



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **ICANWK417A Build an enterprise wireless network**

**Release: 1**

## ICANWK417A Build an enterprise wireless 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 build an enterprise, community or mesh wireless network within and outside buildings.

### Application of the Unit

This unit applies to individuals working in senior design roles in the networking area who are required to develop complex wireless networks for organisations.

### 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                                                                                                                                                                                                                                                                                                    |
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| <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

|                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <p>1. Confirm client requirements and network equipment required</p>             | <p>1.1 Identify and clarify organisational <b>requirements</b> of the client</p> <p>1.2 Evaluate client requirements along with business needs in order to translate into technical requirements</p> <p>1.3 Review existing network design <b>documentation</b> to ensure it is authorised, current and complete</p> <p>1.4 Identify <b>network topology</b></p> <p>1.5 Identify the <b>components</b> required to be installed to meet the technical requirements</p> <p>1.6 Contact vendors and service suppliers to obtain specifications and availability of identified components</p> <p>1.7 Ensure preliminary work is completed within the required timeframe</p> |
| <p>2. Prepare for installation</p>                                               | <p>2.1 Ensure client and <b>users</b> are aware of date and time of installation</p> <p>2.2 Gather, prepare and check installation and safety equipment</p> <p>2.3 Assess on-site safety arrangements for installers and users</p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>3. Select, install and configure access points and other wireless devices</p> | <p>3.1 Select appropriate <b>hardware</b> based on identified components</p> <p>3.2 Install and configure hardware to provide wireless access to network</p> <p>3.3 Ensure connections are secured against intrusion or data access by unauthorised persons, are safe for users, and are protected from the environment</p> <p>3.4 Configure <b>security</b>, monitoring, logging and quality of service features consistent with <b>standards</b> and protocols</p> <p>3.5 Ensure test equipment is calibrated</p> <p>3.6 Test wireless network systems performance and verify that it meets enterprise requirements and is consistent with standards and protocols</p> |
| <p>4. Select, install and configure antennas</p>                                 | <p>4.1 Select appropriate antennas based on design plan</p> <p>4.2 Safely install and configure antennas to provide wireless access to network</p> <p>4.3 Measure and assess signal strength within and outside building</p>                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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|                                            | 4.4 Resolve and report radio frequency interference issues                                                                                                                                                                                                                                          |
| 5. Secure wireless network                 | 5.1 Identify possible security threats to <b>assets</b><br>5.2 Configure client server and helper security devices<br>5.3 Configure associations and filters                                                                                                                                        |
| 6. Train users                             | 6.1 Provide training for users to establish and manage network connections<br>6.2 Resolve pairing and log-on difficulties for users<br>6.3 Inform users of wireless network etiquette and traffic capacity issues<br>6.4 Advise users of help-desk contact details                                  |
| 7. Monitor and administer wireless network | 7.1 Monitor wireless network performance using diagnostic <b>tools</b> , including appropriate software<br>7.2 Debug networking issues to maintain trouble-free wireless connection<br>7.3 Document current settings and store securely consistent with <b>commercial and business requirements</b> |
| 8. Finalise build process                  | 8.1 Review network for performance issues, planned maintenance or upgrade requirements<br>8.2 Report to client with network documentation and recommendations for performance issues<br>8.3 File documentation according to organisational outlines                                                 |

## Required Skills and Knowledge

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

### Required skills

- analytical skills to design, develop and implement various wireless network solutions
- communication skills to:
  - communicate with users
  - liaise with vendors and obtain prices and product details
  - train users
- numeracy skills to prepare a cost-benefit analysis
- planning and organisational skills to plan and manage project according to time lines and cost schedules
- problem-solving skills to troubleshoot and debug
- technical skills to:
  - implement local area networks (LANs)
  - implement wireless networking strategies and configure wireless network software and hardware.

### Required knowledge

- detailed knowledge of:
  - audit and intrusion detection systems
  - auditing and penetration testing techniques
  - bandwidth and quality of service
  - factors affecting signal quality
  - layer 2 and layer 3 design issues
  - small office home office (SOHO) and enterprise LANs
  - transmission control protocols or internet protocols (TCPs/IPs) and applications
  - wireless security strategies
  - wireless topologies
  - wireless local area network (WLAN) and wireless area network (WAN) solutions
- overview knowledge of:
  - features of security threats
  - network protocols and operating systems
  - security protocols, standards and data encryption.

## 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.*

|                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Overview of assessment</b>                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b> | <p>Evidence of the ability to:</p> <ul style="list-style-type: none"> <li>• develop and maintain wireless networks.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Context of and specific resources for assessment</b>                                             | <p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> <li>• network technical requirements</li> <li>• network infrastructure, including wireless hardware and software</li> <li>• appropriate learning and assessment support when required</li> <li>• modified equipment for people with special needs.</li> </ul>                                                                                                                                                                                                                                                               |
| <b>Method of assessment</b>                                                                         | <p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <p>verbal or written questioning to assess candidate's knowledge of:</p> <ul style="list-style-type: none"> <li>• wireless topologies</li> <li>• wireless security networks</li> <li>• wireless security strategies</li> <li>• review of candidate's client report and supporting documentation with recommendations.</li> </ul>                                                                                                                    |
| <b>Guidance information for assessment</b>                                                          | <p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate.</p> <p>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.</p> <p>Indigenous people and other people from a non-English speaking background may need additional support.</p> <p>In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.</p> |



## 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.*

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| <b>Requirements</b> may include:     | <ul style="list-style-type: none"> <li>• how and what the organisation wants in regard to work environment</li> <li>• preventative maintenance and diagnostic policy</li> <li>• problem solution processes</li> <li>• roles and technical responsibilities in network management</li> <li>• vendor and product service level support agreements.</li> </ul>                                                                                        |
| <b>Client</b> may include:           | <ul style="list-style-type: none"> <li>• external organisations</li> <li>• individuals</li> <li>• internal departments</li> <li>• internal employees.</li> </ul>                                                                                                                                                                                                                                                                                   |
| <b>Documentation</b> may follow:     | <ul style="list-style-type: none"> <li>• audit trails</li> <li>• client training</li> <li>• International Organization for Standardization (ISO), International Electrotechnical Commission (IEC) and Australian Standards (AS) standards</li> <li>• maintaining equipment inventory</li> <li>• naming standards</li> <li>• project-management templates and report writing</li> <li>• satisfaction reports</li> <li>• version control.</li> </ul> |
| <b>Network topology</b> may include: | <ul style="list-style-type: none"> <li>• cabled, connected or single zone</li> <li>• carrier links</li> <li>• free space optics</li> <li>• indoor and outdoor installations</li> <li>• local multi-point distribution service (LMDS)</li> <li>• multi-channel multi-point distribution service (MMDS)</li> <li>• multiple zone</li> <li>• satellite connections</li> <li>• stand-alone or multi-zone wireless networks.</li> </ul>                 |
| <b>Components</b> may include:       | <ul style="list-style-type: none"> <li>• hardware, such as: <ul style="list-style-type: none"> <li>• antennas and other connectivity devices</li> <li>• digital subscriber line (DSL) modems</li> <li>• mobile equipment</li> <li>• modem wireless access points</li> </ul> </li> </ul>                                                                                                                                                            |

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|                               | <ul style="list-style-type: none"> <li>• networks</li> <li>• personal computers</li> <li>• power controllers</li> <li>• remote sites</li> <li>• servers</li> <li>• uninterruptible power supplies (UPS)</li> <li>• workstations</li> <li>• cabling, such as:             <ul style="list-style-type: none"> <li>• category 5e, 6 and 7</li> <li>• coaxial</li> <li>• fibre optic</li> </ul> </li> <li>• software, such as:             <ul style="list-style-type: none"> <li>• commercial applications</li> <li>• customised</li> <li>• in-house</li> <li>• organisation specific</li> <li>• packaged</li> </ul> </li> <li>• wireless access.</li> </ul> |
| <b>Users</b> may include:     | <ul style="list-style-type: none"> <li>• community members</li> <li>• department</li> <li>• department within the organisation</li> <li>• third party.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hardware</b> may include:  | <ul style="list-style-type: none"> <li>• access points</li> <li>• bridges</li> <li>• other wireless devices.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Security</b> may include:  | <ul style="list-style-type: none"> <li>• authentication, authorisation and accounting (AAA)</li> <li>• diameter</li> <li>• IP security (IPSec)</li> <li>• lightweight extensible authentication protocol (LEAP)</li> <li>• privacy key management (PKM)</li> <li>• secure sockets layer (SSL)</li> <li>• smart cards</li> <li>• tokens</li> <li>• wi-fi protected access (WPA)</li> <li>• wired equivalent privacy (WEP).</li> </ul>                                                                                                                                                                                                                      |
| <b>Standards</b> may include: | <ul style="list-style-type: none"> <li>• International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), Institute of Electrical and Electronics Engineers (IEEE), Internet Engineering Task Force (IETF), International Telecommunication Union (ITU) and Australian Standards (AS)</li> </ul>                                                                                                                                                                                                                                                                                                                    |

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|                                                          | <ul style="list-style-type: none"><li>• organisational</li><li>• project.</li></ul>                                                                                                                                                                                                                                                                       |
| <b>Assets</b> may include:                               | <ul style="list-style-type: none"><li>• data and information</li><li>• intellectual property</li><li>• physical assets.</li></ul>                                                                                                                                                                                                                         |
| <b>Tools</b> may include:                                | <ul style="list-style-type: none"><li>• cable testing</li><li>• carrier-connection tests</li><li>• data and voice-integration measurements</li><li>• equipment testing</li><li>• frequency and spectrum analysers</li><li>• network performance software</li><li>• policing and shaping tools</li><li>• power meters</li><li>• radiation meter.</li></ul> |
| <b>Commercial and business requirements</b> may include: | <ul style="list-style-type: none"><li>• availability</li><li>• backup and recovery of data</li><li>• confidentiality</li><li>• firewalls</li><li>• hacking prevention</li><li>• integrity</li><li>• password logons</li><li>• remote access to internal network.</li></ul>                                                                                |

## Unit Sector(s)

Networking