ICTOPN5120A Plan for an optical system upgrade and cut over

Release: 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

ICTOPN5120A Plan for an optical system upgrade and cut over

Modification History

Not Applicable

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Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to plan the activities of a major upgrade of optical systems from specifications provided by the planning and design section. Major upgrades in enterprise networks or telecommunications service provider's networks involve cut over activities to integrate additional work into existing network.
	The exponential growth of internet protocol (IP) traffic is driving IP optical integration, in particular the convergence of IP and dense wavelength division multiplexing (DWDM) networks in Next Generation Networks (NGN), necessitating regular system upgrades.
	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	Field officers, technicians or technical supervisors from carriers, contractors or other service providers whose work involves upgrading optical systems and equipment in enterprise networks and service providers' core and access networks apply the skills and knowledge in this unit.
	They are involved in maintenance, upgrades and cut overs of emerging technologies in IP based telecommunications networks.
	Relevant jobs roles include a supervisor in charge of installation and maintenance teams responsible for the new installations and upgrades of telecommunications networks.

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. Gather information to prepare upgrade activity plan	1.1. Obtain *relevant legislation*, *codes*, *regulations and standards* for compliance when conducting work 1.2. Obtain design specifications from the planning and design section to determine the scope and *nature* of the *upgrade* 1.3. Analyse the design specification and design plan and determine the accuracy of the design plan to site installation and requirements with *customer* 1.4. Determine the *network equipment* types and obtain installation details from manufacturer 1.5. Prepare an equipment and component list and source vendors for procurement
2. Prepare upgrade activity plans	2.1. Prepare a detailed *installation plan* of the upgrade for the installer 2.2. Prepare a detailed *installation procedure* to carry out the upgrade to minimise impact to the customer 2.3. Prepare pre-installation *optical tests* on existing equipment to determine benchmarks and performance levels prior to the upgrade 2.4. Prepare post-installation optical tests on upgrade to ensure upgraded system is achieving the desired results 2.5. Prepare monitoring schedule to progressively assess the *progress of the upgrade* 2.6. Prepare *contingency plan* for backing out if upgrade is not progressing according to schedule and disruptions to customer are excessive 2.7. Prepare cut over procedures
3. Complete documentation	3.1. Update and produce *documentation* for submission 3.2. Submit planning activity document to planning and design section for approval

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

REQUIRED SKILLS AND KNOWLEDGE

Required skills

- analytical skills to evaluate impact of upgrades on customer, equipment and systems
- communication skills to provide advice and guidance and liaise with other technical staff on operational matters
- literacy skills to:
    - prepare:
        - installation plans
        - installation procedures
        - pre-installation tests
        - post-installation tests
        - contingency plans
        - cut over plan
    - read and interpret:
        - enterprise procedures, manuals and specifications
        - technical data, technical and non-technical information from a range of sources
        - test results
- numeracy skills to interpret technical data
- PC skills to monitor installed software
- planning and organisational skills to plan and prioritise own work
- problem solving skills to:
    - deal with unexpected situations on the basis of safety and specified work outcomes
    - prepare upgrade plan
    - troubleshoot common equipment and network problems
- safety awareness skills to:
    - apply precautions and required action to minimise, control or eliminate hazards
    - follow enterprise occupational health and safety (OHS) procedures
    - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
    - analyse the impact of applications on traffic flow in the network
    - determine customer requirements and an upgrade plan
    - determine the impact of upgrading hardware and software on network functionality
    - identify the technical requirements, constraints and manageability issues for a given customer network requirement
    - implement upgrade of equipment and software

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REQUIRED SKILLS AND KNOWLEDGE

- use test equipment and monitoring tools
- use tools and equipment to assemble and disassemble equipment

Required knowledge

- alarms
- backup systems
- computer knowledge
- escalation and outage procedures
- network management systems
- overview knowledge of telecommunications networks and equipment
- telecommunications monitoring tools
- telecommunications test equipment and test setups
- telecommunications wiring practices
- upgrade and post-upgrade routines

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:
	• prepare an upgrade plan incorporating the essential activities listed:
	    • detailed installation plan and installation procedures
	    • pre-installation and post-installation tests
	    • monitoring schedule to assess progress of the upgrade
	    • contingency plan.

Context of and specific resources for assessment	Assessment must ensure: • site where upgrade and cut over may be planned • use of equipment, software, test and monitoring equipment currently used in industry • relevant regulatory, equipment, enterprise and vendor documentation that impacts on work activities.
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 performing upgrade • direct observation of the candidate performing tests and monitoring alarms • review of documents prepared by the candidate providing upgrade plan and assessing impact of upgrade taking into consideration customer feedback • oral or written questioning to assess knowledge of upgrade, testing and monitoring procedures.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTTEN4073A Cut over customer premises equipment major upgrades • ICTTEN4076A Complete equipment and software

EVIDENCE GUIDE	
	upgrades
	• ICTTEN4086A Undertake routine maintenance of the telecommunications network
	• ICTTEN5061A Cut over new and replacement network equipment.
	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	
Relevant legislation, ***codes***, ***regulations and standards*** may include:	- Australian Communications Industry Forum (ACIF) standards and codes - AS Communications Cabling Manual (CCM) Volume 1 - AS/NZS 3000:2007 - AS/NZS 3080:2003 - AS/NZS 3084:2003 - AS/NZS 3085.1:2004 - AS/NZS IEC 61935.1:2006 - AS/NZS IEC 61935.2:2006 - AS/NZS ISO/IEC 14763.3:2007 - AS/NZS ISO/IEC 15018:2005 - AS/NZS ISO/IEC 24702:2007 - cabling security codes and regulations - Environmental Protection Acts - OHS Acts - technical standards AS/ACIF S008:2006 and AS/ACIF S009:2006.
Nature of upgrade work may include:	- commission of new system - installation of new additional equipment - installation of new software - integration of new equipment into existing system - provision of temporary service - removal of redundant equipment - test on new system.
Upgrade may include:	- introducing dispersion compensation devices - moving to 40 Gbps technology - network capacity upgrade: - additional optical fibres to be added - additional DWDM wavelength channels and associated hardware to be added - increase data rate by changing transmitter and receiver cards - replace optical fibre with a type more suited towards 40 Gbps - upgrading from erbium doped fibre amplifiers (EDFA) to Raman optical amplifiers - upgrading laser transmitter power.
Customer may be:	asset manager

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RANGE STATEMENT

	• contractor • network planner • nominated customer representative • project manager • service provider.
Network equipment may include:	• asynchronous transfer mode (ATM) switch • dispersion compensation devices • enclosures • hubs • optical add drop multiplexer (OADM) • optical amplifier • optical filters • optical splitters • patch panels • regenerator • synchronous digital hierarchy (SDH) multiplexers • transponder shelf.
Installation plan may include:	• cable trays • detailed drawings and equipment layout • detailed list of equipment and types • earthing specifications • equipment locations • equipment mounting details • interconnecting cabling between racks • monitoring equipment • power feeds • rack positions • testing procedures • tools.

Installation procedures may include:	• setup procedures
	• monitoring progress according to plan
	• notification of network operations centre (NOC)
	• sourcing hardware and software
	• upgrade activity:
	  • installing optical equipment
	  • post-upgrade testing
	  • pre-update testing
	  • shutdown installation

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RANGE STATEMENT	
	• rectifying faults.
Optical tests may include:	• bit error rate test (BERT) • default settings • functional test • optical power levels • optical return loss • optical signal to noise ratio (OSNR) • performance tests.
Progress of upgrade may include:	• rate of deliverables against project timeline • risk management • timing.
Contingency plan may:	• be developed as part of the upgrade planning and design • be escalated and referred to more specialist team • invoke partial upgrade to be continued at later stage • invoke reversion procedure to pre-update condition.
Documentation may include:	• configuration details • implementation and testing procedures • network impact statement • software test results • system updates • test results and recommendations • upgrade details • vendor, equipment and enterprise specific details.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

Competency field

Competency field	Optical networks