Australian Government

Department of Education, Employment and Workplace Relations

ICANWK517A Determine best-fit topology for a wide area network

Release: 1

INDUSTRY
SKILLS
COUNCILS
Creating Australia's Future

ICANWK517A Determine best-fit topology for a wide area network

Modification History

Release	Comments
Release 1	This Unit first released with *ICA11 Information and Communications Technology Training Package version 1.0*

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to identify the best way computers and local area networks (LANs) can be connected to make a wide area network (WAN).

Application of the Unit

This unit applies to individuals in networking areas who are required to research and recommend the most appropriate topology for a wide area network.

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

Element	Performance Criteria
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

1. Identify WAN needs	1.1 Identify the different LAN, or wireless local area network (WLAN) or virtual private network (VPN) segments of the proposed WAN
	1.2 Determine segment needs using functional analysis
	1.3 Estimate *traffic* content and volumes according to expected organisational usage, by examining *telecommunications infrastructure*
	1.4 Develop an organisational WAN functional matrix
2. Create WAN specification	2.1 Determine *resource requirements* for each LAN or WLAN or VPN segment on the basis of functional analysis
	2.2 Consider and report how features of the physical environment affect WAN design
	2.3 Choose a *WAN service* appropriate to the amount and type of traffic expected to access the WAN
	2.4 Include redundant links in the proposed WAN connectivity for link backup purposes, in case the main link is disrupted
	2.5 Document appropriate WAN service

Required Skills and Knowledge

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

Required skills

- analytical skills to identify WAN needs
- literacy skills to compile reports
- numeracy skills to estimate traffic needs and compare costs
- technical skills to use:
  - functional matrices
  - LAN functional matrices
  - network protocols
  - traffic simulation tools.

Required knowledge

- detailed knowledge of:
  - concepts and types of modems
  - internet protocol (IP) addressing
  - packet switching
  - routed or routable protocols, including IP, IPX and AppleTalk
  - router operations, including DDR
  - routing protocols, including RIP, EIGRP and OSPF
  - transmission control protocols or internet protocols (TCPs/IPs)
  - relationship of asynchronous and synchronous communication
  - use of microwave and satellite communication in networking
- overview knowledge of:
  - constraints and costs
  - features of telecommunications infrastructure, including the difference between digital and analog networks
  - growth projections and capacity planning
  - high or low-speed links
  - protocols
  - redundancy paths
  - response time and reliability requirements
  - scope of operation
  - security
  - traffic flow patterns
  - traffic load
  - users and the applications expected.

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: • consider budget constraints and business needs • identify the configuration for connecting a LAN or WLAN or VPN into a WAN • document the configuration.
Context of and specific resources for assessment	Assessment must ensure access to: • design documents relating to LANs to be incorporated into the WAN • equipment specifications • costings • appropriate learning and assessment support when required • modified equipment for people with special needs.

Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:
	 • verbal or written questioning to assess candidate's knowledge of:
	   • network segments
	   • telecommunications infrastructure
	 • review of candidate's WAN functional matrix
	 • evaluation of documented recommendation.

Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate. 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. Indigenous people and other people from a non-English speaking background may need additional support. 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.

Traffic may include:	• data • video • voice.
Telecommunications infrastructure may include:	• asymmetrical digital subscriber line (ADSL) • high speed digital subscriber line (HDSL) • integrated services digital network (ISDN) • leased lines • switched circuits (permanent virtual circuits (PVCs) and switched virtual circuits (SVCs) • symmetrical digital subscriber line (SDSL) • T-carriers, synchronous optical network (SONET) technologies.
Resource requirements may include:	• average transaction and file transfer size • nature of WAN traffic (i.e. constant, steady, flows or communication in bursts) • number of users • telecommunications links • type of applications using the link.
WAN service may include:	• bandwidth • cost structure • reliability.

Unit Sector(s)

Networking

Innovation and Business Skills Australia