

Contents

Preface	Preface-1
1. Introduction	1-1
1.1 Purpose and Scope	1-1
1.2 Target Audience	1-1
1.3 Structure of This Document	1-2
1.4 Requirements Terminology	1-2
1.5 Requirement Labeling Conventions	1-3
1.5.1 Numbering of Requirement and Related Objects	1-3
1.5.2 Requirement, Conditional Requirement, and Objective Object Identification	1-3
1.6 Update History	1-4
2. WDM Technology and Network Architectures	2-1
2.1 Overview of WDM Technology	2-1
2.1.1 Functional Definitions of ONEs	2-2
2.2 Network Architectures	2-5
2.2.1 Point-to-Point	2-5
2.2.2 Linear Chain	2-7
2.2.3 Optical Channel Dedicated Protection Ring (OChDPRING)	2-8
3. Management Architectures	3-1
3.1 TMN Logical Architecture	3-1
3.1.1 Management Functional Areas for an Optical Transport Network	3-1
3.1.2 Logical Layers	3-2
3.2 Benefits of Implementing a TMN	3-5
3.3 NMS Architecture	3-6
3.4 NMS Functional Scope	3-7
4. Operations Functional Requirements	4-1
4.1 Configuration Management	4-1
4.1.1 Installation Support	4-1
4.1.2 Provisioning	4-5
4.2 Performance Management	4-23
4.2.1 Performance Monitoring	4-24
4.2.2 Performance Management Control	4-30
4.2.3 Performance Analysis	4-30
4.3 Fault Management	4-31
4.3.1 Alarm Surveillance	4-31
4.3.2 Fault Localization	4-34
4.3.3 Fault Correction	4-35
4.3.4 Testing	4-36
4.3.5 Trouble Administration	4-37
4.4 Security Management	4-41
4.4.1 NMS Security Features	4-42

4.4.2	Security Administration	4-51
4.4.3	Interoperable Security Features	4-53
4.5	Common Operations Management	4-54
5.	Operations Communications	5-1
5.1	NMS to EMS Communications	5-1
5.1.1	Standard Protocols for NMS to EMS Interfaces	5-1
5.1.2	NMS to Legacy OS Interfaces	5-1
5.1.3	CORBA as an Alternative Protocol for NMS to EMS Interfaces	5-1
5.1.4	Information Modeling	5-2
	References	References-1
	Acronyms	Acronyms-1
	Requirement-Object Index	ROI-1

List of Figures

Figure 2-1.	Two-Channel, Unidirectional, Point-to-Point WDM System . . .	2-1
Figure 2-2.	Two-Channel, Bidirectional, Point-to-Point WDM System . . .	2-2
Figure 2-3.	Point-to-Point Configuration	2-5
Figure 2-4.	Point-to-Point WDM Systems	2-6
Figure 2-5.	Point-to-Point WDM Systems with Wavelength Pass-Through .	2-7
Figure 2-6.	Linear Chain with OTMs and OADM	2-7
Figure 2-7.	Optical Channel Dedicated Protection Ring (OChDPRING) . .	2-8
Figure 3-1.	TMN Functional Structure	3-4
Figure 3-2.	Examples of System Implementation of TMN Logical Layer Functions	3-5
Figure 3-3.	NMS Architecture Example	3-7