



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **ICANWK508A Install, operate and troubleshoot medium enterprise switches**

**Release: 1**

## ICANWK508A Install, operate and troubleshoot medium enterprise switches

### Modification History

Release	Comments
Release 1	This Unit first released with <i>ICAI1 Information and Communications Technology Training Package version 1.0</i>

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to use appropriate tools, equipment, software and protocols to install, operate, and troubleshoot medium enterprise switches.

### Application of the Unit

This unit applies to the installation, operation and troubleshooting of medium enterprise networks. Job roles include help-desk technician and network-support technician.

### Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.

### Pre-Requisites

Not applicable.

### Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

<b>Element</b>	<b>Performance Criteria</b>
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i>

## Elements and Performance Criteria

<p>1. Prepare to install an medium enterprise switch</p>	<p>1.1 Prepare for given work according to legislation, OHS, codes, regulations and standards</p> <p>1.2 Arrange access to the site according to required procedure</p> <p>1.3 Review existing <i>network</i> design <i>documentation</i> to ensure it is current and complete</p> <p>1.4 Select the <i>network elements</i> required to be installed to meet the technical <i>requirements</i></p> <p>1.5 Contact vendors and service suppliers to obtain specifications and availability of identified components</p> <p>1.6 Develop plans, with prioritised tasks and contingency arrangements, for installation of components with minimum disruption to <i>client</i></p> <p>1.7 Liaise with <i>appropriate person</i> to obtain approval for the plans, including security clearance and timing</p>
<p>2. Configure basic switch operation</p>	<p>2.1 Describe network segmentation, basic traffic management and basic switching concepts</p> <p>2.2 Perform, save and verify initial switch configuration tasks</p> <p>2.3 Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts</p> <p>2.4 Perform, save and verify initial switch configuration tasks</p> <p>2.5 Upgrade firmware on a switch</p> <p>2.6 Save and back up switch configuration files</p> <p>2.7 Implement <i>basic switch security</i></p>
<p>3. Configure and verify advanced switching functions</p>	<p>3.1 Describe <i>enhanced switching technologies</i></p> <p>3.2 Configure and verify virtual local area networks (VLANs)</p> <p>3.3 Configure and verify trunks between switches</p> <p>3.4 Configure and verify inter-VLAN routing</p> <p>3.5 Configure and verify spanning tree protocol (STP) and rapid spanning tree protocol (RSTP) operation</p>
<p>4. Troubleshoot medium enterprise switches</p>	<p>4.1 Troubleshoot device configuration and network connectivity using <i>basic utilities</i></p> <p>4.2 Identify and resolve <i>common switched network issues</i></p>

## Required Skills and Knowledge

*This section describes the skills and knowledge required for this unit.*

### Required skills

- communication skills to liaise with internal and external personnel on technical, operational and business-related matters
- literacy skills to:
  - interpret technical documentation
  - write reports as required
- numeracy skills to:
  - take test measurements
  - interpret results
  - evaluate performance and interoperability of network
- planning and organisational skills to:
  - coordinate the process in liaison with others
  - plan, prioritise and monitor own work
- problem-solving skills to:
  - adapt configuration procedures to requirements of network and reconfigure depending on differing operational contingencies, risk situations and environments
  - troubleshoot and debug router switch issues
- research skills to investigate appropriate hardware to meet requirements
- technical skills to:
  - assess and implement security requirements
  - select and configure networking devices.

### Required knowledge

- overview knowledge of RSTP
- detailed knowledge of:
  - debug commands
  - routing between VLANs
  - STP
  - switch calling line identification (CLI) commands
  - VLANs.

## Evidence Guide

*The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.*

<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> <li>• prepare for the installation of an enterprise switch</li> <li>• install, configure and test the network elements to ensure interoperability within the network</li> <li>• apply network topologies, protocols and security issues</li> <li>• apply solutions and troubleshoot defined network problems.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> <li>• site where network installation may be conducted</li> <li>• enterprise switches and operating systems</li> <li>• equipment specifications</li> <li>• hardware and software</li> <li>• organisational guidelines</li> <li>• appropriate learning and assessment support when required.</li> </ul> <p>Where applicable, physical resources should include equipment modified for people with special needs.</p>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• direct observation of the candidate installing, configuring and testing a new or updated network</li> <li>• evaluation of documentation that outlines testing procedures, test results, recommendation to network changes and completion records</li> <li>• verbal or written questioning of required knowledge.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate.</p> <p>Assessment processes and techniques must be culturally appropriate, and suitable to the communication skill level, language, literacy and numeracy capacity of the candidate and the work being performed.</p> <p>Indigenous people and other people from a non-English speaking background may need additional support.</p>

	In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.
--	---------------------------------------------------------------------------------------------------------------------------

## Range Statement

*The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.*

<b><i>Network</i></b> may include:	<ul style="list-style-type: none"> <li>• data</li> <li>• internet</li> <li>• large and small local area networks (LAN)</li> <li>• national wide area networks (WAN)</li> <li>• virtual private network (VPN).</li> </ul>
<b><i>Documentation</i></b> may include:	<ul style="list-style-type: none"> <li>• equipment inventory</li> <li>• International Organization for Standardization (ISO), International Electrotechnical Commission (IEC) and Australian Standards (AS) standards</li> <li>• naming standards</li> <li>• project management templates and report writing</li> <li>• satisfaction reports</li> <li>• version control.</li> </ul>
<b><i>Network elements</i></b> may include:	<ul style="list-style-type: none"> <li>• adaptors</li> <li>• communications cables and connectors</li> <li>• hubs</li> <li>• routers</li> <li>• servers</li> <li>• switches.</li> </ul>
<b><i>Requirements</i></b> may refer to:	<ul style="list-style-type: none"> <li>• application</li> <li>• business</li> <li>• network</li> <li>• people in the organisation</li> <li>• system.</li> </ul>
<b><i>Client</i></b> may include:	<ul style="list-style-type: none"> <li>• external organisations</li> <li>• individuals</li> <li>• internal departments</li> <li>• internal employees.</li> </ul>
<b><i>Appropriate person</i></b> may include:	<ul style="list-style-type: none"> <li>• authorised business representative</li> <li>• client</li> <li>• supervisor.</li> </ul>
<b><i>Basic switch security</i></b> may include:	<ul style="list-style-type: none"> <li>• port deactivation</li> <li>• port security</li> </ul>



	<ul style="list-style-type: none"> <li>• secure shell (SSH).</li> </ul>
<i>Enhanced switching technologies</i> may include:	<ul style="list-style-type: none"> <li>• 802.1q</li> <li>• per-VLAN spanning tree protocol (PVSTP)</li> <li>• RSTP</li> <li>• trunking</li> <li>• VLAN.</li> </ul>
<i>Basic utilities</i> may include:	<ul style="list-style-type: none"> <li>• debug commands</li> <li>• ipconfig</li> <li>• ping</li> <li>• secure shell (SSH)</li> <li>• Telnet</li> <li>• traceroute.</li> </ul>
<i>Common switched network issues</i> may include:	<ul style="list-style-type: none"> <li>• auto-negotiation</li> <li>• configuration issues</li> <li>• media issues</li> <li>• switch hardware failures</li> <li>• VLAN</li> <li>• STP and RSTP</li> <li>• trunking.</li> </ul>

## Unit Sector(s)

Networking