ICTNPL5096A Develop planning strategies for access network design

Release: 1

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Modification History

Not Applicable

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Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to develop specifications for access networks to be used by network designers. It involves gathering information on anticipated demand and business requirements for the access 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 access network technologies within a telecommunications network.
	As a member of a network planning team, their job titles include network planner, project manager and access network planner.
	This unit may apply to various technologies and transmission mediums such as fibre to the x (FTTx), hybrid fibre coaxial (HFC), convergent Next Generation Networks (NGN), copper, optical fibre and wireless required to support the deployment of Access 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 access network requirements and infrastructure capability	1.1. Estimate likely growth in *access network* use by analysing forecasting *market intelligence data* on customer demand
	1.2. Compare available *capacity* and *capability* of current *access infrastructure* deployment against the researched demand data to identify infrastructure and product shortfalls
	1.3. Quantify *network requirements* for upgrades or network augmentation to increase capacity and capability of existing network
	1.4. Determine relevant *standards*, *business and regulatory requirements* to be considered in access network planning
	1.5. 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*, *network elements* and *equipment* for access network 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 relevant supporting documentation for a project brief that complies with *access network deployment rules*
	3.2. Plan project delivery to suit business requirements and *practical limitations*
	3.3. Produce the access 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:
  - determine the equipment that will be used across the spectrum of access network technologies
  - outline the product offerings allowable across all competing access 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 technological changes
- 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 to requirements of particular access networks 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 access network technologies

Required knowledge

- capability and limitations of the various access network technologies
- current equipment to meet future service obligations
- detailed knowledge of:
  - broadband networks
  - data networks
  - elements and architecture of the various access networks
  - elements and architectures of the various access network technologies
  - facilities and environmental issues
  - limits of a fixed access transmission network
  - media and content
  - regional and metropolitan network
  - typical access network technologies
  - voice networks

REQUIRED SKILLS AND KNOWLEDGE

- wireless network
- distribution structure of networks, including backbone, access and edge
- key technologies that make up the access network
- overview knowledge of:
  - levels of reliability performance standards, applicable to the specific equipment deployment needs
  - network design including routing and redundancy
  - standards and regulations
- typical problems and challenges that describe the capability and limitations of the various access networks

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 access network design which satisfy customer and enterprise financial goals • develop a clearly documented network plan, within specification and including merging technological development 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 network evaluation and planning • review of reports completed by the candidate for planning the development and growth of the telecommunications network • oral or written questioning to assess knowledge of the various aspects of planning for an access telecommunications network.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTNPL5071A Develop planning strategies for core network design • ICTNPL5154A Develop planning strategies for building environment design.

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EVIDENCE GUIDE	
	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.	
Access network may refer to:	- access fibre network - broadband network - copper: - asymmetrical digital subscriber line (ADSL) - digital subscriber line (DSL) - twisted pair

RANGE STATEMENT

	• fibre to the premises (FTTP)
	• hybrid fibre coaxial (HFC)
	• wireless networks:
	   • wireless fidelity (WiF)i
	   • world interoperability for microwave access (WiMAX)
	   • wide local area networks (WLAN).

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

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

Access infrastructure may refer to:	• building facilities and services
	• equipment:
	   • cable
	   • customer
	   • data networking
	   • network management
	   • optical

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RANGE STATEMENT

	- switching - test and monitoring - transmission - wireless - power requirements.
Network requirements may refer to:	- appropriate equipment - compatibility - interoperability - scalable network - suitable technology - upgradeable network.
Standards, *business and regulatory requirements* may include:	- company specific policy and standards - council requirements - deployment rules - design standards - 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:	- digital subscriber lines: - ADSL - DSL - mobile radio - NGN: - broadband access - data transfer - internet protocol (IP) based systems - IP private branch exchange (IP PBX) - internet protocol TV (IPTV) - mobile data - mobile telephony - multimedia - video - voice over internet protocol (VoIP)

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RANGE STATEMENT

	• optical transmission systems:
	     • dense wavelength division multiplexing (DWDM) systems
	     • wavelength division multiplexing (WDM) systems.

Network elements may include:	• current copper network:
	     • copper cable
	     • exchange
	     • lead in cable
	     • lightning protection
	     • loading coils
	     • main distribution frame, cross connect unit
	     • manhole
	     • pair gain system
	     • pits
	 • current fibre network:
	     • exchange
	     • fibre access points
	     • high density/optical fibre distribution frame (HD/OFDF)
	     • joint enclosure
	     • manhole
	     • optical fibre
	     • pits
	 • FTTP network:
	     • broadband passive optical network (BPON)
	     • conduit
	     • distribution/lead in multi-port (DLM/LM)
	     • ethernet broadband remote access server (EBRAS)
	     • exchange
	     • fibre distribution hub (FDH)
	     • gigabit passive optical network (GPON)
	     • headend
	     • high density/optical fibre distribution frame (HD/OFDF)
	     • home optical network terminal
	     • lead-in
	     • manhole

RANGE STATEMENT	
	- optical distribution network - optical fibre - packet optical line terminal (P-OLT) - pits - video optical line terminal (V-OLT) - wave division multiplexer (WDM) - HFC network: - coaxial cable - exchange - headend - hub - IP edge - line power supply - node - optical fibre - optical receiver - radio frequency (RF) amplifier - tap - video service centre - transmission hub - wireless network: - access points - antennas - dish - exchange - RF amplifiers - radio towers and huts - RF receivers - RF transmitters - satellite - waveguide.
Equipment may include:	- digital - IP based - optical: - add/drop multiplexers - amplifiers - filters - receivers

RANGE STATEMENT

	• splitters/combiners
	• switches
	• transmitters
	• wireless:
	   • amplifiers
	   • filters
	   • microwave
	   • receivers
	   • RF broadband
	   • satellite
	   • transmitters.

Supporting documentation may include:	• area plans • briefing documents • business justifications • demand data • maps.
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 • resource allocation • timing.

Access network deployment rules may refer to:	• separation from other services:
	   • electricity
	   • fire equipment
	   • gas
	   • other telecommunications service providers
	   • water
	• restricted site access:
	   • financial institutions
	   • government offices
	   • rail corridor
	   • research establishments.

Practical limitations may include:	• accessibility of project site • material delivery and installation times

RANGE STATEMENT	
	• 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