Australian Government

Department of Education, Employment and Workplace Relations

ICTNPL5071A Develop planning strategies for core network design

Release: 1

ICTNPL5071A Develop planning strategies for core network design

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to develop specifications for core networks to be used by network designers. It involves gathering information on anticipated demand and business requirements for the core network to determine design criteria to meet current and future needs. 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	Technical officers or engineers from private and public organisations apply the skills and knowledge in this unit. They combine technical skills with broader organisational skills to plan the various core network technologies within a telecommunications network. As a member of a network planning team, their job titles would include network planner, project manager and core network planner. This unit may apply to various core network technologies such as data, ethernet, Next Generation Networks (NGN), fixed and wireless broadband, core and edge networks, media and content required for the deployment of core network infrastructure.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

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. Evaluate the core network requirements and infrastructure capability	1.1. Estimate likely growth in ***core network*** use by analysing forecasting ***market intelligence data*** on customer demand 1.2. Analyse current traffic and growth trends in edge and backbone networks to forecast the traffic growth and capacity demand for the core network 1.3. Compare available ***capacity***, ***capability*** and ***parameters*** of current ***core infrastructure*** deployment against the researched demand data to identify infrastructure shortfalls 1.4. Quantify the ***network requirements*** for any upgrades or network augmentation 1.5. Determine relevant ***standards and regulatory requirements*** to be considered in core network planning 1.6. Formulate justification to proceed by analysing the ***business requirements*** and benefits to the business
2. Prepare a strategic plan and scoping document	2.1. Determine appropriate ***technologies*** and ***network elements*** for core nnetwork deployment, including new or alternative solutions to meet business requirements 2.2. Select commercially viable technology compatible with the existing network to deploy with existing and future network 2.3. Prepare a planning document and ***supporting documentation*** with recommendations that complies with deployment standards and regulatory requirements 2.4. Provide ***estimated costs*** and schedule for a planning solution
3. Produce the project brief	3.1. Evaluate and summarise ***project scope*** into the required briefing format with supporting documentation that complies with ***core network deployment rules*** 3.2. Plan project delivery to suit business requirements and ***practical limitations*** 3.3. Produce the core networks specifications with ***approvals*** and present to the design section to produce detailed design specifications

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- analytical skills to evaluate the equipment and product offerings allowable across the competing core network technologies
- communication skills to liaise with internal and external personnel on technical and non- technical matters
- learning skills to keep up to date with equipment to meet future service obligations
- literacy skills to interpret technical and non-technical documentation and the writing of summary reports in required formats
- numeracy skills to interpret data results and evaluate different types of technical data
- planning and organisational skills to plan, prioritise and monitor own work and coordinate the planning process in liaison with others
- problem solving and contingency management skills to adapt planning procedures to requirements of particular sites and modify activities depending on differing operational contingencies, risk situations and environments
- research skills to interrogate databases and investigate different network requirements
- technical skills to select and compare benefits and limitations of core network technologies

Required knowledge

- capability and limitations of the various core network technologies for present and future needs
- detailed knowledge of:
  - elements and architecture of core networks
  - limits of a core network
  - typical core network technologies
- elements and architectures of the various core technologies
- key technologies that make up the core network
- overview knowledge of:
  - distribution structure of networks including backbone, core and edge
  - levels of reliability performance standards applicable to the specific equipment deployment needs
  - network design including routing and redundancy
  - standards and regulations

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: • use data to interpret growth patterns and develop options for core network design which satisfy customer and enterprise financial goals • develop a clearly documented network plan within specification and including merging technological developments and product implementation.
Context of and specific resources for assessment	Assessment must ensure: • computer assisted design (CAD) • computer networks • data for network planning • network equipment deployment plans • planning models • standards and regulations.
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 undertaking core network evaluation and planning • review of reports completed by the candidate for planning the development and growth of the ore network • oral or written questioning to assess knowledge of the various aspects of planning for a core telecommunications network.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTNPL4112A Evaluate core network architectures • ICTNPL4113A Plan the deployment of Core Network • ICTNPL5096A Develop planning strategies for Access Network design

EVIDENCE GUIDE	
	• ICTNPL5154A Develop planning strategies for building environment design. 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	
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.	
Core network may include:	• billing • broadband • data • Ethernet

RANGE STATEMENT	
	• media and content • network management • NGN • switching • transport (synchronous digital hierarchy (SDH) optical networking) • voice.

Market intelligence data may refer to:	• customer request
	• development area plans
	• development triggers
	• market research:
	  • external triggers may include:
	  • government initiatives
	  • local councils
	  • local government planning
	  • property developers
	• market surveys
	• planning approvals
	• planning commission
	• service delivery
	• telecommunication databases:
	  • capacity assessment
	  • network performance
	  • traffic dimensioning
	  • zoning.

Capacity may refer to:	• available ports • ability to augment • technical limitations of port provision.
Capability may refer to:	• ability to deliver desired products • meeting design specifications • meeting technical limitations.

Parameters may include:	• asymmetrical digital subscriber line (ADSL) network:
	  • bandwidth utilisation of broadband remote access server (BRAS)-digital subscriber line access multiplexer (DSLAM) trunks
	  • bandwidth utilisation of BRAS- layer 2 network protocol network server (LNS) trunks
	  • BRAS memory and central processing unit

RANGE STATEMENT	
	(CPU) load • number of available BRAS ports • number of internet protocol (IP) addresses in use • number of point-to-point protocol (PPP) sessions in use • hybrid fibre coaxial (HFC) cable broadband network: • cable modem termination system (CMTS) memory and CPU load • IP address availability • number of services connected to a segment • upstream/downstream bandwidth utilisation • IP or multiprotocol label switching (MPLS) data network: • available and utilised bandwidth and ports • network latency • packet loss rates • router or switch card slots available • router or switch CPU load • router or switch memory • media and content hosting and distribution network: • available and utilised bandwidth • available and utilised ports • router CPU load • router memory • router slots available • metropolitan Ethernet network: • available and utilised bandwidth • available and utilised ports • available and utilised virtual local area networks (VLAN) • packet loss rates • switch card slots available • switch CPU load • switch memory • SDH network: • bandwidth provisioned

RANGE STATEMENT	
	• number of add-drop multiplexers (ADM) connected to a ring • number of card slots and ports available • number of circuits provisioned • voice network: • available and utilised bandwidth • available and utilised ports • echo cancellation considerations • network jitter • network latency • number and duration of calls • packet loss rate • quality of service (QoS) • signalling capacity • traffic.
Core infrastructure may refer to:	• building facilities and services • equipment: • billing • cable • customer • data networking • network management • network operations centre • optical • switching • test and monitoring • transmission • wireless • power requirements.
Network requirements may refer to:	• appropriate equipment • compatibility • interoperability • scalable network • suitable technology • upgradeable network.
Standards and regulatory requirements may include:	• company specific policy and standards • design standards • deployment rules

RANGE STATEMENT	

	• regulatory body requirements:
	  • Australian Competition and Consumer Commission (ACCC)
	  • Telecommunications Act.

Business requirements may refer to:	• complying with standards and regulations • deployment of infrastructure in a commercially viable way • meeting customer demands on the network.
Technologies may include:	• carrier Ethernet • dense wavelength division multiplexing (DWDM) systems • IP core • IP private branch exchange (IP PBX) • IPTV • IPv6 networks • MPLS networks • optical routing • optical switching • optical transmission systems • virtual networks.

Network elements may include:	• access points
	• adapters
	• antennas
	• CPU
	• data network:
	  • backbone
	  • edge
	  • MPLS
	  • routers
	  • switches
	• Ethernet network:
	  • applications
	  • gateways
	  • LAN switch
	  • routers
	  • servers
	  • switches
	  • transmission equipment
	  • VLAN

RANGE STATEMENT	

	• HFC cable:
	  • ADM
	  • broadband amplifier
	  • cable modems
	  • DSLAMs
	  • fibre network
	  • multiplexer
	• IP network:
	  • gateways
	  • routers
	  • servers
	  • switches
	• media and content network
	• media managers
	• routers
	• servers
	• SDH transport:
	  • add/drop multiplexer (ADM)
	  • SDH switch
	  • STM-1
	• VoIP and wireless voice network:
	  • gateways
	  • routers
	  • servers
	  • switches
	• voice managers.

Supporting documentation may include:	• briefing documents • business justifications • demand data • government initiatives • market surveys.
Estimated costs may refer to:	• comparable past project costs • costing models • unit rates.
Project scope may include:	• costing • details of requirements to build • justification • materials

RANGE STATEMENT	
	• resource allocation • timing.
Core network deployment rules may refer:	• compatibility with other Core Networks • interoperability with other Core Networks • maintain network integrity • minimal impact on network disruption • scalable technology • upgradeable technology.
Practical limitations may include:	• accessibility of project site • material delivery and installation times • resource availability • resource skill set.
Approvals may include:	• compliance • contract delivery • financial delegation • governance • quality assurance.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

Competency field

Competency field	Network planning