Australian Government

Department of Education, Employment and Workplace Relations

ICANWK603A Plan, configure and test advanced internetwork routing solutions

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 necessary to plan, configure and support advanced internet protocol (IP) addressing and routing when implementing scalable and secure routers connected to local area networks (LANs) and wide area networks (WANs). The unit also covers configuration of secure routing solutions to support branch offices and mobile workers.

Application of the Unit

This unit applies to an information and communications technology (ICT) network specialist, network engineer, network infrastructure engineer, senior network administrator, network and systems manager, ICT security specialist, security engineer, communications engineer and communications manager.

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. Plan, configure and test a complex network-routing protocol solution	1.1 Determine ***network*** resources required for implementing a ***complex distance-vector routing protocol*** solution, a ***multi-area link-state routing protocol*** solution and an ***exterior routing protocol*** solution on a network 1.2 Produce separate protocol implementation plans and verification plans for each routing solution 1.3 Configure and test the routing protocol solution 1.4 Document results of the routing protocol solution implementation and verification plans for each solution
2. Plan, configure and test an internet protocol version 6 (IPv6) based network solution	2.1 Determine network resources needed for implementing IPv6 on a network 2.2 Produce an implementation plan and a verification plan for an IPv6-based network solution 2.3 Configure IPv6 routing and IPv6 interoperation with IPv4 2.4 Verify and test the IPv6 solution and make amendments if necessary 2.5 Document results of IPv6 implementation and verification plans
3. Plan, configure and test an IPv4 or IPv6-based network redistribution solution	3.1 Produce an IPv4 or IPv6 redistribution implementation plan and verification plan based on the outcomes of a network redistribution analysis 3.2 Configure and verify the redistribution solution for the network 3.3 Document results of redistribution, implementation and verification plans 3.4 Analyse the differences between implementing an IPv4 and an IPv6 redistribution solution
4. Plan, configure and test a layer 3 path control solution	4.1 Produce a layer 3 path control implementation plan and a verification plan based on the outcomes of a network redistribution analysis 4.2 Configure and verify layer 3 path control for the network 4.3 Implement basic teleworker and branch services 4.4 Evaluate and compare ***broadband technologies*** and ***VPN technologies*** in terms of access and data transfer rate as solutions for secure broadband network

Required Skills and Knowledge

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

Required skills

- analytical skills to identify functional, performance and management features associated with the operation of complex networks
- communication skills to:
  - communicate complex concepts and issues technically and in plain language
  - liaise with diverse clients
- literacy skills to:
  - develop and prepare operational documentation, such as policies and procedures, and technical and management reports
  - interpret and prepare technical documentation
  - prepare project-management documentation
- planning and organisational skills to risk manage complex and dynamic environments
- problem-solving skills suitable for complex and dynamic environments with demanding service levels
- technical skills to:
  - design, implement and maintain complex networks to industry standards and best practice
  - identify viable complementary and emerging technologies.

Required knowledge

- broadband technologies relevant to advanced internetworking routing solutions
- business justifications for having integrated and unified enterprise networks
- emerging viable business and social technologies
- external developments or factors that affect network design
- IPv4 and IPv6 technologies and solutions
- maintenance and management tools and practices suitable for complex networks to achieve availability and resilience
- network topologies
- regulations, standards and certifications relevant to advanced internetworking routing solutions
- risk-management strategies and practices suitable for a complex network environment
- routing tables, protocols and operational processes
- routing technologies for an enterprise environment
- security for enterprise networks
- security standards and technologies for network environments
- benefits of formal or structured approaches to network management
- virtual private network (VPN) technologies.

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: • plan, configure and support advanced routed network infrastructure • use network tools • plan and analyse redistribution solutions • produce and configure layer 3 path control implementation plan • provide solutions to static and dynamic routing issues together with optimisation strategies.
Context of and specific resources for assessment	Assessment must ensure access to: • site where network installation may be conducted • router hardware and software • organisational guidelines • computers • LAN and WAN systems • 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: • direct observation of the candidate installing, configuring and testing a new or updated network • evaluation of documentation outlining 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 may include:	• integrated network • internet • intranet • LAN • router-based network • switch-based network • VPN • WAN • wireless LAN (WLAN).
Complex distance-vector routing protocol may include:	• ad hoc on-demand distance vector routing protocol (AODV) • destination-sequenced distance-vector routing (DSDV) protocol • enhanced interior gateway routing protocol (EIGRP) • interior gateway routing protocol (IGRP).
Multi-area link-state routing protocol may include:	• intermediate system to intermediate system (IS-IS) • multicast open shortest path first (MOSPF) • open shortest path first (OSPF) and (OSPFv3).
Exterior routing protocol may include:	• border gateway protocol (BGP) • external border gateway protocol (EBGP) • exterior gateway protocol (EGP) • multiprotocol BGP (MBGP).

Broadband technologies may include:	• digital subscriber lines (DSL, ADSL)
	• ethernet
	• fibre technologies
	• cellular:
	  • high-speed packet access (HSPA)
	  • evolution-data optimised (EVDO)
	• satellite
	• worldwide interoperability for microwave access (WiMAX).

VPN technologies may include:	• hybrid • mobile • secure • trusted

	• tunnels.

Unit Sector(s)

Networking