



Australian Government

Department of Education, Employment and Workplace Relations

ICANWK610A Design and build integrated VoIP networks

Release: 1

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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 use appropriate tools, equipment, software and protocols to design and build an internet protocol (IP)-based integrated voice network for small to medium enterprises.

Application of the Unit

This unit applies to the use of foundational elements of voice over internet protocol (VoIP) calls, and the description of dial plans for the design and implementation of gateways, gatekeepers and IP-IP gateways. Relevant job roles include advanced VoIP network support specialist, VoIP network engineer and VoIP systems installer.

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. Plan design concepts of a voice network for specified voice quality	1.1 Determine the design requirements of an IP-based voice network including the choice of network elements 1.2 Evaluate the various applications of real time protocols and of signalling protocols for an appropriate gateway 1.3 Design a site numbering plan including digit manipulation and path selection process 1.4 Plan and assign calling privileges as required 1.5 Predict VoIP call flow and potential impact on voice quality considerations and network performance
2. Design, configure implement and test voice protocols and interoperation of VoIP communications network	2.1 Produce the design layout of the voice network according to the design requirements 2.2 Design and configure a gateway and a gatekeeper to using H.323 protocol suite for dial plan resolution and call admission control for the network 2.3 Configure and test the use of real-time protocols, call management protocols and gateway signalling protocol in the network design 2.4 Analyse the function and interoperation of gatekeepers within an IP communications network
3. Design, configure and test a VoIP IP-to-IP call system	3.1 Analyse the IP-to-IP gateway features and functionality requirements for a given network design requirement 3.2 Configure the gatekeeper to support an IP-to-IP gateway 3.3 Configure and test the IP-to-IP gateway to provide address hiding, protocol and media interworking and call admission control implementations 3.4 Produce test results and evaluate against design requirements

Required Skills and Knowledge

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

Required skills

- communication skills to liaise with internal and external personnel on technical, operational and business-related matters
- literacy skills to:
 - interpret technical documentation
 - write reports as required
- numeracy skills to:
 - take test measurements and interpret results
 - evaluate performance and interoperability of network
- planning and organisational skills to:
 - coordinate the process in liaison with others
 - plan, prioritise and monitor own work
- problem-solving and contingency-management skills to:
 - adapt configuration procedures to requirements of network
 - reconfigure depending on differing operational contingencies, risk situations and environments
 - troubleshoot and debug WLAN issues
- research skills to investigate appropriate hardware to meet requirements
- technical skills to:
 - select and configure networking devices and assess and implement security requirements
 - use networking and network management tools.

Required knowledge

- codecs and their protocols for use
- configuration, verification and troubleshooting procedures to undertake:
 - basic router operation and routing
 - switch with VLANs and inter-switching communications
- design considerations and deployment schemes
- gateway technologies
- IOS and IP networking models
- procedures and techniques for implementing LAN/WAN topologies
- network topologies, architectures and elements
- networking standards and protocols
- voice applications and protocols
- VoIP 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: • produce design plan and requirements of VoIP network • configure and test for voice gateways • design site numbering plan, dial plans and priorities • use networking and network management tools • configure and test real time protocols, call management protocols and gateway signalling protocol in the network elements • implement voice systems and applications.
Context of and specific resources for assessment	Assessment must ensure access to: • site where network installation may be conducted • hardware and software • organisational guidelines • computers • stand-alone and lightweight WLAN controllers and AP • hardware and software LAN/WLAN voice technologies • 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 prepared by the candidate 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.
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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.

<i>Design requirements</i> may include:	• applications for dial peer types • applications of different types of voice ports • calling privileges • functionality of digital signal processor (DSP) • grade of service • latency • numbering plan • quality of service • requirements, complexity and types of codecs (coder-decoders): • G.711 • G.722_64K • G.723.1 • G.726 • G.728 • G.729 • IIBC MODE 30 • ILBC MODE 20 - internet low bitrate codec • role and type of gateways • voice quality requirements.
<i>Network elements</i> may include:	• call managers • gatekeepers • gateways • IP phones • routers • servers • soft phones • switches • toll managers.
<i>Real time protocols</i> may include:	• compressed RTP (CRTP) • control protocol (RTCP) • real-time transport protocol (RTP) • Secure RTP (SRTP).

<i>Signalling protocols</i> may include:	• H.323 • media gateway control protocol (MGCP) • skinny client control protocol (SCCP) • session initiation protocol (SIP).
<i>H.323 protocol suite</i> may include:	• call control • media control • registration, admission and status (RAS).

Unit Sector(s)

Networking