Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN4214A Install and maintain a wide area network

Release: 1

ISC INDUSTRY SKILLS COUNCILS
Creating Australia's Future

ICTTEN4214A Install and maintain a wide area network

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to use appropriate tools, equipment, software and protocols to install and maintain a wide area network (WAN).
	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 the installation and maintenance of medium to large enterprise networks requiring secure WAN access.
	Relevant job roles include installer of internet protocol (IP) networks, IP network technician, network administrator and network support.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

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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. Prepare for the installation and maintenance of a network with WAN access	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 from job briefs or appropriate personnel
	1.4. Select and obtain network hardware, software, **WAN protocol** and technology requirements according to **enterprise procedures**
	1.5. Obtain operating instructions, manuals, installation procedures, hardware and software testing methodologies and testing resources
	1.6. Consult appropriate personnel to ensure the task is coordinated effectively with others involved at the worksite
2. Install and maintain a WAN accessible network	2.1. Determine **network addressing scheme** for network connectivity and confirm using **calculations**
	2.2. Identify security threats and initiate control measures according to enterprise procedures
	2.3. Set up and configure the network to provide WAN access according to manufacturer's specifications and enterprise procedures
	2.4. Use hardware and software analysis and diagnostic methodologies to test network connectivity
3. Complete and document WAN network 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
This section describes the skills and knowledge required for this unit.

REQUIRED SKILLS AND KNOWLEDGE

Required skills

- communication skills to:
  - identify customer requirements
  - liaise with customers and peers to achieve outcomes
- literacy skills to 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 client network problems using industry standard troubleshooting methodologies and tools
- 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:
  - determine and select an appropriate WAN configuration
  - facilitate network connectivity by installing and configuring a WAN communication protocols:
    - frame relay
    - high-level data link control (HDLC)
    - link access procedure, balance (LAPB)
    - point-to-point (PPP)
  - implement teleworker services and network security measures
  - use tools and equipment

Required knowledge

- enterprise OHS procedures
- IP addressing services and network scaling
- methods of securing network services including access control lists
- Open Systems Interconnection layered communication model
- requirements to provide teleworker network services
- tools and equipment correct usage
- WAN link protocols:
  - frame relay

REQUIRED SKILLS AND KNOWLEDGE

- HDLC
- LAPB
- PPP
- WAN troubleshooting methodologies and analysis and diagnostic tools

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 the installation of a WAN accessible network • select and apply WAN link protocols • configure IP addressing across the WAN • troubleshoot WAN communication issues • install WAN access security measures.
Context of, and specific resources for assessment	Assessment must ensure: • a site where installation and maintenance of a WAN may be conducted • use of 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 installing and maintaining a WAN • direct observation of the candidate troubleshooting WAN communication problems • 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 • ICTTEN4212A Apply advanced routing protocols to network design • ICTTEN4213A Configure and troubleshoot advanced network switching.

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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 • protective equipment.

RANGE STATEMENT

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.
WAN protocol may include:	• frame relay • HDLC • LAPB • PPP.

Enterprise procedures may include:	• instructions:
	   • designs
	   • drawings
	   • job sheets
	   • plans
	• manufacturer's specifications
	• operational procedures
	• reporting and communication
	• use of tools and equipment:
	   • bit error rate tester (BERT)
	   • protocol analyser
	   • WAN analyser.

Network addressing scheme may include:	• dynamic addressing • static addressing • subnet addressing.
Calculations may include:	• binary addition • binary conversion • binary division • binary multiplication • binary number system • binary subtraction.

RANGE STATEMENT	
Essential installation information may include:	• installation and configuration documentation • installation software • IP addressing schemes • logical and physical diagrams • network administrator codes • network schematics • 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