



Australian Government

ICTOPN507 Plan and configure dense wavelength division multiplexing optical networks

Release: 1

ICTOPN507 Plan and configure dense wavelength division multiplexing optical networks

Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 7.0.

Application

This unit describes the skills and knowledge required to plan and configure dense wavelength division multiplexing (DWDM) optical networks for metropolitan area networks (MAN) and 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).

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 cabling plan from relevant personnel and arrange for site access in compliance with organisational regulations and work standards 1.2 Notify relevant personnel of identified safety hazards at worksite and complete required safety procedures
2. Plan DWDM installation activities and develop specifications	2.1 Identify tools, safety equipment, plant and machinery required for installation activities 2.2 Conduct physical inspection of proposed DWDM sites according to organisational requirements and procedures 2.3 Confirm that backbone dark fibre is accessible and available according to cabling plan

ELEMENT	PERFORMANCE CRITERIA
	2.4 Confirm that proposed backbone and customer fibre cable routes to splicing cabinet and fibre patch panel 2.5 Identify barriers to cable installation 2.6 Verify proposed power cabling route from distribution board and circuit breakers 2.7 Modify cabling plan and notify relevant personnel of all changes 2.8 Prepare fibre installation specifications, power cable and grounding specifications according to cabling plan, safe work practices and manufacturer instructions 2.9 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	3.1 Prepare configuration documents, and detail configuration plans and specifications for installation teams 3.2 Specify location of DWDM shelves, racks and shelf interconnection fibre cabling layout according to cabling plan 3.3 Specify individual DWDM units and circuit card types according to customer requirements
4. Plan preliminary optical tests	4.1 Verify backbone fibres at patch panel and conduct bidirectional optical time domain reflectometer (OTDR) test 4.2 Record measurement results and OTDR images according to organisational requirements 4.3 Conduct bidirectional optical loss test set (OLTS) measurement of insertion loss on backbone fibres between patch panels at adjacent sites 4.4 Record measurement results according to organisational requirements
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 relevant personnel 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	DESCRIPTION
Numeracy	Uses mathematical equations to evaluate technical data, calculate required settings and make adjustments
Oral communication	- Uses listening and questioning skills to confirm requirements and participates in verbal exchanges of ideas and solutions - Uses detailed and clear language to address key personnel, contractors, vendors and clients
Reading	Interprets textual information from sources to identify and plan for all job requirements and to adhere to procedures and standards
Writing	Completes reports and documentation using clear and technically specific language, numerical data and diagrammatic information
Teamwork	Identifies requirements of important communication exchanges, selecting required channels, format, tone and content to suit purpose and audience and monitoring impact
Planning and organising	- Develops plans to manage relatively complex, non-routine tasks with an awareness of how they may contribute to longer term operational and strategic goals - Monitors adherence to legal and regulatory rights and responsibilities with specific reference to safe industry practices
Problem solving	- Explains how own role meshes with others and contributes to broader work goals - Makes a range of critical and non-critical decisions in relatively complex situations, taking a range of constraints into account
Technology	Demonstrates a sophisticated knowledge of principles, concepts, language and practices associated with the digital world

Unit Mapping Information

Supersedes and is equivalent to ICTOPN501 Plan and configure dense wavelength division multiplexing systems.

Links

Companion Volume Implementation Guide is found on VETNet -

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

Assessment Requirements for ICTOPN507 Plan and configure dense wavelength division multiplexing optical networks

Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 7.0.

Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- plan and configure at least two dense wavelength division multiplexing (DWDM) optical networks.

In the course of the above, the candidate must:

- prepare DWDM shelf configurations and specifications
- plan preliminary optical tests
- complete project and acceptance documentation and submit for approval
- comply with work health and safety (WHS) requirements and job specifications.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- configuration of DWDM shelves
- principles of DWDM operations
- functions and features of cabling plans
- risk of electrostatic discharge
- functions and features of specification documents
- functions and operating features of the following test equipment:
 - hand-held optical power meter
 - optical spectrum analyser
 - optical time domain reflectometer (OTDR)
 - transmission test set
- functions of an optical add drop multiplexer

- role of the following items in planning and configuring DWDM systems internet protocol (IP):
 - subnet masks
 - dynamic host configuration protocol (DHCP)
 - default gateways
- International Telecommunications Union (ITU) wavelength grid for DWDM
- types and characteristics of optical fibre connector types
- path protection and protection switching processes
- features of physical optical loopbacks and software loopbacks used in testing DWDM systems
- protocols used on optical DWDM systems
- use of ring topologies and linear network topologies in DWDM system cable routes
- WHS requirements that impact safe inspection of optical connectors and safe measurement of optical power from laser transmission systems.

Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- test equipment used in industry
- manufacturer technical documentation
- required regulations and specifications.

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

Links

Companion Volume Implementation Guide is found on VETNet -

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