



Australian Government

Department of Education, Employment and Workplace Relations

ICANWK518A Design an enterprise wireless local area network

Release: 1

ICANWK518A Design an enterprise wireless local area network

Modification History

Release	Comments
Release 1	This Unit first released with <i>ICA11 Information and Communications Technology Training Package version 1.0</i>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to conduct an internal and outdoor site survey and design a complex wireless local area network (LAN).

Application of the Unit

This unit applies to individuals in the networking area who are required to evaluate client requirements and design an appropriate wireless local 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
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>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.</i>

Elements and Performance Criteria

1. Document current network configuration	1.1 Obtain details of current network layout and parameters 1.2 Hold consultations with key stakeholders 1.3 Document the current network configuration, network topology and links to carrier
2. Research client needs	2.1 Identify the client's current needs 2.2 Determine future needs 2.3 Document current and future needs according to organisational requirements
3. Implement site survey	3.1 Select the appropriate diagnostic tools and measurement processes 3.2 Select test equipment and ensure calibration 3.3 Undertake site survey with minimum disruption to client and ensure safe working environment for users and survey personnel 3.4 Record physical infrastructure, building use, aesthetics and other issues that will impact on future network performance and client acceptance 3.5 Record radio frequency interference issues, sources and possible resolution 3.6 Document results of site survey
4. Develop specifications for upgrade of wireless network	4.1 Document the current network performance equipment and capacity for the expanded network 4.2 Assess interference issues relating to existing radio frequency, topographic barriers, climate, obstacles, transmission distances and construction materials 4.3 Assess optimum location and position of access points, repeaters, routers and other equipment 4.4 Develop cabling plans and repeater links, including power requirements 4.5 Determine frequency to be used based on client and user requirements
5. Model network	5.1 Determine appropriate test and modelling routines 5.2 Determine estimated network traffic and planned growth 5.3 Test planned network using modelling tools and techniques 5.4 Document outcome of tests and revise design where

	required
6. Determine components for network	6.1 Select and test vendor products and equipment where appropriate 6.2 Consult others, including emerging industry bodies, for sustainable compatibility and economic running costs and user connectivity access 6.3 Finalise components list for suitability and vendor claims 6.4 Prepare implementation plans
7. Present design to client	7.1 Present the design in a clear and logical fashion 7.2 Provide advice to client on reasons for design choice 7.3 Inform the client of design limitations, performance expectations and possible unanticipated outcomes, including security threats 7.4 Obtain feedback from client 7.5 Undertake modifications to design if required 7.6 Complete final design documentation and seek client endorsement

Required Skills and Knowledge

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

Required skills

- communication skills to liaise with stakeholders, users and industry bodies
- literacy skills to write technical documentation and record user requirements
- numeracy skills to undertake a cost-benefit comparison
- technical skills to:
 - analyse wireless network performance
 - design, develop and implement various wireless network solutions
 - implement wireless networking strategies and configure wireless network software and hardware
 - implement WLAN and WMAN
 - produce wireless network designs.

Required knowledge

- detailed knowledge of:
 - audit and intrusion detection systems
 - auditing and penetration testing techniques
 - bandwidth and quality of service
 - factors affecting signal quality
 - features of antenna design
 - layer 2 and layer 3 design issues
 - radio frequency theory and practice
 - small office home office (SOHO) and enterprise LANs
 - transmission control protocols or internet protocols (TCP/IP) and applications
 - problems associated with topography and obstacles in radio transmission path
 - wireless security strategies
 - wireless topologies
 - WLAN and WMAN solutions
- overview knowledge of:
 - network protocols and operating systems
 - security protocols, standards and data encryption
 - security threats.

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: • assess wireless network performance • produce wireless network designs appropriate to client requirements • document design.
Context of and specific resources for assessment	Assessment must ensure access to: • network infrastructure, including wireless hardware and software • network technical requirements • real or simulated wireless networks • 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: • wireless networks • wireless security • review of candidate's completed design documentation • evaluation of candidate's implementation plan • direct observation of candidate briefing client and obtaining feedback.
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.

Networks may include:	• domestic • large enterprise WLANs • medium • small.
Network topology may include:	• cabled connected single zone • carrier links • Free Space Optics • indoor and outdoor installations • LMDS • MMDS • multiple zone • satellite connections • stand-alone multi-zone wireless networks.
Client may include:	• communities • external organisations • individuals • internal departments • internal employees.
Document may follow:	• audit trails • client training • International Organization for Standardization (ISO), International Electrotechnical Commission (IEC) and Australian Standards (AS) standards • maintaining equipment inventory • naming standards • project management templates and report writing • satisfaction reports • version control.
Organisational requirements may include:	• how and what the organisation wants in regard to work environment • preventative maintenance and diagnostic policy • problem solution processes • roles and technical responsibilities in network management • vendor and product service level support agreements.

Tools may include:	• cable testing • carrier connection tests • data and voice integration measurements • equipment testing • frequency and spectrum analysers • modelling tools for network performance software • power meters • radiation meter.
Site survey may include:	• building plans • GPS measurements • indoor propagation analysis • path loss measurements • physical inspection • satellite mapping.
Users may include:	• department within the organisation • person within a department • third party.
Cabling may include:	• category 5e, 6 and 7 cable • coaxial cable • fibre optic cable.
Implementation plans may include:	• cabling • construction requirements • cut-over arrangements • service suppliers.
Security may include:	• authentication, authorisation and accounting (AAA) • diameter • IP security (IPSec) • lightweight eXtensible authentication protocol (LEAP) • privacy key management (PKM) • secure sockets layer (SSL) • smart cards • tokens • wi-fi protected access (WPA) • wired equivalent privacy (WEP).

Unit Sector(s)

Networking