Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN4212A Apply advanced routing protocols to network design

Release: 1

ICTTEN4212A Apply advanced routing protocols to network design

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to use software tools, equipment, software and protocols to configure and troubleshoot network routers. 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.

Application of the Unit

Application of the unit	The unit applies to configuration, analysis and troubleshooting of routers in small and medium sized enterprise (SME) networks. It is relevant to advanced routing networks that employ subnet addressing and provide services over a secure network. Relevant job roles include installer of internet protocol (IP) SME networks, SME network technician, network administrator and network support.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan to apply routing protocols	1.1. Prepare for given work according to occupational health and safety (***OHS***) and ***environmental requirements*** with ***appropriate personnel*** 1.2. Identify safety hazards and implement risk control measures in consultation with appropriate personnel 1.3. Determine nature and scope of the ***network*** and ***network routing requirements*** from job briefs and appropriate personnel 1.4. Determine hardware and software diagnostic test methodologies and testing resources according to ***enterprise procedures*** 1.5. Obtain operating instructions, manuals, hardware and software testing methodologies 1.6. Consult appropriate personnel to ensure the task is coordinated effectively with others involved at the worksite
2. Build and test advanced routing	2.1. Set up router interfaces according to manufacturer's specifications and established procedures 2.2. Implement advanced routing protocols to achieve network design requirements 2.3. Implement classless addressing across a network to perform logical connectivity and confirm using ***calculations*** 2.4. Troubleshoot network routing according to manufacturer's specifications and established procedures 2.5. Identify security threats and initiate control measures according to enterprise procedures
3. Complete and document advanced router installation	3.1. Restore worksite to safe condition according to established safety procedures 3.2. Record and store ***essential installation information*** according to enterprise procedures 3.3. Notify appropriate personnel about the completion of the task according to enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- communication skills to liaise and negotiate with customers and peers to achieve design specifications
- literacy skills to:
  - develop network documentation and maintain network records
  - read and interpret enterprise procedures, manuals and specifications
- numeracy skills to interpret technical data
- planning and organisational skills to plan and prioritise own work
- problem solving skills to:
  - deal with unexpected situations on the basis of safety and specified work outcomes
  - troubleshoot common network problems according to help desk procedures
- safety awareness skills to:
  - apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
  - follow enterprise OHS procedures
  - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
  - configure network routing interfaces and protocols
  - implement IP addressing schemes and security strategies
  - troubleshoot advanced routing for client networks
  - use software tools and equipment
  - verify routing

Required knowledge

- distance vector routing protocols RIP v1 and v2
- dynamic routing
- enterprise OHS procedures
- hybrid routing protocols enhanced interior gateway routing protocol (EIGRP)
- link-state routing protocols open shortest path first (OSPF)
- routing and packet forwarding
- routing tables
- scalable routing strategies variable length subnet masking (VSLM) and classless inter-domain routing (CIDR)
- security protocols using access lists
- static routing
- use of software tools and equipment

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 ability to: • plan network routing requirements to meet design specification • configure advanced protocols on network routers • manage network addressing • troubleshoot the network • install network security.
Context of, and specific resources for assessment	Assessment must ensure: • a network facility and workstations • tools, equipment and materials currently used in industry • relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Methods of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct observation of the candidate applying advance routing protocols • review documentation of network routing requirements and router installation prepared by the candidate • oral or written questioning to assess required knowledge.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example with: • ICTTEN2209A Build and maintain a secure network • ICTTEN4213A Configure and troubleshoot advanced network switching • ICTTEN4214A Install and maintain a wide area network.

EVIDENCE GUIDE	
	Aboriginal people and other people from a non-English speaking background may have second language issues. Access must be provided to appropriate learning and assessment support when required. Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed. In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. Where applicable, physical resources should include equipment modified for people with special needs.

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.	
OHS may include:	• awards provisions • hazardous substances and dangerous goods codes • legislation • local safe operation procedures • material safety management systems

RANGE STATEMENT	
	• protective equipment.
Environmental requirements may include:	• dust • excessive energy and water use • excessive noise • fume • gas • liquid waste • smoke emissions • solid waste • vapour.
Appropriate personnel may include:	• customer • manager • network manager • site engineer • supervisor.
Network may include:	• internetwork • LAN • WAN.
Network routing requirements may include:	• addressing schemes • latency • management • packet loss • protocols • security.

Enterprise procedures may include:	• instructions:
	  • designs
	  • drawings
	  • job sheets
	  • plans
	• manufacturer's specifications
	• operational procedures
	• reporting and communication
	• use of tools and equipment.

Calculations may include:	• binary addition • binary conversion • binary division • binary multiplication • binary number system • binary subtraction.

RANGE STATEMENT	
Essential installation information may include:	• configuration • installation software • IP addressing schemes • logical and physical diagrams • network administrator codes • passwords • security access codes • troubleshooting reports.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

Competency field

Competency field	Telecommunications networks engineering