. This section covers information on VTC and IPT including Voice over Internet Protocol (VoIP). Although IPT refers generally to the transport of telephone calls over IP networks, the scope of this section includes connectivity to the PSTN as well as remote sites.

18.3.3. Additional information relating to topics covered in this section can be found in

- Chapter 12 – Product Security;
- Chapter 11 – Communications Systems and Devices;
- Chapter 19 – Gateways Security; and
- any section in this manual relating to the protection of data networks.

Exception for VTC and IPT gateways

18.3.4. Where a gateway connects between an analogue telephone network such as the PSTN and a computer network, Chapter 19 – Gateway Security does not apply.

18.3.5. Where a gateway connects between a VTC or IPT network and any other VTC or IPT network, Chapter 19 – Gateway Security applies.

Hardening VTC and IPT systems

18.3.6. Data in a VTC or IPT network consists of IP packets and should not be treated any differently to other data. In accordance with the principles of least-privilege and security-in-depth, hardening can be applied to all handsets, control units, software, servers and gateways. For example a Session Initiation Protocol (SIP) server could:

- have a fully patched software and operating system;
- only required services running;
- use encrypted non-replayable authentication; and
- apply network restrictions that only allow secure Session Initiation Protocol (SIP) and secure Real Time Transport (RTP) traffic from IP phones on a VLAN to reach the server.

RATIONALE & CONTROLS

18.3.7. Video and voice-aware firewalls

18.3.7.R.01. Rationale

The use of video and voice-aware firewalls ensures that only video or voice traffic (e.g. signalling and data) is allowed for a given call and that the session state is maintained throughout the transaction.

18.3.7.R.02. Rationale

The requirement to use a video or voice-aware firewall does not necessarily require separate firewalls to be deployed for video conferencing, IP telephony and data traffic. If possible, agencies are encouraged to implement one firewall that is either video and data-aware; voice and data-aware; or video, voice and data-aware depending on their needs.

18.3.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use a video or voice-aware firewall that meets the same minimum level of assurance as specified for normal firewalls.

18.3.8. Protecting IPT signalling and data

18.3.8.R.01. Rationale

IPT voice and signalling data is vulnerable to eavesdropping but can be protected with encryption. This control helps protect against DoS, man-in-the-middle and call spoofing attacks made possible by inherent weaknesses in the VTC and IPT protocols.

18.3.8.R.02. Rationale

When protecting IPT signalling and data, voice control signalling can be protected using TLS and the 'sips://' identifier to force the encryption of all legs of the connection. Similar protections are available for RTP and the Real-Time Control Protocol.

18.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD protect VTC and IPT signalling and data by using encryption.

18.3.8.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

An encrypted and non-replayable two-way authentication scheme should be used for call authentication and authorisation.

18.3.9. Establishment of secure signalling and data protocols

18.3.9.R.01. Rationale

Use of secure signalling and data protects against eavesdropping, some types of DoS, man-in-the-middle and call spoofing attacks.

18.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that VTC and IPT functions can be established using only the secure signalling and data protocols.

18.3.10. Local area network traffic separation

18.3.10.R.01. Rationale

Availability and quality of service are the main drivers for applying the principles of separation and segregation.

18.3.10.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST either separate or segregate the VTC and IPT traffic from other data traffic.

18.3.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD either separate or segregate the IPT traffic from other data traffic.

18.3.11. VTC and IPT Device setup

18.3.11.R.01. Rationale

VTC equipment and VoIP phones need to be hardened and separated or segregated from the data network to ensure they will not provide an easy entry point to the network for an attacker.

18.3.11.R.02. Rationale

USB ports on these devices can be used to circumvent USB workstation policy and upload malicious software for unauthorised call recording/spoofing and entry into the data network. Unauthorised or unauthenticated devices should be blocked by default to reduce the risk of a compromise or denial of service.

18.3.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST:

- configure VTC and VoIP devices to authenticate themselves to the call controller upon registration;
- disable phone auto-registration and only allow a whitelist of authorised devices to access the network;
- block unauthorised devices by default;
- disable all unused and prohibited functionality; and
- use individual logins for IP phones.

18.3.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD:

- configure VoIP phones to authenticate themselves to the call controller upon registration;
- disable phone auto-registration and only allow a whitelist of authorised devices to access the network;
- block unauthorised devices by default;
- disable all unused and prohibited functionality; and
- use individual logins for IP phones.

18.3.12. Call authentication and authorisation

18.3.12.R.01. Rationale

This control ensures server-client mutual authentication.

18.3.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Authentication and authorisation SHOULD be used for all actions on the IPT network, including:

- call setup;
- changing settings; and
- checking voice mail.

18.3.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

An encrypted and non-replayable two-way authentication scheme SHOULD be used for call authentication and authorisation.

18.3.12.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Authentication SHOULD be enforced for:

- registering a new phone;
- changing phone users;
- changing settings; and
- accessing voice mail.

18.3.13. VTC and IPT device connection to workstations

18.3.13.R.01. Rationale

Availability and quality of service are the main drivers for applying the principles of separation and segregation.

18.3.13.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT connect workstations to VTC or IPT devices unless the workstation or the device, as appropriate for the configuration, uses VLANs or similar mechanisms to maintain separation between VTC, IPT and other data traffic.

18.3.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT connect workstations to VTC or IPT devices unless the workstation or the device, as appropriate for the configuration, uses VLANs or similar mechanisms to maintain separation between VTC, IPT and other data traffic.

18.3.14. Lobby and shared area IPT devices

18.3.14.R.01. Rationale

IPT devices in public areas may give an attacker opportunity to access the internal data network by replacing the phone with another device, or installing a device in-line. There is also a risk to the voice network of social engineering (since the call may appear to be internal) and data leakage from poorly protected voice mail-boxes.

18.3.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Where an agency uses a VoIP phone in a lobby or shared area they SHOULD limit the phone's:

- ability to access data networks; and
- functionality for voice mail and directory services.

18.3.14.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use traditional analogue phones in lobby and shared areas.

18.3.15. Softphone and Webcam usage

18.3.15.R.01. Rationale

Software and applications for softphones and webcams can introduce additional attack vectors into the network as they are exposed to threats from the data network via the workstation and can subsequently be used to gain access to the network.

18.3.15.R.02. Rationale

Softphones and webcams typically require workstation to workstation communication, normally using a number of randomly assigned ports to facilitate RTP data exchange. This presents a security risk as workstations generally should be separated using host-based firewalls that deny all connections between workstations to make malicious code propagation inside the network difficult.

18.3.15.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies using softphones or webcams SHOULD have separate dedicated network interface cards on the host for VTC or IPT network access to facilitate VLAN separation.

18.3.15.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies using softphones or webcams SHOULD install a host-based firewall on workstations utilising softphones or webcams that allows traffic only to and from a minimum number of ports.

18.3.15.C.03. Control: System Classification(s): C, S, TS; Compliance: SHOULD NOT

Agencies SHOULD NOT use softphones or webcams.

18.3.16. Workstations using USB softphones and webcams

18.3.16.R.01. Rationale

Adding softphones and webcams to a whitelist of allowed USB devices on a workstation will assist with restricting access to only authorised devices, and allowing the SOE to maintain defences against removable media storage and other unauthorised USB devices.

18.3.16.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use access control software to control USB ports on workstations using softphones and webcams by utilising the specific vendor and product identifier of the authorised phone.

18.3.17. Developing a denial of service response plan

18.3.17.R.01. Rationale

Communications are considered critical for any business and are therefore especially vulnerable to Denial of Service (DoS). The guidance provided will assist in protecting against VTC or IPT DoS attacks, signalling floods, established call teardown and RTP data floods. These elements should be included in the agency's wider response plan (See Section 6.4 – Business Continuity and Disaster Recovery).

18.3.17.R.02. Rationale

Simple DoS attacks and incidents are often the result of bandwidth exhaustion. Agencies should also consider other forms of DoS including Distributed Denial of Service attacks (DdoS), DNS and latency incidents.

18.3.17.R.03. Rationale

System resilience can be improved by architecting a structured approach and providing layered defence such as network and application protection as separate layers.

18.3.17.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop a Denial of Service response plan including:

- how to identify the precursors and other signs of DoS;
- how to diagnose the incident or attack type and attack method;
- how to diagnose the source of the DoS;
- what actions can be taken to clear the DoS;
- how communications can be maintained during a DoS; and
- report the incident.

18.3.18. Content of a Denial of Service (DoS) response plan

18.3.18.R.01. Rationale

An VTC or IPT DoS response plan will need to address the following:

- how to identify the source of the DoS, either internal or external (location and content of logs);
- how to diagnose the incident or attack type and attack method;
- how to minimise the effect on VTC or IPT, of a DoS of the data network (e.g. Internet or internal DoS), including separate links to other office locations for VTC and IPT and/or quality of service prioritisation;
- strategies that can mitigate the DOS (banning certain devices/Ips at the call controller and firewalls, implementing quality of service, changing VoIP authentication, changing dial-in authentication; and
- alternative communication options (such as designated devices or personal mobile phones) that have been identified for use in case of an emergency.

18.3.18.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

A Denial of Service response plan SHOULD include monitoring and use of:

- router and switch logging and flow data;
- packet captures;
- proxy and call manager logs and access control lists;
- VTC and IPT aware firewalls and voice gateways;
- network redundancy;
- load balancing;
- PSTN failover; and
- alternative communication paths.

18.4. Intrusion Detection and Prevention

OBJECTIVE

18.4.1. An intrusion detection and prevention strategy is implemented for systems in order to respond promptly to incidents and preserve availability, confidentiality and integrity of systems.

CONTEXT

Scope

18.4.2. This section covers information relating to detection and prevention of malicious code propagating through networks as well as the detection and prevention of unusual or malicious activities.

Methods of infections or delivery

18.4.3. Malicious code can spread through a system from a number of sources including:

- files containing macro viruses or worms;
- email attachments and Web downloads with malicious active content;
- executable code in the form of applications;
- security weaknesses in a system or network;
- security weaknesses in an application; and
- contact with an infected system or media.

18.4.4. The speed at which malicious code can spread through a system presents significant challenges and an important part of any defensive strategy is to contain the attack and limit damage.

REFERENCES

Title	Publisher	Source
ISO/IEC 27001:2006, A.15.3, Information Systems Audit Considerations	ISO / IEC	http://www.iso27001security.com/html/27001.html
	Standards NZ	http://www.standards.co.nz
HB 171:2003 Guidelines for the Management of Information Technology Evidence	Standards NZ	http://www.standards.co.nz

RATIONALE & CONTROLS

18.4.5. Intrusion Detection and Prevention strategy (IDS/IPS)

18.4.5.R.01. Rationale

An IDS/IPS when configured correctly, kept up to date and supported by appropriate processes, can be an effective way of identifying, responding to and containing known attack types, specific attack profiles or anomalous or suspicious network activities.

18.4.5.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST develop, implement and maintain an intrusion detection strategy that includes:

- appropriate intrusion detection mechanisms, including network-based IDS/IPSs and host-based IDS/IPSs as necessary;
- the audit analysis of event logs, including IDS/IPS logs;
- a periodic audit of intrusion detection procedures;
- information security awareness and training programs;
- a documented Incident Response Plans (IRP); and
- provide the capability to detect information security incidents and attempted network intrusions on gateways and provide real-time alerts.

18.4.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD develop, implement and maintain an intrusion detection strategy that includes:

- appropriate intrusion detection mechanisms, including network-based IDS/IPSs and host-based IDS/IPSs as necessary;
- the audit analysis of event logs, including IDS/IPS logs;
- a periodic audit of intrusion detection procedures;
- information security awareness and training programs; and
- a documented IRP.

18.4.5.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure sufficient resources are provided for the maintenance and monitoring of IDS/IPS.

18.4.6. IDS/IPSs on gateways

18.4.6.R.01. Rationale

If the firewall is configured to block all traffic on a particular range of port numbers, then the IDS should inspect traffic for these port numbers and alert if they are detected.

18.4.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD deploy IDS/IPSs in all gateways between the agency's networks and unsecured public networks or BYOD wireless networks.

18.4.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD deploy IDS/IPSs at all gateways between the agency's networks and any network not managed by the agency.

18.4.6.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD locate IDS/IPSs within the gateway environment, immediately inside the outermost firewall.

18.4.7. IDS/IPS Maintenance

18.4.7.R.01. Rationale

When signature-based intrusion detection is used, the effectiveness of the IDS/IPS will degrade over time as new intrusion methods are developed. It is for this reason that IDS/IPS systems and signatures need to be up to date to identify the latest intrusion detection methods.

18.4.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST select IDS / IPS that monitor uncharacteristic and suspicious activities.

18.4.7.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

When signature-based intrusion detection is used, agencies MUST keep the signatures and system patching up to date.

18.4.8. Malicious code counter-measures

18.4.8.R.01. Rationale

Implementing policies and procedures for preventing and dealing with malicious code outbreaks that enables agencies to provide consistent incident response, as well as giving clear directions to system users on how to respond to an information security incident.

18.4.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST:

- develop and maintain a set of policies and procedures covering how to:
 - minimise the likelihood of malicious code being introduced into a system;
 - prevent all unauthorised code from executing on an agency network;
 - detect any malicious code installed on a system;
- make their system users aware of the agency's policies and procedures; and
- ensure that all instances of detected malicious code outbreaks are handled according to established procedures.

18.4.9. Configuring the IDS/IPS**18.4.9.R.01. Rationale**

Generating alerts for any information flows that contravene any rule within the firewall rule set will assist security personnel in identifying and reporting to any possible breaches of agency systems.

18.4.9.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

In addition to agency defined configuration requirements, agencies SHOULD ensure that IDS/IPSs located inside a firewall are configured to generate a log entry, and an alert, for any information flows that contravene any rule within the firewall rule set.

18.4.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD test IDS/IPSs rule sets prior to implementation to ensure that they perform as expected.

18.4.9.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

If a firewall is configured to block all traffic on a particular range of port numbers, the IDP/IPSs SHOULD inspect traffic for these port numbers and generate an alert if they are detected.

18.4.10. Event management and correlation**18.4.10.R.01. Rationale**

Deploying tools to manage correlation of suspicious events or events of interest across all agency networks will assist in identifying suspicious patterns in information flows throughout the agency.

18.4.10.R.02. Rationale

The history of events is important in this analysis and should be accommodated in any archiving decisions.

18.4.10.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD deploy tools for:

- the management and archive of security event information; and
- the correlation of suspicious events or events of interest across all agency networks.

18.4.11. Host-based IDS/IPSS

18.4.11.R.01. Rationale

Host-based IDS/IPS use behaviour-based detection schemes and can therefore assist in the detection of previously unidentified anomalous and suspicious activities such as:

- process injection;
- keystroke logging;
- driver loading;
- library additions or supercessions;
- call hooking.

They may also identify new malicious code. It should be noted that some anti-virus and similar security products are evolving into converged endpoint security products that incorporate HIDS/HIPS.

18.4.11.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD install host-based IDS/IPSS on authentication, DNS, email, Web and other high value servers.

18.4.12. Active content blocking

18.4.12.R.01. Rationale

Filtering unnecessary content and disabling unwanted functionality reduces the number of possible entry points that an attacker can exploit.

18.4.12.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use:

- filters to block unwanted content and exploits against applications that cannot be patched;
- settings within the applications to disable unwanted functionality; and
- digital signatures to restrict active content to trusted sources only.

18.5. Internet Protocol Version 6

OBJECTIVE

18.5.1. IPv6 is disabled until it is ready to be deployed.

CONTEXT

Scope

18.5.2. This section covers information on IPv6 and its deployment within networks. Where this manual specifies requirements for network devices, the requirements apply equally whether deploying IPv6 or IPv4.

18.5.3. IPv6 was officially launched by the Internet Society in June 2012, with the change from IPv4 to IPv6. There is the potential to introduce vulnerabilities to agency networks through incorrect or mis-configuration, poor design and poor device compatibility. Attackers will also be actively seeking to exploit vulnerabilities that will inevitably be exposed.

18.5.4. Agencies unable to meet the compliance requirements as specified for a control when deploying IPv6 network infrastructure will need to follow the procedures as specified in this manual for varying from a control and the associated compliance requirements.

DNS Security Extensions (DNSSEC)

18.5.5. DNSSEC has been developed to enhance Internet security and can digitally 'sign' data to assure validity. It is essential that DNSSEC is deployed at each step in the lookup from root zone to final domain name (e.g., www.icann.org). Signing the root (deploying DNSSEC on the root zone) is a necessary step in this overall process. Importantly it does not encrypt *data*. It just attests to the validity of the address of the site you visit. DNSSEC and IPv6 have been engineered to integrate and thus enhance Internet security.

REFERENCES

Title	Publisher	Source
A strategy for the transition to IPv6 for Australian Government agencies.	Australian Government Information Management Office	https://agimo2.govspace.gov.au/files/2012/04/Endorsed Strategy for the Transition to IPv6 for Australian Government agencies.pdf
Manageable Network Plan	NSA	www.nsa.gov/ia/ files/vtechrep/ManageableNetworkPlan.pdf
Router Security Configuration Guide Supplement – Security for IPv6 Routers, 23 May 2006 Version: 1.0	NSA	http://www.nsa.gov/ia/ files/routers/I33-002R-06.pdf
Firewall Design Considerations for IPv6, 10/3/2007	NSA	http://www.hpc.mil/images/hpcdocs/ipv6/nsa-firewall-design-ipv6-i733-041r-2007.pdf
Guidelines on Firewalls and Firewall Policy, NIST Special Publication 800-41, Revision 1, September 2009	NIST	http://csrc.nist.gov/publications/PubsSPs.html
Guidelines for secure deployment of IPv6, Special Publication 800-119, December 2010	NIST	http://csrc.nist.gov/publications/nistpubs/800-119/sp800-119.pdf
A Complete Guide on IPv6 Attack and Defense	SANS Institute	http://www.sans.org/reading-room/whitepapers/detection/complete-guide-ipv6-attack-defense-33904?show=complete-guide-ipv6-attack-defense-33904&cat=detection
Internet Protocol, Version 6 (IPv6) Specification, RFC 2460, December 1998	IETF	http://www.ietf.org/rfc/rfc2460.txt
IP Version 6 Addressing Architecture, RFC 4291, February 2006	IETF	http://tools.ietf.org/html/rfc4291
A Recommendation for IPv6 Address Text Representation, ISSN: 2070-1721, RFC 5952, August 2010	IETF	http://tools.ietf.org/html/rfc5952

Title	Publisher	Source
IPv6 Addressing of IPv4/IPv6 Translators, ISSN: 2070-1721, RFC 6052, October 2010	IETF	http://tools.ietf.org/html/rfc6052
Significance of IPv6 Interface Identifiers, RFC 7136, ISSN: 2070-1721, February 2014	IETF	http://tools.ietf.org/html/rfc7136
DNSSEC Operational Practices, Version 2	IETF	http://tools.ietf.org/search/rfc6781
Clarifications and Implementation Notes for DNS Security (DNSSEC)	IETF	http://tools.ietf.org/search/rfc6840
A Framework for DNSSEC Policies and DNSSEC Practice Statements	IETF	http://tools.ietf.org/html/rfc6841
IETF RFC 7123 Security Implications of IPv6 on IPv4 Networks	IETF	http://tools.ietf.org/html/rfc7123
IETF RFC 4861 Neighbor Discovery for IP version 6 (IPv6)	IETF	http://tools.ietf.org/html/rfc4861
IETF RFC 5942 IPv6 Subnet Model: The Relationship between Links and Subnet Prefixes	IETF	http://tools.ietf.org/html/rfc5942
IETF RFC 3315 Dynamic Host Configuration Protocol for IPv6 (DHCPv6)	IETF	http://www.ietf.org/rfc/rfc3315.txt
IETF RFC 6104 Rogue IPv6 Router Advertisement Problem Statement	IETF	http://tools.ietf.org/html/rfc6104
IPv6 First-Hop Security Concerns	Cisco	http://www.cisco.com/web/about/security/intelligence/ipv6_first_hop.html
DNSSEC – What Is It and Why Is It Important?	Internet Corporation for Assigned Names and Numbers (ICANN)	http://www.icann.org/en/about/learning/factsheets/dnssec-qa-09oct08-en.htm

RATIONALE & CONTROLS

18.5.6. Use of dual-stack equipment

18.5.6.R.01. Rationale

In order to reduce the attack surface area of agency systems, it is good practice that agencies disable unused services and functions within network devices and operating systems. If agencies are deploying dual-stack equipment but not using the IPv6 functionality, then that functionality should be disabled. It can be re-enabled when required. This will reduce the opportunity to exploit IPv6 functionality before appropriate security measures have been implemented.

18.5.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies not using IPv6, but which have deployed dual-stack network devices and ICT equipment that supports IPv6, MUST disable the IPv6 functionality, unless that functionality is required.

18.5.6.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Network security devices on IPv6 or dual-stack networks MUST be IPv6 capable.

18.5.7. Using IPv6

18.5.7.R.01. Rationale

The information security implications around the use of IPv6 are still largely unknown and untested. As many of the deployed network protection technologies, such as firewalls and IDSs, do not consistently support IPv6, agencies choosing to implement IPv6 face an increased risk of systems compromise.

18.5.7.R.02. Rationale

A number of tunnelling protocols have been developed to facilitate interoperability between IPv4 and IPv6. Disabling IPv6 tunnelling protocols when this functionality is not explicitly required will reduce the risk of bypassing network defences by means of encapsulating IPv6 data inside IPv4 packets.

18.5.7.R.03. Rationale

Stateless Address Autoconfiguration (SLAAC) is a method of stateless IP address configuration in IPv6. SLAAC reduces the ability to maintain complete logs of IP address assignment on the network. To avoid this constraint, stateless IP addressing SHOULD NOT be used.

18.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using IPv6 MUST conduct a security risk assessment on risks that could be introduced as a result of running a dual stack environment or transitioning completely to IPv6.

18.5.7.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies implementing a dual stack or wholly IPv6 network or environment MUST re-accredit their networks.

18.5.7.C.03. Control: System Classification(s): All Classifications; Compliance: MUST
IPv6 tunnelling MUST be disabled on all network devices, unless explicitly required.

18.5.7.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD
Dynamically assigned IPv6 addresses SHOULD be configured with DHCPv6 in a stateful manner and with lease information logged and logs stored in a centralised logging facility.

18.5.8. New systems and networks

18.5.8.R.01. Rationale

Planning and accommodating changes in technology are an essential part of securing architectures and systems development.

18.5.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST
Any network defence elements and devices MUST be IPv6 aware.

18.5.8.C.02. Control: System Classification(s): All Classifications; Compliance: MUST
New network devices, including firewalls, IDS and IPS, MUST be IPv6 capable.

18.5.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD consider the use of DNSSEC.

18.5.9. Introducing IPv6 capable equipment to gateways

18.5.9.R.01. Rationale

Introducing IPv6 capable network devices into agency gateways can introduce a significant number of new security risks. Undergoing reaccreditation when new IPv6 equipment is introduced will ensure that any IPv6 functionality that is not intended to be used cannot be exploited by an attacker before appropriate information security mechanisms have been put in place.

18.5.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST
IPv6 tunnelling MUST be blocked by network security devices at externally connected network boundaries.

18.5.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies deploying IPv6 equipment in their gateway but not enabling the functionality SHOULD undergo reaccreditation.

18.5.10. Enabling IPv6 in gateways

18.5.10.R.01. Rationale

Once agencies have completed the transition to a dual-stack environment or completely to an IPv6 environment, reaccreditation will assist in ensuring that the associated information security mechanisms for IPv6 are working effectively.

18.5.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies enabling a dual-stack environment or a wholly IPv6 environment in their gateways MUST reaccredit their gateway systems.

18.6. Data Transfers

OBJECTIVE

18.6.1. Data transfers between systems are controlled and accountable.

CONTEXT

Scope

18.6.2. This section covers the fundamental requirements of data transfers between systems and applies equally to data transfers using removal media and to data transfers via gateways.

18.6.3. Additional requirements for data transfers using removal media can be found in the Section 13.3 – Media Usage and additional requirements for data transfers via gateways can be found in the Section 19.5 – Data Import and Export.

18.6.4. Transfers from a classified system where strong information security controls exist to a system of lower classification where controls may not be as robust, can lead to data spills, information loss and privacy breaches. It is important that appropriate levels of oversight and accountability are in place to minimise or prevent the undesirable loss or leakage of information.

RATIONALE & CONTROLS

18.6.5. User responsibilities

18.6.5.R.01. Rationale

When users transfer data to and from systems they need to be aware of the potential consequences of their actions. This could include data spills of classified information onto systems not accredited to handle the classification of the data or the unintended introduction of malicious code. Accordingly agencies will need to hold personnel accountable for all data transfers that they make.

18.6.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST establish a policy and train staff in the processes for data transfers between systems and the authorisations required before transfers can take place.

18.6.5.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that system users transferring data to and from a system are held accountable for the data they transfer.

18.6.6. Data transfer processes and procedures

18.6.6.R.01. Rationale

Personnel can assist in preventing information security incidents by checking protective markings (classifications, caveats, endorsements and releasability) checks to ensure that the destination system is appropriate for the protection of the data being transferred, performing antivirus checks on data to be transferred to and from a system, and following all processes and procedures for the transfer of data.

18.6.6.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that data transfers are performed in accordance with processes and procedures approved by the Accreditation Authority.

18.6.6.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that data transfers are performed in accordance with processes and procedures approved by the Accreditation Authority.

18.6.7. Data transfer authorisation

18.6.7.R.01. Rationale

Using a trusted source to approve transfers from a classified system to another system of a lesser classification or where a releasability endorsement is applied to the data to be transferred, ensures appropriate oversight and reporting of the activity.

18.6.7.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that all data transferred to a system of a lesser classification or a less secure system, is approved by a trusted source.

18.6.8. Trusted sources

18.6.8.R.01. Rationale

Trusted sources are designated personnel who have the delegated authority to assess and approve the transfer or release of data or documents. Trusted sources may include security personnel within the agency such the CISO and the ITSM.

18.6.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Trusted sources MUST be:

- Individuals identified from business requirements and the result of a security risk assessment; and
- approved by the Accreditation Authority.

18.6.9. Import of data

18.6.9.R.01. Rationale

Scanning imported data for active or malicious content reduces the security risk of a system or network being infected, thus allowing the continued confidentiality, integrity and availability of the system or network.

18.6.9.R.02. Rationale

Format checks provide a method to prevent known malicious formats from entering the system or network. Keeping and regularly auditing these logs allow for the system or network to be checked for any unusual activity or usage.

18.6.9.R.03. Rationale

Personnel reporting unexpected events through the agency's incident management process provide an early opportunity to contain malware, limit damage and correct errors.

18.6.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies importing data to a system MUST ensure that the data is scanned for malicious and active content.

18.6.9.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies importing data to a system MUST implement the following controls:

- scanning for malicious and active content;
- data format checks;
- identify unexpected attachments or embedded objects;
- log each event; and
- monitoring to detect overuse/unusual usage patterns.

18.6.10. Export of highly formatted textual data

18.6.10.R.01. Rationale

When highly formatted textual data with no free text fields is to be transferred between systems, the checking requirements are lessened because the format of the information is strongly defined.

18.6.10.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

When agencies export formatted textual data with no free text fields and all fields have a predefined set of permitted formats and data values, agencies MUST implement the following controls:

- protective marking checks;
- data validation and format checks;
- size limits;
- keyword checks;
- identify unexpected attachments or embedded objects;
- log each event; and
- monitoring to detect overuse/unusual usage patterns.

18.6.11. Export of other data

18.6.11.R.01. Rationale

Textual data that it is not highly formatted can be difficult to check in an automated manner. Agencies will need to implement measures to ensure that classified information is not accidentally being transferred to another system not accredited for that classification or transferred into the public domain.

18.6.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

When agencies export data, other than highly formatted textual data, agencies MUST implement the following controls:

- protective marking checks;
- data validation and format checks;
- limitations on data types;
- size limits;
- keyword checks;
- identify unexpected attachments or embedded objects;
- log each event; and
- monitoring to detect overuse/unusual usage patterns.

18.6.12. Preventing export of NZEO data to foreign systems**18.6.12.R.01. Rationale**

In order to reduce the security risk of spilling data with a caveat onto foreign systems, it is important that procedures are developed to detect NZEO marked data and to prevent it from crossing into foreign systems or being exposed to foreign nationals.

18.6.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST:

- ensure that keyword searches are performed on all textual data;
- ensure that any identified data is quarantined until reviewed and approved for release by a trusted source other than the originator; and
- develop procedures to prevent NZEO information in both textual and non-textual formats from being exported.

18.7. Peripheral (KVM) Switches

OBJECTIVE

18.7.1. An evaluated peripheral switch is used when sharing keyboards, monitors and mice between different systems.

CONTEXT

Scope

18.7.2. This section covers information relating specifically to the use of keyboard/video/mouse (KVM) switches.

Peripheral switches with more than two connections

18.7.3. If the peripheral switch has more than two systems connected then the level of assurance needed is determined by the highest and lowest of the classifications involved.

RATIONALE & CONTROLS

18.7.4. Assurance requirements

18.7.4.R.01. Rationale

When accessing multiple systems through a peripheral switch it is important that sufficient assurance is available in the operation of the switch to ensure that information does not accidentally pass between the connected systems.

18.7.4.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies accessing a classified system and a less classified system via a peripheral switch **MUST** use an evaluated product with a level of assurance as indicated in the table below.

High system	Low system	Level of assurance
RESTRICTED & all lower classifications	UNCLASSIFIED	EAL2
CONFIDENTIAL	UNCLASSIFIED	high assurance
	RESTRICTED	high assurance
SECRET	UNCLASSIFIED	high assurance
	RESTRICTED	high assurance
	CONFIDENTIAL	high assurance
TOP SECRET	UNCLASSIFIED	high assurance
	RESTRICTED	high assurance
	CONFIDENTIAL	high assurance
	SECRET	high assurance

18.7.5. Assurance requirements for NZEO systems

18.7.5.R.01. Rationale

NZEO systems are particularly sensitive. Additional security measures need to be put in place when connecting them to other systems.

18.7.5.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies accessing a system containing NZEO information and a system of the same classification that is not accredited to process NZEO information, **MUST** use an evaluated product with an EAL2 (or higher) level of assurance.

19. GATEWAY SECURITY

19.1. Gateways

OBJECTIVE

19.1.1. To ensure that gateways are properly configured to protect agency systems and information transferred between systems from different security domains.

CONTEXT

Scope

19.1.2. Gateways can be considered to be information flow control mechanisms operating at the Network layer and may also control information flow at the Transport, Session, Presentation and Application layers of the Open Systems Interconnection model (OSI). Specific controls for different technologies can be found in Section 19.3 – Firewalls, Section 19.4 – Diodes and Section 18.7 – Peripheral (KVM) switches.

19.1.3. Additional information relating to topics covered in this section can be found in the following sections of this manual:

- Section 5.2 – Accreditation Framework;
- Section 8.2 – Servers and Network Devices;
- Section 8.3 – Network Infrastructure;
- Section 8.4 – IT Equipment;
- Chapter 12 – Product Selection;
- Section 16.1 – Identification and Authentication;
- Section 16.5 – Event Logging and Auditing;
- Section 18.6 – Data Transfers;
- Section 19.3 – Firewalls;
- Section 19.4 – Diodes.
- Section 19.5 – Data Import and Export; and
- Section 19.6 – Content Filtering.

Deploying gateways

19.1.4. This section provides a baseline for agencies deploying gateways. Agencies will need to consult additional sections of this manual depending on the specific type of gateways deployed.

19.1.5. For network devices used to control data flow in bi-directional gateways, Section 19.3 – Firewalls will need to be consulted. Section 19.4 – Diodes will also need to be consulted for one-way gateways. Additionally, for both types of gateways, Data Transfers (Section 18.6) and Cross-Domain Solutions will need to be consulted for requirements on appropriately controlling data flows.

19.1.6. The requirements in this manual for content filtering, data import and data export apply to all types of gateways.

Gateway classification

19.1.7. For the purposes of this chapter, the gateway assumes the highest classification of the connected domains.

REFERENCES

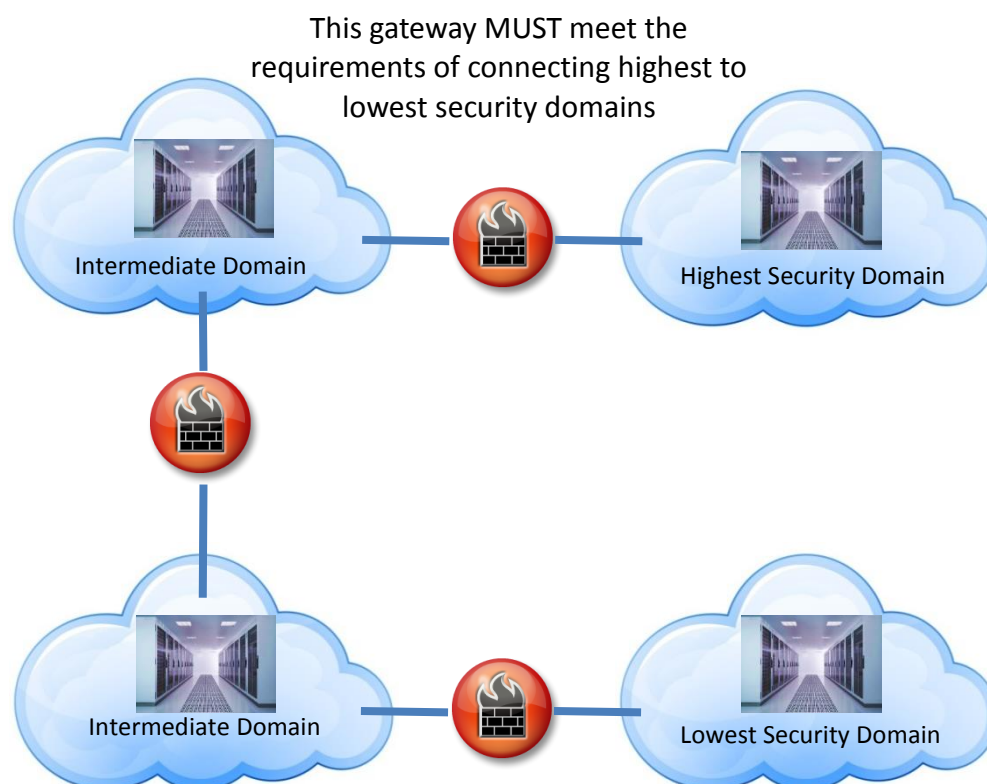
Title	Publisher	Source
Gateway / Cross Domain Solution Audit Guide, Australian Government	ASD	http://www.asd.gov.au/publications/Gateway_CDS_Audit_Guide.docx
Guidelines on Firewalls and Firewall Policy, NIST SP800-41,	NIST	http://csrc.nist.gov/publications/nistpubs/800-41-Rev1/sp800-41-rev1.pdf
Good Practices for deploying DNSSEC, ENISA	ENISA	http://www.enisa.europa.eu/activities/Resilience-and-CIIP/networks-and-services-resilience/dnssec/gpgdnssec
The OSI model ISO/IEC 7498-1:1994 Information Technology – Open Systems Interconnection: The Basic Model	ISO / IEC	http://standards.iso.org/ittf/PubliclyAvailableStandards/index.html

RATIONALE & CONTROLS

19.1.8. Gateways involving cascaded connections

19.1.8.R.01. Rationale

Protecting a cascaded connection path with the minimum assurance requirement of a direct connection between the highest and lowest networks ensures appropriate reduction in security risks of the extended connection. An illustration of a cascaded connection can be seen below.



19.1.8.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

When agencies have cascaded connections between networks involving multiple gateways they **MUST** ensure that the assurance levels specified for network devices between the overall lowest and highest networks are met by the gateway between the highest network and the next highest network within the cascaded connection.

19.1.9. Using gateways

19.1.9.R.01. Rationale

Physically locating all gateway components inside a secure server room will reduce the risk of unauthorised access to the device.

19.1.9.R.02. Rationale

The system owner of the higher security domain of connected security domains would be most familiar with the controls required to protect the more sensitive information and as such is best placed to manage any shared components of gateways. In some cases where multiple security domains from different agencies are connected to a gateway, it may be more appropriate to have a qualified third party manage the gateway on behalf of all connected agencies.

Gateway components may also reside in a virtual environment – refer to Sections 21.2 and 21.3.

19.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that:

- all agency networks are protected from networks in other security domains by one or more gateways;
- all gateways contain mechanisms to filter or limit data flow at the network and content level to only the information necessary for business purposes; and
- all gateway components, discrete and virtual, are physically located within an appropriately secured server room.

19.1.9.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

For gateways between networks in different security domains, any shared components MUST be managed by the system owners of the highest security domain or by a mutually agreed party.

19.1.10. Configuration of gateways**19.1.10.R.01. Rationale**

Gateways are essential in controlling the flow of information between security domains. Any failure, particularly at the higher classifications, may have serious consequences. Hence mechanisms for alerting personnel to situations that may give rise to information security incidents are especially important for gateways.

19.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that gateways:

- are the only communications paths into and out of internal networks;
- by default, deny all connections into and out of the network;
- allow only explicitly authorised connections;
- are managed via a secure path isolated from all connected networks (i.e. physically at the gateway or on a dedicated administration network);
- provide sufficient logging and audit capabilities to detect information security incidents, attempted intrusions or anomalous usage patterns; and
- provide real-time alerts.

19.1.11. Operation of gateways

19.1.11.R.01. Rationale

Providing an appropriate logging and audit capability will help to detect information security incidents and attempted network intrusions, allowing the agency to respond and to take measures to reduce the risk of future attempts.

19.1.11.R.02. Rationale

Storing event logs on a separate, secure log server will assist in preventing attackers from deleting logs in an attempt to destroy evidence of any intrusion.

19.1.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that all gateways connecting networks in different security domains:

- include a firewall of an appropriate assurance level on all gateways to filter and log network traffic attempting to enter the gateway;
- are configured to save event logs to a separate, secure log server;
- are protected by authentication, logging and audit of all physical access to gateway components; and
- have all controls tested to verify their effectiveness after any changes to their configuration.

19.1.12. Demilitarised zones

19.1.12.R.01. Rationale

Demilitarised zones are used to prevent direct access to information and systems on internal agency networks. Agencies that require certain information and systems to be accessed *from* the Internet or some other form of remote access, should place them in the less trusted demilitarised zone instead of on internal agency networks.

19.1.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST use demilitarised zones to house systems and information directly accessed externally.

19.1.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use demilitarised zones to house systems and information directly accessed externally.

19.1.13. Risk assessment

19.1.13.R.01. Rationale

Performing a risk assessment on the gateway and its configuration prior to its implementation will assist in the early identification and mitigation of security risks.

19.1.13.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST perform a risk assessment on gateways and their configuration *prior* to their implementation.

19.1.14. Risk transfer

19.1.14.R.01. Rationale

Gateways could connect networks with different domain owners, including across agency boundaries. As a result, all domain and system owners MUST understand and accept the risks from all other networks before gateways are implemented.

19.1.14.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

All domain and system owners connected through a gateway MUST understand and accept the residual security risk of the gateway and from any connected domains including those via a cascaded connection.

19.1.14.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD annually review the security architecture of the gateway and risks of all connected domains including those via a cascaded connection.

19.1.15. Information stakeholders and Shared Ownership

19.1.15.R.01. Rationale

Changes to a domain connected to a gateway can affect the security posture of other connected domains. All domains owners should be considered stakeholders in all connected domains.

19.1.15.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Once connectivity is established, domain owners MUST be considered information stakeholders for all connected domains.

19.1.15.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Once connectivity is established, domain owners SHOULD be considered information stakeholders for all connected domains.

19.1.16. System user training

19.1.16.R.01. Rationale

It is important that system users are competent to use gateways in a secure manner. This can be achieved through appropriate training before being granted access.

19.1.16.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

All system users MUST be trained on the secure use and security risks of the gateways before being granted access.

19.1.16.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

All system users SHOULD be trained in the secure use and security risks of the gateways before being granted access.

19.1.17. Administration of gateways

19.1.17.R.01. Rationale

Application of role separation and segregation of duties in administration activities will protect against security risks posed by a malicious system user with extensive access to gateways.

19.1.17.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST limit access to gateway administration functions.

19.1.17.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that system administrators are formally trained to manage gateways by qualified trainers.

19.1.17.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that all system administrators of gateways that process NZEO information meet the nationality requirements for these caveats.

19.1.17.C.04. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST separate roles for the administration of gateways (e.g. separate network and security policy configuration roles).

19.1.17.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD separate roles for the administration of gateways (e.g. separate network and security policy configuration roles).

19.1.18. System user authentication

19.1.18.R.01. Rationale

Authentication to networks as well as gateways can reduce the risk of unauthorised access and provide an audit capability to support the investigation of information security incidents.

19.1.18.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST authenticate system users to all classified networks accessed through gateways.

19.1.18.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that only authenticated and authorised system users can use the gateway.

19.1.18.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use multi-factor authentication for access to networks and gateways.

19.1.19. IT equipment authentication

19.1.19.R.01. Rationale

Authenticating IT equipment to networks accessed through gateways will assist in preventing unauthorised IT equipment connecting to a network.

19.1.19.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD authenticate any IT equipment that connects to networks accessed through gateways.

19.1.20. Configuration control

19.1.20.R.01. Rationale

To avoid changes that may introduce vulnerabilities into a gateway, agencies should fully consider any changes and associated risks. Changes may also necessitate re-certification and accreditation of the system, see Chapter 5 – System Certification and Accreditation.

19.1.20.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST undertake a risk assessment and update the SRMP before changes are implemented.

19.1.20.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST document any changes to gateways in accordance with the agency's Change Management Policy.

19.1.20.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD undertake a risk assessment and update the SRMP before changes are implemented.

19.1.21. Testing of gateways

19.1.21.R.01. Rationale

The testing of security measures on gateways will assist in ensuring that the integrity of the gateway is being maintained. An attacker who is aware of the regular testing schedule may cease malicious activities during such periods to avoid detection. Any test should, therefore, be unannounced and conducted at irregular intervals.

19.1.21.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that testing of security measures is performed at random intervals no more than six months apart.

19.2. Cross Domain Solutions (CDS)

OBJECTIVE

19.2.1. Cross-domain solutions secure transfers between systems of differing classifications or trust levels with high assurance over the security of systems and information.

CONTEXT

Scope

19.2.2. This section describes the use and implementation of Cross Domain Solutions (CDS).

19.2.3. CDS provide information flow control mechanisms at each layer of the OSI model with a higher level of assurance than typical gateways. This section extends the preceding Gateways section. CDS systems must apply controls from each section.

19.2.4. Additional information relating to topics covered in this section can be found in the following chapters and sections:

- Section 5.2 – Accreditation Framework;
- Section 8.2 – Servers and Network Devices;
- Section 8.3 – Network Infrastructure;
- Section 8.4 – IT Equipment;
- Chapter 12 – Product Selection;
- Section 16.1 – Identification and Authentication;
- Section 16.5 – Event Logging and Auditing;
- Section 18.6 – Data Transfers;
- Section 19.1 – Gateways;
- Section 19.3 – Firewalls;
- Section 19.4 – Diodes.
- Section 19.5 – Data Import and Export; and
- Section 19.6 – Content Filtering.

Deploying Cross Domain Solutions

19.2.5. Consult the section on Firewalls in this chapter for devices used to control data flow in bi-directional gateways.

19.2.6. Consult the section on Diodes in this chapter for devices used to control data flow in uni-directional gateways.

19.2.7. Consult the Data Transfers and Content Filtering sections for requirements on appropriately controlling data flows in both bi-directional and uni-directional gateways

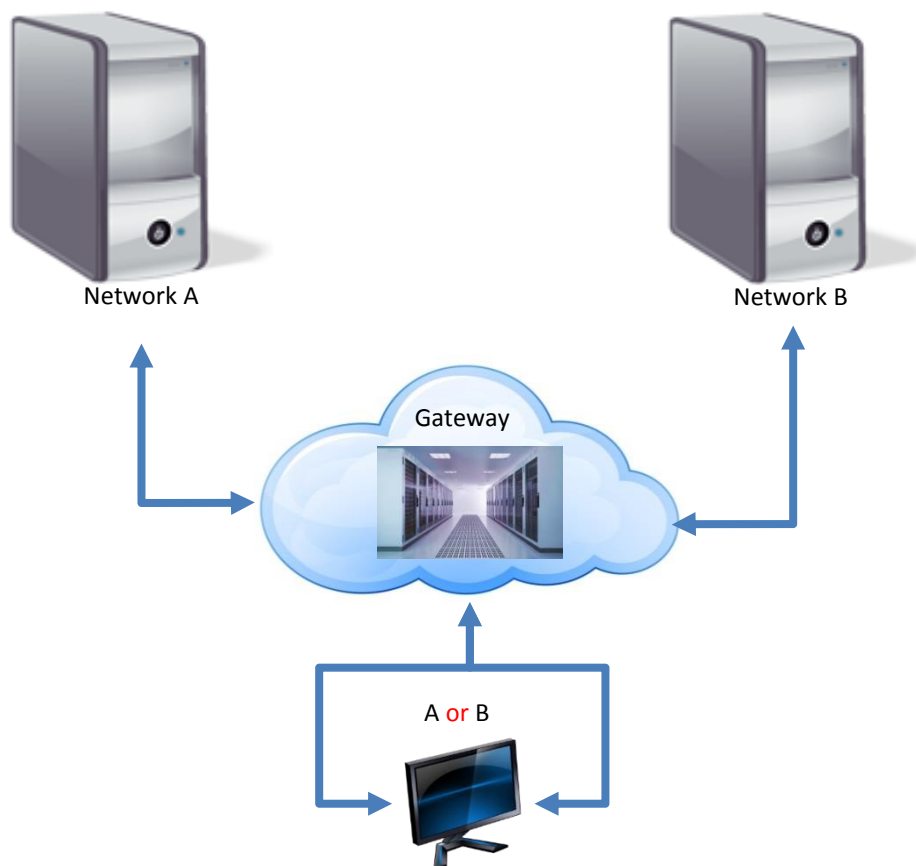
Types of gateways

19.2.8. This manual defines three types of gateways:

- access gateways;
- multilevel gateways; and
- transfer gateways.

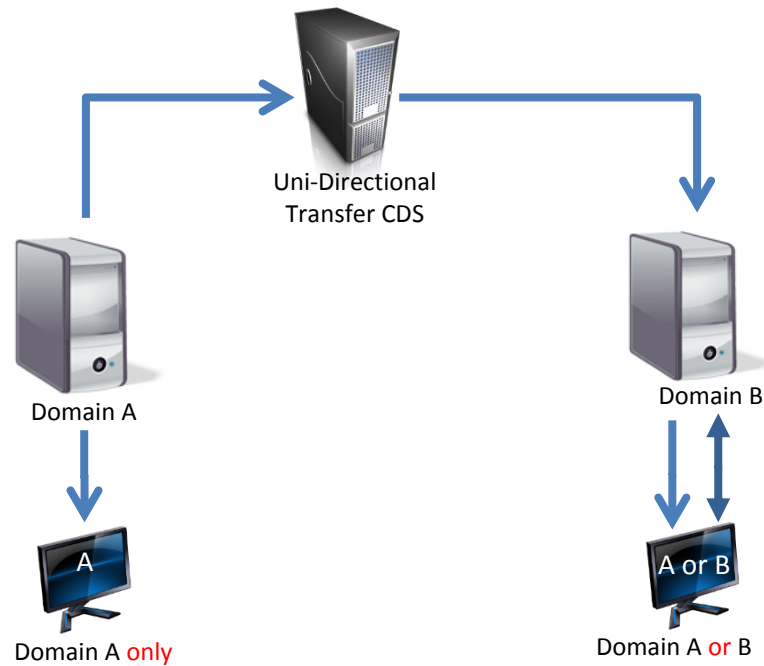
Access Gateway

19.2.9. An access gateway provides the system user with access to multiple security domains from a single device.

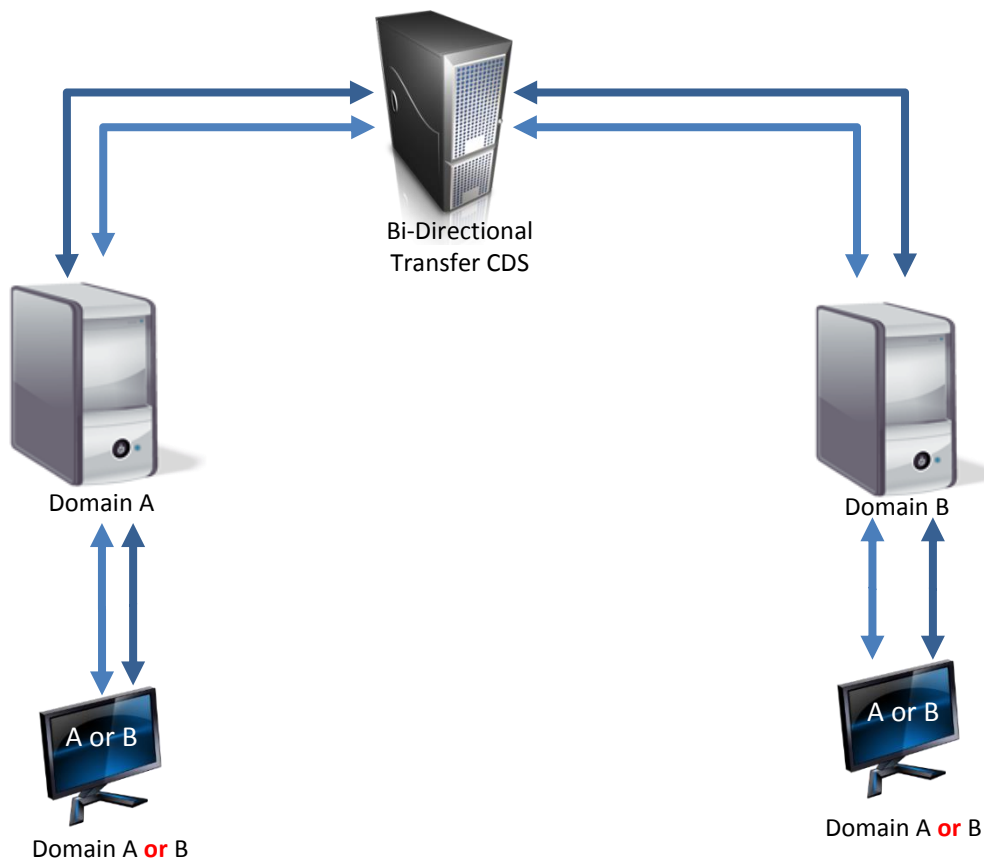


19.2.10. A transfer gateway facilitates the transfer of information, in one or multiple directions (low to high or high to low) between different security domains. A traditional gateway to the Internet is considered a form of transfer gateway.

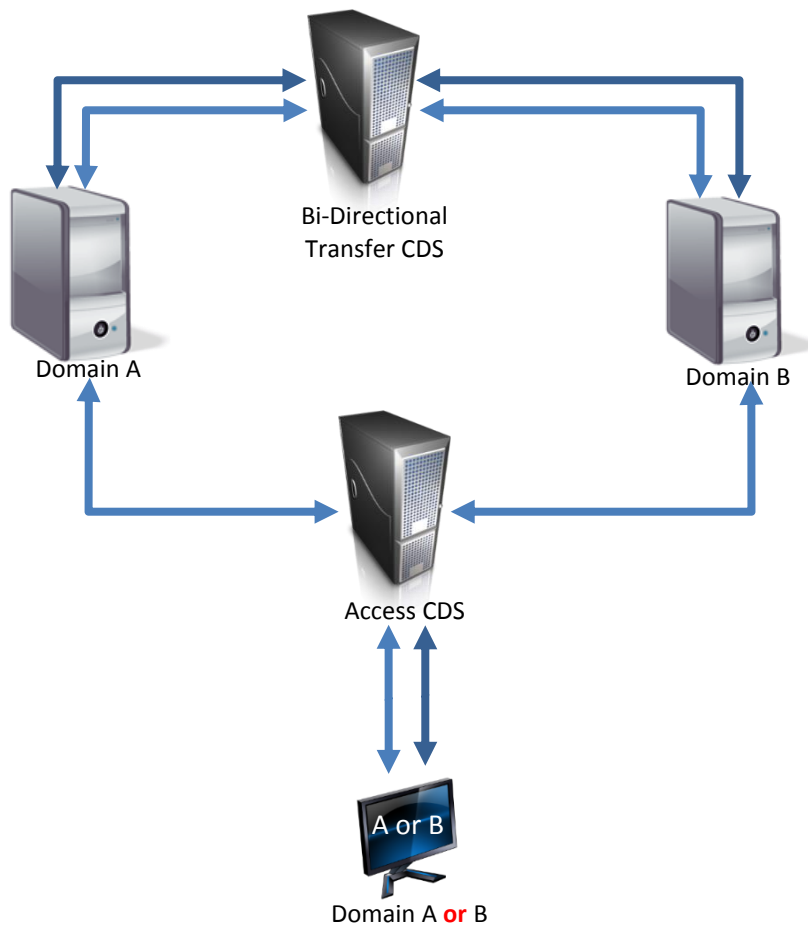
19.2.11. The following illustrates a Uni-Directional Transfer Cross Domain Solution.



19.2.12. A Bi-Directional Cross Domain Solution enables access, based on authorisations, to data at multiple classifications and releasability levels.



19.2.13. A Multi-Level Transfer Cross Domain Solution enables access, based on authorisations, to data at multiple classifications and releasability levels.



REFERENCES

19.2.14. Additional guidance can be found at:

Title	Publisher	Source
Information Assurance Guidance For Systems Based On A Security Real-Time Operating System Systems Security Engineering, Sse-100-1, 14 December 2005	NSA	http://www.nsa.gov/ia/files/SSE-100-1.pdf
Solving the Cross-Domain Conundrum, Colonel Bernard F. Koelsch United States Army, 2013	US Army War College	http://handle.dtic.mil/100.2/ADA589325
Client Side Cross-Domain Security, Microsoft Corporation June 2008	Microsoft	http://archive.msdn.microsoft.com/xdsecurity/wp/Release/ProjectReleases.aspx?ReleaseId=1157
A Risk-Based Approach To Cross-Domain Working	Detica, BAE Systems	https://www.baesystemsdetica.com/uploads/resources/Cyber - Risk Based Approach to v1.pdf

RATIONALE & CONTROLS

19.2.15. Gateway classification

19.2.15.R.01. Rationale

The trust level or classification of systems directs users and systems administrators to the appropriate handling instructions and level of protection required for those systems. This aids in the selection of systems controls.

19.2.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

For the purposes of this Manual, the CDS MUST be classified at the highest classification of connected domains.

19.2.16. Allowable gateways

19.2.16.R.01. Rationale

Connecting systems to the Internet attracts significant risk and so highly classified systems are prohibited from being *directly* connected to each other or to the Internet. If an agency wishes to connect a highly classified system to the Internet the connection will need to be cascaded through a system of a lesser classification that is approved to connect directly to the Internet.

19.2.16.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies connecting a TOP SECRET, SECRET OR CONFIDENTIAL network to any other network MUST implement a CDS.

19.2.16.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT implement a gateway permitting data to flow *directly* from:

- a TOP SECRET network to any network below SECRET;
- a SECRET network to an UNCLASSIFIED network; or
- a CONFIDENTIAL network to an UNCLASSIFIED network.

19.2.17. Implementing Cross Domain Solutions

19.2.17.R.01. Rationale

Connecting multiple sets of gateways and Cross Domain Solutions (CDS) increases the threat surface and, consequently, the likelihood and impact of a network compromise. When a gateway and a CDS share a common network, the higher security domain (such as a classified agency network) can be exposed to malicious activity, exploitation or denial of service from the lower security domain (such as the Internet).

19.2.17.R.02. Rationale

To manage this risk, CDS should implement products that have completed a high assurance evaluation, see Chapter 12 – Product Selection. The AISEP Evaluated Product List (EPL) includes products that have been evaluated in the high assurance scheme but is not an exhaustive list.

Where CDS are not listed on the AISEP EPL, the GCSB can provide guidance on product selection and implementation on request.

19.2.17.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

When designing and deploying a CDS, agencies MUST consult with the GCSB and comply with all directions provided.

19.2.17.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies connecting a typical gateway and a CDS to a common network MUST consult the GCSB on the impact to the security of the CDS and comply with all directions provided.

19.2.18. Separation of data flows**19.2.18.R.01. Rationale**

Gateways connecting highly classified systems to lower classified, or Internet connected systems need to design and implement physically separate paths to provide stronger control of information flows. Typically this is achieved through separate pathing and the use of diodes. Such gateways are generally restricted to process and communication only highly-structured formal messaging traffic.

19.2.18.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that all bi-directional gateways between TOP SECRET and SECRET networks, SECRET and less classified networks, and CONFIDENTIAL and less classified networks, have separate upward and downward paths which use a diode and physically separate infrastructure for each path.

19.2.19. Trusted Sources**19.2.19.R.01. Rationale**

Trusted sources are designated personnel who have the delegated authority to assess and approve the transfer or release of data or documents. Trusted sources may include security personnel within the agency such the CISO and the ITSM.

19.2.19.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Trusted sources MUST be:

- Individuals identified derived from business requirements and the result of a security risk assessment; and
- approved by the Accreditation Authority.

19.2.19.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Trusted sources MUST authorise all data to be exported from a security domain.

19.2.20. Operation of the Cross Domain Solution

19.2.20.R.01. Rationale

The highly sensitive nature of the data within cross domain solutions requires additional audit and logging for control, management, record and forensic purposes. This is in addition to the audit and logging requirements in Section 16.5 – Event Logging and Auditing.

19.2.20.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

All data exported from a security domain MUST be logged.

19.3. Firewalls

OBJECTIVE

19.3.1. Agencies operating bi-directional gateways implement firewalls and traffic flow filters to provide a protective layer to their networks in both discrete and virtual environments.

CONTEXT

Scope

19.3.2. This section covers information relating to filtering requirements for bi-direction gateways between networks of different security domains.

19.3.3. When a control specifies a requirement for a diode or filter the appropriate information can be found within Section 19.4 –Diodes and Section 19.6 – Content Filtering.

19.3.4. Additional information that also applies to topics covered in the section can be found in:

- Section 18.6 – Data Transfers;
- Section 19.5 – Data Import and Export;
- Chapter 12 – Product Security which provides advice on the selection of evaluated products; and
- Section 21.2 – Virtualisation.

Inter-connecting networks within an agency

19.3.5. When connecting networks accredited to the same classification and set of caveats within an agency the requirements of this section may not apply. When connecting networks accredited with different classifications or caveats within an agency the information in this section applies.

Connecting agency networks to the Internet

19.3.6. When connecting an agency network to the Internet, the Internet is considered an UNCLASSIFIED and insecure network.

REFERENCES

19.3.7. Further information on the Network Device Protection Profile (NDPP) and firewalls can be found at:

Title	Publisher	Source
Network Device Protection Profile (NDPP)	(US) National Information Assurance Partnership	http://www.niap-ccevs.org/pp/pp_nd_v1.0/
CPA Security Characteristic, IP Filtering Firewalls, Version 1.1	CESG	http://www.cesg.gov.uk/publications/Documents/sc_for_ip_filtering_firewalls.pdf

RATIONALE & CONTROLS

19.3.8. Firewall assurance levels

19.3.8.R.01. Rationale

The higher the required assurance level for a firewall, the greater the assurance that it provides an appropriate level of protection against an attacker. For example, an EAL2 firewall is certified to provide protection against a basic threat potential, whilst an EAL4 firewall is certified to provide protection against a moderate threat potential.

19.3.8.R.02. Rationale

If a uni-directional connection between two networks is being implemented only one gateway is necessary with requirements being determined based on the source and destination networks. However, if a bi-directional connection between two networks is being implemented both gateways will be configured and implemented with requirements being determined based on the source and destination networks.

19.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

All gateways MUST contain a firewall in both physical and virtual environments.

19.3.8.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST check the evaluation has examined the security enforcing functions by reviewing the target of evaluation/security target and other testing documentation.

19.3.8.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST use devices as shown in the following table for their gateway when connecting two networks of different classifications or two networks of the same classification but of different security domains.

Your network	Their network	You require	They require
RESTRICTED and below	UNCLASSIFIED	EAL4 firewall	N/A
	RESTRICTED	EAL2 firewall	EAL2 firewall
	CONFIDENTIAL	EAL2 firewall	EAL4 firewall
	SECRET	EAL2 firewall	EAL4 firewall
	TOP SECRET	EAL2 firewall	Consultation with GCSB
CONFIDENTIAL	UNCLASSIFIED	Consultation with GCSB	N/A
	RESTRICTED	EAL4 firewall	EAL2 firewall
	CONFIDENTIAL	EAL2 firewall	EAL2 firewall
	SECRET	EAL2 firewall	EAL4 firewall
	TOP SECRET	EAL2 firewall	Consultation with GCSB
SECRET	UNCLASSIFIED	Consultation with GCSB	N/A
	RESTRICTED	EAL4 firewall	EAL2 firewall
	CONFIDENTIAL	EAL4 firewall	EAL2 firewall
	SECRET	EAL2 firewall	EAL2 firewall
	TOP SECRET	EAL2 firewall	EAL4 firewall
TOP SECRET	UNCLASSIFIED	Consultation with GCSB	N/A
	RESTRICTED	Consultation with GCSB	EAL2 firewall
	CONFIDENTIAL	Consultation with GCSB	EAL2 firewall
	SECRET	EAL4 firewall	EAL2 firewall
	TOP SECRET	EAL4 firewall	EAL4 firewall

19.3.8.C.04. Control: System Classification(s): All Classifications; Compliance: MUST

The requirement to implement a firewall as part of gateway architecture MUST be met independently by both parties (gateways) in both physical and virtual environments.

Shared equipment DOES NOT satisfy the requirements of this control.

19.3.9. Firewall assurance levels for NZEO networks

19.3.9.R.01. Rationale

As NZEO networks are particularly sensitive, additional security measures need to be put in place when connecting them to other networks.

19.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST use a firewall of at least an EAL4 assurance level between an NZEO network and a foreign network in addition to the minimum assurance levels for firewalls between networks of different classifications or security domains.

19.3.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use a firewall of at least an EAL2 assurance level between an NZEO network and another New Zealand controlled network, in addition to the minimum assurance levels for firewalls between networks of different classifications or security domains.

19.4. Diodes

OBJECTIVE

19.4.1. Networks connected to one-way (uni-directional) gateways implement diodes in order to protect the higher classified system.

CONTEXT

Scope

19.4.2. This section covers information relating to filtering requirements for one-way gateways used to facilitate data transfers. Additional information that also applies to topics covered in the section can be found in:

- Section 18.6 – Data Transfers;
- Section 19.5 – Data Import and Export; and
- Chapter 12 – Product Security which provides advice on selecting evaluated products.

REFERENCES

19.4.3. Further information on the Evaluated Products List can be found at:

Title	Publisher	Source
Evaluated Products List (EPL)	AISEP	http://www.asd.gov.au/infosec/epl/index.php

RATIONALE & CONTROLS

19.4.4. Diode assurance levels

19.4.4.R.01. Rationale

A diode enforces one-way flow of network traffic thus requiring separate paths for incoming and outgoing data. As such, it is much more difficult for an attacker to use the same path to both launch an attack and release the information. Using diodes of higher assurance levels for higher classified networks provides an appropriate level of assurance to agencies that the specified security functionality of the product will operate as claimed.

19.4.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST use devices as shown in the following table for controlling the data flow of one-way gateways between networks of different classifications.

High network	Low network	You require
RESTRICTED	UNCLASSIFIED	EAL2 diode
CONFIDENTIAL	UNCLASSIFIED	high assurance diode
	RESTRICTED	high assurance diode
SECRET	UNCLASSIFIED	high assurance diode
	RESTRICTED	high assurance diode
	CONFIDENTIAL	high assurance diode
TOP SECRET	UNCLASSIFIED	high assurance diode
	RESTRICTED	high assurance diode
	CONFIDENTIAL	high assurance diode
	SECRET	high assurance diode

19.4.5. Diode assurance levels for NZEO networks

19.4.5.R.01. Rationale

As NZEO networks are particularly sensitive additional security measures are necessary when connecting them to other networks.

19.4.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST use a diode of at least an EAL4 assurance level between an NZEO network and a foreign network in addition to the minimum assurance levels for diodes between networks of different classifications.

19.4.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD use a diode of at least an EAL2 assurance level between an NZEO network and another New Zealand controlled network in addition to the minimum assurance levels for diodes between networks of different classifications.

19.4.6. Volume Checking**19.4.6.R.01. Rationale**

Monitoring the volume of data being transferred across a diode will ensure that it conforms to expectations. It can also alert the agency to potential malicious activity if the volume of data suddenly changes from the norm.

19.4.6.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies deploying a diode to control data flow within one-way gateways SHOULD monitor the volume of the data being transferred.

19.5. Data Import and Export

OBJECTIVE

19.5.1. Data is transferred through gateways in a controlled and accountable manner.

CONTEXT

Scope

19.5.2. This section covers the specific requirements relating to the movement of data between systems via gateways. Fundamental requirements of data transfers between systems can be found in Section 18.6 – Data Transfers. These fundamental requirements apply to gateways.

RATIONALE & CONTROLS

19.5.3. User responsibilities

19.5.3.R.01. Rationale

When users transfer data to or from a system they need to be aware of the potential consequences of their actions. This could include data spills of sensitive or classified data onto systems not accredited to handle the data, or the unintended introduction of malicious code to a system. Accordingly, users need to be held accountable for all data transfers they make.

19.5.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Users transferring data to and from a system MUST be held accountable for the data they transfer.

19.5.4. Data Transfer authorisation

19.5.4.R.01. Rationale

Users can help prevent information security incidents by:

- checking protective markings to ensure that the destination system is appropriate for the data being transferred;
- performing antivirus checks on data to be transferred to and from a system;
- following the processes and procedures for the transfer of data.

19.5.4.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

All data transferred to a system of a lesser sensitivity or classification MUST be approved by a trusted source.

19.5.5. Trusted sources

19.5.5.R.01. Rationale

Trusted sources include security personnel such as CISO, the ITSA, ITSMs and ITSOs.

19.5.5.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Trusted sources MUST be:

- a strictly limited list derived from business requirements and the result of a security risk assessment;
- where necessary an appropriate security clearance is held; and
- approved by the Accreditation Authority.

19.5.6. Import of data through gateways

19.5.6.R.01. Rationale

In order to ensure the continued functioning of systems it is important to constantly analyse data being imported. Converting data from one format into another can effectively destroy most malicious active content.

19.5.6.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

When agencies import data to a system through gateways, the data MUST be filtered by a product specifically designed for that purpose, including filtering malicious and active content.

19.5.6.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

When agencies import data to a system through gateways, full or partial audits of the event logs MUST be performed at least monthly.

19.5.6.C.03. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Agencies SHOULD convert data being imported at gateways into an alternative format before entering the network.

19.5.7. Export of data through gateways

19.5.7.R.01. Rationale

In order to ensure the continued integrity and confidentiality of data on an agency network, data MUST pass through a series of checks before it is exported onto systems of a lesser classification.

19.5.7.R.02. Rationale

Filtering content based on protective markings is an adequate method to protect the confidentiality of lesser classified material.

19.5.7.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD restrict the export of data to a system of a lesser classification by filtering data using at least protective marking checks.

19.5.8. Export of highly formatted textual data through gateways

19.5.8.R.01. Rationale

The security risks of releasing higher classified data are partially reduced when the data is restricted to highly formatted textual data. In such cases the data is less likely to contain hidden data and have classified content. Such data can be automatically scanned through a series of checks to detect classified content. Risk is further reduced when there is a gateway filter that blocks (rejects) the export of data classified above the classification of the network outside of the gateway, and logs are regularly reviewed to detect if there has been unusual usage or overuse.

19.5.8.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

When the export of highly formatted textual data occurs through gateways agencies MUST implement:

- checks for protective markings;
- data filtering performed by a product specifically designed for that purpose;
- data range and data type checks; and
- full or partial audits of the event logs performed at least monthly.

19.5.9. Export of other data through gateways

19.5.9.R.01. Rationale

Textual data which is not highly formatted can contain hidden data as well as having a higher classification due to the aggregated content. Risk is somewhat reduced by running additional automated checks on non-formatted data being exported, in addition to those checks for highly formatted textual data. Where a classification cannot be automatically determined, a human trusted source should make that determination.

19.5.9.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

When agencies export data, other than highly formatted textual data, through gateways, agencies MUST implement data filtering performed by a product specifically designed for that purpose.

19.5.9.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

When agencies do not perform audits of the complete data transfer logs at least monthly they MUST perform randomly timed audits of random subsets of the data transfer logs on a weekly basis.

19.5.9.C.03. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Where the classification cannot be determined automatically, a human trusted source SHOULD assess the classification of the data.

19.5.9.C.04. Control: System Classification(s): C, S, TS; Compliance: SHOULD

When the export of other data occurs through gateways agencies SHOULD perform audits of the complete data transfer logs at least monthly.

19.5.10. Preventing export of NZEO data to foreign systems

19.5.10.R.01. Rationale

NZEO networks are particularly sensitive and further security measures need to be put in place when connecting them to other networks.

19.5.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

To prevent the export of NZEO data to foreign systems, agencies MUST implement data filtering performed by a product specifically designed for that purpose.

19.5.10.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST undertake checks of protective markings and keywords before permitting data export.

19.5.11. Requirement to sign exported data

19.5.11.R.01. Rationale

Digitally signing data being exported, demonstrates authenticity and improves assurance that the data has not been altered in transit.

19.5.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

A trusted source MUST sign the data to be exported if the data is to be communicated over a network to which untrusted personnel or systems have access.

19.5.11.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure that the gateway verifies authority to release prior to the release of the data to be exported.

19.5.11.C.03. Control: System Classification(s): C, S, TS; Compliance: SHOULD

Agencies SHOULD use a product evaluated to at least an EAL4 assurance level for the purpose of data signing and signature confirmation.

19.6. Content Filtering

OBJECTIVE

19.6.1. The flow of data within gateways is examined and controls applied in accordance with the agency's security policy. To prevent unauthorised or malicious content crossing security domain boundaries.

CONTEXT

Scope

19.6.2. This section covers information relating to the use of content filters within bi-directional or one-way gateways in order to protect security domains.

19.6.3. Content filters reduce the risk of unauthorised or malicious content crossing a security domain boundary.

RATIONALE & CONTROLS

19.6.4. Limiting transfers by file type

19.6.4.R.01. Rationale

The level of security risk will be affected by the degree of assurance agencies can place in the ability of their data transfer filters to:

- confirm the file type by examination of the contents of the file;
- confirm the absence of malicious content;
- confirm the absence of inappropriate content;
- confirm the classification of the content; and
- handle compressed files appropriately.

Reducing the number of allowed file types reduces the number of potential vulnerabilities available for an attacker to exploit.

19.6.4.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST strictly define and limit the types of files that can be transferred based on business requirements and the results of a security risk assessment.

19.6.4.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD strictly define and limit the types of files that can be transferred based on business requirements and the results of a security risk assessment.

19.6.5. Blocking active content

19.6.5.R.01. Rationale

Many files are executable and are potentially harmful if activated by a system user. Many static file type specifications allow active content to be embedded within the file, which increases the attack surface.

19.6.5.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST block all executables and active content from entering a security domain.

19.6.5.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD block all executables and active content from being communicated through gateways.

19.6.6. Blocking suspicious data

19.6.6.R.01. Rationale

The definition of suspicious content will depend on the system's risk profile and what is considered normal traffic. The table below identifies some filtering techniques that can be used to identify suspicious data.

Technique	Purpose
Antivirus scan	Scans the data for viruses and other malicious code.
Data format check	Inspects data to ensure that it conforms to expected/permited format(s).
Data range check	Checks the data within each field to ensure that it falls within the expected/permited range.
Data type check	Inspects each file header to determine the file type.
File extension check	Checks file extensions to ensure that they are permited.
Keyword search	Searches data for keywords or 'dirty words' that could indicate the presence of classified or inappropriate material.
Metadata check	Inspects files for metadata that should be removed prior to release.
Protective marking check	Validates the protective marking of the data to ensure that it complies with the permited classifications and caveats.
Manual inspection	The manual inspection of data for suspicious content that an automated system could miss, which is particularly important for the transfer of image files, multi-media or content-rich files.

19.6.6.C.01. Control: **System Classification(s): All Classifications; Compliance: MUST**

Agencies MUST block, quarantine or drop any data identified by a data filter as suspicious until reviewed and approved for transfer by a trusted source other than the originator.

19.6.7. Content validation

19.6.7.R.01. Rationale

Content validation aims to ensure that the content received conforms to a defined, approved standard. Content validation can be an effective means of identifying malformed content, allowing agencies to block potentially malicious content. Content validation operates on a whitelisting principle, blocking all content except for that which is explicitly permitted. Examples of content validation include:

- ensuring numeric fields only contain numeric numbers;
- other fields operate with defined character sets;
- ensuring content falls within acceptable length boundaries;
- ensuring XML documents are compared to a strictly defined XML schema.

19.6.7.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST perform validation on all data passing through a content filter, blocking content which fails the validation.

19.6.7.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD perform validation on all data passing through a content filter, blocking content which fails the validation.

19.6.8. Content conversion and transformation

19.6.8.R.01. Rationale

Content/file conversion or file transformation can be an effective method to render potentially malicious content harmless by separating the presentation format from the data. By converting a file to another format, the exploit, active content and/or payload can often be removed or disrupted enough to be ineffective.

Examples of file conversion and content transformation to mitigate the threat of content exploitation include:

- converting a Microsoft Word document to a PDF file;
- converting a Microsoft PowerPoint presentation to a series of JPEG images;
- converting a Microsoft Excel spreadsheet to a Comma Separated Values (CSV) file; or
- converting a PDF document to a plain text file.

Some file types, such as XML, will not benefit from conversion. The conversion process should also be applied to any attachments or files contained within other files, for example, archive files or encoded files embedded in XML.

19.6.8.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD perform content/file conversion for all ingress or egress data transiting a security domain boundary.

19.6.9. Content sanitisation

19.6.9.R.01. Rationale

Sanitisation is the process of attempting to make potentially malicious content safe to use by removing or altering active content while leaving the original content as intact as possible. Sanitisation is not as secure a method of content filtering as conversion, though many techniques may be combined. Extraneous application and protocol data, including metadata, should also be inspected and filtered where possible. Examples of sanitisation to mitigate the threat of content exploitation include:

- removal of document properties information in Microsoft Office documents;
- removal or renaming of Javascript sections from PDF files;
- removal of metadata such as EXIF information from within JPEG files.

19.6.9.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD perform content/file sanitisation on suitable file types if content/file conversion is not appropriate for data transiting a security domain boundary.

19.6.10. Antivirus scans

19.6.10.R.01. Rationale

Antivirus scanning is used to prevent, detect and remove malicious software that includes computer viruses, worms, Trojans, spyware and adware.

19.6.10.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD perform antivirus scans on all content using up-to-date engines and signatures, using multiple different scanning engines.

19.6.11. Archive and container files

19.6.11.R.01. Rationale

Archive and container files can be used to bypass content filtering processes if the content filter does not handle the file type and embedded content correctly. The content filtering process should recognise archived and container files, ensuring the embedded files they contain are subject to the same content filtering measures as un-archived files.

19.6.11.R.02. Rationale

Archive files can be constructed in a manner which can pose a denial-of-service risk due to processor, memory or disk space exhaustion. To limit the risk of such an attack, content filters can specify resource constraints/quotas while extracting these files. If these constraints are exceeded the inspection is terminated, the content blocked and a security administrator alerted.

19.6.11.C.01. Control: **System Classification(s): All Classifications; Compliance: SHOULD**

Agencies SHOULD extract the contents from archive/container files and subject the extracted files to content filter tests.

19.6.11.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD perform controlled inspection of archive/container files to ensure that content filter performance or availability is not adversely affected.

19.6.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD block files that cannot be inspected and generate an alert or notification.

19.6.12. Whitelisting permitted content

19.6.12.R.01. Rationale

Creating and enforcing a whitelist of allowed content/files is a strong content filtering method. Allowing content that satisfies a business requirement only can reduce the attack surface of the system. As a simple example, an email content filter might allow only Microsoft Office documents and PDF files.

19.6.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST identify, create and enforce a whitelist of permitted content types based on business requirements and the results of a security risk assessment.

19.6.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD identify, create and enforce a whitelist of permitted content types based on business requirements and the results of a security risk assessment.

19.6.13. Data integrity

19.6.13.R.01. Rationale

Ensuring the authenticity and integrity of content reaching a security domain is a key component in ensuring its trustworthiness. It is also essential that content that has been authorised for release from a security domain is not modified or contains other data not authorised for release, for example by the addition or substitution of sensitive information.

19.6.13.R.02. Rationale

If content passing through a filter contains a form of integrity protection, such as a digital signature, the content filter should verify the content's integrity before allowing it through. If the content fails these integrity checks it may have been spoofed or tampered with and should be dropped or quarantined for further inspection.

Examples of data integrity checks include:

- an email server or content filter verifying an email protected by DKIM;
- a web service verifying the XML digital signature contained within a SOAP request;
- validating a file against a separately supplied hash;
- checking that data to be exported from the security domain has been digitally signed by the release authority.

19.6.13.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

If data is signed, agencies MUST ensure that the signature is validated before the data is exported.

19.6.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD verify the integrity of content where applicable, and block the content if verification fails.

19.6.14. Encrypted data**19.6.14.R.01. Rationale**

Encryption can be used to bypass content filtering if encrypted content cannot be subject to the same checks performed on unencrypted content. Agencies will need to consider the need to decrypt content, depending on:

- the security domain they are communicating with;
- whether the need-to-know principle is to be enforced;
- end-to-end encryption requirements; or
- any privacy and policy requirements.

19.6.14.R.02. Rationale

Choosing not to decrypt content poses a risk of encrypted malicious software communications and data moving between security domains. Additionally, encryption could mask the movement of information at a higher classification being allowed to pass to a security domain of lower classification, which could result in a data spill.

19.6.14.R.03. Rationale

Some systems allow encrypted content through external/boundary/perimeter controls to be decrypted at a later stage, in which case the content should be subject to all applicable content filtering controls after it has been decrypted.

19.6.14.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD decrypt and inspect all encrypted content, traffic and data to allow content filtering.

19.6.15. Monitoring data import and export**19.6.15.R.01. Rationale**

To ensure the continued confidentiality and integrity of systems and data, import and export processes should be monitored and audited.

19.6.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST use protective marking checks to restrict the export of data from each security domain, including through a gateway.

19.6.15.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

When importing data to each security domain, including through a gateway, agencies **MUST** audit the complete data transfer logs at least monthly.

19.6.16. Exception Handling

19.6.16.R.01. Rationale

Legitimate reasons may exist for the transfer of data that may be identified as suspicious according to the criteria established for content filtering. It is important to have an accountable and auditable mechanism in place to deal with such exceptions.

19.6.16.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies **SHOULD** create an exception handling process to deal with blocked or quarantined file types that may have a valid requirement to be transferred.

20. WORKING OFF-SITE

20.1. Agency owned Mobile Devices

OBJECTIVE

20.1.1. Classified information on mobile devices is protected from unauthorised disclosure.

CONTEXT

Scope

20.1.2. This section covers information relating to the use of agency owned mobile devices including, but not restricted to, mobile phones, smartphones, portable electronic devices, personal digital assistants, laptops, netbooks, tablet computers, and other portable Internet connected devices.

Trusted Operating Environments

20.1.3. A Trusted Operating Environment (TOE) provides assurance that every reasonable effort has been made to secure the operating system of a mobile device such that it presents a managed risk to an agency's information and systems. Any residual risks are explicitly accepted by the agency.

20.1.4. Special care is necessary when dealing with All-of-Government systems or systems that affect several agencies. Security measures that can be implemented to assist in the development of a TOE include:

- strong usage policies are in place;
- unnecessary hardware, software and operating system components are removed;
- unused or undesired functionality in software and operating systems is removed or disabled;
- anti-malware and other security software is installed and regularly updated;
- downloads of software, data or documents are limited or not permitted;
- installation of unapproved applications is not permitted;
- software-based firewalls limiting inbound and outbound network connections are installed;
- patching of installed the operating system and other software is current;
- each connection is authenticated (multi-factor) before permitting access to an agency network;
- both the user and mobile device are authenticated during the authentication process;
- mobile device configurations may be validated before a connection is permitted;
- privileged access from the mobile device to the agency network is not allowed;
- access to some data may not be permitted; and
- agency control of the mobile device may supersede any convenience aspects.

Treating workstations as mobile devices

20.1.5. When an agency issues a workstation for home-based work instead of a mobile device the requirements in this section apply equally to the issued workstation.

Devices with multiple operating states

20.1.6. Some mobile devices may have functionality to allow them to operate in either an unclassified state or a classified state. In such cases the mobile devices will need to be handled according to the state that it is being operated in at the time. For example, some devices can start-up in an unclassified mode or start-up in a cryptographically protected mode.

Bluetooth and Infra-Red Devices

20.1.7. Bluetooth and Infra-Red devices, such as keyboards, headsets and mice are subject to an additional set of risks. Refer to Chapter 11 – Communication Systems and Devices.

RATIONALE & CONTROLS

20.1.8. Mobile devices usage policy

20.1.8.R.01. Rationale

As mobile devices routinely leave the office environment and the physical protection it affords it is important that policies are developed to ensure that they are protected in an appropriate manner when used outside of controlled agency facilities.

20.1.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop a policy governing the use of mobile devices.

20.1.8.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT allow mobile devices to process or store TOP SECRET information unless explicitly approved by GCSB to do so.

20.1.8.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement a Mobile Device Management (MDM) solution.

20.1.9. Personnel awareness

20.1.9.R.01. Rationale

Mobile devices can have both a data and voice component capable of processing or communicating classified information. In such cases, personnel will need to be aware of the approved classification level for each function.

This includes Multi-Media Message Service (MMS) and Short Message Service (SMS) which are NOT appropriate for sensitive or classified information. Encryption should be considered.

20.1.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST advise personnel of the maximum permitted classifications for data and voice communications when using mobile devices.

20.1.9.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT use SMS or MMS for sensitive or classified communications.

20.1.10. Non-agency owned and controlled mobile devices

20.1.10.R.01. Rationale

Agencies need to retain control of any non-agency device that contains agency or government information. Non-agency devices are discussed in Section 20.4 – BYOD.

20.1.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST apply the full set of BYOD controls for devices NOT directly owned and controlled by the agency. These controls are detailed in Section 20.4 – BYOD.

20.1.11. Agency owned mobile device storage encryption

20.1.11.R.01. Rationale

Encrypting the internal storage and removable media of agency owned mobile devices will reduce the risk of data loss associated with a lost or stolen device. While the use of encryption may not be suitable to treat the device as an unclassified asset it will still present a significant challenge to a malicious actor looking to gain easy access to information stored on the device. To ensure that the benefits of encryption on mobile devices are maintained, users must not store passphrases, passwords, PINS or other access codes for the encryption software on, or with, the device.

Information on the use of encryption to reduce storage and physical transfer requirements is detailed in Section 17.1 – Cryptographic Fundamentals and 17.2 – Approved Cryptographic Algorithms.

20.1.11.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies unable to lower the storage and physical transfer requirements of a mobile device to an unclassified level through the use of encryption **MUST** physically transfer the device as a classified asset in accordance with the relevant handling instructions (refer to the PSM).

20.1.11.C.02. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Users **MUST NOT** store passwords, passphrases, PINs or other access codes for encryption on or with the mobile device on which data will be encrypted when the device is issued for normal operations.

20.1.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies unable to lower the storage and physical transfer requirements of a mobile device to an unclassified level through the use of encryption **SHOULD** physically transfer the device as a classified asset in accordance with the relevant handling instructions (refer to the PSM).

20.1.11.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies **SHOULD** encrypt classified information on all mobile devices using an Approved Cryptographic Algorithm.

20.1.11.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Pool or shared devices **SHOULD** be reissued with unique passwords, passphrases, PINs or other access codes for each separate issue or deployment.

20.1.12. Mobile device communications encryption

20.1.12.R.01. Rationale

The above approach cannot be used for communicating classified information over unsecured public infrastructure. If appropriate encryption is not available the mobile device will not be approved for communicating classified information.

20.1.12.R.02. Rationale

Note: This applies to information classified as RESTRICTED and above.

20.1.12.R.03. Rationale

Encryption does not change the class level of the information itself but allows reduced handling requirements to be applied.

20.1.12.C.01. Control: System Classification(s): R, C, S, TS; Compliance: MUST

Agencies MUST use encryption, on mobile devices communicating information over public network infrastructure, to lower handling instructions to be equivalent to those for unclassified networks.

20.1.13. Mobile device privacy filters

20.1.13.R.01. Rationale

Privacy filters can be applied to the screens of mobile devices to prevent onlookers from reading the contents off the screen of the device. This assists in mitigating a shoulder surfing or other oversight attack or compromise.

20.1.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD apply privacy filters to the screens of mobile devices.

20.1.14. Disabling Bluetooth functionality

20.1.14.R.01. Rationale

As Bluetooth provides little security for the information that is passed between devices and a number of exploits have been publicised, it SHOULD NOT be used on mobile devices. Refer to Chapter 11 – Communications Systems and Devices.

20.1.14.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT enable Bluetooth functionality on mobile devices.

20.1.14.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT enable Bluetooth functionality on mobile devices.

20.1.15. Configuration control

20.1.15.R.01. Rationale

Poorly controlled devices are more vulnerable to compromise and provide an attacker with a potential access point into agency systems. Although agencies may initially provide a secure device, the state of security may degrade over time. The agency will need to reevaluate the security of devices regularly to ensure their integrity.

20.1.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agency personnel MUST NOT disable security functions or security configurations on a mobile device once provisioned.

20.1.15.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD control the configuration of mobile devices in the same manner as devices in the agency's office environment.

20.1.15.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD prevent personnel from installing unauthorised applications on a mobile device once provisioned.

20.1.16. Maintaining mobile device security

20.1.16.R.01. Rationale

As mobile devices are not continually connected to ICT systems within an agency it is important that they are routinely returned to the agency so that patches can be applied and they can be tested to ensure that they are still secure.

Alternatively a mobile device management solution may implement policy checks and updates on connection to agency systems.

20.1.16.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure that mobile devices have security updates applied on a regular basis and are tested to ensure that the mobile devices are still secure.

20.1.16.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD conduct policy checks as mobile devices connect to agency systems.

20.1.17. Connecting mobile devices to the Internet

20.1.17.R.01. Rationale

During the period that a device is connected to the Internet, without a VPN connection, it is exposed to attacks. This period needs to be minimised to reduce the security risks. Minimising this period includes ensuring that system users do not connect directly to the Internet to access the Web between VPN sessions.

20.1.17.R.02. Rationale

A split tunnel VPN can allow access to an agency's systems from another network, including unsecured networks such as the Internet. If split tunnelling is enabled there is an increased security risk that the VPN connection is susceptible to attack from such networks.

20.1.17.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST disable split tunnelling when using a VPN connection from a mobile device to connect to an agency network.

20.1.17.C.02. Control: System Classification(s): C, S, TS; Compliance: SHOULD NOT

Agencies SHOULD NOT allow mobile devices to connect to the Internet except when temporarily connecting to facilitate the establishment of a VPN connection to an agency network.

20.1.18. Paging and message services

20.1.18.R.01. Rationale

Paging and message services do not appropriately encrypt information and cannot be relied upon for the communication of classified information.

20.1.18.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT use paging, MMS or SMS to communicate classified information.

20.1.19. Emergency destruction

20.1.19.R.01. Rationale

Where a mobile device carries classified information, or there is an increased risk of loss or compromise of the device, agencies will need to develop emergency destruction procedures. Such procedures should focus on the destruction of information on the mobile device and not necessarily the device itself. Many mobile devices used for classified information achieve this through the use of a cryptographic key zeroise or sanitisation function.

20.1.19.R.02. Rationale

Staff will need to understand the rationale and be familiar with emergency destruction procedures, especially where there is a higher probability of loss, theft or compromise.

20.1.19.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST**
Agencies **MUST** develop an emergency destruction plan for mobile devices.

20.1.19.C.02. Control: System Classification(s): All Classifications; Compliance: **MUST**
If a cryptographic zeroise or sanitise function is provided for cryptographic keys on a mobile device it **MUST** be used as part of the emergency destruction procedures.

20.1.19.C.03. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Agencies **SHOULD** ensure personnel are trained in emergency destruction procedures and are familiar with the emergency destruction plan.

20.1.20. Labelling

20.1.20.R.01. Rationale

Agencies may wish to affix an additional label to mobile devices asking finders of lost devices to hand it in to any New Zealand police station, or if overseas, a New Zealand embassy, consulate or high commission.

20.1.20.C.01. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Agencies **SHOULD** use soft labelling for mobile devices when appropriate to reduce their attractiveness value.

20.1.21. Unauthorised use of mobile devices

20.1.21.R.01. Rationale

Where mobile devices are issued to personnel for business purposes their use for private purposes should be governed by agency policy and agreed by the employee or contractor to whom the device is issued.

20.1.21.R.02. Rationale

Agencies must recognise the risks and costs associated with personal use of an agency device.

20.1.21.C.01. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Agencies **SHOULD** develop a policy to manage the non-business or personal use of an agency owned device.

20.1.21.C.02. Control: System Classification(s): All Classifications; Compliance: **SHOULD NOT**
Mobile devices **SHOULD NOT** be used other than by personnel specifically authorised by the agency.

20.2. Working Outside the Office

OBJECTIVE

20.2.1. Classified information on mobile devices is not accessed from public or insecure locations.

CONTEXT

Scope

20.2.2. This section covers information on accessing classified information using mobile devices from unsecured locations outside the office and home environments. This section does not apply to working from home; requirements relating to home-based work are outlined in Section 20.3 – Working From Home. Further information on the use of mobile devices can be found in Section 20.1 – Agency Owned Mobile Devices.

RATIONALE & CONTROLS

20.2.3. Working outside the office

20.2.3.R.01. Rationale

As the security risk relating to specific targeting of mobile devices capable of processing highly classified information is high, these mobile devices cannot be used outside of facilities certified to an appropriate level to allow for their use. In addition, as agencies have no control over public locations including, but not limited to, such locations as public transport, transit lounges, hotel lobbies, and coffee shops, mobile devices are not approved to process classified information as the security risk of classified information being overheard or observed is considered to be too high in such locations.

20.2.3.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT allow personnel to access or communicate classified information on mobile devices outside of secured areas unless there is a reduced chance of being overheard or having the screen of the device observed.

20.2.3.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies allowing personnel to access or communicate classified information outside of the office SHOULD NOT allow personnel to do so in public locations (e.g. public transport, transit lounges, hotel lobbies and coffee shops).

20.2.4. Carrying mobile devices

20.2.4.R.01. Rationale

Mobile devices used outside the office are frequently transferred through areas not certified to process the classified information on the device. Mechanisms need to be put in place to protect the information stored on those devices.

20.2.4.R.02. Rationale

When agencies apply encryption to mobile devices to reduce their physical transfer requirements it is only effective when the encryption function of the device is not authenticated. In most cases this will mean the mobile device will be in an unpowered state (i.e. not turned on), however, some devices are capable of deauthenticating the cryptography when it enters a locked state after a predefined timeout period. Such mobile devices can be carried in a locked state in accordance with reduced physical transfer requirements based on the assurance given in the cryptographic functions.

20.2.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure mobile devices are carried in a secured state when not being actively used, by:

- power off; or
- power on but pass code enabled.

20.2.5. Using mobile devices

20.2.5.R.01. Rationale

Mobile devices are portable in nature and can be easily stolen or misplaced. It is strongly advised that personnel do not leave mobile devices unattended at any time.

20.2.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

When in use mobile devices MUST be kept under continual direct supervision.

20.2.6. Travelling with mobile devices

20.2.6.R.01. Rationale

If personnel place mobile devices or media in checked-in luggage when travelling they lose control over the devices. Such situations provide an opportunity for mobile devices to be stolen or tampered with by an attacker.

20.2.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

When travelling with mobile devices and media, personnel MUST retain control over them at all times including by not placing them in checked-in luggage or leaving them unattended.

20.2.6.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Travelling personnel requested to decrypt mobile devices for inspection by customs personnel or from whom mobile devices are taken out of sight by customs personnel MUST report the potential compromise of classified information or the device to an ITSM as soon as possible.

20.3. Working From Home

OBJECTIVE

20.3.1. Personnel working from home protect classified information in the same manner as in the office environment.

CONTEXT

Scope

20.3.2. This section covers information on accessing classified information using mobile devices from a home environment in order to conduct home-based work. Further information on the use of mobile devices can be found in Section 20.1 – Agency Owned Mobile Devices.

The use of workstations instead of mobile devices

20.3.3. Where an agency chooses to issue a workstation for home-based work instead of a mobile device, the requirements for mobile devices within Section 20.1 – Agency Owned Mobile Devices, equally apply to the workstation that is used.

RATIONALE & CONTROLS

20.3.4. Storage requirements

20.3.4.R.01. Rationale

All mobile devices have the potential to store classified information and therefore need protection against loss and compromise.

20.3.4.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that when mobile devices are not being actively used they are secured in accordance with the minimum physical security requirements as stated in the PSM.

20.3.5. Processing requirements

20.3.5.R.01. Rationale

When agencies consider allowing personnel to work from a home environment they need to be aware that implementing physical security measures may require modifications to the person's home, or the provision of approved containers or secure storage units at the expense of the agency.

20.3.5.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure that the area within which mobile devices are used meets the minimum physical security requirements as stated in the PSM.

20.4. Non-Agency Owned Devices and Bring Your Own Device (BYOD)

OBJECTIVE

20.4.1. Where an Agency permits personnel to supply their own mobile devices (such as smartphones, tablets and laptops), Official Information and agency information systems are protected to a level equivalent to an agency provided and managed office environment.

CONTEXT

Scope

20.4.2. This section provides information on the use and security of **non-agency owned or provided** mobile devices when used for official business. This is commonly known as Bring Your Own Device (BYOD). The use of agency owned devices is described earlier in Section 20.1

20.4.3. In the context of this section, a BYOD Network is any agency owned or provided network dedicated to BYOD. A BYOD Network is usually within an agency's premises but does NOT include networks and related services provided by commercial telecommunication or other technology providers.

20.4.4. BYOD will introduce a wide range of risks, including information and privacy risks, to an organisation, in addition to the existing ICT risks and threats. Agencies will need to carefully examine and consider the security, privacy, governance, assurance and compliance risks and implications of BYOD.

20.4.5. Mobile devices are a "soft" target for malware and cybercrime providing a further attack channel or vector for organisational ICT infrastructures and networks. Risks fall principally into the following categories:

- Data exfiltration and theft;
- Data tampering;
- Data loss;
- Malware;
- System outages and Denial of Service; and
- Increased incident management and recovery costs.

REFERENCES

Title	Publisher	Source
Risk Management of Enterprise Mobility including Bring Your Own Device	ASD	http://www.asd.gov.au/publications/csocprotect/Enterprise_Mobility_BYOD.pdf
End User Devices Security and Configuration Guidance	CESG	https://www.gov.uk/government/collections/end-user-devices-security-guidance

RATIONALE & CONTROLS

20.4.6. Risk Assessment

20.4.6.R.01. Rationale

Commonly termed “Bring Your Own Device” (BYOD), personal use of mobile computing in an organisational environment is widespread and personnel have become accustomed to the use of a variety of personal mobile devices. BYOD can have many advantages for an agency and for personnel. At the same time, BYOD will introduce a range of new information security risks and threats and may exacerbate existing risks.

20.4.6.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST undertake a risk assessment and implement appropriate controls BEFORE implementing a BYOD Policy and permitting the use of BYOD.

20.4.6.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST take an integrated approach to BYOD security, covering policy, training, support, systems architecture, security, systems management, change management, incident detection & management and business continuity.

20.4.7. Applicability and Usage

20.4.7.R.01. Rationale

BYOD introduces number of additional risks and attack vectors to agency systems. Not all BYOD risks can be fully mitigated with technologies available today. It is therefore important that, where feasible, all the controls specified in this section are implemented.

20.4.7.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

BYOD MUST is permitted ONLY for agency information systems up to and including RESTRICTED.

20.4.7.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

BYOD MUST NOT be used for CONFIDENTIAL, SECRET or TOP SECRET systems.

20.4.8. Technical Controls

20.4.8.R.01. Rationale

“Jail-Breaking” and “rooting” are terms applied to devices where operating systems controls have been by-passed to allow installation of alternate operating systems or software applications that are not otherwise permitted. This is a risky practice and can create opportunities for device compromise. Users may wish to alter settings to allow the download of personal apps. This can result in security setting violations.

20.4.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Devices that have been “jail-broken”, “rooted” or have settings violations MUST NOT be used for any agency business or be allowed to connect to any agency systems UNLESS this been specifically authorised.

20.4.9. BYOD Policy

20.4.9.R.01. Rationale

Technical controls fall into two categories: organisational systems and device controls. Protection for organisational systems will start with a risk assessment which guides the development of a secure architecture to support BYOD operations. Additional controls will need to be applied to individual devices. The privacy of user data should be considered. A user policy is essential.

20.4.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies may identify additional policy provisions and controls that are required, based on their assessment of risk. Agencies MUST implement the additional controls and protocols before implementing BYOD.

20.4.9.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST implement a BYOD acceptable use policy, agreed and signed by each person using a BYOD device.

20.4.9.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

The agency's policy MUST clearly establish eligibility of personnel for participation in the agency BYOD scheme.

20.4.9.C.04. Control: System Classification(s): All Classifications; Compliance: MUST

Personnel MUST have written authorisation (usually managerial approval) before a connection is enabled (on-boarding).

20.4.9.C.05. Control: System Classification(s): All Classifications; Compliance: MUST

Written authorisation MUST include the nature and extent of agency access approved, considering:

- time, day of the week;
- location; and
- local or roaming access.

20.4.9.C.06. Control: System Classification(s): All Classifications; Compliance: MUST

Procedures MUST be established for removal of agency installed software and any agency data when the user no longer has a need to use BYOD, is redeployed or ceases employment (off-boarding).

20.4.9.C.07. Control: System Classification(s): All Classifications; Compliance: MUST

Standard Operating Procedures for the agency's BYOD network MUST be established.

20.4.9.C.08. Control: System Classification(s): All Classifications; Compliance: MUST

Provision MUST be made for contractors and other authorised non-employees. It is at the agency's discretion whether this activity is permitted. The risk assessment MUST reflect this factor.

20.4.9.C.09. Control: System Classification(s): All Classifications; Compliance: MUST
Ownership of data on BYOD devices MUST be clearly articulated and agreed.

20.4.9.C.010. Control: System Classification(s): All Classifications; Compliance: MUST
Agency policies MUST clearly articulate the separation between corporate support and where individuals are responsible for the maintenance and support of their own devices.

20.4.9.C.011. Control: System Classification(s): All Classifications; Compliance: MUST
Agency policies MUST clearly articulate the acceptable use of any GPS or other tracking capability.

20.4.9.C.012. Control: System Classification(s): All Classifications; Compliance: MUST
Individual responsibility for the cost of any BYOD device and its accessories MUST be agreed.

20.4.9.C.013. Control: System Classification(s): All Classifications; Compliance: MUST
Individual responsibility for replacement in the event of loss or theft MUST be agreed.

20.4.9.C.014. Control: System Classification(s): All Classifications; Compliance: MUST
Individuals MUST be responsible for the installation and maintenance of any mandated BYOD-based firewalls and anti-malware software and for implementing operating system updates and patches on their device.

20.4.9.C.015. Control: System Classification(s): All Classifications; Compliance: MUST
The procedures for purchasing and installing business related applications on the mobile devices MUST be specified and agreed.

20.4.9.C.016. Control: System Classification(s): All Classifications; Compliance: MUST
The responsibility for payment of voice and data plans and roaming charges MUST be specified.

20.4.10. BYOD Infrastructure and System Controls

20.4.10.R.01. Rationale

The use of BYOD presents increased risk and threat to agency systems. Changes to an agency's security architecture are necessary in order to minimise and manage the increased risk and threat to agency systems, information and information privacy.

20.4.10.R.02. Rationale

It is important that the principles of separation and segregation are applied to any system architecture or design to assist in the management of risk in BYOD systems.

20.4.10.R.03. Rationale

BYOD devices will seek to establish multiple connections through Wi-Fi "hot spots", Bluetooth connection and simultaneous internet and cellular connections. This behaviour creates multiple simultaneous "back channels" which can provide attack vectors for malicious activities and is considered to be high risk.

20.4.10.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

A security architectural review MUST be undertaken by the agency before allowing BYOD devices to connect to agency systems.

20.4.10.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

The BYOD network segment MUST be segregated from other elements of the agency's network.

20.4.10.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST architecturally separate guest and public facing networks from BYOD networks.

20.4.10.C.04. Control: System Classification(s): All Classifications; Compliance: MUST

Network policies and authentication mechanisms MUST be configured to allow access to agency resources ONLY through the BYOD network segment.

20.4.10.C.05. Control: System Classification(s): All Classifications; Compliance: MUST

Access to internal resources and servers MUST be carefully managed and confined to only those services for which there is a defined and properly authorised business requirement.

20.4.10.C.06. Control: System Classification(s): All Classifications; Compliance: MUST

Wireless access points used for access to agency networks MUST be implemented and secured in accordance with the directions in this manual (See Section 18.2 – Wireless Local Area Networks).

20.4.10.C.07. Control: System Classification(s): All Classifications; Compliance: MUST

Bluetooth on BYOD devices MUST be disabled while within designated secure areas on agency premises.

20.4.10.C.08. Control: System Classification(s): All Classifications; Compliance: MUST
Access Controls MUST be implemented in accordance with Chapter 16 – Access Control.

20.4.10.C.09. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST maintain a list of permitted operating systems, including operating system version numbers, for BYOD devices.

20.4.10.C.010. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST check each BYOD device for malware and sanitise the device appropriately before installing agency software or operating environments.

20.4.10.C.011. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST check each BYOD device for malware and sanitise the device appropriately before permitting access to agency data.

20.4.10.C.012. Control: System Classification(s): All Classifications; Compliance: MUST
BYOD MUST have a Mobile Device Management (MDM) solution implemented with a minimum of the following enabled:

- The MDM is enabled to “wipe” devices of any agency data if lost or stolen;
- If the MDM cannot discriminate between agency and personal data, all data, including personal data, is deleted if the device is lost or stolen;
- The MDM is capable of remotely applying agency security configurations for BYOD devices;
- Mobile device security configurations are validated (health check) by the MDM before a device is permitted to connect to the agency’s systems;
- “Jail-broken”, “rooted” or settings violations MUST be detected and isolated;
- “Jail-broken” devices are NOT permitted to access agency resources;
- Access to agency resources is limited until the device and/or user is fully compliant with policy and SOPs;
- Auditing and logging is enabled; and
- Changes of Subscriber Identity Module (SIM) card are monitored to allow remote blocking and wiping in the event of theft or compromise.

20.4.10.C.013. Control: System Classification(s): All Classifications; Compliance: MUST
Appropriate intrusion detection systems MUST be implemented.

20.4.10.C.014. Control: System Classification(s): All Classifications; Compliance: MUST
Continuous monitoring MUST be established to detect actual or potential security compromises or incidents from BYOD devices. Refer also to Chapter 6.

20.4.10.C.015. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST maintain a list of approved cloud applications that may be used on BYOD devices.

20.4.10.C.016. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST block the use of unapproved cloud applications for processing any agency or organisational data.

20.4.10.C.017. Control: System Classification(s): All Classifications; Compliance: MUST NOT

BYOD devices MUST NOT be permitted direct connection to internal hosts, including all other devices on the local network.

20.4.10.C.018. Control: System Classification(s): All Classifications; Compliance: MUST NOT

BYOD devices connecting to guest and public facing networks MUST NOT be permitted access to the corporate network other than through a VPN over the Internet.

20.4.10.C.019. Control: System Classification(s): All Classifications; Compliance: SHOULD

Bluetooth on BYOD devices SHOULD be disabled while within agency premises and while accessing agency systems and data.

20.4.10.C.020. Control: System Classification(s): All Classifications; Compliance: SHOULD

BYOD devices and systems SHOULD use Multifactor (at least two-factor) authentication to connect to agency systems and prior to being permitted access to agency data.

20.4.11. Wireless IDS / IPS systems**20.4.11.R.01. Rationale**

Normal Aps will automatically associate with the strongest signal and associated Access Point (AP). A rogue AP may belong to another organisation in an adjacent building, contractor, customer, supplier or other visitor. Unauthorised Aps can be installed for malicious purposes.

20.4.11.R.02. Rationale

Wireless IDS / IPS systems have the ability to detect rogue wireless AP's by channel, MAC address, frequency band and SSID. They can continuously monitor wireless networks and detect and block denial-of-service and man-in-the-middle wireless attacks. Establishing baselines of known authorised and unauthorised devices and AP's will assist in detecting and isolating any rogue devices and AP's.

20.4.11.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST implement a wireless IDS /IPS on BYOD wireless networks.

20.4.11.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST implement rogue AP and wireless "hot spot" detection and implement appropriate response procedures.

20.4.11.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD conduct a baseline survey to identify:

- Known and authorised devices and AP's; and
- Known and unauthorised devices and AP's.

20.4.12. BYOD Device Controls

20.4.12.R.01. Rationale

Mobile devices are susceptible to loss, theft and being misplaced. These devices can be easily compromised when out of the physical control of the authorised user or owner. To protect agency systems it is important that BYOD devices are also secured and managed on an ongoing basis.

20.4.12.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Any agency data exchanged with the mobile device MUST be encrypted in transit (See Chapter 17 – Cryptography).

20.4.12.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Any agency data stored on the device MUST be encrypted (including keys, certificates and other essential session establishment data).

20.4.12.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

The use of virtual containers, sandboxes, wraps or similar mechanisms on the mobile device MUST be established for each authorised session for any organisational data. These virtual containers MUST be non-persistent and be removed at the end of each session.

20.4.12.C.04. Control: System Classification(s): All Classifications; Compliance: MUST

Any sensitive agency data MUST be removed/securely deleted, or encrypted at the end of a session.

20.4.12.C.05. Control: System Classification(s): All Classifications; Compliance: MUST

Connections to the agency network MUST be time limited to avoid leaving a session “logged on”.

20.4.12.C.06. Control: System Classification(s): All Classifications; Compliance: MUST

Communications between the mobile device and the agency network MUST be established through a Virtual Private Network (VPN).

20.4.12.C.07. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST disable split-tunnelling when using a BYOD to connect to an agency network (See Section 20.1.17 – Agency Owned Mobile Devices).

20.4.12.C.08. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST disable the ability for a BYOD device to establish simultaneous connections (e.g. wireless and cellular) when connected to an agency’s network.

20.4.12.C.09. Control: System Classification(s): All Classifications; Compliance: MUST

The use of passwords or PINs to unlock the BYOD device MUST be enforced in addition to authentication mechanisms agency access.

20.4.12.C.010. Control: System Classification(s): All Classifications; Compliance: MUST

Device passwords MUST be distinct from any agency access and authentication passwords.

20.4.12.C.011. Control: System Classification(s): All Classifications; Compliance: MUST

BYOD passwords MUST be distinct from other fixed or mobile agency network passwords (See Section 16.1 – Identification and Authentication for details on password requirements).

20.4.13. Additional Controls**20.4.13.R.01. Rationale**

There are many new devices and operating system versions being frequently released. It may not be feasible or cost-effective for an agency to support all combinations of device and operating system.

20.4.13.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD compile a list of approved BYOD devices and operating systems for the guidance of staff.

20.4.13.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD consider the implementation of Data Loss Prevention (DLP) technologies.

20.4.13.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD consider the use of bandwidth limits as a means of controlling data downloads and uploads.

20.4.13.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD take legal advice on the provisions in their BYOD policy.

21. ENTERPRISE SYSTEMS SECURITY

21.1. Cloud Computing

OBJECTIVE

21.1.1. Cloud systems risks are identified and managed and that Official Information and agency information systems are protected in accordance with Cabinet Directives, the NZISM, the New Zealand Classification System and with other government security requirements and guidance.

CONTEXT

Terminology

21.1.2. Terminology and definitions of cloud models and services used in this section are consistent with NIST Special Publication 800-145, The NIST Definition of Cloud Computing, dated September 2011 (see table of References below).

21.1.3. A fundamental construct in the management of risk in cloud environment is that of Trust Zones and Trust Boundaries. A Trust Zone is a zoning construct based on levels of trust, classification and essential information security. A Trust Boundary is the interface between two or more Trust Zones. Trust Zones use the principles of separation and segregation to manage sensitive information assets and ensure security policies are consistently applied to all assets in a particular trust Zone. Refer also to Section 21.2 – Virtualisation.

Mandates and Requirements

21.1.4. In August 2013, the Government introduced their approach to cloud computing, establishing a 'cloud first' policy and an all-of-government direction to cloud services development and deployment. This is enabled by the Cabinet Minute [CAB Min (13) 37/6B].

21.1.5. Under the 'cloud first' policy state service agencies are expected to adopt approved cloud services either when faced with new procurements, or an upcoming contract extension decision.

21.1.6. In October 2013 the Government approved the GCIO risk and assurance framework for cloud computing, which agencies must follow when they are considering using cloud services [CAB Min (13) 37/6B]. It also directs that no data classified above RESTRICTED should be held in a *public* cloud, whether it is hosted onshore or offshore.

21.1.7. It is important to note that although agencies can outsource **responsibility** to a service provider for implementing, managing and maintaining security controls, they cannot outsource their **accountability** for ensuring their data is appropriately protected.

Background

21.1.8. The adoption of cloud technologies and services, the hosting of critical data in the cloud and the risk environment requires that agencies exercise caution. Many cloud users are driven by the need for performance, scalability, resource sharing and cost saving so a comprehensive risk assessment is essential in identifying and managing jurisdictional, sovereignty, governance, technical and security risks.

21.1.9. Typically agencies and other organisations start with a small, private cloud, allowing technical and security architectures, management processes and security controls to be developed and tested and gain some familiarity with cloud technologies and processes. These organisations then progress by using non-critical data, for example email, and other similar applications, in a hybrid, private or public cloud environment.

21.1.10. There are a number of technical risks associated with cloud computing, in addition to the existing risks inherent in organisational systems. Attention must also be paid to the strategic, governance and management risks of cloud computing. Security architecture and security controls also require careful risk assessment and consideration.

21.1.11. Cloud service providers will invariably seek to limit services, liability, compensation or penalties through carefully worded service contracts, which may present particular risks.

21.1.12. Much has been made of the operational cost savings related to cloud technologies, particularly a lower cost of operating. Less obvious are the risks and related cost of managing risk to an acceptable level. It is important to note that short term overall cost increases may, in some cases, be attributed to the adoption of cloud technologies and architectures.

21.1.13. Some valuable work in mapping the cloud risk landscape has been undertaken by such organisations as the Cloud Security Alliance, the US National Institute of Standards and Technology (NIST), the UK's Cloud Industry Forum and the European Network and Information Security Agency (ENISA). It is important to note that the extent of the risk landscape continues to evolve and expand.

Scope

21.1.14. This section provides information and some guidance on the risks associated with cloud computing, its implementation and ongoing use. Some controls are specified but agencies will necessarily undertake their own comprehensive risk assessment and select controls to manage those risks.

REFERENCES

21.1.15. While NOT an exhaustive list, further information on Cloud can be found at:

Title	Publisher	Source
Cabinet Minute of Decision – CAB Min (12) 29/8A – ‘Cloud First’ Policy	Cabinet Office	http://ict.govt.nz/assets/Uploads/Documents/CabMin12-cloud-computing.pdf
Cabinet Minute of Decision – CAB Min (13) 37/6B – Cloud Computing Risk and Assurance Framework	Cabinet Office	http://ict.govt.nz/assets/Cabinet-Papers/Cab-Minute-Cloud-Computing-Risk-and-Assurance-Framework-Oct-2013.pdf
All-of-government cloud computing approach	Government Chief Information Officer	http://ict.govt.nz/programmes/government-approach/
Requirements for Cloud Computing	Government Chief Information Officer	http://ict.govt.nz/guidance-and-resources/requirements-for-cloud-computing/
Cloud Computing: Security and Privacy Considerations	Government Chief Information Officer	http://ict.govt.nz/assets/ICT-System-Assurance/Cloud-Computing-Information-Security-and-Privacy-Considerations-FINAL2.pdf
Risk Assessment Process: Information Security	Government Chief Information Officer	http://ict.govt.nz/assets/ICT-System-Assurance/Risk-Assessment-Process-Information-Security.pdf
Government Use of Offshore Information and Communication Technologies (ICT) Service Providers – Advice on Risk Management April 2009	State Services Commission	http://ict.govt.nz/assets/ICT-System-Assurance/offshore-ICT-service-providers-april-2009.pdf
Cloud Computing a Guide to Making the Right Choices – February 2013	Office of the Privacy Commissioner (OPC)	http://privacy.org.nz/assets/Files/Brochures-and-pamphlets-and-pubs/OPC-Cloud-Computing-guidance-February-2013.pdf
Cloud Computing Security Considerations	Australian Signals Directorate (ASD)	http://www.dsd.gov.au/infosec/cloudsecurity.htm
Cloud Computing Policy and Guidance	Australian Government Information Management Office (AGIMO)	http://agict.gov.au/policy-guides-procurement/cloud

Title	Publisher	Source
Cloud Control Matrix V3.0	Cloud Security Alliance (CSA)	https://cloudsecurityalliance.org/medi a/news/csa-releases-ccm-version-3/
Security Guidance for Critical Areas of Focus in Cloud Computing V3.0	CSA	http://www.cloudsecurityalliance.org/guidance
Top Threats to Cloud Computing	CSA	http://www.cloudsecurityalliance.o rg/topthreats.html
Governance, Risk Management and Compliance Stack	CSA	http://www.cloudsecurityalliance.org/grcstack.html
Security & Resilience in Governmental Clouds - Making an informed decision	The European Network and Information Security Agency (ENISA)	http://www.enisa.europa.eu/activities /risk-management/emerging-and-future-risk/deliverables/security-and-resilience-in-governmental-clouds
Cloud Computing Information Assurance Framework	ENISA	http://www.enisa.europa.eu/activities /risk-management/files/deliverables/cloud-computing-information-assurance-framework
Cloud Computing Security Risk Assessment	ENISA	http://www.enisa.europa.eu/activities /risk-management/files/deliverables/cloud-computing-risk-assessment
Critical Cloud Computing – A CIIP perspective on cloud computing services	ENISA	www.enisa.europa.eu/activities/Resilie nce-and-CIIP/cloud-computing/critical-cloud-computing/at_download/fullReport
Guidelines on Security and Privacy in Public Cloud Computing ,Special Publication 800-144	Computer Security Division, Information Technology Laboratory, National Institute of Standards and Technology (NIST)	http://csrc.nist.gov/publications/nistpu bs/800-144/SP800-144.pdf
The NIST Definition of Cloud Computing , Special Publication 800-145	NIST	http://csrc.nist.gov/publications/nistpu bs/800-145/SP800-145.pdf
Cloud Computing Synopsis and Recommendations, NIST Special Publication 800-146	NIST	http://csrc.nist.gov/publications/nistpu bs/800-146/sp800-146.pdf

Title	Publisher	Source
Cloud Computing Standards Roadmap, NIST Special Publication 500-291	NIST	http://www.nist.gov/itl/cloud/upload/NIST_SP-500-291_Version-2_2013_June18_FINAL.pdf
Cloud Computing Reference Architecture NIST Special Publication 500-292	NIST	http://www.nist.gov/customcf/get_pdf.cfm?pub_id=909505
OASIS – various reference and guidance documents	Organization for the Advancement of Structured Information Standards (OASIS)	https://www.oasis-open.org/committees/tc_cat.php?cat=cloud
Enterprise Risk Management for Cloud Computing	The Committee of Sponsoring Organizations of the Treadway Commission (COSO)	http://www.coso.org/documents/Cloud%20Computing%20Thought%20Paper.pdf
Cloud Security	Cloud Industry Forum	http://www.cloudindustryforum.org/cloud-sigs/cloud-security

RATIONALE & CONTROLS

21.1.16. Applicability

21.1.16.R.01. Rationale

Security controls may not be available, cost effective or appropriate for all information classification levels. Much will depend on the cloud computing deployment model adopted. It is important that agencies understand when it is appropriate to use cloud services and how to select appropriate cloud services and service models, based on the classification of the information, any special handling caveats and associated confidentiality, availability and integrity risks.

21.1.16.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT use public, hybrid (incorporating a public element), or other external cloud services for systems and data classified CONFIDENTIAL, SECRET or TOP SECRET.

21.1.16.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

The use of cloud services and infrastructures for systems and data classified CONFIDENTIAL, SECRET or TOP SECRET MUST be approved by the GCSB.

21.1.16.C.03. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies intending to adopt cloud technologies or services MUST ensure cloud service providers apply the controls specified in this manual to any systems hosting, processing or storing agency data and systems.

21.1.16.C.04. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT use public or hybrid (incorporating a public element) cloud services to host, process, store or transmit NZEO caveated information.

21.1.16.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies intending to adopt cloud technologies or services SHOULD ensure cloud service providers apply the controls specified in this manual to any cloud service hosting, processing or storing agency data and systems.

21.1.17. Risk Assessment

21.1.17.R.01. Rationale

The adoption of cloud technologies will introduce a wide range of technology and information system risks *in addition* to the risks that already exist for agency systems. It is vital that these additional risks are identified and assessed in order to select appropriate controls and countermeasures. Trust boundaries must be defined to assist in determining effective controls and where these controls can best be applied.

21.1.17.R.02. Rationale

The **responsibility** for the implementation, management and maintenance of controls will depend on the service model and deployment model (refer to NIST SP800-145) used in the delivery of cloud services.

21.1.17.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies intending to adopt cloud technologies or services MUST conduct a comprehensive risk assessment *before* implementation or adoption.

21.1.17.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies intending to adopt cloud technologies or services MUST determine trust boundaries *before* implementation.

21.1.17.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies intending to adopt cloud technologies or services MUST determine where the responsibility (agency or cloud service provider) for implementing, managing and maintaining controls lies in accordance with agreed trust boundaries.

21.1.17.C.04. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure cloud risks for any cloud service adopted are understood and formally accepted by the Agency Head or Chief Executive and the agency's Accreditation Authority.

21.1.17.C.05. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST consult with the GCIO to ensure the strategic and other cloud risks are comprehensively assessed.

21.1.17.C.06. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies procuring or using cloud services to be used by multiple agencies MUST ensure all interested parties formally agree the risks, essential controls and any residual risks of such cloud services.

21.1.18. Offshore Services

21.1.18.R.01. Rationale

Cloud services hosted offshore introduce several additional risks, in particular, jurisdictional, sovereignty and privacy risks. Foreign owned cloud service providers operating in New Zealand, are subject to New Zealand legislation and regulation. They may, however, also be subject to a foreign government's privacy, lawful access and data intercept legislation.

21.1.18.R.02. Rationale

The majority of these jurisdictional, sovereignty and privacy risks cannot be adequately managed with controls available today. They must therefore be carefully considered and accepted by the Agency Head or Chief Executive before the adoption of such cloud services.

21.1.18.R.03. Rationale

Some cloud services hosted within New Zealand may be supported by foreign based technical staff. This characteristic introduces a further risk element to the use of foreign-owned cloud service providers.

21.1.18.R.04. Rationale

Further complexity can be introduced when all-of-government or multi-agency systems are deployed or integrated with cloud services. Any security breach can affect several agencies and compromise large or aggregated data sets.

21.1.18.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using cloud services hosted offshore MUST ensure jurisdictional, sovereignty and privacy risks are fully considered and formally accepted by the Agency Head or Chief Executive and the agency's Accreditation Authority.

21.1.18.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using cloud services hosted offshore MUST ensure that the agency retains ownership of its information in any contract with the cloud service provider.

21.1.18.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies using cloud services hosted offshore and connected to all-of-government systems MUST ensure the Government Chief Information Officer (GCIO) agrees the risks and accepts any residual risks.

21.1.18.C.04. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT use cloud services hosted offshore for information or systems classified CONFIDENTIAL, SECRET or TOP SECRET.

21.1.18.C.05. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT use cloud services hosted offshore for information with an NZEO caveat or endorsement.

21.1.18.C.06. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT use cloud services hosted offshore *unless*:

- privacy, information sensitivity and information value has been fully assessed by the agency;
- a comprehensive risk assessment is undertaken by the agency;
- controls to manage identified risks have been specified by the agency; and
- the cloud service provider is able to provide adequate assurance that these controls have been properly implemented *before* the agency uses the cloud service.

21.1.19. System Availability

21.1.19.R.01. Rationale

The availability of agency systems, business functionality and any customer or client online services, is subject to additional risks in an outsourced cloud environment. A risk assessment will include consideration of business requirements on availability in a cloud environment.

21.1.19.R.02. Rationale

Risks to business functionality may include service outages, such as communications, data centre power, back and other failures or interruptions. Entity failures such the merger, acquisition or liquidation of the cloud service provider may also present a significant business risk to availability.

21.1.19.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies intending to adopt cloud technologies or services MUST consider the risks to the availability of systems and information in their design of cloud systems architectures and supporting controls and governance processes.

21.1.19.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Any contracts for the provision of cloud services MUST include service level, availability, recoverability and restoration provisions.

21.1.19.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST ensure contracts with cloud service providers include provisions to manage risks associated with the merger, acquisition, liquidation or bankruptcy of the service provider and any subsequent termination of cloud services.

21.1.20. Unauthorised Access

21.1.20.R.01. Rationale

Cloud service providers may not provide adequate physical security and physical and logical access controls to meet agencies requirements. An assessment of cloud service risks will include physical and systems security. Refer also to Chapter 19– Gateway Security, Section 20.2 – Virtualisation and Section 20.3 – Virtual Local Area Networks.

21.1.20.R.02. Rationale

Some cloud services hosted within New Zealand may be supported by technical staff, presenting additional risk. In some cases the technical staff are based offshore. The use of encryption can provide additional assurance against unauthorised access – refer to Chapter 17 – Cryptography.

21.1.20.R.03. Rationale

Data Loss Prevention (DLP) technologies and techniques are implemented to safeguard sensitive or critical information from leaving the organisation. They operate by identifying unauthorised access and data exfiltration and take remedial action by monitoring, detecting and blocking unauthorised attempts to exfiltrate data. For DLP to be effective, all data states (processing, transmission and storage) are monitored.

21.1.20.C.01. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies intending to adopt cloud technologies or services SHOULD ensure cloud service providers apply the physical, virtual and access controls specified in this manual for agency systems and data protection.

21.1.20.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies intending to adopt cloud technologies or services SHOULD apply separation and access controls to protect data and systems where support is provided by offshore technical staff.

21.1.20.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies intending to adopt cloud technologies or services SHOULD apply controls to detect and prevent unauthorised data transfers and multiple or large scale data transfers to offshore locations and entities.

21.1.20.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies intending to adopt cloud technologies or services SHOULD consider the use of encryption for data in transit and at rest.

21.1.21. Incident Handling and Management

21.1.21.R.01. Rationale

Cloud service providers may not provide the same level of incident identification and management as provided by agencies. In some cases, these services will attract additional costs. Careful management of contracts is required to ensure agency requirements for incident detection and management are fully met when adopting cloud services.

21.1.21.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST include incident handling and management services in contracts with cloud service providers.

21.1.21.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop and implement incident identification and management processes in accordance with this manual (See Chapter 6 – Information Security Monitoring, Chapter 7 – Information Security Incidents, Chapter 9 – Personnel Security and Chapter 16 – Access Control).

21.1.22. Backup, Recovery Archiving and Data Remanence

21.1.22.R.01. Rationale

Cloud service providers will invariably provide some business continuity and disaster recovery plans, including system and data backup, for their own operational purposes. These plans may not include customer data or systems. Where cloud service providers do not adequately meet agency business requirements, an agency defined backup and recovery plan may be necessary.

21.1.22.R.02. Rationale

Residual information remaining on a device or storage media after clearing or sanitising the device or media is described as data remanence. This characteristic is sometimes also described as data persistence, although this description may include the wider implication of multiple copies.

21.1.22.R.03. Rationale

Full consideration of risks associated with data remanence and data persistence is required to ensure agency requirements for backup, recovery, archiving and data management is included in any cloud service contract.

21.1.22.R.04. Rationale

In addition to backups, cloud service providers may also archive data. Multi-national or foreign based cloud service providers may have established data centres in several countries. Backup and archiving is invariably automated and there may be no feasible method of determining where and in what jurisdiction the data have been archived. This can create an issue of data remanence and persistence where cloud service contracts are terminated but not all agency data can be effectively purged or deleted from the provider's systems.

21.1.22.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop and implement a backup, recovery and archiving plan and supporting procedures (See Section 6.4 – Business Continuity and Disaster Recovery).

21.1.22.C.02. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST include a data purge or secure delete process in any cloud service contracts.

21.1.22.C.03. Control: System Classification(s): All Classifications; Compliance: MUST

Any data purge or secure delete process in any cloud service contracts MUST be independently verifiable.

21.1.23. User Awareness and Training**21.1.23.R.01. Rationale**

The introduction of cloud services will introduce change to the appearance and functionality of systems, how users access agency systems and types of user support. It is essential that users are aware of information security and privacy concepts and risks associated with the services they use.

Support provided by the cloud service provider may attract additional charges.

21.1.23.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Agencies MUST develop and implement user awareness and training programmes to support and enable safe use of cloud services (See Section 9.1 – Information Security Awareness and Training).

21.2. Virtualisation

OBJECTIVE

21.2.1. To identify virtualisation specific risks and apply mitigations to minimise risk and secure the virtual environment.

CONTEXT

21.2.2. Virtualisation is the software simulation of the components of an information system and may include the simulation of hardware, operating systems, applications, infrastructure and storage. Underlying the simulation is hardware and control or simulation software, often described as a virtual machine (VM).

21.2.3. A Hypervisor is a fundamental component of a virtual environment and provides a supervisory function and framework that enables multiple operating systems, often described as “Guest Operating Systems”, to run on a single physical device.

21.2.4. A fundamental construct in the management of risk in virtual environments is that of Trust Zones and Trust Boundaries. A Trust Zone is a zoning construct based on levels of trust, classification and essential information security. A Trust Boundary is the interface between two or more Trust Zones. Trust Zones use the principles of separation and segregation to manage sensitive information assets and ensure security policies are consistently applied to all assets in a particular trust Zone. As assets are added to a Trust Zone, they inherit the security policies set for that Trust Zone.

21.2.5. Trust Zones will also apply the Principal of Least Privilege, which requires that each element in the network is permitted to access only those other network elements that are required for the node to perform its business function.

21.2.6. Virtualisation is radically changing how agencies and other organisations select, deploy implement and manage ICT. While offering significant benefits in efficiency, resource consolidation and utilisation of CIT assets, virtualisation can add risks to the operation of a system and the security of the data processed and managed by that system.

21.2.7. Virtualisation adds layers of technology and can combine many, traditionally discrete and physically separate components, into a single physical system. This consolidation invariably creates greater impact if faults occur or the system is compromised. Virtual systems are designed to be dynamic and to facilitate the movement and sharing of data. This characteristic is also a prominent attack vector and can make the enforcement and maintenance of security boundaries much more complex.

21.2.8. Virtualisation is susceptible to the same threats and vulnerabilities as traditional ICT assets but traditional security offers limited visibility of virtualised environments where the assets configurations and security postures are constantly changing. Incidents in virtualised environments can rapidly escalate across multiple services, applications and data sets, causing significant damage and making recovery complex.

Virtualisation Risks

21.2.9. Virtualisation risks can be considered in four categories:

- Risks directly related to virtualisation technologies;
- Systems architecture; implementation and management;
- The usage and business models; and
- Generic technology risks.

Mitigations

21.2.10. The controls described elsewhere in this manual deal with generic technology risks. Important steps in risk mitigation for virtual environments include:

- Identify and accurately characterise all deployed virtualisation and security measures beyond built-in hypervisor controls on VMs.
- Comparing security controls against known threats and industry standards to determine gaps and select appropriate controls.
- Identify and implement anti-malware tools, intrusion prevention and detection, active vulnerability scanning and systems security management and reporting tools.

REFERENCES

Title	Publisher	Source
NIST Special Publication 800-125, Guide to Security for Full Virtualisation Technologies	NIST	http://csrc.nist.gov/publications/nistpubs/800-125/SP800-125-final.pdf
The Security Technical Implementation Guides,	Defense Information Systems Agency,	http://iase.disa.mil/stigs/os/virtualization/esx.html
Virtualization Security Checklist	ISACA	http://www.isaca.org/Knowledge-Center/Research/Documents/Virtualization-Security-Checklist-26Oct2010-Research.pdf
A Guide to Virtualization Hardening Guides	SANS	http://www.sans.org/reading_room/analysts_program/vmware-guide-may-2010.pdf
Virtual Machine Security Guidelines	The Center for Internet Security	http://benchmarks.cisecurity.org/tools2/vm/CIS_VM_Benchmark_v1.0.pdf
Software-Defined Networking (SDN) Definition	Open Networking Foundation	https://www.opennetworking.org/sdn-resources/sdn-definition
Network segmentation and segregation	ASD	http://www.asd.gov.au/publications/cso/cprotect/Network_Segmentation_Segregation.pdf

RATIONALE & CONTROLS

21.2.11. Functional segregation between servers

21.2.11.R.01. Rationale

Agencies may implement segregation through the use of techniques to restrict a process to a limited portion of the file system, but this is often less effective. Virtualisation technology **MUST** be carefully architected to avoid cascade failures.

21.2.11.R.02. Rationale

The key element in separating security domains of differing classifications is physical separation. Current virtualisation technology cannot guarantee separation.

21.2.11.R.03. Rationale

The use of virtualisation technology within a security domain is a recognised means of efficiently architecting a system.

21.2.11.C.01. Control: System Classification(s): All Classifications; Compliance: **MUST NOT**
Virtualisation technology **MUST NOT** be used for functional segregation between servers of different classifications.

21.2.11.C.02. Control: System Classification(s): C, S, TS; Compliance: **MUST NOT**
Virtualisation technology **MUST NOT** be used for functional segregation between servers in different security domains at the same classification.

21.2.11.C.03. Control: System Classification(s): All Classifications; Compliance: **SHOULD**
Agencies **SHOULD** ensure that functional segregation between servers is achieved by:

- physically, using single dedicated machines for each function; or
- using virtualisation technology to create separate virtual machines for each function within the same security domain.

21.2.11.C.04. Control: System Classification(s): All Classifications; Compliance: **SHOULD NOT**
Virtualisation technology **SHOULD NOT** be used for functional segregation between servers in different security domains at the same classification.

21.2.12. Risk Management

21.2.12.R.01. Rationale

Where virtualisation technologies are to be used, risk identification, assessment and management are important in order to identify virtualisation specific risks, threats and treatments.

21.2.12.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST undertake a virtualisation specific risk assessment in order to identify risks, related risk treatments and controls.

21.2.12.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD undertake a virtualisation specific risk assessment in order to identify risks and related risk treatments.

21.2.13. Systems Architecture

21.2.13.R.01. Rationale

It is important to include virtualisation specific concepts, constraints, mitigations and controls in the design of systems architectures that propose using virtualisation technologies, in order to gain maximum advantage from the use of these technologies and to ensure security of systems and data is maintained.

21.2.13.R.02. Rationale

Virtual environments enable a small number of technical specialists to cover a wide range of activities such as network, security, storage and application management. Such activities are usually undertaken as discrete activities by a number of individuals in a physical environment. To remain secure and correctly and safely share resources, VMs must be designed following the principles of separation and segregation through the establishment of trust zones.

21.2.13.R.03. Rationale

Software-defined networking (SDN) is an approach to networking in which control is decoupled from hardware and managed by a separate application described as a controller. SDNs are intended to provide flexibility by enabling network engineers and administrators to respond to rapidly changing business requirements. Separation and segregation principles also apply to SDNs.

21.2.13.R.04. Rationale

In addition to segregation of key elements, VM security can be strengthened through functional segregation. For example, the creation of separate security zones for desktops and servers with the objective of minimising intersection points.

21.2.13.R.05. Rationale

Poor control over VM deployments can lead to breaches where unauthorised communication and data exchange can take place between VMs. This can create opportunity for attackers to gain access to multiple VMs and the host system.

21.2.13.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST architect virtualised systems and environments to enforce the principles of separation and segregation of key elements of the system using trust zones or security domains.

21.2.13.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT permit the sharing of files or other operating system components between host and guest operating systems.

21.2.13.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD architect virtualised systems and environments to enforce the principles of separation and segregation of key elements of the system using trust zones.

21.2.13.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD design virtualised systems and environments to enable functional segregation within a security domain.

21.2.13.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD harden the host operating systems following an agency or other approved hardening guide.

21.2.13.C.06. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD separate production from test or development virtual environments.

21.2.13.C.07. Control: System Classification(s): All Classifications; Compliance: SHOULD NOT

Agencies SHOULD NOT permit the sharing of files or other operating system components between host and guest operating systems.

21.2.14. Systems Management

21.2.14.R.01. Rationale

VMs are easy to deploy, often without formal policies or controls to manage the creation, management and decommissioning of VMs. This is sometimes described as “VM sprawl”, which is the unplanned proliferation of VMs. Attackers can take advantage of poorly managed and monitored resources. More deployments also mean more failure points, so VM sprawl can create operational difficulties even if no malicious activity is involved.

21.2.14.R.02. Rationale

A related difficulty occurs with **unsecured VM migration** when a VM is migrated to a new host, and security policies and configuration are not updated. VMs may also be migrated to other physical servers with little or no indication to users that a migration has occurred. Unsecured migration can introduce vulnerabilities through poor configuration and incomplete security and operational monitoring.

21.2.14.R.03. Rationale

Denial of service attacks can be designed specifically to exploit virtual environments. These attacks range from traffic flooding to the exploit of the virtual environment host’s own resources.

21.2.14.R.04. Rationale

The ability to monitor VM backbone network traffic is vital to maintain security and operations. Conventional methods for monitoring network traffic are generally not effective because the traffic is largely contained and controlled within the virtual environment. Careful selection and implementation of hypervisors will ensure effective monitoring tools are enabled, tested and monitored.

21.2.14.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST ensure a VM migration policy and related SOPs are implemented.

21.2.14.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST implement controls to prohibit unauthorised VM migrations within a virtual environment or between physical environments.

21.2.14.C.03. Control: System Classification(s): C, S, TS; Compliance: MUST

Agencies MUST implement controls to safely decommission VMs when no longer required, including elimination of images, snapshots, storage, backup, archives and any other residual data.

21.2.14.C.04. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD ensure a VM migration policy and related SOPs are implemented.

21.2.14.C.05. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement controls to prohibit unauthorised VM migrations within a virtual environment or between physical environments.

21.2.14.C.06. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement controls to safely decommission VMs when no longer required.

21.2.14.C.07. Control: System Classification(s): All Classifications; Compliance: SHOULD

Agencies SHOULD implement security and operational management and monitoring tools which include the following minimum capabilities:

- Identify VMs when initiated;
- Validate integrity of files prior to installation;
- Scan new VMs for vulnerabilities and misconfigurations;
- Load only minimum operating system components and services;
- Set resource usage limits;
- Establish connections to peripherals only as required;
- Ensure host and guest time synchronisation;
- Detect snapshot rollbacks and scans after restores;
- Track asset migration; and
- Monitor the security posture of migrated assets.

21.2.15. Authentication and Access

21.2.15.R.01. Rationale

VM sprawl can compromise authentication and access procedures, identity management, and system logging. This can be complicated with the use of customer-facing interfaces, such as websites.

21.2.15.R.02. Rationale

Host and guest interactions and their system vulnerabilities can magnify virtual system vulnerabilities. The co-hosting and multi-tenancy nature of virtual systems and the existence of multiple data sets can make a serious attack on a virtual environment particularly damaging.

21.2.15.R.03. Rationale

A guest OS can avoid or ignore its VM encapsulation to interact directly with the hypervisor either as a direct attack or through poor design, configuration and control. This can give the attacker access to all VMs in the virtual environment and potentially, the host machine. Described as a “VM escape”, it is considered to be one of the most serious threats to virtual systems.

21.2.15.R.04. Rationale

Hyperjacking is a form of attack that takes direct control of the hypervisor in order to gain access to the hosted VMs and data. This attack typically requires direct access to the hypervisor. While technically challenging, hyperjacking is considered a real-world threat.

21.2.15.C.01. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST maintain strong physical security and physical access controls.

21.2.15.C.02. Control: System Classification(s): All Classifications; Compliance: MUST
Agencies MUST maintain strong authentication and access controls.

21.2.15.C.03. Control: System Classification(s): All Classifications; Compliance: SHOULD
Agencies SHOULD maintain strong data validation checks.

21.3. Virtual Local Area Networks

OBJECTIVE

21.3.1. Virtual local area networks (VLANs) are deployed in a secure manner that does not compromise the security of information and systems.

CONTEXT

Scope

21.3.2. This section covers information relating to the use of VLANs within agency networks.

Multiprotocol Label Switching

21.3.3. For the purposes of this section Multiprotocol Label Switching (MPLS) is considered to be equivalent to VLANs and is subject to the same controls.

Exceptions for connectivity

21.3.4. A single network, managed in accordance with a single SecPlan, for which some functional separation is needed for administrative or similar reasons, can use VLANs to achieve that functional separation.

21.3.5. VLANs can also be used to separate VTC and IPT traffic from data traffic at the same classification (See Section 18.3 – Video and Telephony Conferencing and Internet Protocol Telephony).

Software Defined Networking (SDN)

21.3.6. Software-defined networking (SDN) is an approach to networking in which control is decoupled from hardware and managed by a separate application described as a controller. SDNs are intended to provide flexibility by enabling network engineers and administrators to respond to rapidly changing business requirements.

21.3.7. Separation and Segregation principles also apply to SDNs. Refer to Section 21.1 – Virtualisation.

REFERENCES

Title	Publisher	Source
IEEE 802.1Q-2011 IEEE Standard for Local and Metropolitan area networks – Media Access Control (MAC) Bridges, and Virtual Bridged Local Area Networks.	IEEE Standards Association	http://standards.ieee.org

RATIONALE & CONTROLS

21.3.8. Using VLANs

21.3.8.R.01. Rationale

Limiting the sharing of a common (physical or virtual) switch between VLANs of differing classifications reduces the chance of data leaks that could occur due to VLAN vulnerabilities. Furthermore, disabling trunking on physical switches that carry VLANs of differing security domains will reduce the risk of data leakage across the VLANs. The principles of separation and segregation must be applied to all network designs and architectures.

21.3.8.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

The principles of separation and segregation MUST be applied to the design and architecture of VLANs.

21.3.8.C.02. Control: System Classification(s): C, S, TS; Compliance: MUST NOT

Agencies MUST NOT use VLANs between classified networks and any other network of a lower classification.

21.3.8.C.03. Control: System Classification(s): All Classifications; Compliance: MUST NOT

Agencies MUST NOT use VLANs between any classified network and any unclassified network.

21.3.8.C.04. Control: System Classification(s): All Classifications; Compliance: MUST NOT

VLAN trunking MUST NOT be used on switches managing VLANs of differing security domains.

21.3.9. Configuration and administration

21.3.9.R.01. Rationale

When administrative access is limited to originating from the highest classified network on a switch, the security risk of a data spill is reduced.

21.3.9.C.01. Control: System Classification(s): All Classifications; Compliance: MUST

Administrative access MUST be permitted only from the most trusted network.

21.3.10. Disabling unused ports

21.3.10.R.01. Rationale

Disabling unused ports on a switch will reduce the opportunity for direct or indirect attacks on systems.

21.3.10.C.01. Control: System Classification(s): C, S, TS; Compliance: MUST

Unused ports on the switches MUST be disabled.

21.3.10.C.02. Control: System Classification(s): All Classifications; Compliance: SHOULD

Unused ports on the switches SHOULD be disabled.

22. SUPPORTING INFORMATION

22.1. Glossary of Abbreviations

Abbreviation	Meaning
3DES	Triple Data Encryption Standard
AES	Advanced Encryption Standard
AH	Authentication Header
AISEP	Australasian Information Security Evaluation Program
AoG	All of Government
AS	Australian Standard
ASD	Australian Signals Directorate
BYOD	Bring Your Own Device
CC	Common Criteria
CEO	Chief Executive Officer
CIO	Chief Information Officer
CISO	Chief Information Security Officer
COMSEC	Communications Security
CSO	Chief Security Officer
CSP	Cyber Security Policy
DdoS	Distibuted Denial-Of-Service
DH	Diffie-Hellman
DIS	Draft International Standard
DKIM	Domainkeys Identified Mail
DoS	Denial-Of-Service
DSA	Digital Signature Algorithm
EAL	Evaluation Assurance Level

EAP-TLS	Extensible Authentication Protocol-Transport Layer Security
ECDH	Elliptic Curve Diffie-Hellman
ECDSA	Elliptic Curve Digital Signature Algorithm
EEPROM	Electrically Erasable Programmable Read-Only Memory
EPL	Evaluated Products List
EPLD	Evaluated Products List – Degausser
EPROM	Erasable Programmable Read-Only Memory
ESP	Encapsulating Security Payload
FIPS	Federal Information Processing Standard
FTL	Flash Transition Layer
GCIO	NZ Government Chief Information Officer
GCSB	Government Communications Security Bureau
GPU	Graphics Processing Unit
HB	Handbook
HGCE	High Grade Cryptographic Equipment
HMAC	Hashed Message Authentication Code
HSM	Hardware Security Module
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICT	Information And Communications Technology
IDS	Intrusion Detection System
IEC	International Electrotechnical Commission
IEEE	Institute Of Electrical And Electronics Engineers
IETF	International Engineering Task Force
IKE	Internet Key Exchange

IM	Instant Messaging
IODEF	Incident Object Description Exchange Format
IP	Internet Protocol
IPSec	Internet Protocol Security
IR	Infra-Red
IRC	Internet Relay Chat
IPT	Internet Protocol Telephony
IRP	Incident Response Plan
ISAKMP	Internet Security Association Key Management Protocol
ISO	International Organization For Standardization
ITSEC	Information Technology Security Evaluation Criteria
ITSM	Information Technology Security Manager
KMP	Key Management Plan
MDM	Mobile Device Manager
MFD	Multifunction Device
MMS	Multimedia Message Service
MSL	(New Zealand) Measurement Standards Laboratory
NAND	Flash Memory Named After The NAND Logic Gate
NAND	NOT AND – A Binary Logic Operation
NDPP	Network Device Protection Profile
NIST	National Institute Of Standards And Technology
NOR	Flash Memory Named After The NOR Logic Gate
NOR	NOT OR – A Binary Logic Operation
NTP	Network Time Protocol
NZCSI	New Zealand Communications-Electronic Security Instruction

NZCSS	New Zealand Communications Security Standard
NZ e-GIF	New Zealand Interoperability Framework
NZEO	New Zealand Eyes Only
NZISM	New Zealand Information Security Manual
NZS	New Zealand Standard
OTP	One-Time Password
PED	Portable Electronic Device
PIN	Personal Identification Number
PKI	Public Key Infrastructure
PP	Protection Profile
PSM	Protective Security Manual
PSTN	Public Switched Telephone Network
RAM	Random Access Memory
RF	Radio Frequency
RFC	Request For Comments
RSA	Rivest-Shamir-Adleman
RTP	Real-Time Transport Protocol
SCEC	Security Construction And Equipment Committee
SCI	Sensitive Compartmented Information
SCIF	Sensitive Compartmented Information Facility
SDN	Software Defined Networking
SecPlan	System Security Plan
SecPol	System Security Policy
SitePlan	System Site Plan
SHA	Secure Hashing Algorithm

SIM	Subscriber Identity Module
S/MIME	Secure Multipurpose Internet Mail Extension
SMS	Short Message Service
SOE	Standard Operating Environment
SOP	Standard Operating Procedure
SP	Special Publication
SPF	Sender Policy Framework
SRMP	Security Risk Management Plan
SSD	Solid State Drive
SSH	Secure Shell
SSL/TLS	Secure Sockets Layer/Transport Layer Security
TOE	Trusted Operating Environment
UTC	Co-ordinated Universal Time
VLAN	Virtual Local Area Network
VoIP	Voice Over Internet Protocol
VPN	Virtual Private Network
WAP	Wireless Access Point
WEP	Wired Equivalent Privacy
WLAN	Wireless Local Area Network
WPA2	Wi-Fi Protected Access 2
XAUTH	Ike Extended Authentication

22.2. Glossary of Terms

Term	Meaning
802.11	The Institute of Electrical and Electronics Engineers standard defining WLAN communications.
Access Gateway	A gateway that provides the system user access to multiple security domains from a single device, typically a workstation.
Accreditation	A procedure by which an authoritative body gives formal recognition, approval and acceptance of the associated residual security risk with the operation of a system and issues a formal approval to operate the system.
Accreditation Authority	The authoritative body associated with accreditation activities.
Agency	New Zealand Government departments, authorities, agencies or other bodies established in relation to public purposes, including departments and authorities staffed under the Public Service Act.
Agency Head	The government employee with ultimate responsibility for the secure operation of agency functions, whether performed in-house or outsourced.
All of Government	“All of Government” refers to the entire New Zealand state sector
Application Whitelisting	An approach in which all executables and applications are prevented from executing by default, with an explicitly defined set of allowed executables.
Asset	Anything of value to an agency, such as IT equipment and software, information, personnel, documentation, reputation and public confidence.
Attack Surface	The amount of IT equipment and software used in a system. The greater the attack surface the greater the chances are of an attacker finding an exploitable vulnerability.
Audit	An independent review of event logs and related activities performed to determine the adequacy of current security measures, to identify the degree of conformance with established policy or to develop recommendations for improvements to the security measures currently applied.

Term	Meaning
Australasian Information Security Evaluation Program	A program under which evaluations are performed by impartial companies against the Common Criteria. The results of these evaluations are then certified by ASD, which is responsible for the overall operation of the program.
Authentication Header	A protocol used for authentication within IPSec.
Baseline	Information and controls that are used as a minimum implementation or starting point to provide a consistent minimum standard of systems security and information assurance.
Blacklist	A set of inclusive non-accepted items that confirm the item being analysed is not acceptable. It is the opposite of a whitelist which confirms that items are acceptable.
Cascaded Connections	Cascaded connections occur when one network is connected to another, which has a connection to a third network, and so on.
Caveat	A marking that indicates that the information has special requirements in addition to those indicated by the classification. The term covers codewords, source codewords, releasability indicators and special-handling caveats.
Certification	A procedure by which a formal assurance statement is given that a deliverable confirms to a specified standard.
Certification Authority	An official with the authority to assert that a system complies with prescribed controls within a standard.
Certification Report	A report generated by a certification body of a Common Criteria scheme that provides a summary of the findings of an evaluation.
Chief Information Security Officer	A senior executive who is responsible for coordinating communication between security, ICT and business functions as well as overseeing the application of controls and security risk management processes within an agency.
Classified Information	Government information that requires protection from unauthorised disclosure.
Classified Systems	Systems that process, store or communicate classified information.

Term	Meaning
Coercivity	A property of magnetic material, used as a measure of the amount of coercive force required to reduce the magnetic induction to zero from its remnant state.
Common Criteria	An International Organisation for Standardisation standard (15408) for information security evaluations.
Common Criteria Recognition Arrangement	An international agreement which facilitates the mutual recognition of Common Criteria evaluations by certificate producing schemes, including the Australian and New Zealand certification scheme.
Communications Security	The measures and controls taken to deny unauthorised personnel information derived from telecommunications and to ensure the authenticity of such telecommunications.
Conduit	A tube, duct or pipe used to protect cables.
Connection Forwarding	The use of network address translation to allow a port on a network node inside a local area network to be accessed from outside the network. Alternatively, using a Secure Shell server to forward a Transmission Control Protocol connection to an arbitrary port on the local host.
ConOp	Concept of Operation
Consumer Guide	Product specific advice concerning evaluated products can consist of findings from mutually recognised information security evaluations (such as the Common Criteria), findings from GCSB internal evaluations, any recommendations for use and references to relevant policy and standards.
Content Filtering	The most commonly used method to filter spam. Most antivirus methods are classified as content filters too, since they scan files, binary attachments of email and Hypertext Markup Language payload.
Cryptographic Hash	An algorithm (the hash function) which takes as input a string of any length (the message), and generates a fixed length string (the message digest or fingerprint) as output. The algorithm is designed to make it computationally infeasible to find any input which maps to a given digest, or to find two different messages that map to the same digest.
Cryptoperiod	The useful life of the cryptographic key.

Term	Meaning
Cryptographic Protocol	An agreed standard for secure communication between two or more entities.
Cryptographic System	A related set of hardware or software used for cryptographic communication, processing or storage, and the administrative framework in which it operates.
Cryptographic System Material	Material that includes, but is not limited to, key, equipment, devices, documents and firmware or software that embodies or describes cryptographic logic.
Data At Rest	Information residing on media or a system that is not powered or is unauthenticated to.
Data In Transit	Information that is being conveyed across a communication medium.
Data In Use	Information that has been decrypted for processing by a system.
Data Remanence	Residual information remaining on a device or storage media after clearing or sanitising the device or media. Sometimes described as data persistence.
Data Spill	An information security incident that occurs when information is transferred between two security domains by an unauthorised means. This can include from a classified network to a less classified network or between two areas with different need-to-know requirements.
Declassification	A process whereby information is reduced to an unclassified state and an administrative decision is made to formally authorise its release into the public domain.
Degausser	An electrical device or permanent magnet assembly which generates a coercive magnetic force to destroy magnetic storage patterns in order to sanitise magnetic media.
Delegate	A person or group of personnel to whom the authority to authorise non-compliance with requirements in this manual has been devolved by the agency head.

Term	Meaning
Demilitarised Zone	A small network with one or more servers that is kept separate from an agency's core network, either on the outside of the agency's firewall, or as a separate network protected by the agency's firewall. Demilitarised zones usually provide public domain information to less trusted networks, such as the Internet.
Department	Term used to describe Public Service Departments and Non-Public Service Departments within the state sector. Refer State Services Commission list of Central Government Agencies – http://www.ssc.govt.nz/sites/all/files/guide-to-central-govt-agencies-30aug2013.pdf
Device Access Control Software	Software that can be installed on a system to restrict access to communications ports on workstations. Device access control software can either block all access to a communications port or allow access using a whitelisting approach based on device types, manufacturer's identification, or even unique device identifiers.
Diffie-Hellman Groups	A method used for specifying the modulus size used in the hashed message authentication code algorithms. Each DH group represents a specific modulus size. For example, group 2 represents a modulus size of 1024 bits.
Diode	A device that allows data to flow in only one direction.
Domain Owner	A domain owner is responsible for the secure configuration of the security domain throughout its life-cycle, including all connections to/from the domain.
Dual-Stack Device	A product that implements both IP version 4 and 6 protocol stacks.
Emanation Security	The counter-measure employed to reduce classified emanations from a facility and its systems to an acceptable level. Emanations can be in the form of RF energy, sound waves or optical signals.
Emergency Access	The process of a system user accessing a system that they do not hold appropriate security clearances for due to an immediate and critical emergency requirement.
Emergency Situation	A situation requiring the evacuation of a site. Examples include fires and bomb threats.

Term	Meaning
Encapsulating Security Payload	A protocol used for encryption and authentication within IPSec.
Escort	A person who ensures that when maintenance or repairs are undertaken to IT equipment that uncleared personnel are not exposed to information.
Evaluation Assurance Level	A level of assurance in the security functionality of a product gained from undertaking a Common Criteria evaluation. Each EAL comprises a number of assurance components, covering aspects of a product's design, development and operation.
Facility	An area that facilitates government business. For example, a facility can be a building, a floor of a building or a designated space on the floor of a building.
Fax Machine	A device that allows copies of documents to be sent over a telephone network.
Filter	A device that controls the flow of data in accordance with a security policy.
Firewall	A network protection device that filters incoming and outgoing network data, based on a series of rules.
Firmware	Software embedded in a hardware device.
Flash Memory Media	A specific type of EEPROM.
Fly Lead	A lead that connects IT equipment to the fixed infrastructure of the facility. For example, the lead that connects a workstation to a network wall socket.
Foreign National	A person who is not a New Zealand citizen.
Foreign System	A system that is not owned and operated by the New Zealand Government.
Functional Segregation	Functional segregation is segregation based on the device function or intended function.
Government Chief Information Officer	Government Chief Information Officer (GCIO) describes the role undertaken by the Chief Executive of the Department of Internal Affairs to provide leadership on ICT matters within the NZ Government.

Term	Meaning
Gateway	Gateways connect two or more systems from different security domains to allow access to or transfer of information according to defined security policies. Some gateways can be automated through a combination of physical or software mechanisms. Gateways are typically grouped into three categories: access gateways, multilevel gateways and transfer gateways.
General User	A system user who can, with their normal privileges, make only limited changes to a system and generally cannot bypass system security.
Hardware	A generic term for any physical component of information and communication technology, including peripheral equipment and media used to process information.
Hardware Security Module	Hardware Security Modules (HSMs) are defined as a device, cards or appliance usually installed inside of a PC or server which provides cryptographic functions.
Hashed Message Authentication Code Algorithms	The SHA-1 hashing algorithm, combined with additional cryptographic functions, forms the HMAC algorithms of HMAC-SHA-1-96.
High Grade Cryptographic Equipment	The equivalent to United States Type 1 cryptographic equipment.
Host-Based Intrusion Prevention System	A security device, resident on a specific host, which monitors system activities for malicious or unwanted behaviour and can react in real-time to block or prevent those activities.
Hybrid Hard Drives	Non-volatile magnetic media that use a cache to increase read and write speeds and reduce boot time. The cache is normally flash memory media or battery backed RAM.
Incident Response Plan	A plan for responding to information security incidents as defined by the individual agency.
Information	Information is defined as any communication or representation of knowledge such as facts, data, and opinions in any medium or form, electronic as well as physical. Information includes any text, numerical, graphic, cartographic, narrative, or any audio or visual representation.

Term	Meaning
Information Asset	Information asset is any information or related equipment has value to an organization. This includes equipment, facilities, patents, intellectual property, software and hardware. Information Assets also include services, information, and people, and characteristics such as reputation, brand, image, skills, capability and knowledge.
Information and Communications Technology (ICT)	ICT includes: <ul style="list-style-type: none"> • Information management; • Technology infrastructure; and • Technology-enabled business processes and services.
Information Security	Measures relating to the confidentiality, availability and integrity of information that is processed, stored and communicated by electronic or similar means.
Information Security Incident	An occurrence or activity that may threaten the confidentiality, integrity or availability of a system or the information stored, processed or communicated by it.
Information Security Policy	A high-level document that describes how an agency protects its systems. The CSP is normally developed to cover all systems and can exist as a single document or as a set of related documents.
Information Technology Security Manager	ITSMs are executives within an agency that act as a conduit between the strategic directions provided by the CISO and the technical efforts of systems administrators. The main responsibility of ITSMs is the administrative controls relating to information security within the agency.
Infrared Device	Devices such as mice, keyboards, pointing devices, PEDs and laptops that have an infrared communications capability.
Internet Key Exchange Extended Authentication	Internet Key Exchange Extended Authentication is used for providing an additional level of authentication by allowing IPSec gateways to request additional authentication information from remote users. As a result, users are forced to respond with credentials before being allowed access to the connection.
Intrusion Detection System	An automated system used to identify an infringement of security policy.
IP Security	A suite of protocols for secure IP communications through authentication or encryption of IP packets as well as including protocols for cryptographic key establishment.

Term	Meaning
IP Telephony	The transport of telephone calls over IP networks.
IP Version 6	A protocol used for communicating over a packet switched network. Version 6 is the successor to version 4 which is widely used on the Internet. The main change introduced in version 6 is a greater address space available for identifying network devices, workstations and servers.
ISAKMP Aggressive Mode	An IPsec protocol that uses half the exchanges of main mode to establish an IPsec connection.
ISAKMP Main Mode	An IPsec protocol that offers optimal security using six packets to establish an IPsec connection.
ISAKMP Quick Mode	An IPsec protocol that is used for refreshing security association information.
Isolation	Isolation may include disconnection from other systems and any external connections. In some cases system isolation may not be possible for architectural or operational reasons.
IT Equipment	IT equipment includes, but is not limited to, workstations, printers, photocopiers, scanners and multifunction devices.
Key Management	The use and management of cryptographic keys and associated hardware and software. It includes their generation, registration, distribution, installation, usage, protection, storage, access, recovery and destruction.
Key Management Plan	A plan that describes how cryptographic services are securely deployed within an agency. It documents critical key management controls to protect keys and associated material during their life cycle, along with other controls to provide confidentiality, integrity and availability of keys.
Limited Higher Access	The process of a system user accessing a system that they do not hold appropriate security clearances for, for a limited non-ongoing period of time.
Lockable Commercial Cabinet	A cabinet that is commercially available, of robust construction and is fitted with a commercial lock.
Logging Facility	A facility that includes the software component which generates the event and associated details, the transmission (if necessary) of these logs and how they are stored.

Term	Meaning
Malicious Code	Any software that attempts to subvert the confidentiality, integrity or availability of a system. Types of malicious code include logic bombs, trapdoors, Trojans, viruses and worms.
Malicious Code Infection	An information security incident that occurs when malicious code is used to infect a system. Example methods of malicious code infection include viruses, worms and Trojans.
Management Traffic	Traffic generated by system administrators and processes over a network in order to control a device. This traffic includes standard management protocols, but also includes traffic that contains information relating to the management of the network.
Mandatory Controls	Controls within this manual with either a 'MUST' or a 'MUST NOT' compliance requirement.
Media	A generic term for hardware that is used to store information.
Media Destruction	The process of physically damaging the media with the objective of making the data stored on it inaccessible. To destroy media effectively, only the actual material in which the data is stored needs to be destroyed.
Media Disposal	The process of relinquishing control of media when no longer required, in a manner that ensures that no data can be recovered from the media.
Media Sanitisation	The process of erasing or overwriting data stored on media.
Multifunction Devices	The class of devices that combines printing, scanning, copying, faxing or voice messaging functionality within the one device. These devices are often designed to connect to computer and telephone networks simultaneously.
Multilevel Gateway	A gateway that enables access, based on authorisation, to data at many classification and releasability levels where each data unit is individually marked according to its domain.
Need-To-Know	The principle of telling a person only the information that they require to fulfil their role.
Network Access Control	Policies used to control access to a network and actions on a network, including authentication checks and authorisation controls.

Term	Meaning
Network Device	Any device designed to facilitate the communication of information destined for multiple system users. For example: cryptographic devices, firewalls, routers, switches and hubs.
Network Infrastructure	The infrastructure used to carry information between workstations and servers or other network devices. For example: cabling, junction boxes, patch panels, fibre distribution panels and structured wiring enclosures.
Network Protection Device	A sub-class of network device used specifically to protect a network. For example, a firewall.
NZ Eyes Only	A caveat indicating that the information is not to be passed to or accessed by foreign nationals.
NZ Government Information Security Manual	National security policy that aims to provide a common approach to ensure that the implementation of information security reduces both agency specific, and whole of government, security risks to an acceptable level.
NZ Government Protective Security Manual	National security policy that aims to provide a common approach to ensure that the implementation of protective security (mainly physical and personnel) reduces both agency specific, and whole of government, security risks to an acceptable level.
No-Lone-Zone	An area in which personnel are not permitted to be left alone such that all actions are witnessed by at least one other person.
Non-Volatile Media	A type of media which retains its information when power is removed.
Off-Hook Audio Protection	A method of mitigating the possibility of an active, but temporarily unattended handset inadvertently allowing discussions being undertaken in the vicinity of the handset to be heard by the remote party. This could be achieved through the use of a hold feature, mute feature, push-to-talk handset or equivalent.
Official Information	<i>Official Information</i> is any information held by a department or agency. See the Official Information Act 1982 (as amended).
Openpgp Message Format	An open-source implementation of Pretty Good Privacy, a widely available cryptographic toolkit.
Patch Cable	A metallic (copper) or fibre optic cable used for routing signals between two components in an enclosed container or rack.

Term	Meaning
Patch Panel	A group of sockets or connectors that allow manual configuration changes, generally by means of connecting cables to the appropriate connector. Cables could be metallic (copper) or fibre optic.
Perfect Forward Security	Additional security for security associations in that if one security association is compromised subsequent security associations will not be compromised.
Peripheral Switch	A device used to share a set of peripherals between a number of computers.
Principles of Separation and Segregation	Systems architecture and design incorporating separation and segregation in order to establish trust zones, define security domains and enforce boundaries.
Privacy Marking	Privacy markings are used to indicate that official information has a special handling requirement or a distribution that is restricted to a particular audience.
Privileged User	A system user who can alter or circumvent system security protections. This can also apply to system users who could have only limited privileges, such as software developers, who can still bypass security precautions. A privileged user can have the capability to modify system configurations, account privileges, audit logs, data files or applications.
Protective Marking	A marking that is applied to unclassified or classified information to indicate the security measures and handling requirements that are to be applied to the information to ensure that it is appropriately protected.
Public Domain Information	Official information authorised for unlimited public access or circulation, such as agency publications and websites.
Public Key Infrastructure	The framework and services that provide for the generation, production, distribution, control, accounting and destruction of public key certificates. Components include the personnel, policies, processes, server platforms, software, and workstations used for the purpose of administering certificates and public-private key pairs, including the ability to issue, maintain, recover and revoke public key certificates. SOURCE: CNSSI-4009
Public Switched Telephone Network	A public network where voice is communicated using analogue communications.

Term	Meaning
Push-To-Talk	Handsets that have a button which must be pressed by the user before audio can be communicated, thus providing fail-safe off-hook audio protection.
Quality Of Service	A process to prioritise network traffic based on availability requirements.
Radio Frequency Device	Devices including mobile phones, wireless enabled personal devices and laptops.
Reaccreditation	A procedure by which an authoritative body gives formal recognition, approval and acceptance of the associated residual security risk with the continued operation of a system.
Reclassification	A change to the security measures afforded to information based on a reassessment of the potential impact of its unauthorised disclosure. The lowering of the security measures for media containing classified information often requires sanitisation or destruction processes to be undertaken prior to a formal decision to lower the security measures protecting the information.
Remote Access	Access to a system from a location not within the physical control of the system owner.
Removable Media	Storage media that can be easily removed from a system and is designed for removal.
Residual Risk	The risk remaining after management takes action to reduce the impact and likelihood of an adverse event, including control activities in responding to a risk (Institute of Internal Auditors). Also sometimes referred to as “net risk” or “controlled risk”.
Rogue Wireless Access Point	An unauthorised Wireless Access Point operating outside of the control of an agency.
Seconded Foreign National	A representative of a foreign government on exchange or long-term posting to an agency.
Secured Area	An area that has been certified to physical security requirements as either; a Secure Area, a Partially Secure Area or an Intruder Resistant Area to allow for the processing of classified information.

Term	Meaning
Secure Multipurpose Internet Mail Extension	A protocol which allows the encryption and signing of Multipurpose Internet Mail Extension-encoded email messages including attachments.
Secure Shell	A network protocol that can be used to securely log into a remote workstation, executing commands on a remote workstation and securely transfer file(s) between workstations.
Security Association	A collection of connection-specific parameters containing information about a one-way connection within IPSec that is required for each protocol used.
Security Association Lifetimes	The duration security association information is valid for.
Security Domains	<p>A security domain is a system or collection of systems operating under a security policy that defines the classification and releasability of the information processed within the domain. It can be exhibited as a classification, a community of interest or releasability within a certain classification.</p> <p>This term is NOT synonymous with <i>Trust Zone</i>.</p>
Security Risk Management Plan	A plan that identifies the risks and appropriate risk treatments including controls needed to meet agency policy.
Security Target	An artefact of Common Criteria evaluations. It contains the information security requirements of an identified target of evaluation and specifies the functional and assurance security measures offered by that target of evaluation to meet the stated requirements.
Segregation	Segregation may be achieved by isolation, enforcing separation of key elements of a virtual system, removing network connectivity to the relevant device or applying access controls to prevent or limit access.
Separation	Separation is a physical distinction between elements of a network or between networks. This applies in both physical and virtual systems architectures
Server	A computer (including mainframes) used to run programs that provide services to multiple users. For example, a file server, email server or database server.

Term	Meaning
Softphone	A software application that allows a workstation to act as a VoIP phone, using either a built-in or an externally connected microphone and speaker.
Software Component	An element of a system, including but not limited to, a database, operating system, network or Web application.
Solid State Drives	Non-volatile media that uses flash memory media to retain its information when power is removed and, unlike non-volatile magnetic media, contains no moving parts.
SSH-Agent	An automated or script-based Secure Shell session.
Standard Operating Environment	A standardised build of an operating system and associated software that is deployed on multiple devices. A SOE can be used for servers, workstations, laptops and mobile devices.
Standard Operating Procedures	Instructions for complying with a SecPlan and procedures for the operation of systems.
System	A related set of IT equipment and software used for the processing, storage or communication of information and the governance framework in which it operates.
System Owner	The person responsible for the information resource.
System Classification	The classification of a system is the highest classification of information for which the system is approved to store or process.
System Security Plan	A plan documenting the controls for a system.
System User	A general user or a privileged user of a system.
Target Of Evaluation	The functions of a product subject to evaluation under the Common Criteria.
Technical Surveillance Counter-Measures	The process of surveying facilitates to detect the presence of technical surveillance devices and to identify technical security weaknesses that could aid in the conduct of a technical penetration of the surveyed facility.
Telephone	A device that converts between sound waves and electronic signals that can be communicated over a distance.
Telephone System	A system designed primarily for the transmission of voice traffic.

Term	Meaning
Tempest	A short name referring to investigations and studies of compromising emanations.
TEMPEST Rated IT Equipment	IT equipment that has been specifically designed to minimise TEMPEST emanations.
TOP SECRET Areas	Any area certified to operate at TOP SECRET, containing TOP SECRET servers, workstations or associated network infrastructure.
Traffic Flow Filter	A device that has been configured to automatically filter and control the form of network data.
Transfer Gateway	A gateway that facilitates the transfer of information, in one or multiple directions (i.e. low to high or high to low), between different security domains.
Transport Mode	An IPSec mode that provides a secure connection between two endpoints by encapsulating an IP payload.
Trust Boundary	A Trust Boundary is the interface between two or more Trust Zones.
Trust Zone	A trust zone is a logical construct encompassing an area with a high degree of trust between the data, users, providers and the systems. It may include a number of capabilities such as secure boot, code-signing, trusted execution and DRM. This term is NOT synonymous with <i>Security Domain</i> .
Trusted Source	A person or system formally identified as being capable of reliably producing information meeting certain defined parameters, such as a maximum data classification and reliably reviewing information produced by others to confirm compliance with certain defined parameters.
Tunnel Mode	An IPSec mode that provides a secure connection between two endpoints by encapsulating an entire IP packet.
UNCLASSIFIED Information	Information that is assessed as not requiring a classification.
UNCLASSIFIED Systems	Systems that process, store or communicate information produced by the New Zealand Government that does not require a classification.

Term	Meaning
Unsecured Space	An area that has not been certified to physical security requirements to allow for the processing of classified information.
Virtual Private Network	The tunnelling of a network's traffic through another network, separating the VPN traffic from the underlying network. A VPN can encrypt traffic if necessary.
Virtual Private Network Split Tunnelling	Functionality that allows personnel to access both a public network and a VPN connection at the same time, such as an agency system and the Internet.
Virtualisation	Virtualisation is the software simulation of the components of an information system and may include the simulation of hardware, operating systems, applications, infrastructure and storage.
Volatile Media	A type of media, such as RAM, which gradually loses its information when power is removed.
Wear Levelling	A technique used in flash memory that is used to prolong the life of the media. Data can be written to and erased from an address on flash memory a finite number of times. The wear levelling algorithm helps to distribute writes evenly across each memory block, thereby decreasing the wear on the media and increasing its lifetime. The algorithm ensures that updated or new data is written to the first available free block with the least number of writes. This creates free blocks that previously contained data.
Whitelist	A set of inclusive accepted items that confirm the item being analysed is acceptable. It is the opposite of a blacklist which confirms that items are not acceptable.
Wi-Fi Protected Access	Certifications of the implementations of protocols designed to replace WEP. They refer to components of the 802.11i security standard.
Wired Equivalent Privacy	A deprecated 802.11 security standard.
Wireless Access Point	A device which enables communications between wireless clients. It is typically also the device which connects the wireless local area network to the wired local area network.
Wireless Communications	The transmission of data over a communications path using electromagnetic waves rather than a wired medium.

Term	Meaning
Wireless Local Area Network	A network based upon the 802.11 set of standards. Such networks are often referred to as wireless networks.
Workstation	A stand-alone or networked single-user computer.
X11 Forwarding	X11, also known as the X Window System, is a basic method of video display used in a variety of operating systems. X11 forwarding allows the video display from one network node to be shown on another node.

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