Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN6206A Produce an ICT network architecture design

Release: 1

ICTTEN6206A Produce an ICT network architecture design

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to compile, and evaluate the business specifications from a client and produce a set of architecture design solutions that will cater for present and future forecast demands. 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.

Application of the Unit

Application of the unit	Officers in field work who to carry out design and implementation of technical solutions of ICT networks apply the skills and knowledge in this unit for a practical solution in network design. They would be employed by telecommunications and IT networking provisioning companies specialising in integrating the converging and emerging technologies of ICT networks.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

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

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to produce ICT architecture design	1.1. Obtain ***business specifications*** and ***business requirements*** for the ***client*** from ***appropriate person*** 1.2. Review specifications and requirements to identify the type of ***ICT network*** and network specifications required 1.3. Consult with key ***stakeholders*** to identify their requirements 1.4. Assess business problems, opportunities and objectives and confirm details with appropriate person
2. Produce the preliminary ICT network architecture design	2.1. Ascertain ***technical requirements***, including ***hardware***, ***software*** and ***network elements*** according to specifications 2.2. Select software solutions to suit business platform 2.3. Develop preliminary physical network diagrams as a preface to ***architecture*** blueprint 2.4. Produce a document on the possible ***impact*** of the network design on the business requirements
3. Evaluate preliminary design and likely performance using forecast demands	3.1. Predict forecast traffic demands and the impact on network design from current and future demand requirements 3.2. Benchmark the design using expected ***performance parameters*** 3.3. Review the design based on identification of the likely performance profile (best/worst) 3.4. Determine costs involved with a range of supplier products 3.5. Produce an evaluation report on predicted performance and costs of the network architecture design addressing the business specifications and recommendations
4. Finalise network design and obtain approval	4.1. Review the benchmarks and requirements and final design proposed 4.2. Determine the support and training requirements needed 4.3. Obtain the latest technical specifications and pricing by contacting possible vendors 4.4. Document the network design and present ***documentation*** to appropriate person for approval 4.5. Obtain sign off on final business solution

Required Skills and Knowledge

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 read and interpret technical documentation and write reports, design solutions and recommendations
- numeracy skills to interpret business requirements and specifications and evaluate possible technical design scenarios for optimum solution
- planning and organisational skills to plan, prioritise and monitor own work
- problem solving and contingency management skills to adapt varied business procedures to requirements
- research skills to interrogate vendor databases and websites to implement different solutions to meet client business specifications
- technical skills to:
  - evaluate and make further recommendations for optimum solution
  - produce technical designs

Required knowledge

- broad technical knowledge of technologies:
  - Access Networks
  - Core Networks
  - ICT network topologies
  - mobile cellular networks
  - network protocols and operating systems
  - optical networks and principles
  - radio frequency (RF) technologies and principles
  - radio frequency identification (RFID) hardware and software
- business processes
- client business domain, business function and organisation
- compatibility issues and resolution procedures
- configuration of internet protocol (IP) networks
- customer and business liaison
- desktop applications and operating systems
- documenting technical specifications
- linkage between processes

REQUIRED SKILLS AND KNOWLEDGE
• security protocols, standards and data encryption

Evidence Guide

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: • adapt technologies to specified technical solutions • use site design software and hardware • evaluate client specifications against accepted industry practices • produce technical designs from business specifications • analyse feedback from client and make adjustment to the proposal • produce information that can be shared between businesses • apply design concepts to business solutions • produce technical reports • make recommendations and offer optimum design solutions.

Context of and specific resources for assessment	Assessment must ensure:
	• sites providing:
	  • client functional requirements
	  • business specifications
	  • database software
	  • simulation software
	  • organisational guidelines
	  • network or computer layout
	  • site design software and hardware
	  • information on a range of ICT business solutions.

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: • review of evaluation report prepared by the candidate on predicted performance and costs of the network architecture design outlining the business specifications and recommendations • oral or written questioning on required knowledge

EVIDENCE GUIDE	
	and skills • evaluation of research methodologies and the final proposal prepared by the candidate outlining solutions and recommendations.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTOPN6128A Design a dense wavelength division multiplexing systems • ICTRFN6171A Produce and evaluate architecture designs for WiMAX networks • ICTTEN6169A Produce and evaluate architecture designs for convergent cellular mobile networks. Aboriginal people and other people from a non-English speaking background may have second language issues. Access must be provided to appropriate learning and assessment support when required. Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed. In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. Where applicable, physical resources should include equipment modified for people with special needs.

Range Statement

RANGE STATEMENT

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.	
Business specifications may include:	• budget allocation • budget costs estimate • current system functionality • future plan • growth forecast • technical requirements • timeline • user problem statement.
Business requirements may include:	• business application • business plan • existing system • mission statement • nature of the business • network or people in the organisation.
Client may include:	• external organisations • ICT company • individuals • internal departments • internal employees • service industry.
Appropriate person may include:	• authorised business representative • client • ICT network administrator • ICT network manager • ICT support manager • small or medium enterprise (SME) customer • small office home office (SOHO) customer • supervisor.
ICT network may include:	• Access Network • broadband network • Core network • customer network • internet • intranet

RANGE STATEMENT	
	• multimedia • radio • RFID • security • switching • telecommunications • transmission • voice, video and data.
Stakeholders may include:	• development team • project team • sponsor • user.
Technical requirements may refer to:	• bandwidth • hardware problems • network growth • network security • network traffic congestions • new technologies • power usage • software problems • transmission dropouts • upgrades.

Hardware may include:	• cabling network
	• cellular phone network
	• internet protocol TV (IPTV)
	• IT network elements:
	  • gateway
	  • local area network (LAN) switch
	  • router
	  • server
	  • wireless network
	• multimedia
	• optical network
	• radio network
	• RFID equipment
	• switching equipment
	• transmission equipment
	• voice and data equipment.

Software may include:	• commercial

RANGE STATEMENT	
	• customised software • in-house • network management • operating system • packaged • patches • vendor propriety.

Network elements may include:	• add-drop multiplexer
	• antenna
	• base station
	• dense wavelength division multiplexing (DWDM) unit
	• encoder
	• IT network elements:
	  • gateway
	  • LAN switch
	  • router
	  • server
	  • wireless network
	• laser module
	• optical unit
	• protocol analyser
	• receiver
	• RF unit
	• RFID unit
	• splitter
	• transmitter.

Architecture may include but is not limited to:	• carrier network architecture:
	  • Access
	  • billing
	  • broadband
	  • broadcasting
	  • Core
	  • data
	  • optical
	  • wireless
	• configuration:
	  • large memory model
	  • requests per second

RANGE STATEMENT	

	• small memory model
	• database software:
	  • Informix
	  • Ingres, DB2
	  • Microsoft SQL server
	  • mSQL
	  • MySQL
	  • Oracle
	  • SQL server
	  • Sybase
	• operating system:
	  • Linux
	  • Mac OS
	  • Novell NetWare
	  • Windows.

Impact may refer to:	• fewer downtimes • improved efficiency • improved response times • increased return on investment • lower operational costs • more 'user friendly' network.
Performance parameters may include:	• attenuation • bandwidth • bit error rate (BER) • congestion • data security • distortion • dropouts • interference • latency • packet loss • phase jitter • polarisation • quality of service - QoS • transmission data rate.
Documentation may include:	• audit trails • client training and satisfaction reports • costing details • design report

RANGE STATEMENT	
	• evaluation report and recommendations • implementation plan • international standards • International Electrotechnical Commission (IEC) • Institute of Electrical and Electronics Engineers (IEEE) standards • Internet Engineering Task Force (IETF) standards • International Telecommunications Union (ITU) standards • Australian standards • naming standards • version control.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

Competency field

Competency field	Telecommunications networks engineering