Australian Government

Department of Education, Employment and Workplace Relations

ICANWK516A Determine best-fit topology for a local network

Release: 1

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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 determine the most appropriate way of networking computers to meet user needs and business requirements.

Network topologies include large and small local area networks (LANs), wide area networks (WANs), virtual private networks (VPNs), virtual local area networks (VLANs) and wireless local area networks (WLANs).

Application of the Unit

This unit applies to individuals in senior roles in the networking area who are required to plan the most appropriate topology for a proposed 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. Determine user needs	1.1 Identify the different segments of the proposed ***network*** based on business ***requirements***
	1.2 Determine segment needs, using network functional analysis
	1.3 Estimate ***traffic*** content and volumes based on business requirements
	1.4 Develop a prioritised organisational network functional matrix
2. Develop local area network specification	2.1 Determine the resource requirements for each network segment on the basis of functional analysis
	2.2 Analyse features of the physical environment for the effect on network design
	2.3 Conduct a costing process for possible topology options
	2.4 Consider topology options with reference to available resources and network functional matrix
	2.5 Select and document appropriate network topology based on business requirements and functional analysis

Required Skills and Knowledge

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

Required skills

- analytical skills to determine features of the physical environment for the effect on network design
- literacy skills to produce network recommendations
- numeracy skills to conduct a costing process
- technical skills to:
  - conduct basic traffic analysis
  - connect networks and keep cables tidy
  - use LAN functional matrices
  - use network protocols
  - use traffic simulation tools.

Required knowledge

- detailed knowledge of:
  - adaptor cards
  - bridges
  - constraints, including costs and queuing
  - ethernet
  - gateways
  - growth projections and capacity planning
  - high and low-speed links
  - hubs
  - protocols
  - redundancy paths
  - response time and reliability requirements
  - routers
  - scope of operation
  - security
  - transmission control protocol or internet protocol (TCP/IP)
  - traffic flow patterns
  - traffic load
  - users applications requirements
- overview knowledge of:
  - cabling, particularly unshielded twisted pair (UTP), shielded twisted pair (STP) or optic fibre
  - characteristics and relative strengths and weaknesses of LAN network topologies
  - features and capabilities of current industry-accepted hardware and software products
  - features of line sharing protocols.

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: • analyse business or organisational needs • identify the most appropriate LAN, VPN or WLAN topology • document the recommendation.
Context of and specific resources for assessment	Assessment must ensure access to: • business requirements • equipment specifications • organisational and industry costing • 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 knowledge of:
	  • network segments
	  • network traffic
	  • different topologies
	• review of candidate's network functional matrix
	• evaluation of candidate's documented topology 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.

Network may include:	• data • large and small LANs • private lines • public switched telephone network (PSTN) for dial-up modems only • VLANs • VPNs • voice • WANs • WLANs.
Requirements may be in reference to:	• application • business • network • people in the organisation • system.
Traffic may include:	• data • video • voice.

Unit Sector(s)

Networking