



Australian Government

Department of Education, Employment and Workplace Relations

ICAI5173B Install and configure a single-segment local area network switch

Release: 1

ICAI5173B Install and configure a single-segment local area network switch

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit defines the competency required to select, install and test a single switch on one segment of a local area network (LAN). The following units are linked and form an appropriate cluster: • ICAA5144B Determine best fit topology for a local network • ICAI5174B Install high end switches in multi switched local area networks • ICAI5176C Install and configure router
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Application of the Unit

Application of the unit	
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
	ICAI2015B	Install software applications
	ICAI3101B	Install and manage network protocols

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine specifications for switch	1.1. Determine and document the topology of the LAN 1.2. Investigate and determine current and future network capacity according to current and future business requirements 1.3. Determine the number and type of switch required, with reference to current and future network requirements 1.4. Determine the requirements for network management and security, as prescribed by organisational policy
2. Select appropriate hardware	2.1. Select the switch and switch operating system software version with the appropriate features according to required specifications 2.2. Choose computers and consider what effect on traffic servers, routers and other network devices will have, when implemented according to network requirements
3. Install switch and supporting peripherals	3.1. Assemble and mount in rack for physical security and connect switch and peripherals , in accordance with manufacturer requirements 3.2. Connect switches 3.3. Connect user to access points using cable that meets the appropriate standard 3.4. Connect power to the switch, power it up and check operation
4. Configure switch	4.1. Establish a valid network connection with other network devices 4.2. Configure a network address for the switch 4.3. Install and/or configure simple network management protocol (SNMP) agent software, on each switch, to collect network traffic data for the management information base (MIB) from that segment of the network and relay it to the management console 4.4. Install and configure SNMP management console software on a computer designated to be the network manager's main console, to collect network traffic data from the switch acting as agents 4.5. Manually configure the user access ports of the switch for speed and for full- or half-duplex operation
5. Test and troubleshoot switch and network	5.1. Test the switch and other network devices in accordance with manufacturer requirements and

ELEMENT	PERFORMANCE CRITERIA
	organisational guidelines 5.2.Ensure that there is connectivity across the network 5.3.Test SNMP by unplugging some machines from the switch or powering down a switch and observe whether the SNMP management software reports these events 5.4.Make adjustments to the network, depending on test and troubleshooting results

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- Methods for troubleshooting switches (e.g. knowing how to stop user access ports 'flapping' when two switches try to auto-configure their port speed and duplex setting to match each other's settings, but are not able to synchronise with each other)
- Cabling skills to follow a hierarchical network design
- Implementation and configuration of networks
- Configuring a workstation within a network environment

Required knowledge

- Differences between standard and intelligent (i.e. configurable) switches and between switches and hubs
- Documentation skills for networks (e.g. labelling of cable terminations and developing a cut sheet or cabling map)
- Common network cable types and connectors
- Common network topologies
- Implementation and configuration of networks
- Advantages and disadvantages of switches over hubs
- Australian Computer Society Code of Ethics

Evidence Guide

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.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- Assessment must confirm the ability to install switches without the network losing connectivity or failing.

To demonstrate competency in this unit the person will require access to:

- Switches
- Network devices
- Workstations and servers
- Cabling

Context of and specific resources for assessment

Setting up switches is an important task for most organisations and with a diverse range of switches, care should be taken to ensure security is managed effectively.

The breadth, depth and complexity covering planning and initiation of alternative approaches to skills or knowledge applications across a broad range of technical and/or management requirements, evaluation and coordination would be characteristic.

Assessment must ensure:

- The demonstration of competency may also require self-directed application of knowledge and skills, with substantial depth in some areas where judgement is required in planning and selecting appropriate equipment, services and techniques for self and others.
- Applications involve participation in development of strategic initiatives as well as personal responsibility and autonomy in performing complex technical operations or organising others. It may include participation in teams including teams concerned

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	with planning and evaluation functions. Group or team coordination may also be involved.
Method of assessment	The purpose of this unit is to define the standard of performance to be achieved in the workplace. In undertaking training and assessment activities related to this unit, consideration should be given to the implementation of appropriate diversity and accessibility practices in order to accommodate people who may have special needs. Additional guidance on these and related matters is provided in ICA05 Section 1. - Competency in this unit should be assessed using summative assessment to ensure consistency of performance in a range of contexts. This unit can be assessed either in the workplace or in a simulated environment. However, simulated activities must closely reflect the workplace to enable full demonstration of competency. - Assessment will usually include observation of real or simulated work processes and procedures and/or performance in a project context as well as questioning on underpinning knowledge and skills. The questioning of team members, supervisors, subordinates, peers and clients where appropriate may provide valuable input to the assessment process. The interdependence of units for assessment purposes may vary with the particular project or scenario.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: - ICAA5144B Determine best-fit topology for a local network - ICAI5174B Install high-end switches in multi-switched local area networks - ICAI5176B Install and configure router An individual demonstrating this competency would be able to: - Demonstrate understanding of a broad knowledge base incorporating theoretical concepts, with

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	substantial depth in some areas - Analyse and plan approaches to technical problems or management requirements - Transfer and apply theoretical concepts and/or technical or creative skills to a range of situations - Evaluate information, using it to forecast for planning or research purposes - Take responsibility for own outputs in relation to broad quantity and quality parameters - Take some responsibility for the achievement of group outcomes - Maintain knowledge of industry products and services Additionally, an individual demonstrating this competency would be able to: - Demonstrate knowledge in a well-developed range of switch configurations - Apply solutions to a variety of switch-related problems - Interpret and apply available technical and network information
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Range Statement**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.

<i>Network capacity</i>	- LAN topology support (e.g. Ethernet, AppleTalk, Token Ring, FDDI) - port bandwidth capabilities (e.g. 100 megabits per second) - hardware reliability - expandability (e.g. number of available uplink ports)
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RANGE STATEMENT	
	• redundant power supply (AC/DC)
Topology may include:	• ring • star • bus • hierarchical • hybrid
Switch produced by the following vendors:	• Accton • Cisco • DLink • Intel • 3Com • NetGear • System 3000 Ethernet • Bay
Computer may include:	• laptops • workstations • servers • other devices
Peripherals may include but are not limited to:	• Printers, scanners, tape cartridges • Speakers, multimedia kits • Personal computer fax, modems • Input equipment may include mouse, touch pad, keyboard, pens • Mobile phones, palmtops and personal digital assistants (PDAs), laptops and desktop computers • Bluetooth devices, universal serial bus (USB), Firewire (IEEE 1394)
User may include:	• a person within a department • a department within the organisation • a third party
Cable may include but is not limited to:	• UTP • STP • fibre
Standard may include:	• EIA/TIA 568A • EIA/TIA 568B

Unit Sector(s)

Unit sector	Implement
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Co-requisite units

Co-requisite units		

Competency field

Competency field	
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