



Australian Government

ICTOPN501 Plan and configure dense wavelength division multiplexing systems

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 2.0.

Application

This unit describes the skills and knowledge required to prepare activity plans and specifications required to deploy a dense wavelength division multiplexing (DWDM) optical network suitable for a metropolitan area network (MAN) or long haul applications.

It applies to individuals who work as members of a team and use high-level communication and technical skills to provide services in Next Generation Networks (NGN) using emerging technologies.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Unit Sector

Telecommunications – Optical Networks

Elements and Performance Criteria

Element	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare for DWDM planning activities	1.1 Obtain relevant legislation, codes, regulations and standards for compliance when conducting work 1.2 Scope the work by obtaining project plan from appropriate personnel and arrange for site access to comply with security arrangements 1.3 Notify appropriate personnel of identified safety hazards at the worksite
2. Plan DWDM	2.1 Follow work health and safety (WHS) and environmental

installation activities and develop specifications	requirements for given work and identify and avoid other services 2.2 Identify tools, safety equipment, plant and machinery for installation work activities 2.3 Conduct physical inspections of proposed DWDM sites and verify backbone dark fibre is accessible and available according to cabling plan 2.4 Verify proposed backbone and customer fibre cable routes to splicing cabinet and fibre patch panel, and identify barriers to cable installation 2.5 Verify proposed power cabling route from distribution board and circuit breakers, and identify barriers to cable installation 2.6 Modify cable plan if required and notify appropriate personnel 2.7 Prepare fibre installation specifications and power cable and grounding specifications according to cabling plan and safe work practices and manufacturer's instructions 2.8 Verify proposed location of associated hardware racks, cabinets and ironwork, and confirm access to enterprise local area network (LAN)
3. Prepare DWDM shelf configuration and specifications according to customer requirements	3.1 Prepare a configuration document including configuration plans and specifications for the installation team 3.2 Specify location of DWDM shelves or racks and the shelf interconnection fibre cabling layout according to cabling plan 3.3 Specify individual DWDM units and circuit card types required to suit customer requirements
4. Plan preliminary optical tests	4.1 Verify backbone fibres at patch panel and conduct bidirectional optical time domain reflectometer (OTDR) test and record measurement results and OTDR images 4.2 Conduct bidirectional optical loss test set (OLTS) measurement of insertion loss on backbone fibres from patch panel to patch panel at adjacent sites and record measurement results
5. Complete documentation and obtain sign-off	5.1 Provide results of optical measurements to design team 5.2 Complete and provide updated specification documentation to installation team 5.3 Submit documentation to appropriate person for approval and sign-off

Foundation Skills

This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.

Skill	Performance Criteria	Description
Reading	1.1, 2.1, 2.3, 2.7, 3.2	Interprets textual information from relevant sources to identify and plan for all job requirements and to adhere to procedures and standards
Writing	1.2, 1.3, 2.6, 3.1, 4.1, 4.2, 5.1, 5.2	Accurately completes relevant reports and documentation using clear and technically specific language, numerical data and diagrammatic information
Oral Communication	1.2, 1.3, 2.6, 5.1	Uses listening and questioning skills to confirm understanding for requirements, participates in a verbal exchange of ideas and solutions and uses appropriate, detailed and clear language to address key personnel, contractors, vendors and clients
Numeracy	2.7, 4.1, 4.2, 5.1	Uses mathematical equations to evaluate technical data to calculate required settings and make adjustments
Navigate the world of work	1.1, 2.1, 2.7	- Understands how own role meshes with others and contributes to broader work goals - Monitors adherence to legal and regulatory rights and responsibilities with specific reference to safe industry practices
Interact with others	5.3	Actively identifies requirements of important communication exchanges, selecting appropriate channels, format, tone and content to suit purpose and audience and monitoring impact
Get the work done	1.1, 1.2, 2.2-2.5, 2.8, 3.2, 3.3, 4.1, 4.2	- Develops plans to manage relatively complex, non-routine tasks with an awareness of how they may contribute to longer term operational and strategic goals - Makes a range of critical and non-critical decisions in relatively complex situations, taking a range of constraints into account - Demonstrates a sophisticated understanding of principles, concepts, language and practices associated with the digital world

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
ICTOPN501 Plan and configure dense wavelength division multiplexing systems	ICTOPN5118A Plan and configure dense wavelength division multiplexing systems	Updated to meet standards for Training Packages	Equivalent unit

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=a53af4e4-b400-484e-b778-71c9e9d6aff2>

Assessment Requirements for ICTOPN501 Plan and configure dense wavelength division multiplexing systems

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Performance Evidence

Evidence of ability to:

- plan and develop all required dense wavelength division multiplexing (DWDM) installation activities according to all work health and safety (WHS) and job specifications
- prepare all DWDM shelf configurations and specifications
- plan preliminary optical tests
- complete project and acceptance documentations and submit for approval.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- explain configuration of DWDM shelf
- summarise principles of DWDM operations
- manage risk of electrostatic discharge
- summarise features and operating requirements of the following test equipment:
 - hand-held optical power meter
 - optical spectrum analyser
 - optical time domain reflectometer (OTDR)
 - transmission test set
- describe functions of an optical add drop multiplexer
- explain the role of the following in planning and configuration of DWDM systems internet protocol (IP) addressing:
 - subnet mask
 - dynamic host configuration protocol (DHCP)
 - default gateway

- explain International Telecommunications Union (ITU) wavelength grid for DWDM
- identify optical fibre connector types and discuss their characteristics
- identify optical fibre types and discuss their characteristics
- explain path protection and protection switching
- summarise physical optical loopbacks and software loopbacks used to assist with testing DWDM systems
- identify protocols used on optical DWDM systems
- discuss the use of ring topologies and linear network topologies in DWDM system cable routes
- explain specific work health and safety (WHS) requirements that impact safe inspection of optical connectors and safe measurement of optical power from laser transmission systems.

Assessment Conditions

Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the workplace. Noise levels, production flow, interruptions and time variances must be typical of those experienced in the Telecommunications – Optical Networks field of work and include access to:

- test equipment currently used in industry
- manufacturer's technical documentation
- relevant regulations and specifications.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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