



Australian Government

Department of Education, Employment and Workplace Relations

ICTNPL4108A Plan the deployment of access network architectures

Release: 1

ICTNPL4108A Plan the deployment of access network architectures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to plan the deployment of network architecture when conducting access network telecommunications work. It includes use and consideration of access network deployment data, technology, equipment, capacity management and network management information sources. The plan may be for a new installation or upgrade of capacity or technology for existing network or subsystem for convergence to Next Generation Networks (NGN). 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.
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Application of the Unit

Application of the unit	Technical staff and their sub-contractors from private and public organisations apply the skills and knowledge in this unit. They combine technical design skills with broader organisational skills to plan and deploy access network technologies for a service provider such as a major carrier or a rail service provider. Technical officers or engineers may be responsible for small projects or parts of larger projects on NGN in the deployment of copper, wireless, hybrid fibre coaxial (HFC), fibre to the x (FTTx) and fibre networks.
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Scope the project	1.1.Prepare for work according to site specific safety requirements and enterprise occupational health and safety (OHS) processes and procedures 1.2.Determine the type of access network by accessing and using network information sources 1.3.Produce a brief on how access network architecture components relate to the larger network and their impact on the work 1.4.Evaluate the equipment type and technologies to be considered to determine availability and compatibility with existing network equipment 1.5.Obtain resources and equipment needed for the work according to enterprise procedures and check for correct operation and safety 1.6.Assess the capacity limitation of various platforms in the context of the work to ensure maximum network performance 1.7.Determine product capability and calculate allowable capacity of the Access Network to allow for network growth
2. Produce deployment plan for an Access Network	2.1.Conduct planning work using current equipment components and complying with access network deployment rules and exemption process criteria 2.2.Produce a preliminary plan on the deployment of the network that maintains integrity of the access network 2.3.Discuss unexpected situations with appropriate personnel, with consideration to job specifications, safety and enterprise procedures to establish a solution 2.4.Review plan to ensure that it complies with all standards and codes required when working on network access and where appropriate make adjustments
3. Complete work and report its impact on network access	3.1.Produce final deployment plan including recommendations agreed with the customer 3.2.Provide a report on network monitoring techniques used to manage the network to ensure the network is performing at optimum level

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- analytical skills to:
 - interpret data results and evaluate different types of technical data
 - interpret technical and non-technical documentation and write summary reports in required formats
 - select and compare benefits and limitations of access equipment
- communications skills to liaise with internal and external personnel on technical and operational matters
- planning and organisational skills to prioritise and monitor own work
- technical skills to:
 - identify the various technologies that constitute an access network
 - interrogate databases and evaluate equipment types and technologies

Required knowledge

- Access Network:
 - architectures and geographical categorisation
 - information sources
 - technology and equipment
- capacity and capability management
- capacity limitation of various platforms
- commercial considerations of access network deployment
- compatibility issues of technology and equipment
- currency of technology and equipment use
- enterprise deployment rules and rational
- exemption process criteria
- major equipment components of a modern access architecture
- monitoring techniques to manage the access network
- network topologies
- product capability and availability that are allowable within an access network
- telecommunications access networks issues and challenges

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:

- gather data appropriately within information sources and evaluate how the data relates to the access architecture
- source major equipment and technologies used in an access network and detail their compatibilities
- plan the deployment of an access network architecture, including deployment rules, capacity and capability management and monitoring techniques
- complete work within a timeframe typically expected of the discipline, work function and industrial environment.

Context of and specific resources for assessment

Assessment must ensure:

- network design documentation and other site related documentation
- equipment specifications
- live network or training facilities
- organisational guidelines
- networked computers
- networked telecommunications components.

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 planning the deployment of an access network architecture
- review of reports completed by the candidate for differing access network examples
- review of final deployment plan prepared by the candidate outlining recommendations for the customer
- oral or written questioning to assess knowledge of equipment and technologies as used within the access network.

EVIDENCE GUIDE**Guidance information for assessment**

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- ICTNPL4109A Evaluate the capability of access 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**

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.

RANGE STATEMENT

<i>Access network</i> may refer to:	• broadband: • wireless fidelity (WiFi) • world interoperability for microwave access (WiMAX) • copper: • coaxial • HFC • twisted pair • digital services: • asymmetrical digital subscriber lines (ADSL) • digital subscriber lines (DSL) • NGN: • broadband access • data transfer • internet protocol (IP) based systems • internet protocol private branch exchange (IP PBX) • Internet protocol TV (IPTV) • mobile data • mobile telephony • multimedia • video • voice over internet protocol (VoIP) • optical: • FTTN • FTTP • FTTx • HFC • wireless networks: • cellular • microwave • radio • satellite.
<i>Network information sources</i> may include:	• network management databases for: • capacity assessment data • network performance data • traffic dimensioning data

RANGE STATEMENT	
	network management tools.
Access network architecture components may include:	- copper network: - copper cable - lead-in - lightning protection - line power supply - loading coils - main distribution frame - pair gain system - Ethernet broadband remote access server (EBRAS) - HFC network - IP edge - optical: - add/drop multiplexer - broadband passive optical network (BPON) - cross connect unit - distribution/lead-in multi-port (DLM/LM) - fibre access points - fibre distribution hub (FDH) - gigabit passive optical network (GPON) - high density/optical fibre distribution frame (HD/OFDF) - home optical network terminal - optical distribution network - optical fibre - optical receiver - packet optical line terminal (P-OLT) - video optical line terminal (V-OLT) - wave division multiplexer (WDM) - wireless network: - antennae - dish - headend - hubs and nodes - radio towers and huts - radio frequency (RF) amplifier - RF transmitters and receivers

RANGE STATEMENT	
	• satellite • tap • waveguide • video service centre.
Equipment type may include:	• digital • IP based • optical: • add/drop multiplexers • amplifiers • filters • receivers • splitters/combiners • switches • transmitters • wireless: • amplifiers • filters • microwave • receivers • RF broadband • satellite • transmitters.
Technologies may include:	• digital subscriber lines: • ADSL • DSL • IP broadband: • IPTV • VoIP • WiFi • WiMAX • mobile radio • optical transmission systems: • DWDM systems • WDM systems.
Resources may include:	• equipment • hardware • installation platforms • ladders

RANGE STATEMENT	
	• manpower • materials • safety equipment • software • tools.
<i>Enterprise procedures</i> may include:	• asset registration • compliance • preferred suppliers • preferred vendors • procurement agreements • purchase requisition • service level agreements (SLA).
<i>Equipment components</i> may include:	• IP based network elements: • gateways • routers • switches • optical devices: • amplifiers • multiplexers • routers • switches • virtual equipment: • networks • private branch exchange (PBX) • simulations • servers.
<i>Access Network deployment rules</i> may relate to:	• exemption process criteria • restricted site access: • financial institutions • government offices • rail corridor • research establishments • separation from other services: • electricity • fire equipment • gas • other telecommunications service providers • water.

RANGE STATEMENT	
Monitoring techniques may include use of :	• databases: • capacity assessment data • traffic dimensioning data • network performance data • network management system • network management tools.

Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Network planning
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