Australian Government

Department of Education, Employment and Workplace Relations

ICANWK404A Install, operate and troubleshoot a small enterprise branch 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 use appropriate tools, equipment, software and protocols to install, operate and troubleshoot a small enterprise branch network.

Application of the Unit

This unit demonstrates the skills required for an entry-level network support position. It covers networking fundamentals, wide area network (WAN) technologies, basic security, routing and switching fundamentals, and configuring simple networks.

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. Describe the operation of data networks	1.1 Describe the purpose and functions of various ***network elements*** 1.2 Use the open system interconnections (OSI) and transmission control protocol or internet protocol (TCP/IP) models to explain how data flows in a network 1.3 Describe the purpose and basic operation of the protocols in the OSI and TCP/IP models 1.4 Identify and correct common network problems at layers 1, 2, 3 and 7 using a layered model approach
2. Implement a small switched network	2.1 Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts 2.2 Explain network segmentation, basic traffic management and basic switching concepts 2.3 Perform, save and verify initial switch configuration tasks 2.4 Verify network status and switch operation using ***basic utilities*** 2.5 Implement and verify ***basic security for a switch***
3. Implement an IP addressing scheme and IP services to meet network requirements	3.1 Describe the need and role of addressing in a network 3.2 Create and apply an addressing scheme to a network 3.3 Assign and verify valid IP addresses to hosts, servers and networking devices in a local area network (LAN) environment 3.4 Describe the operation and benefits of using private and public IP addressing 3.5 Implement static and dynamic addressing services for hosts in a LAN environment 3.6 Enable ***network address translation (NAT)*** for a small network with a single internet service provider (ISP) and connection and verify operation 3.7 Configure ***dynamic host configuration protocol (DHCP) and domain name system (DNS)*** operation on a router
4. Implement a small routed network	4.1 Select the appropriate media, cables, ports, and connectors to connect routers to other network devices and hosts

	4.2 Describe basic routing concepts 4.3 Perform, save and verify basic router configuration tasks 4.4 Configure and verify a classless routing protocol 4.5 Verify device configuration and network connectivity using basic utilities 4.6 Implement password and physical security
5. Implement and verify WAN links	5.1 Describe different methods for connecting to a WAN 5.2 Configure and verify basic WAN serial connection
6. Troubleshoot a small enterprise branch network	6.1 Identify and resolve common ***switched network issues*** 6.2 Identify and correct IP addressing issues 6.3 Troubleshoot DHCP, NAT and DNS operation on a router 6.4 Identify and resolve ***common routing problems*** 6.5 Troubleshoot basic ***WAN connection problems***

Required Skills and Knowledge

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

Required skills

- communication skills to establish client requirements
- problem-solving skills to troubleshoot and debug switch and router network issues
- technical skills to assess and implement security requirements.

Required knowledge

- overview knowledge of:
  - classless routing protocols
  - WAN link protocols
- detailed knowledge of:
  - basic routing concepts, small enterprise network switches and routers
  - classful routing protocols (RIPv1)
- purpose and basic operation of the protocols in the open system interconnection (OSI) and TCP/IP models.

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: • design an IP addressing scheme to suit requirements • install, configure and test the network elements to ensure interoperability within the network • apply network topologies, protocols and security issues • apply solutions and troubleshoot defined network problems.
Context of and specific resources for assessment	Assessment must ensure access to: • site where network installation may be conducted • small enterprise routers and switches • network design documentation • equipment specifications • hardware and software • organisational guidelines • computers • appropriate learning and assessment support when required. Where applicable, physical resources should include equipment modified 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: • direct observation of the candidate installing, configuring and testing a new or updated network • evaluation of prepared documentation that outlines testing procedures, test results, recommendation to network changes and completion records • verbal or written questioning of required knowledge.
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 elements may include:	• adaptors • communications cables and connectors • hubs • routers • servers • switches.
Basic utilities may include:	• ping • traceroute (tracert) • Telnet • secure shell (SSH) • ipconfig.
Basic security for a switch may include:	• port security • port deactivation.
NAT, DHCP and DNS may include:	• calling line identification (CLI) configuration • graphical user interface (GUI) configuration.
Switched network issues may include:	• auto-negotiation problems • configuration issues • media issues • switch-hardware failures.
Common routing problems may include:	• configuration issues • dynamic-routing protocols • hardware failures • media issues • static routes.
WAN connection problems may include:	• configuration issues • hardware failures • incorrect passwords • media issues • protocol mismatches.

Unit Sector(s)

Networking