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SERIES Q: SWITCHING AND SIGNALLING

Q3 interface

ATM-PON requirements and managed entities for the network and network element views

ITU-T Recommendation Q.834.1

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For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation Q.834.1

ATM-PON requirements and managed entities for the network and network element views

Summary

This Recommendation defines the managed entities that are required to support the requirements for the management of a Passive Optical Network (ATM-PON). These definitions are to be used to develop a protocol-neutral information model. A network element view combined with a network view of an ATM-PON is modelled according to a protocol-neutral information modelling concept. The concept provides a protocol-neutral MIB and thus permits developers to derive an implementation-specific MIB from any management protocol. The information model described herein is used on an interface between a Network Management Layer and an Element Management Layer.

Source

ITU-T Recommendation Q.834.1 was approved on 13 June 2004 by ITU-T Study Group 4 (2001-2004) under the ITU-T Recommendation A.8 procedure.

Keywords

APON, BPON.

FOREWORD

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

ITU-T Recommendation Q.834.1

ATM-PON requirements and managed entities for the network and network element views

1 Scope

This Recommendation specifies an information of ATM-PON system at a Q interface at a reference point beyond an element management layer (ITU-T Rec. M.3013). This Q interface is defined as the network and network element views.

This Recommendation provides network as well as network element view managed entities to support a protocol-neutral information model for ATM-PON. As a consequence, the managed entities and their properties will be used to develop a protocol-neutral information model. The model may then be used to develop specific MIBs, which are appropriate for the management protocols. These managed entities are specific to the ATM-PON system. Therefore, the suffix "F" is added to their names in order to distinguish them from generic managed entities.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[1] ITU-T Recommendation M.3010 (2000), *Principles for a telecommunications management network*.

[2] ITU-T Recommendation M.3013 (2000), *Considerations for a telecommunications management network.*

[3] ITU-T Recommendation G.709/Y.1331 (2003), *Interfaces for the Optical Transport Network (OTN)*.

[4] ITU-T Recommendation G.774 (2001), *Synchronous digital hierarchy (SDH) – Management information model for the network element view*.

[5] ITU-T Recommendation G.902 (1995), *Framework Recommendation on functional access networks (AN) – Architecture and functions, access types, management and service mode aspects*.

[6] ITU-T Recommendation G.982 (1996), *Optical access networks to support services up to the ISDN primary rate or equivalent bit rates*.

[7] ITU-T Recommendation G.983.1 (1998), *Broadband optical access systems based on Passive Optical Networks (PON), plus Amendment 1 (2001) and Corrigendum 1 (1999)*.

[8] ITU-T Recommendation G.983.2 (2002), *ONT management and control interface specification for B-PON, plus Amendment 1 (2003).*

[9] ITU-T Recommendation G.983.3 (2001), *A broadband optical access system with increased service capability by wavelength allocation, plus Amendment 1 (2002)*.

[10] ITU-T Recommendation G.983.4 (2001), *A broadband optical access system with increased service capability using dynamic bandwidth assignment*.

[11] ITU-T Recommendation G.852.2 (1999), *Enterprise viewpoint description of transport network resource model*.

[12] ITU-T Recommendation G.992.1 (1999), *Asymmetrical digital subscriber line (ADSL) transceivers*.

[13] ITU-T Recommendation G.992.2 (1999), *Splitterless asymmetric digital subscriber line (ADSL) transceivers*.

[14] ITU-T Recommendation I.321 (1991), *B-ISDN protocol reference model and its application*.

[15] ITU-T Recommendation I.326 (2003), *Functional architecture of transport networks based on ATM*.

[16] ITU-T Recommendation I.366.1 (1998), *Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2*.

[17] ITU-T Recommendation I.366.2 (2000), *AAL type 2 service specific convergence sublayer for narrow-band services*.

[18] ITU-T Recommendation I.432.2 (1999), *B-ISDN user-network interface – Physical layer specification: 155 520 kbit/s and 622 080 kbit/s operation*.

[19] ITU-T Recommendation X.731 (1992) | ISO/IEC 10164-2:1993, *Information technology – Open Systems Interconnection – Systems Management: State management function*.

[20] ATM Forum AF-NM-0020.001 (1998), *M4 Interface Requirements and Logical MIB: ATM Network Element View*.

[21] IETF RFC 1483 (1993), *Multiprotocol Encapsulation over ATM Adaptation Layer 5*.

[22] ANSI T1.413 (1998), *Network to Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface*.

[23] IEEE 802.1D, *Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges*.

3 Definitions

This Recommendation uses the following terms that are already defined in ITU-T Recs G.982 and G.983.1:

3.1 optical access network (OAN): The set of access links sharing the same network-side interfaces and supported by optical access transmission systems. The OAN may include a number of ODNs connected to the same OLT.

3.2 optical distribution network (ODN): An ODN provides the optical transmission means from the OLT towards the users, and vice versa. It utilizes passive optical components.

3.3 optical line terminal (OLT): An OLT provides the network-side interface of the OAN, and is connected to one or more ODNs.

3.4 optical network terminal (ONT): An ONU used for FTTH and includes the User Port function.

3.5 optical network unit (ONU): An ONU provides (directly or remotely) the user-side interface of the OAN, and is connected to the ODN.

4 Abbreviations

This Recommendation uses the following abbreviations:

AAL	ATM Adaptation Layer
ABR	Available Bit Rate
ADSL	Asymmetrical Digital Subscriber Line
AIS	Alarm Indication Signal
AN	Access Network
APON	ATM-PON
ATM	Asynchronous Transfer Mode
BBE	Background Block Error
BES	Bursty Errored Seconds
BICI	Broadband Inter-Carrier Interface
BISSI	Broadband Inter-Switching System Interface
CBR	Constant Bit Rate
CCS	Common Channel Signalling
CES	Circuit Emulation Service
CID	Channel ID
CLP	Cell Loss Priority
CMIP	Common Management Information Protocol
CORBA	Common Object Request Broker Architecture
CPS	Common Part Sublayer
CRC	Cyclic Redundancy Check
CS	Convergence Sublayer
CTP	Connection Termination Point
DCE	Data-Circuit terminating Equipment
DCN	Data Communications Network
DSx	Digital Signal Level x
DTE	Data Terminating Equipment
ELCP	Emulated Loop Control Protocol
EM	Element Management
EML	Element Management Layer
EMS	Element Management System
ES	Errored Second
ESF	Extended Super Frame
FSAN	Full Service Access Network
GFR	Guaranteed Frame Rate
HEC	Header Error Control

IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
LES-EOC	Loop Emulation Service – Embedded Operations Channel
LIM	Line Interface Module
LOF	Loss Of Frame
LOS	Loss Of Signal
ME	Managed Entity
MIB	Management Information Base
MTP	Multipoint Termination Point
NE	Network Element
NEL	Network Element Layer
NM	Network Management
NML	Network Management Layer
NMS	Network Management System
NPC	Network Parameter Control
NT	Network Termination
NW	Network
OAM	Operations, Administration and Maintenance
OAN	Optical Access Network
ODN	Optical Distribution Network
OFS	Out-of-Frame Second
OLT	Optical Line Terminal
OMCI	ONT Management and Control Interface
ONT	Optical Network Terminal
ONU	Optical Network Unit
OOF	Out-Of-Frame
OSF	Operations System Function
PDU	Protocol Data Unit
PM	Performance Management
PON	Passive Optical Network
POTS	Plain Old Telephone Service
PVC	Permanent Virtual Circuit
QoS	Quality of Service
RDI	Remote Defect Indication
RFI	Remote Failure Indication
SAR	Segmentation And Reassembly

SCP	Service Capability and Performance
SD	Signal Degraded
SDH	Synchronous Digital Hierarchy
SDP	Severely Disturbed Period
SDU	Service Data Unit
SES	Severely Errored Second
SM	Service Management
SML	Service Management Layer
SN	Service Node
SNC	SubNetwork Connection
SNI	Service Node Interface
SNMP	Simple Network Management Protocol
SRTS	Synchronous Residual Time Stamp
STD	Structured Data
STF	Start Field
SVC	Switched Virtual Channel
TMN	Telecommunication Management Network
TP	Termination Point
TTP	Trail Termination Point
UAS	UnAvailable Second
UBR	Unspecified Bit Rate
UNI	User-Network Interface
UPC	Usage Parameter Control
UUI	User-to-User Indication
VBR	Variable Bit Rate
VC	Virtual Channel
VCC	Virtual Channel Connection
VCI	Virtual Channel Identifier
VDSL	Very high speed Digital Subscriber Line
VP	Virtual Path
VPC	Virtual Path Connection
VPI	Virtual Path Identifier

5 Conventions

None.

6 General overview

6.1 Operations architecture

This Recommendation addresses the management functions of FSAN network elements across the Q interface.

The operation systems manage FSAN network elements and their interface ports through the Q interface by means of managing OLT. FSAN network elements include OLT, ODN, ONU, NT and ONT (ITU-T Rec. G.983.1) shown in Figure 1. The ODN offers one or more optical paths between one OLT and one or more ONU/ONTs. ONU and NT are connected by ADSL or VDSL. OLT has a BICI/BISSI port towards the core network, and ONT/NT has one or more UNI port(s) for the customers. The OLT manages ONU, NT and ONT (ITU-T Rec. G.983.2).

The FSAN Element Management System (FSAN EMS) consists of E-OSF and includes a little N-OSF and S-OSF (ITU-T Recs M.3010 and M.3013) and manages all the FSAN network elements shown in Figure 1. The Q interface specifies a network element view combined with a network view. This interface is called IF1 in the FSAN operations requirements in Appendix I.

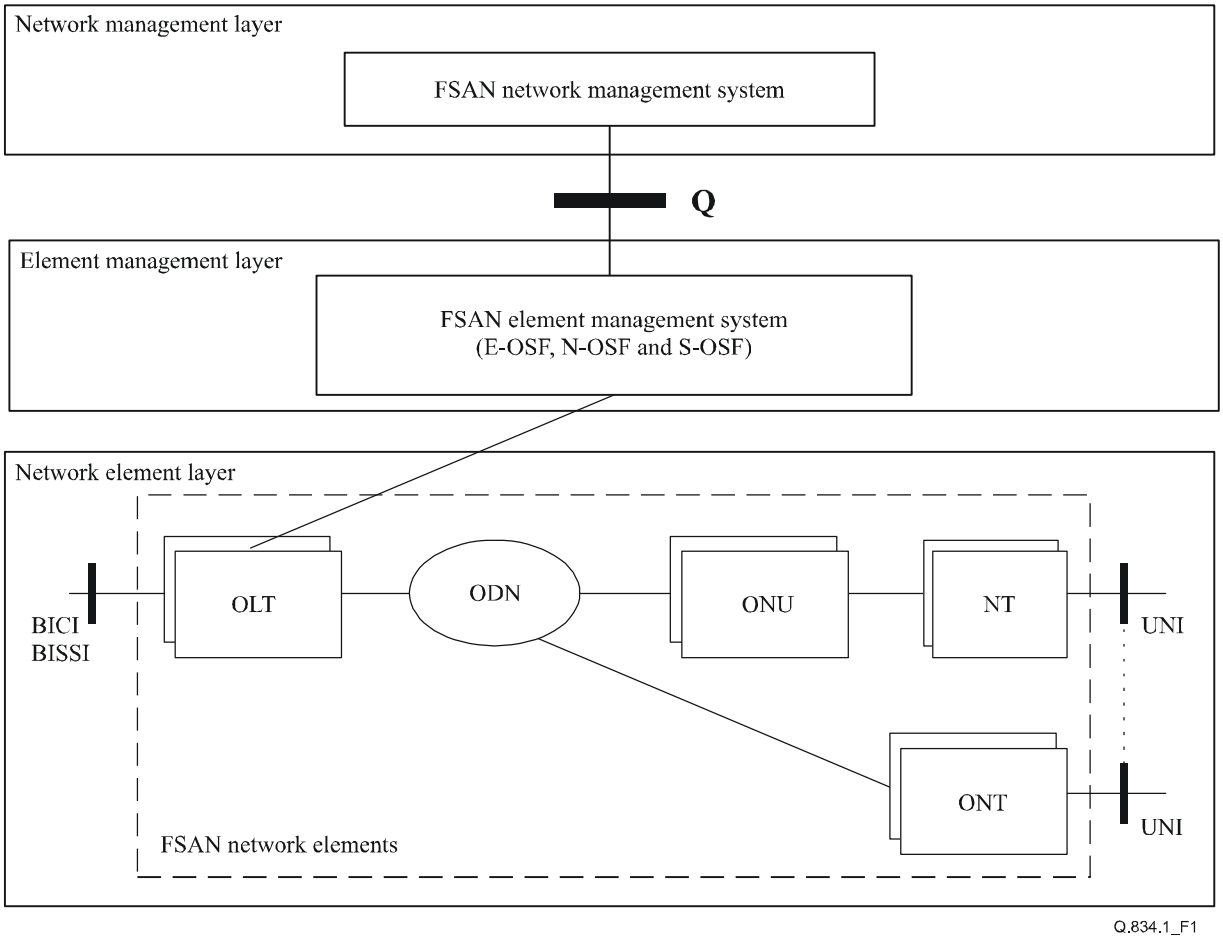


Figure 1/Q.834.1 – FSAN network elements and target interface of operations architecture

6.2 NE view combined with NW view (Combined view)

This Recommendation adopts a combined view defined as the network element (NE) view combined with the network (NW) view in order to treat both FSAN network element and FSAN subnetwork.

7 Requirements

The general requirements for the ATM-PON operation system are described in FSAN operations requirements in Appendix I. This Recommendation uses some of them and derives fault processing from fault management requirements and performance monitoring from performance management requirements.

7.1 Related requirements

The number and letter written after the requirements refer to an associated item in Appendix I, FSAN operations requirements.

7.1.1 Configuration management

For equipment installation, automatic detection shall include the following sequence of activities: installation, power-up self test, equipment authentication, read inventory information, report installation to the FSAN EMS, and download of configuration information. Inventory information shall be read and sent to the FSAN EMS, where possible, regardless of whether the equipment is of the correct type. (38 M)

The FSAN element management system shall be able to create the logical representations of the resources required to manage the network and services. All necessary network and service parameters shall be supplied in the appropriate request. (77 M)

It shall be possible to create the logical resources in the FSAN element management system without the need for equipment to be physically present in the network. (79 M)

The FSAN element management system shall automatically allocate the required resources if they are not identified in the provision request. (82 M)

If all spare and installed resources are in use, the FSAN element management system shall use the next available spare and not the installed resources. (83 M)

If there are no spare resources awaiting installation, then the FSAN element management system shall propose a list of equipment that need to be installed to allow the request to be fulfilled. The equipment list shall indicate:

– the type of equipment to be installed;

– the location where it is to be installed (rack/shelf/slot, OLT or ONU, etc.);

– the software and hardware versions that are compatible with the existing version of installed hardware. (84 M)

Each equipment list shall be stored in the FSAN element management system until an event is received from the NE to indicate that the network equipment has been physically installed and has been correctly authenticated. (85 M)

It shall be possible to pre-configure equipment prior to its installation by providing the required data when the logical representation is created. (86 M)

It shall be possible to modify service parameters (such as bit rate, service type, error checking as applicable) for individual UNI(s) or virtual paths (VPs). (87 M)

The NMS shall be able to create logical resources and paths for end-to-end network and service provision. All necessary parameters shall be supplied in the appropriate request. (121 M)

It shall be possible to create the logical resources in the NMS without the need for the FSAN element management system to be present. (123 M)

The NMS user shall receive an indication on the success or failure of all operations. (127 M)

7.1.2 Fault management

Fault management refers to the broad set of functions associated with the detection, isolation, reporting and correction of abnormal operational conditions in the network. In this context, fault management consists of the following:

– alarm surveillance (detecting/receiving events);

– event processing (correlation and filtering);

– fault localization;

– event logging;

– testing. (24 M)

Network equipment is required to automatically perform a self test (where applicable) when connected to the network. Completion of the self test should leave the network equipment in a known state. An event shall be sent to the FSAN EMS to indicate failure of the self test. (50 M)

It shall be possible to perform service-specific tests associated with the transport medium between the ONU and NT, where the ONU and NT are separate. The test functions, where possible, should also be able to determine if the customer's equipment is present or absent. Any faults detected during testing shall be reported to the FSAN EMS. (55 M)

It shall be possible to accurately distinguish between faults on the ODN and faults on the ONU possibly through the use of internal event correlation and test functions. (57 M)

Detection of a fault, through network surveillance or network testing, which is affecting service shall cause the related equipment to be placed in an unavailable state for provisioning purposes. (100 M)

It shall be possible to block and unblock resources that provide service to allow equipment to be maintained. Whilst a resource is blocked for maintenance purposes, it shall not be possible to use the service supported by that resource. The event report shall use the format described in ITU-T Rec. X.733. (101 M)

The FSAN EMS shall be capable of reporting the following categories of faults to the NMS:

– faults on the network equipment;

– faults on interfaces;

– environmental conditions within the network element where applicable. (102 M)

Fault reports shall accurately indicate the cause, severity, time and location of conditions detected by the network down to specific replaceable equipment. (103 M)

It shall be possible to invoke self tests on specific network equipment from the FSAN EMS. (106 M)

It shall be possible to verify the correct configuration of a service by requesting a connection test from the FSAN EMS to the NE. (107 O)

Where there is an occurrence of a large number of faults, the FSAN EMS shall analyse and correlate the faults within its domain to determine the underlying cause of the problem. This should result in the escalation of one fault report with an appropriate repair action to a user or NMS. (108 M)

It shall be possible to set and modify service-specific failure thresholds. A fault shall be reported to the specified users or NMS when a threshold is exceeded. (109 M)

All fault reports shall be logged. (111 M)

The FSAN EMS shall accept and act on requests to permit/inhibit fault reports from the NMS. (112 M)

It shall be possible to apply test loops to the NE manually on a demand basis during fault diagnosis or automatically as part of background test routines to aid proactive fault location. It shall be possible to activate/deactivate a bit error rate test source in the NE to check for errors on the path between the loops. (113 M)

It shall be possible for an NM-OSF to permit/inhibit fault reports to/from an FSAN EMS. (133 M)

7.1.3 Performance management

Once installed, the network equipment shall be monitored to provide information on network performance and service performance. Measurements shall be based on monitoring network or service parameters. An event shall be sent to the FSAN EMS when the monitoring function detects that a threshold for a parameter has been exceeded. Monitoring shall not affect customer traffic. (62 M)

It shall be possible to activate and de-activate scheduled reporting of current and historical performance data of the network from the FSAN EMS. The parameters used for monitoring shall be configured with network defaults and shall be modifiable where applicable. It shall not be possible to modify any parameters once all monitoring criteria are set and monitoring has been activated without first de-activating. (65 M)

When a monitoring function is activated, it shall be possible to specify a time period over which performance information is to be recorded. The time period shall be configurable. (66 M)

The NE shall suppress all monitoring intervals that have zero counts within any scheduled report that is sent to the FSAN EMS. (68 M)

Performance monitoring shall involve gathering current and historical statistical data relating to 15-minute intervals over a 24-hour period for the purpose of monitoring and correcting the behaviour and effectiveness of the network. This information should also assist network analysis, network planning, capacity management and billing processes. (69 O)

It shall be possible to activate and de-activate the performance monitoring functions from the FSAN EMS. When a monitoring function is activated, it shall be possible to specify a time period over which performance information is to be recorded. The time period shall be configurable. (115 M)

Certain performance monitoring data shall be collected automatically to support the generation of Quality of Service (QoS) information. The management system shall provide QoS information for each of the ATM Constant Bit Rate (CBR), Variable Bit Rate (VBR) and Available Bit Rate (ABR) class of service supported by the network. This information shall include cells discarded, CLP=0 cells discarded, cells successfully passed and CLP=0 cells successfully passed. (116 M)

The EM-OSF shall provide performance data on demand via the user interface or shall generate performance reports periodically as reports according to a pre-established schedule. (118 M)

7.1.4 NW view management

The FSAN element management system shall be able to create the logical representations of the resources required to manage the network and services. All necessary network and service parameters shall be supplied in the appropriate request. (77 M)

It shall be possible to create the logical resources in the FSAN element management system without the need for equipment to be physically present in the network. (79 M)

The FSAN element management system shall automatically allocate the required resources if they are not identified in the provision request. (82 M)

If all spare and installed resources are in use, the FSAN element management system shall use the next available spare and not the installed resources. (83 M)

If there are no spare resources awaiting installation, then the FSAN element management system shall propose a list of the equipment that needs to be installed to allow the request to be fulfilled. The equipment list shall indicate:

– the type of equipment to be installed;

– the location where it is to be installed (rack/shelf/slot, OLT or ONU, etc.);

– the software and hardware versions which are compatible with the existing version of installed hardware. (84 M)

Each equipment list shall be stored in the FSAN element management system until an event is received from the NE to indicate that the network equipment has been physically installed and has been correctly authenticated. (85 M)

It shall be possible to pre-configure equipment prior to its installation by providing the required data when the logical representation is created. (86 M)

It shall be possible to modify service parameters (such as bit rate, service type, error checking as applicable) for individual UNI(s) or Virtual Paths (VPs) when the relevant resources are out of active use. (87 M)

The NMS shall be able to create logical resources and paths for end-to-end network and service provision. All necessary parameters shall be supplied in the appropriate request. (121 M)

It shall be possible to create the logical resources in the NMS without the need for the FSAN element management system to be present. (123 M)

The NMS shall receive an indication on the success or failure of all operations from FSAN element management system. (127 M)

7.1.5 Others

It shall be possible to archive logs periodically using back-up mechanisms. Archiving shall not affect current logs. (34 M)

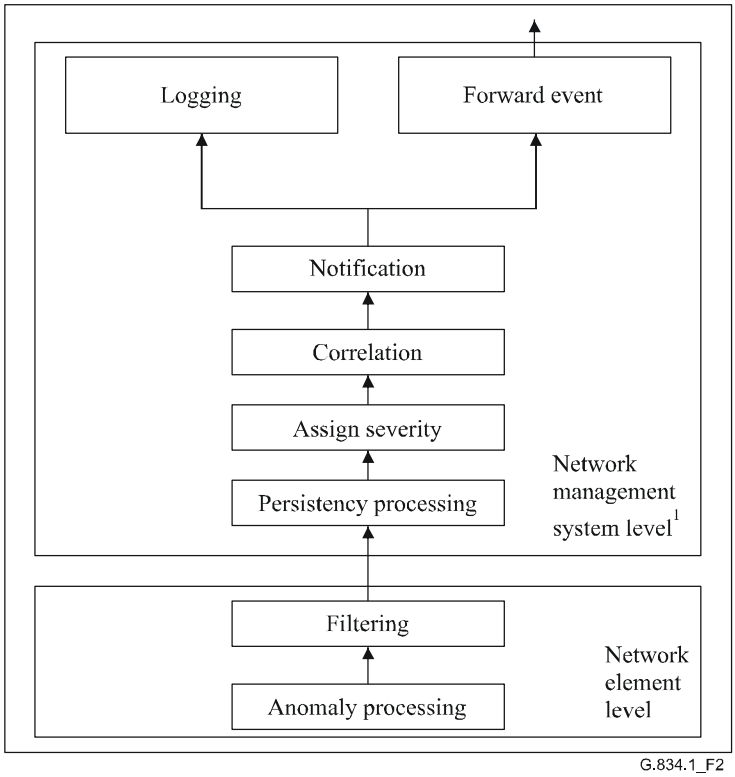
The Data Communications Network (DCN) that conveys the management information between the operations functions is a key component of the management architecture. (137 I)

7.2 Fault processing

Figure 2 shows the basic sequence of operations that are executed during fault processing.

- Anomaly processing deals with the detection of faults or abnormal conditions and generating the corresponding fault notification.
- Filtering is used to filter a fault notification depending on the type and cause of the failure.
- Persistency processing allows the network element to hold a notification for a certain time or to forward a notification if a configurable number of fault occurrences or abnormal conditions have taken place in a specified time window. Thus, transient and toggling defects can be filtered. Therefore, timers are required which can be modified at installation time only. Persistency processing uses a persistency profile.
- Assign severity is used to assign a predefined severity to an alarm. Severity assignment is to be supported for each alarm. The assign severity profile includes the classification of alarms.
- Correlation of alarm is used to allow the FSAN EMS to report only the root cause of the event.

- Notification generates the alarm format that will be logged and/or forwarded to other network management system functions.



[1] This does not imply that any implementation part of the network management functionality may not be realized within the network element.

Figure 2/Q.834.1 – Fault processing sequence

7.3 Performance monitoring

Performance monitoring is described based on the network layer structure shown in Annex B.

The OLT will always stay in a 1:N relationship to ONU or ONT, and the ONU will always have a 1:1 relationship to the NT. The ONT/NT side ends with either a ATM 25 Mbit/s or an IP interface or a Leased Line interface. The different possible layers of performance monitoring are shown in Figures 3, 4 and 5.

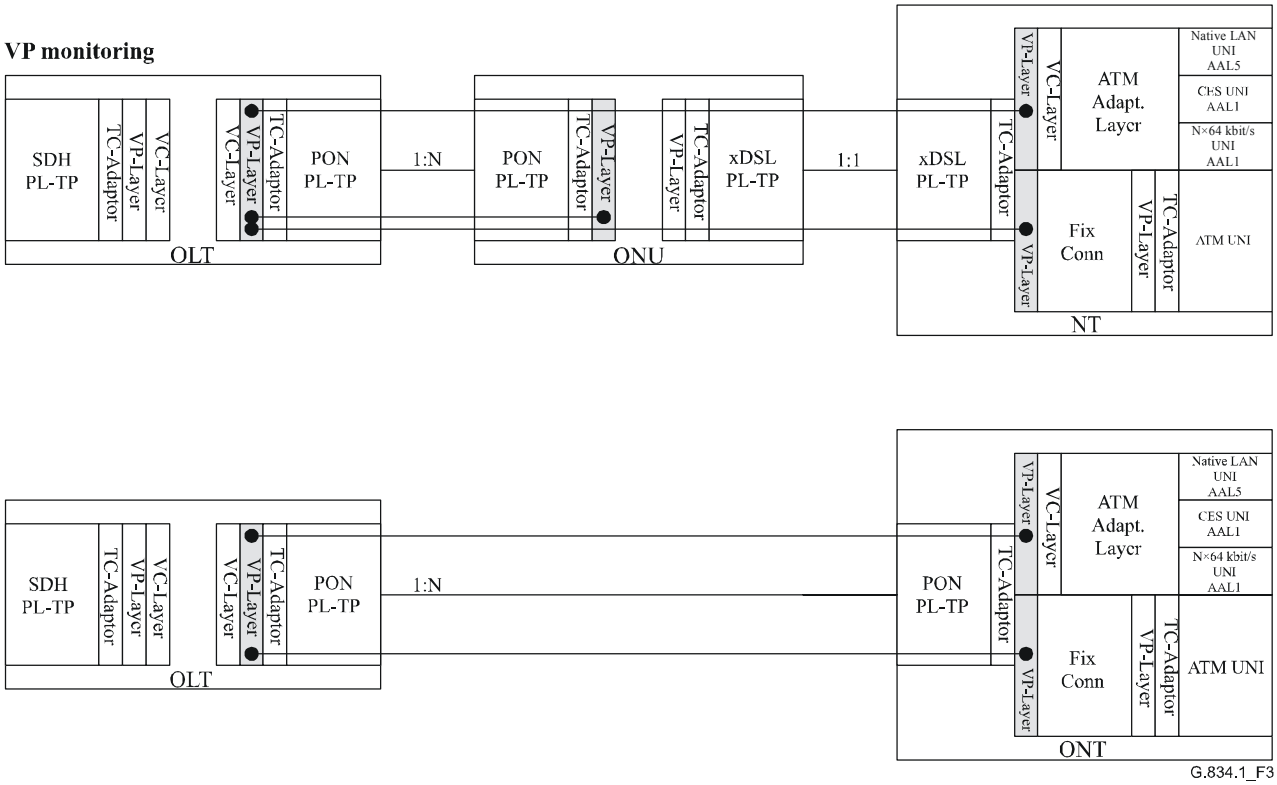


Figure 3/Q.834.1 – Performance monitoring on VP Layer

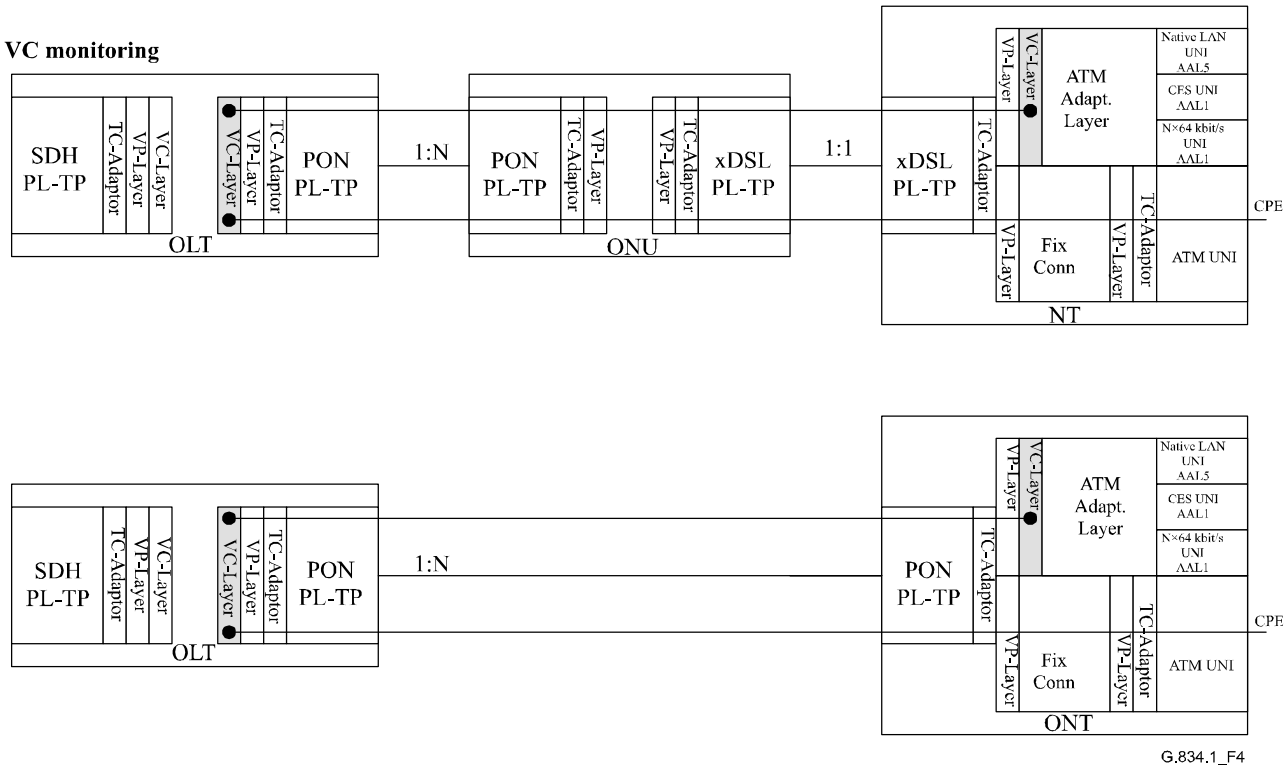


Figure 4/Q.834.1 – Performance monitoring on VC Layer

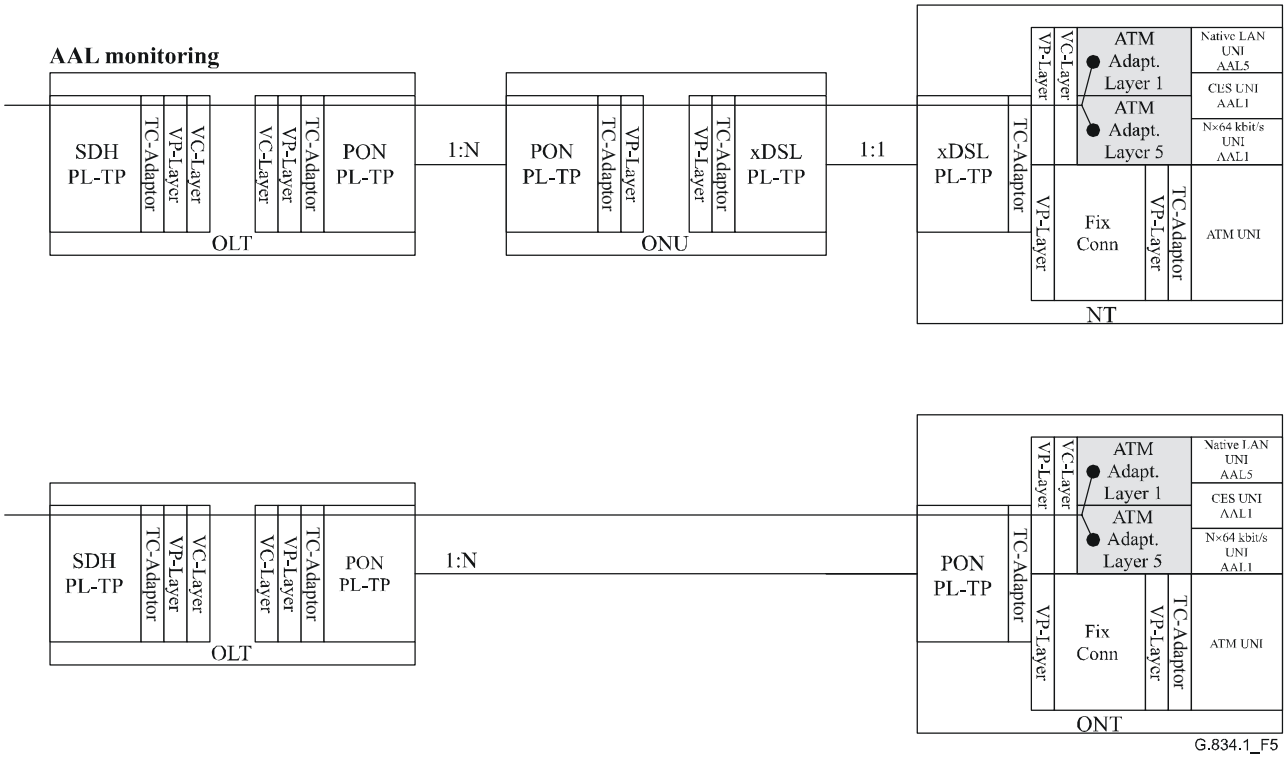


Figure 5/Q.834.1 – Performance monitoring on AAL Performance monitoring is a function to produce user- or service-dependant information to indicate the state of connections for maintenance. For performance monitoring, the source of the connection/link and the sink of the connection/link will be considered. Table 1 describes the required attributes for collection of information and the related managed entities (always bidirectional). A suffix "FSAN" is omitted from each entity. ITU-T Recommendation numbers for the related managed objects are written in the table as references. Traffic management or monitoring will always be executed at one point in the network.

Table 1/Q.834.1 – Performance parameters

Monitoring group	Descriptions	Network element	Attribute	Managed entity
ATM Adaptation Layer 1 (AAL1)	Count of the number of AAL1 header errors. Header errors include correctable and uncorrectable CRC plus bad parity.	OLT/ONT	Header errors	AAL1 Protocol Monitoring current data AAL1 Protocol Monitoring history data Monitoring Period 15 min/24 h
	Count of incoming AAL Type 1 SAR-PDUs where the sequence count in the PDU header causes a transition from the SYNC state to the OUT OF SEQUENCE state as defined by ITU-T Rec. I.363.1.	OLT/ONT	Sequence violations	
	Count of the number of lost cells, as detected by the AAL1 sequence number processing, for example. This count records the number of cells detected as lost in the network prior to the destination interworking function AAL1 layer processing.	OLT/ONT	Cell loss	
	Count of sequency violation events which the AAL CS interprets as misinserted of cells as defined by ITU-T Rec. I.363.1.	OLT/ONT	Cell misinsertion	
	Count of the number of times the reassembly buffer underflows. In the case of a continuous underflow caused by a loss of ATM cell flow, a single buffer underflow should be counted. If the interworking function is implemented with multiple buffers, such as a cell level buffer and a bit level buffer, then either buffer underflow will cause this count to be incremented.	OLT/ONT	Buffer underflows	
	Count of the number of times the reassembly buffer overflows. If the interworking function is implemented with multiple buffers, such as a cell level buffer and a bit level buffer, then either buffer overflow will cause this count to be incremented.	OLT/ONT	Buffer overflows	

Table 1/Q.834.1 – Performance parameters

Monitoring group	Descriptions	Network element	Attribute	Managed entity
	Count of the number of events in which the AAL1 reassembler found that a structured data pointer is not where it is expected, and the pointer must be reacquired. This count is only meaningful for structured data transfer modes as unstructured modes do not use pointers.	OLT/ONT	STD pointer reframes	
	Count of the number of times the AAL reassembler detects a parity check failure at the point where a structured data pointer is expected. This count is only meaningful for structured data transfer modes as unstructured modes do not use pointers.	OLT/ONT	STD pointer parity check failures	
ATM Adaptation Layer 5 (AAL5)	Sum-of-errors count for invalid Convergence Sub-layer (CS) field errors. For AAL Type 5, this attribute provides a single count of the number of CS PDUs discarded due to one of the following error conditions: Invalid Common Part Indicator (CPI), oversized received SDU, or length violation.	OLT/ONT	Invalid CS fields	AAL5 Protocol Monitoring current data AAL5 Protocol Monitoring history data Monitoring Period 15 min/24 h
	Number of CRC violations that were detected for the incoming SAR PDUs.	OLT/ONT	CRC violation	
	Count of reassembly timer expirations. A negative value indicates that this attribute is not supported.	OLT/ONT	Reassembly timer expirations	

Table 1/Q.834.1 – Performance parameters

Monitoring group	Descriptions	Network element	Attribute	Managed entity
Traffic measurement	Count of the number of ATM cells that were discarded due to traffic descriptor violations detected by the UPC/NPC policing of the combined high and low cell loss priority traffic.	OLT/ONT	Discarded cells	upcNpcCurrentData, upcNpcHistoryData (7.2.18 and 7.2.19/I.751) Monitoring Period 15 min/24 h
	Count of number of cells with CLP=0 that were discarded due to traffic descriptor violations detected by UPC/NPC policing of high priority (CLP=0) only traffic.	OLT/ONT	Discarded CLP0 cells	
	Count of number of cells with CLP=0 that were tagged (i.e., CLP reset to 1) by UPC/NPC function.	OLT/ONT	Tagged CLP0 cells	
ATM layer VP/VC performance management	Count for incoming user information cells processed on the termination point being monitored.	OLT/ONU/ ONT/NT	User cells	vpVcPMCurrentData, vpVcPMHistoryData (7.2.24 and 7.2.25/I.751) Monitoring Period 15 min/24 h
	Count of detected lost cells.	OLT/ONU/ ONT/NT	Lost cells	
	Count of incoming user information cells processed on the termination point being monitored by the far-end terminal.	OLT/ONU/ ONT/NT	Far-end user cells	
	Count of detected lost cells.	OLT/ONU/ ONT/NT	Far-end lost cells	

Table 1/Q.834.1 – Performance parameters

Monitoring group	Descriptions	Network element	Attribute	Managed entity
Circuit emulation service UNI	Number of errored seconds encountered by a DS1/E1/J1 interface in the current 15-minute interval.	OLT/ONT	Errored seconds	PM Current Data/PM History Data (ITU-T Rec. G.826) Monitoring Period 15 min/24 h
	Number of severely errored seconds encountered by a DS1/E1/J1 interface in the current 15-minute interval.	OLT/ONT	Severely errored seconds	
	Number of bursty errored seconds encountered by a DS1/E1/J1 interface in the current 15-minute interval. A BES is any second that is not a UAS that contains between 2 and 319 error events, but no LOS, AIS, or OOF condition.	OLT/ONT	Bursty errored seconds	
	Number of unavailable seconds encountered by a DS1/E1/J1 interface in the current 15-minute interval.	OLT/ONT	Unavailable seconds	
	Number of controlled slip seconds encountered by a DS1/E1/J1 interface in the current 15-minute interval.	OLT/ONT	Controlled slip seconds	

8 Managed entities

This clause describes the managed entities that are visible across the Q interface. These managed entities are abstract representations of resources and services in a full service access network. Managed entities are defined in a protocol-neutral fashion. Further work will be required to make the MIB definitions protocol-specific (e.g., CMIP- or CORBA-compliant). Some MIB definitions defined herein are based on the models defined by the ATM Forum [20]. New specific classes are so indicated.

This Recommendation uses a combined view defined in 6.2. Some managed entities for the network view and those for the network element view are pointed to each other in the combined view. Figures 6-1 and 6-2 illustrate combined view managed entities relevant to APON layer.

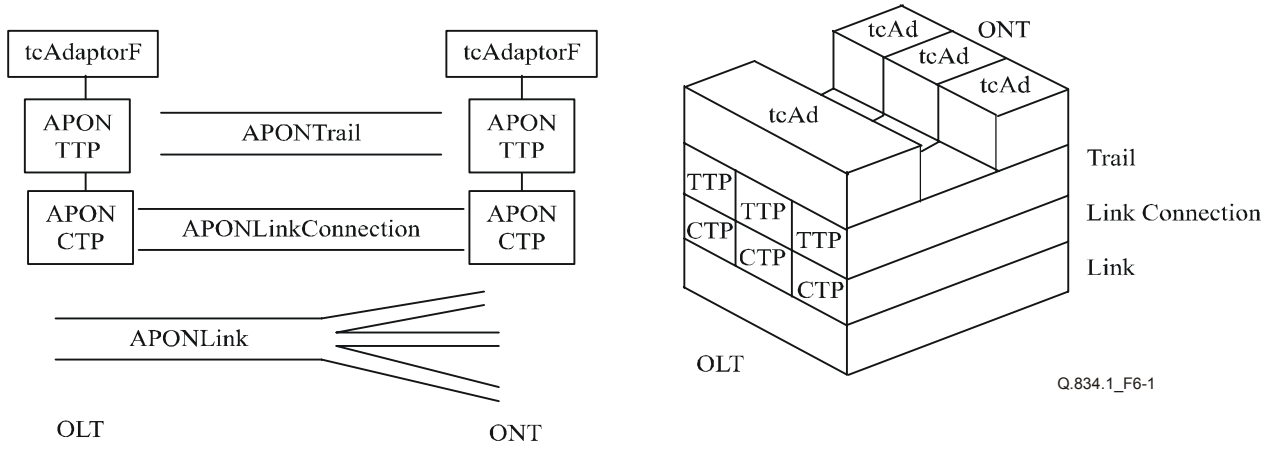


Figure 6-1/Q.834.1 – APON managed entities

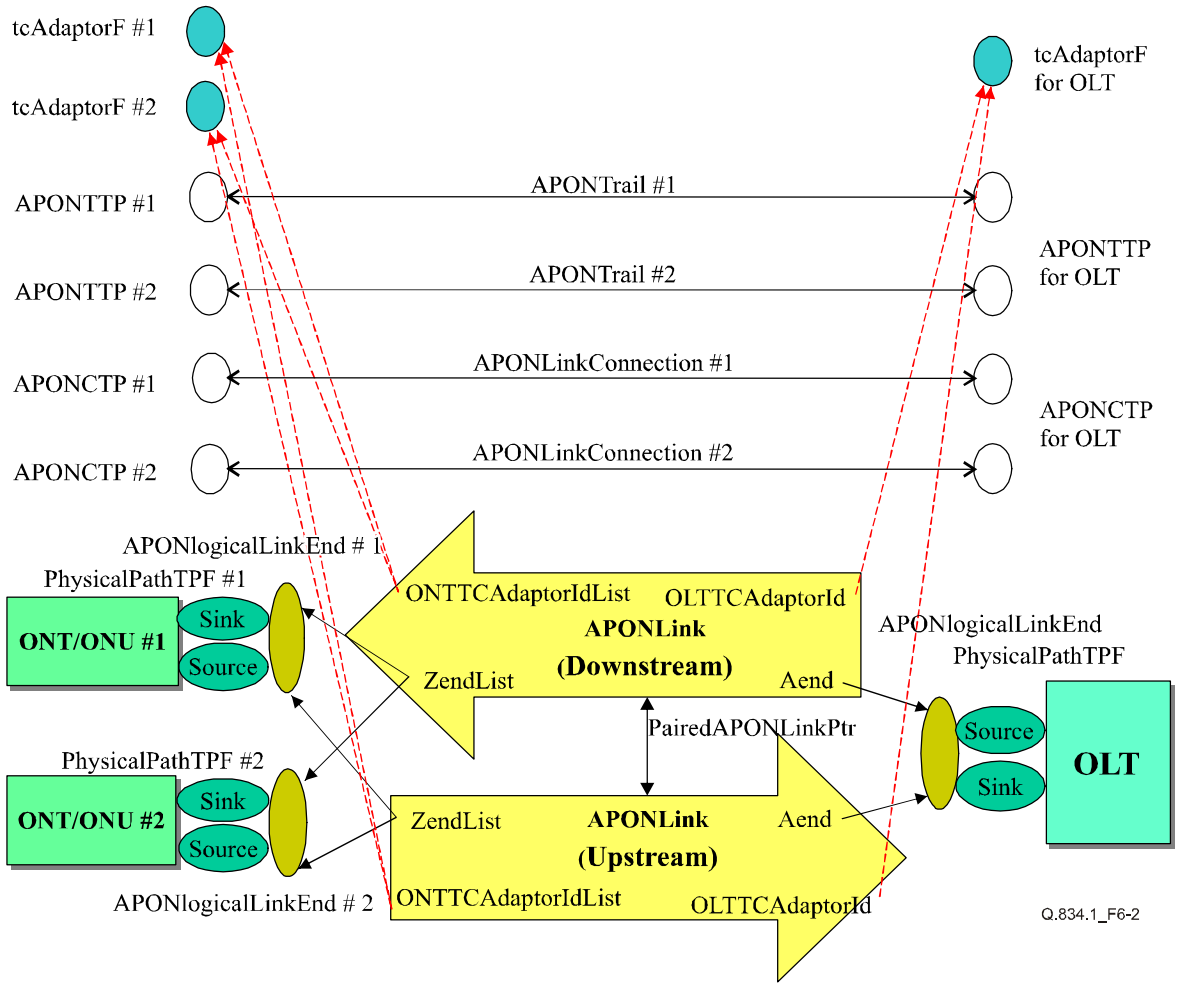


Figure 6-2/Q.834.1 – APON managed entities

8.1 AAL1PMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR) Level and Convergence Sub-layer (CS) protocol monitoring. Instances of this managed entity are created automatically whenever the client requests performance monitoring or NMS at the associated interworking vcCTPF managed entity and the data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

InterworkingVCCTPPtr: This attribute identifies the associated vcCTPF representing the AAL1 functions.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

HeaderErrors: A count of the number of AAL1 header errors detected, including corrected ones. Header errors include correctable and uncorrectable CRC plus bad parity.

LostCells: A count recording the number of cells detected as lost in the network prior to the destination interworking function AAL1 layer processing.

CellMisinsertion: A count of sequence violation events that the AAL CS interprets as due to a misinserted cell.

BufferUnderflows: A count of the number of times that the reassembly buffer underflows.

BufferOverflows: A count of the number of times that the reassembly buffer overflows.

SequenceViolations: A count of incoming AAL Type 1 SAR-PDUs where the sequence count in the PDU header causes a transition from the SYNC state to the OUT OF SEQUENCE state.

SDTPtrReframes: The count of the number of times that the AAL1 reassembler found that a structured data pointer is not where it is expected (only for use with Structured CES).

SDTPtrParityCheckFailures: The count of the number of times the AAL reassembler detects a parity check failure at the point where a structured data pointer is expected (only for use with Structured CES).

Relationships

Zero or more instances of this managed entity shall exist for each instance of an interworking vcCTPF managed entity that represents AAL1 functions.

8.2 AAL1ProfileF

This managed entity is used to organize data that describes the AAL Type 1 processing functions of the FSAN NE. Each instance of this managed entity class defines a combination of parameter values that may be associated with one or more interworking vcCTPF managed entities. Instances of this managed entity are created and deleted by request of the NMS or operators.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SubType: This attribute identifies the AAL subtype. Valid values for this attribute are "null", "voice-band based on 64 kbit/s", "Synchronous Circuit Emulation", "Asynchronous Circuit Emulation", "High-quality Audio", and "Video".

CBRRate: This attribute represents the rate of the CBR service supported by the AAL. Allowed values are "64 kbit/s", "1544 kbit/s", "44 736 kbit/s", and various "n×64 kbit/s".

ClockRecoveryType: This attribute indicates whether the clock recovery type is derived from the physical interface, SRTS (Synchronous Residual Time Stamp), Adaptive Clock Recovery, or derived from a local oscillator. SRTS is chosen for CES DS1 at the ONT. Local oscillator is chosen for DS3 network interface on the OLT.

ForwardErrorCorrectionType: This attribute indicates the FEC method: no FEC, FEC for Loss Sensitive Signal Transport, or FEC for Delay Sensitive Signal Transport.

StructuredDataTransfer: This Boolean attribute indicates whether Structured Data Transfer (SDT) has been configured at the AAL. A value of TRUE means SDT has been selected. This attribute value cannot be set to TRUE when the Forward Error Correction Type attribute equals no FEC.

PartiallyFilledCells: This Boolean attribute identifies the number of leading octets in use. This attribute is used only in conjunction with a value of TRUE for the Structured Data Transfer attribute. This attribute has a permitted range between 0 and 53.

CellLossIntegrationPeriod: This attribute represents the time in milliseconds for the cell loss integration period. If cells are lost for this period of time, the associated interworking vcCTPF entity will generate a cell starvation alarm.[1]

Relationships

One instance of this managed entity shall exist for each combination of AAL1 parameter values used within a FSAN NE. One instance of this managed entity may be associated to one or more instances of an interworking vcCTPF.

8.3 AAL2PMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected as a result of adaptation layer 2 protocol conversion monitoring. Instances of this managed entity are created automatically whenever the client requests performance monitoring or NMS at the associated interworking vcCTP managed entity and the data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

InterworkingVCCTerminationPointPtr: This attribute identifies the associated vcCTP representing the AAL2 functions.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

CPSInPkts: This attribute records the number of CPS packets received by the port group associated with the interworking vcCTP.

CPSOutPkts: This attribute records the number of CPS packets transmitted by the port group associated with the interworking vcCTP.

BufferUnderflow: This attribute records the number of times the reassembly buffer underflows. In the case of a continuous underflow caused by a loss of ATM cell flow, a single buffer underflow should be counted. If the interworking function is implemented with multiple buffers, such as cell level buffer and a bit level buffer, then either buffer underflow will cause this count to be incremented. If the actual counter saturates, it remains at the maximum value.

BufferOverflow: This attribute records the number of times the reassembly buffer overflows. In the case of a continuous underflow caused by a loss of ATM cell flow, a single buffer overflow should be counted. If the interworking function is implemented with multiple buffers, such as cell level buffer and a bit level buffer, then either buffer overflow will cause this count to be incremented. If the actual counter saturates, it remains at the maximum value.

ParityErrors: This attribute records the number of CPS PDUs discarded because of incorrect parity value in the STF.

SeqNumErrors: This attribute records the number of CPS PDUs received with incorrect sequence number in the STF.

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[1] Current OMCI limits the range of this value between 0 and 65535.

CPS_OSFMismatchErrors: This attribute records the number of CPS PDUs received with the number of octets expected for a CPS-Packet overlapping into the next CPS PDU not matching with the information contained in the STF.

CPS_OSFErrors: This attribute records the number of CPS PDUs discarded because of the incorrect OSF value in the STF.

CPSHECErrors: This attribute records the number of CPS packets having a header value indicating transmission errors in the header.

OversizedSDUErrors: This attribute records the number of times the received CPS packet payload exceeds the maximum length indicated in MaxCPS_SDULen attribute.

ReassemblyErrors: This attribute records the number of times that partial CPS packets are discarded because errors were detected for the reassembly could be completed.

HECOverlapErrors: This attribute records the number of times that a CPS packet is received with a HEC that overlaps a CPS PDS boundary.

UUIErrors: This attribute records the number of times that a UUI is received with a value that is reserved for future use.

CIDErrors: This attribute records the number of times that a CPS PDU is received with an incorrect CID value.

Relationships

Zero or more instance of this managed entity shall exist for each instance of an interworking vcCTP managed entity that represents AAL2 functions.

8.4 AAL2ProfileF

This managed entity is used to organize some of the data that describes the AAL Type 2 processing functions of the NE. Each instance of this managed entity class defines a combination of parameter values that may be associated with one or more instances of the interworking vcCTP managed entities. Instances of this managed entity are created and deleted by request of the NMS or Operators. These attributes must be provisioned for both PVC and SVC VCCs.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

DefaultSSCSParameterProfile1Ptr: This attribute identifies the default values for the service-specific convergence service profile associated with channels carrying control and management plane traffic (e.g., CCS, ELCP, ISDN D-channels, and LES-EOC).

DefaultSSCSParameterProfile2Ptr: This attribute identifies the default values for the service-specific convergence service profile associated with channels carrying media streams (e.g., POTS or ISDN B-channels).

Relationships

One instance of this managed entity shall exist for each combination of AAL2 parameter values used within an NE associated with a VCC that is either an SVC or a PVC. One instance of this managed entity may be associated with one or more instances of an interworking vcCTP.

8.5 AAL2PVCProfileF

This managed entity is used to organize data that describes some of the AAL Type 2 processing functions of the NE. Each instance of this managed entity class defines a combination of parameter values that may be associated with one or more instances of the interworking vcCTP managed

entities. Instances of this managed entity are created and deleted by request of the NMS or Operators. These attributes must be provisioned for PVCs (including soft-PVCs).

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AppId: This attribute specifies the protocol combinations used between the interworking functions found in the Voice Gateway and the ONT. Valid values include those provided in Section 4.1.1 of ATM Forum AF-VMOA-0145.000.

MaximumNumChan: This attribute provides the maximum number of channels that can be carried by the VC trail associated with the interworking vcCTP.

MinimumChanIdVal: This attribute provides the minimum value for the Channel Id allowed for any channel within the connection.

MaximumChanIdVal: This attribute provides the maximum value for the Channel Id allowed for the channel within the connection.

MaxCPS_SDULen: This attribute provides the maximum allowed length of the Common Part Sublayer Service Data Unit (or CPS SDU) that will be allowed over the connection in either the upstream or downstream direction of transmission.

TimerCULen: This attribute provides the value for the "combined use" timer Timer_CU.

Relationships

One instance of this managed entity shall exist for each combination of AAL2 parameter values used within an NE associated with a VCC that is a PVC. One instance of this managed entity may be associated with one or more instances of an interworking vcCTP.

8.6 AAL5PMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR) Level and Convergence Sublayer (CS) protocol monitoring. Instances of this managed entity are created automatically whenever the client requests performance monitoring or NMS at the associated interworking vcCTPF managed entity and the data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

InterworkingVCCTPPtr: This attribute identifies the associated TP representing the AAL5 functions.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

SumOfInvalidCSFieldErrors: This attribute provides a sum-of-errors count for invalid Convergence Sublayer (CS) field errors. This attribute provides a single count of the number of CS PDUs discarded due to one of the following error conditions: Invalid Common Part Indicator, oversized received SDU, or length violation.

CRCViolations: This attribute represents the number of CRC violations that were detected for the incoming Segmentation and Reassembly Layer (SAR) PDUs.

BufferOverflows: This attribute indicates the number of times that there was not enough buffer space for a reassembled packet.

EncapProtocolErrors: This attribute indicates the number of times that the RFC 1483 encapsulation protocol detects a bad header.

Relationships

Zero or more instances of this managed entity shall exist for each instance of the interworking vcCTPF managed entity that represents AAL5 functions.

8.7 AAL5ProfileF

This managed entity is used to organize data that describes the AAL Type 5 processing functions of the FSAN NE. Each instance of this managed entity class defines a combination of parameter values that may be associated with one or more interworking vcCTPF managed entities. Instances of this managed entity are created and deleted by request of the NMS or operators.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MaxCPCSSDUSize: This multi-valued attribute represents the maximum CPCS_SDU size that will be transmitted over the connection in both the incoming (forward) and outgoing (backward) direction of transmission.[2]

AALMode: This attribute indicates which mode the AAL for the supporting VCC is employed: message assured, message unasserted, streaming assured, and streaming non-assured.

SSCSType: This attribute identifies the SSCS type for the AAL. Valid values are "none", "Data SSCS based on SSCOP" (assured mode), "Data SSCS based on SSCOP" (non-assured mode), or "Frame Relay SSCS".

Relationships

One instance of this managed entity shall exist for any combination of AAL5 parameter values used within the FSAN NE. One instance of this managed entity may be associated to one or more instances of interworking vcCTPF.

8.8 accessGroupF

This managed entity is used to group TTPFs that lie outside the management scope of the FSAN EMS (even outside the scope of the operator's network) but need to be referred to for management purposes. For example, this managed entity will be used to group vcTTPF instances terminated on customer-provided equipment. It is used to provide a topological view to the operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

TopologicalLinkFPtr: This attribute identifies the topologicalLinkF managed entity for which this managed entity is ending.

SignalIdentification: This attribute identifies the characteristic signal transported between this accessGroupF and the other end of the topologicalLinkF.

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[2] The current version of the OMCI limits the range of this attribute between 0 and 65535. However, the actual maximum value depends on the buffer size in the ONT subscriber circuitry and is likely to be smaller.

Logical(MTP)LinkFPtr: This attribute identifies the logicalLinkF or logicalMTPLinkF associated with this end point.

TTPFPtrList: This attribute serves as a pointer to the instances of the TTPF that is grouped by this managed entity. This pointer may be null.

TopologicalDirectionality: This attribute identifies whether the termination point is "source", "sink", or "bidirectional".

Relationships

Zero or one of these managed entities is associated with a topologicalLinkF.

8.9 adslCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates an ADSL section link connection.

Attributes

ADSLProfilePtr: This attribute identifies the ADSL transport level profile associated with this CTPF.

Relationships

There is zero or more of these managed entities contained within an FSAN NE except for the OLT. One of these managed entities exists for each adslTTPF.

8.10 adslLayerNetworkDomainF

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. The characteristic signal associated with this layer is defined by ITU-T Recs G.992.1 and G.992.2, or ANSI T1.413.

8.11 adslLinkConnectionF

This managed entity is a type of LinkConnectionF and inherits all the attributes and relationships defined by LinkConnectionF. This managed entity represents a VDSL link connection, derived from the G.852.2 definition, i.e., "the transparent capacity of transfer of information characterized by a given signal identification between two fixed points". Directionality is always set to "bidirectional".

Attributes

SignalIdentification: This fixed attribute describes the signal that is transferred across the link. Here, it is set to "ADSL".

Relationships

A topological link is a group of link connections sharing the same extremities. This relationship involves zero or more instances of the managed entity adslLinkConnectionF. An adslLinkConnectionF links two adslCTPFs.

8.12 adslSubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "ADSL".

Attributes

ONUPtr: This attribute identifies the associated ONU.

ContainedLinkList: This attribute identifies the instances of adslTopologicalLinkF contained in this subnetwork.

8.13 adslTopologicalLinkEndF

This managed entity is a type of topologicalLinkEndF and inherits all the attributes and relationships defined by topologicalLinkEndF. Signal identification is set to "ADSL".

8.14 adslTopologicalLinkF

This managed entity is a type of topologicalLinkF and inherits all the attributes and relationships defined by topologicalLinkF. Signal identification is set to "ADSL".

8.15 adslTrailF

This managed entity is a type of trailF and inherits all the attributes and relationships defined by trailF.

Relationships

Each adslTrailF is terminated by adslTTPs.

8.16 adslTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a trail for ADSL. The following alarms can be detected at this managed entity: Loss of Frame (LOF), Remote Failure Indication (RFI), Signal Degraded (SD) fast datastream, Signal Degraded (SD) interleave datastream, Signal Degraded (SD) fast datastream far end, Signal Degraded (SD) interleave datastream far end, Initialization failed (detected by dataInitFailure, configInitFailure, protocolInitFailure, noPeerAtuPresent), Loss of Link, and Loss of Power.

Attributes

TcAdaptorPtr: This attribute points to the tcAdaptor managed entity that uses this managed entity as a server trail.

ADSLProfilePtr: This attribute identifies the ADSL transport level profile associated with this TTPF.

Relationships

There is one or more of these managed entities contained within an FSAN NE except for the OLT. One of these managed entities exists for each adslCTPF managed entity and one for each tcAdaptorF managed entity it supports. One of these managed entities exists for each PhysicalPathTPF of Type "ADSL".

8.17 alarmLogRecordF

This managed entity represents information logged by the FSAN EMS resulting from a FSAN NE generated alarm and subsequent alarm processing within the FSAN EMS. Instances of this managed entity are created and deleted by the FSAN EMS.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

LoggingTime: This attribute provides the time at which the record was entered into the log.

ManagedEntityAssertion: This attribute identifies the type and instance for the managed entity reporting the failure condition.

FailureCondition: This attribute identifies the failure condition detected by the FSAN NE.

Severity: This attribute identifies the severity assigned to the alarm notification.

EventTime: This attribute provides the time at which the event took place as detected by the FSAN NE.

Back-upStatus: This attribute indicates whether or not the managed entity in the FSAN NE emitting the alarm has been backed-up if the managed entity has failed.

Back-upEntity: This attribute identifies the instance of the managed entity that is providing the back-up services to the failed managed entity.

AdditionalInfo: This attribute is used to list service instances affected by the failure condition.

MonitoredParameter: This attribute identifies the performance monitored parameter whose observed value triggered a threshold crossing alert in the FSAN NE, if the alarm is based on a Threshold Crossing Alert (TCA).

ThresholdRange: This attribute identifies the high and low values for the threshold setting of the monitored parameter. If high and low values are the same, then there is only a single threshold setting.

ObservedValue: This attribute provides the value for the performance parameter triggering a TCA, if the alarm is based on a TCA.

Relationships

Multiple instances of this managed entity may be contained in an instance of the LogF managed entity.

8.18 alarmSeverityAssignmentProfileF

This managed entity is used to identify the alarm severity assignments for failure conditions associated with alarm-reporting managed entities. Instances of this managed entity are created and deleted by request of the NMS or the Operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AlarmSeverityAssignmentList: This attribute identifies one or more alarm severity assignments. The assignment correlates severity (critical, major, minor, warning) with failure condition and alarm event name.

Relationships

An instance of this managed entity is referred to by the AlarmSeverityAssignmentProfileFPtr attribute in the alarm-reporting managed entities (e.g., pluginUnitF, PhysicalPathTPF, EquipmentHolderF, etc.).

8.19 APONCTP

This managed entity is a type of CTPF and possesses all the attributes and relationships defined by CTPF. This managed entity is used to represent the termination of APONLinkConnection on an FSAN NE.

Attributes

PhysicalPathTPFPtr: This pointer attribute identifies the associated instance of the physicalPathTPF managed entity.

Relationships

There is one or more of these managed entities contained within an OLT, ONU, or ONT. One of these managed entities exists for each APONTTPF.

8.20 APONLayerNetworkDomain

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. Characteristic information provided in this layer is defined by the APON protocol as defined in ITU-T Rec. G.983.1.

8.21 APONLink

This managed entity is a type of LogicalMTPLinkF and inherits all the attributes and relationships defined by LogicalMTPLinkF. Each PON is composed of two LogicalMTPLinkF(s), one describing the downstream and the other describing the upstream capacity provided by the OLT PON interface. The Aend is associated with a PON interface on the OLT. There is one Zend for each ONT ranged to the Aend PON interface. The TotalLinkConnectionCount attribute value is determined by the number of output ports on the passive optical coupler.

Attributes

OLTTCAdaptorId: This attribute identifies the OLT PON interface.

ONTTCAdaptorIdList: This attribute identifies (lists) the subtending ONT PON interfaces.

PairedAPONLinkPtr: This pointer attribute identifies the APON Link that paired with this one describes the upstream and downstream APON layer capacity.

Relationships

There are two APONLink managed entities for every PON interface on the OLT.

8.22 APONLinkConnection

This managed entity is a type of LinkConnectionF and inherits all the attributes and relationships defined by LinkConnectionF.

Relationships

There is one instance of this managed entity for every installed ONT.

8.23 APONLogicalLinkEnd

This managed entity is a type of logicalLinkEndF and inherits all the attributes and relationships defined by logicalLinkEndF.

8.24 APONSubnetwork

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "APON".

Attributes

OLTPtr: This attribute identifies the associated OLT. This pointer may be null-valued when the APONSubnetworkF is the subnetworkF for the entire APONNetworkLayerDomainF.

ContainedLinkList: This attribute identifies the instances of logicalMTPLinkF contained in this subnetworkF.

ContainedLinkEndList: This attribute identifies the instances of logicalLinkEndF contained in this subnetworkF.

Relationships

One of these managed entities exists for each installed OLT.

8.25 APONTrail

This managed entity is a type of trailF and inherits all the attributes and relationships defined by trailF.

Relationships

Each APONTrail is terminated by two APONTTPs.

8.26 APONPhysicalPortResource

This managed entity collects key capacity metrics for PON-side port of the OLT. One instance of this managed entity is created automatically when the port with PhysicalPathType equal to APON is provisioned. The automatic creation of instances of this managed entity may be reported to the managing system. The managed entity shall be automatically deleted when the port is deleted.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PortManagedEntityId: This attribute identifies the associated port.

MaxBW: This attribute identifies the maximum amount of bandwidth for assignment at the port of OLT.

MaxVPConnectionCount: This attribute identifies the maximum count of VPs assigned to the port of OLT.

AssignedVPConnectionCount: This attribute identifies the already-assigned count of VPs assigned to the port of OLT.

ReservedVPConnectionCount: This attribute identifies the reserved count of VPs assigned to the port of OLT.

MaxVCConnectionCount: This attribute identifies the maximum count of VCs assigned to the port of OLT.

AssignedVCConnectionCount: This attribute identifies the already-assigned count of VCs assigned to the port of OLT.

ReservedVCConnectionCount: This attribute identifies the reserved count of VCs assigned to the port of OLT.

MaxTCONTBW: This attribute identifies the sum of max bandwidth of all provisioned T-CONT assigned to the port of OLT.

AssignedGuaranteedBW: This attribute identifies the already-assigned guaranteed bandwidth assigned to the port of OLT.

ReservedGuaranteedBW: This attribute identifies the reserved guaranteed bandwidth assigned to the port of OLT.

Relationships

One instance of this managed entity shall exist for each instance of the PON-side port of OLT.

8.27 APONPMHistoryData

This managed entity is used to manage performance monitoring data that is collected at PON sections in the past. OLT measures errored second on OLT and each ONU/ONT. This entity is created when performance data is confirmed.

Attributes

ManagedEntityId: This attribute provides a unique number for each instance of this managed entity.

GranularityPeriod: This attribute represents time of a measurement period.

ES: This attribute represents the count of seconds with one or more errors of signal from each ONU/ONT which were detected at OLT during a past measurement period.

FEES: This attribute represents the count of seconds with one or more errors detected at far-end ONU/ONT during a past measurement period.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the threshold data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: Collection completed time is represented.

Relationships

Multiple instances can be contained towards APONPMCurrentDataF.

8.28 APONTTP

This managed entity is a type of TTPF and possesses all the attributes and relationships defined by TTPF. This managed entity represents the point in the FSAN NE where APONTrailF is terminated and originated. The following alarms can be detected at this managed entity: Loss of Physical Layer (detected by LOAi (Loss of Acknowledgement), OAMLi (PLOAM cell loss), CPEi (Cell Phase Error), SUFi (Start up failure) and REC-INH (Receive Alarm Inhibition)), SD (Signal Degraded) and SD (Signal Degraded) far end.

Relationships

There is one or more of these managed entities contained within an OLT, ONU, or ONT. One of these managed entities exists for each APONCTPF.

8.29 ATMCrossConnectionF

This managed entity is used to represent the cross-connect relationship between two VP or VC CTPFs. Instances of this managed entity are created automatically by request of the managing system based on connection requests. Instances of this managed entity are deleted by the FSAN NE or by request of the managing system. The managed entity supports the operational state and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

Availability: This attribute indicates whether or not a managed entity is capable of performing its task.

TerminationPointA: This attribute identifies the instance of the vp (or vc) CTPF managed entity that represents the termination point of one of the two cross-connected link connections.

TerminationPointZ: This attribute identifies the instance of the vp (or vc) CTPF managed entity that represents the termination point of the other one of the two cross-connected link connections.

RecoveryType: This attribute is used to configure an ATMCrossConnectionF as a "recoverable" cross-connection or "non-recoverable" cross-connection. Recoverable cross-connect relationships remain intact regardless of the operational state of the supporting virtual path or virtual connection. A non-recoverable cross-connection is one that is torn down (i.e., released) upon detection of an affecting failure.

Relationships

Zero or more instances of the ATMCrossConnectionF managed entity shall exist for each instance of the ATMCrossConnectionControlF managed entity. Each instance of this managed entity is associated with two (for point-to-point) instances of the vp (or vc) CTPF managed entity by the Termination Point A and Termination Point Z pointer attributes.

8.30 ATMCrossConnectionControlF

This managed entity manages the establishment and release of vp or vc cross-connections (e.g., VPI/VCI translations) in the FSAN NE. The managed entity supports the operational state function as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system. The FSAN NE upon initialization creates an instance of this managed entity automatically. This managed entity cannot be deleted as long as the NE is in service.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

OperationalState: This attribute indicates whether or not a managed entity is capable of performing its task. Valid values are "enabled" and "disabled".

Relationships

One instance of the ATMCrossConnectionControlF managed entity shall exist for each instance of the OLT, ONT, or ONU managed entity.

8.31 ATMNetworkAccessProfileF

This managed entity is used to organize data associated with ATM Network Interfaces (NNI). Instances of this managed entity help to configure ATM network interfaces and PON interfaces terminating on the OLT. Instances of this managed entity can be created automatically at OLT initialization. Instances of this managed entity are created and deleted by request of the NMS or Operators.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

LocalMaximumNumberofVPCsSupportable: This attribute identifies the number of VPCs that can be supported by the OLT at this end of the interface.

LocalMaximumNumberofVCCsSupportable: This attribute identifies the number of VCCs that can be supported by the ATM NE at this end of the interface.

LocalMaximumNumberofAllocatedVPIBits: This attribute identifies the maximum number of allocated bits of the VPI sub-field that can be supported by the FSAN NE at this end of the interface.

LocalMaximumNumberofAllocatedVCIBits: This attribute identifies the maximum number of allocated bits of the VCI sub-field that can be supported by the FSAN NE at this end of the interface.

TotalEgressBandwidth: This attribute identifies the total amount of egress bandwidth for an ATM Interface.

TotalIngressBandwidth: This attribute identifies the total amount of ingress bandwidth for an ATM Interface.

UPC/NPC: This Boolean attribute determines whether or not policing is performed for all connections at the interface.

Relationships

A single instance of ATMNetworkAccessProfileF managed entity is used to characterize the tcAdaptorF managed entity describing the ATM adaptation on the OLT ATM Network Interface or on the OLT PON Interface.

8.32 ATMPhysicalPortResource

This managed entity collects key capacity metrics for NNI-side ATM port of the OLT. One instance of this managed entity is created automatically when the port with ATMBearerInd equal to true is provisioned. The automatic creation of instances of this managed entity may be reported to the managing system. The managed entity shall be automatically deleted when the port is deleted.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PortManagedEntityId: This attribute identifies the associated port.

MaxVPConnectionCount: This attribute identifies the maximum count of VPs assigned to the port of OLT.

MaxVCConnectionCount: This attribute identifies the maximum count of VCs assigned to the port of OLT.

ReservedVPConnectionCount: This attribute identifies the reserved count of VPs assigned to the port of OLT.

ReservedVCConnectionCount: This attribute identifies the reserved count of VCs assigned to the port of OLT.

AssignedVPConnectionCount: This attribute identifies the already-assigned count of VPs assigned to the port of OLT.

AssignedVCConnectionCount: This attribute identifies the already-assigned count of VCs assigned to the port of OLT.

MaxBW: This attribute identifies the maximum amount of bandwidth assigned to the port of OLT.

ReservedBW: This attribute identifies the reserved bandwidth assigned to the port of OLT.

AssignedBW: This attribute identifies the already-assigned bandwidth assigned to the port of OLT.

Relationships

One instance of this managed entity shall exist for each instance of the NNI-side OLT Port with ATMbearerInd equal to true.

8.33 ATMTrafficLoadHistoryDataF

This managed entity records historic traffic load data on links to a specific FSAN NE that is produced as a result of ATM cell monitoring. Instances of this managed entity are created automatically whenever performance monitoring is requested by the managing system on the associated managed entity and the data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MonitoringPtPtr: This attribute identifies the monitoring point for which PM data monitoring was requested.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

CellsReceived: This attribute provides a count of the number of cells received with either CLP=0 or CLP=1.

CellsTransmitted: This attribute provides a count of the number of cells transmitted with either CLP=0 or CLP=1.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the associated monitoring point.

8.34 attributeValueChangeRecordF

This managed entity is used to represent logged information that resulted from attribute value change notifications. The FSAN NE automatically creates instances of this managed entity. Instances of this managed entity are deleted by the FSAN NE or by request of the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

LoggingTime: This attribute identifies the time at which the record was entered into the log.

ManagedEntity: This attribute identifies the type and instance ID of the managed entity that generated the attribute value change notification.

Attribute Type: This attribute identifies the type of attribute whose value has changed.

OldAttributeValue: This attribute identifies the previous value of the attribute.

NewAttributeValue: This attribute identifies the new value of the attribute.

Relationships

Multiple instances of this managed entity may exist for an instance of a logF managed entity.

8.35 au3CTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It represents a termination point where an au3 connection is terminated and originated. The AU-3 consists of a VC-3 plus an AU pointer that indicates the phase alignment of the VC-3 with respect to the STM-N frame. The following alarms can be detected at this managed entity: Alarm Indication Signal (AIS) and Loss of Pointer (LOP).

Attributes

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for each msTTPF and one for each vc3TTPF.

8.36 au4CTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It represents a termination point where an au4 connection is terminated and originated. The AU-4 consists of a VC-4 plus an AU pointer that indicates the phase alignment of the VC-4 with respect to the STM-N frame. The following alarms can be detected at this managed entity: Alarm Indication Signal (AIS) and Loss of Pointer (LOP).

Attributes

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exist for each msTTPF and one for each vc3TTPF.

8.37 BridgedLANLayerNetworkDomainF

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. Characteristic information provided in this layer is set to "Bridged LAN".

8.38 BridgedLANServiceProfileF

This managed entity is used to organize data that describes the Bridged LAN Service functions of the FSAN NE if supported. Instances of this managed entity are created and deleted by request of the managing system or operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

LANType: This attribute provides information on the type of LAN employed, e.g., Ethernet, token-ring, etc.

EncapsulationProtocol: This attribute identifies the encapsulation protocol used for bridging LAN over ATM.

PID: This attribute identifies the media type values that can be used in ATM encapsulation (defined in RFC 1483).

Relationships

This managed entity may be associated to zero or more instances of an interworking vcCTPF terminating AAL5.

8.39 BridgedLANSubnetworkF

This managed entity is a type of SubnetworkF and inherits all the attributes and relationships defined by SubnetworkF. This managed entity cannot be further decomposed. Characteristic information provided in this layer is set to "Bridged LAN".

8.40 BICIF

This managed entity is used to organize data associated with Broadband Inter-Carrier Interfaces (BICIFs) terminating on the FSAN NE. One instance of this managed entity shall exist for each BICIF terminating on the FSAN NE. Instances of this managed entity are created and deleted by request of the managing system to configure ATM interfaces terminating on the FSAN NE as BICIFs.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

TCAdaptorId: This attribute provides a Ptr to the associated instance of the tcAdaptorF managed entity.

Far-EndCarrierNetwork: This attribute identifies the adjacent carrier to which the BICIF transmission path is connected. This attribute is needed to support SVC services only.

LoopbackLocationCode: This attribute provides the code that shall exist in incoming OAM Loopback cells that are to be looped-back at the BICIF termination point represented by the managed entity.

Relationships

Multiple instances of the BICIF managed entity may exist for each instance of the OLT managed entity. Each instance of the BICIF managed entity is related to a tcAdaptorF managed entity by the TCAdaptorId attribute.

8.41 BISSIF

This managed entity is used to organize data associated with Broadband Inter-Switching System Interfaces (BISSIFs) terminating on the FSAN NE. One instance of this managed entity shall exist for each BISSIF terminating on the FSAN NE. Instances of this managed entity are created and deleted by request of the managing system to configure ATM interfaces terminating on the FSAN NE as BISSIFs.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

TCAdaptorId: This attribute provides a Ptr to the associated instance of the TC Adaptor managed entity.

LoopbackLocationCode: This attribute provides the code that shall exist in incoming OAM loopback cells that are to be looped-back at the BISSIF termination point represented by the managed entity.

Relationships

Multiple instances of the BISSIF managed entity may exist for each instance of the OLT. Each instance of the BISSIF managed entity is related to a tcAdaptorF managed entity by the TCAdaptorId attribute.

8.42 cellBasedCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates a cell-based connection.

Attributes

BitratePhysicalLayer: This attribute provides the value for the corresponding line bit rate (e.g., 155 Mbit/s).

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for each cellBasedTTPF managed entity having the same line bit rate.

8.43 cellBasedTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a cell-based section trail. The following alarms can be detected at this managed entity: Loss of Frame (LOF), Loss of Multiframe (LOM), Alarm Indication Signal (AIS), Signal Degraded (SD) and Remote Defect Indication (RDI).

Attributes

BitratePhysicalLayer: This attribute provides the value for the corresponding line bit rate (e.g., 155 Mbit/s).

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exist for each cellBasedCTPF and one or more for each tcAdaptorF for each interface on a FSAN NE providing native ATM physical layer. One of these managed entities exists for each PhysicalPathTPF of type "cell-based" with the same bit rate.

8.44 CESServiceProfileF

This managed entity is used to organize data that describes the CES service functions of the FSAN NE (at the DS1 or DS3 level). Instances of this managed entity are created and deleted by request of the managing system or operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

CESBufferedCDVTolerance: This attribute represents the duration of user data that must be buffered by the CES interworking entity to offset cell delay variation. This timing will be in 10 microsecond increments. The default value for DS1 CES is 750 microseconds and 1000 microseconds for DS3 CES.

ChannelAssociatedSignalling: This attribute selects which AAL1 format should be used. It applies to structured interfaces only. For unstructured interfaces this value, if present, must be set to the default "basic". The valid values are: basic, e1Cas, SfCas, ds1EsfCas, j2Cas.

CableGaugeLength: This attribute provides the length of twisted pair cable from the physicalPathTP of type "DS1" interface to the DSX1 cross-connect point (if applicable).[3]

Relationships

This managed entity may be associated to zero or more instances of an interworking vcCTPF terminating AAL1.

8.45 CTPF

This managed entity terminates and originates a link connection as well as a subnetwork connection. Instances of this managed entity can be created and deleted by request of the managing system or implicitly through a provisioning request. The managed entity supports the availability status, operational state and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system. This managed entity is defined for the purposes of grouping together all common attributes of connection termination point on an FSAN NE in the NE view, but only instances of specific CTPFs (e.g., adslCTPF, DS1CTPF, etc.) shall be implemented.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

AvailabilityStatus: This attribute indicates whether or not a managed entity is capable of performing its task.

OperationalState: This attribute indicates whether or not a managed entity is capable of performing its task. The operational state reflects the perceived ability to receive or to generate a valid signal. Valid values are "enabled" and "disabled". If the termination point detects that a signal received has failed or it is unable to process the incoming signal, then the operational state will change from the value enabled to disabled. If the termination point detects that a valid signal cannot be generated, then the operational state will also change from the value "enabled" to "disabled".

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[3] This attribute may have enumerated syntax with a selection of length ranges as setting values.

SupportedByPlug-inF: This attribute identifies the interface circuit pack to which this managed entity is associated.

UpstreamConnectivityPointer: This attribute identifies the termination point managed entity that sends information (traffic) to this managed entity at the same layer.

DownstreamConnectivityPointer: This attribute identifies the termination point managed entity that receives information (traffic) from this managed entity at the same layer.

PointDirectionality: This attribute identifies whether the termination point is "source", "sink", or "bidirectional".

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for any TTPF supported by it. Two instances of this managed entity are associated to each link connection. Zero or more of these instances are associated with each subnetworkConnectionF.

8.46 DS1CTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates a 1544 kbit/s link connection. Characteristic information provided in this layer is set to "DS1". The following alarms can be detected at this managed entity: Loss of Frame (LOF), Alarm Indication Signal (AIS), Signal Degraded (SD), and Remote Alarm Indication (RAI).

Attributes

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair ", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

sncPtr: This attribute identifies the ds1SubnetworkConnectionF terminated by this managed entity.

Relationships

There is zero or more of these managed entities contained within a TDM interface on an FSAN NE. One of these managed entities exists for each DS1TTPF.

8.47 DS1LayerNetworkDomainF

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. Characteristic information provided in this layer is set to "DS1".

8.48 DS1PMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected at a DS1CTPF for near-end DS1 path monitoring for both directions of traffic. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated DS1CTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

CTPFPtr: This attribute identifies the associated TPF.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

ErroredSecondsP: If the line uses ESF framing, an ES is any second that is not a UAS that contains a LOS condition, an AIS condition, an OOF (frame alignment) condition, or one or more CRC-6 or bipolar violation errors (line code violations). If a line uses SF framing, an ES is any second with a BPV, LOS, AIS, or OOF. This parameter monitors the characteristic signal from the customer to the NE.

BurstyErroredSecondsP: A BES is any second that is not a UAS that contains between 2 and 319 error events, but no LOS, AIS, or OOF condition. This parameter monitors the characteristic signal from the customer to the NE.

SeverelyErroredSecondsP: An SES is any second that is not a UAS that contains an LOS condition, an AIS condition, or an OOF condition or more than 320 error events. This parameter monitors the characteristic signal from the customer to the NE.

UnavailableSecondsP: UAS provides the count of seconds of unavailability. A UAS state is declared when ten consecutive SESs occur. The ten SESs are subtracted from the SES count and added to the UAS count. Subsequent seconds are accrued to the UAS count until the UAS state is cleared. The UAS state is cleared when ten consecutive non-SESs occur. When that happens, the consecutive ten non-SESs are subtracted from the UAS count. This parameter monitors the characteristic signal from the customer to the NE.

ErroredSecondsPFE: If the line uses ESF framing, an ES is any second that is not a UAS that contains a LOS condition, an AIS condition, an OOF (frame alignment) condition, or one or more CRC-6 or Bipolar violation errors (line code violations). If a line uses SF framing, an ES is any second with a BPV, LOS, AIS, or OOF. This parameter monitors the characteristic signal from the network to the NE.

BurstyErroredSecondsPFE: A BES is any second that is not a UAS that contains between 2 and 319 error events, but no LOS, AIS, or OOF condition. This parameter monitors the characteristic signal from the network to the NE.

SeverelyErroredSecondsPFE: An SES is any second that is not a UAS that contains an LOS condition, an AIS condition, or an OOF condition or more than 320 error events. This parameter monitors the characteristic signal from the network to the NE.

UnavailableSecondsPFE: UAS provides the count of seconds of unavailability. A UAS state is declared when ten consecutive SESs occur. The ten SESs are subtracted from the SES count and added to the UAS count. Subsequent seconds are accrued to the UAS count until the UAS state is cleared. The UAS state is cleared when ten consecutive non-SESs occur. When that happens, the consecutive ten non-SESs are subtracted from the UAS count. This parameter monitors the characteristic signal from the network to the NE.

Relationships

Zero or more instances of this managed entity shall exist for each instance of DS1CTPF.

8.49 DS1SubnetworkConnectionF

This managed entity is a type of subnetworkConnectionF and inherits all the attributes and relationships defined by subnetworkConnectionF.

8.50 DS1SubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "DS1".

Attributes

OLTPtr: This attribute identifies the associated OLT.

8.51 DS1TTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a 1544 kbit/s trail. Characteristic information provided in this layer is set to "DS1". The following alarms can be detected at this managed entity: LOF (Loss of Frame), AIS (Alarm Indication Signal), Alarm Indication Signal – Customer Installation (AIS-CI), Signal Degraded (SD), Remote Alarm Indication (RAI).

Relationships

There is zero or more of these managed entities contained within a network terminating FSAN NE. One of these managed entities exists for each DS1CTPF. One of these managed entities exists for each PhysicalPathTPF of type "DS1".

8.52 DS3CTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates a 44 736 kbit/s link connection. Characteristic information provided in this layer is set to "DS3".

Attributes

DS1CTPFPointerList: This attribute points to the DS1CTPs within a channelized DS3 interface.

sncPtr: This attribute identifies the ds3SubnetworkConnectionF terminated by this managed entity.

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for each PhysicalPathTPF of type "DS3 " and one for each DS3TTPF. Zero or one of these managed entities exists for up to 28 DS1CTPF(s) for a channelized DS3 interface.

8.53 DS3LayerNetworkDomainF

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. Characteristic information provided in this layer is set to "DS3".

8.54 DS3PhysicalPortResource

This managed entity collects key capacity metrics for NNI-side DS3 Port of the OLT. One instance of this managed entity is created automatically when the port with PhysicalPathType equal to DS3 is provisioned. The automatic creation of instances of this managed entity may be reported to the managing system. The managed entity shall be automatically deleted when the port is deleted.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PortManagedEntityId: This attribute identifies the associated port.

MaxTSs: This attribute identifies the maximum amount of timeslots assigned to the port of OLT.

ReservedTSs: This attribute identifies the reserved timeslots assigned to the port of OLT.

AssignedTSs: This attribute identifies the already-assigned timeslots assigned to the port of OLT.

Relationships

One instance of this managed entity shall exist for each instance of the NNI-side OLT Port with PhysicalPathType equal to DS3.

8.55 DS3PMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected at the DS3 interfaces to the OLT, ONT, or NT for near-end DS3 line and path monitoring. Instances of this managed entity are created automatically whenever performance monitoring is requested by the managing system at the associated PhysicalPathTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

CTPFPtr: This attribute identifies the associated DS3CTPF.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

ErroredSecondsL: This parameter is a count of one-second intervals containing one or more BPVs, one or more EXZs, or one or more LOS defects. BPVs that are part of the zero substitution codes (as defined in ANSI T1.102) are excluded.

SeverelyErroredSecondsL: This parameter is a count of one-second intervals containing 45 or more BPVs or EXZs and no LOS defects. BPVs that are part of the zero substitution codes (as defined in ANSI T1.102) are excluded.

CVCPorCVPP: This parameter is a count of one-second intervals containing one or more CP-bit parity errors for CP parity applications or a count of one-second intervals containing one or more P-bit parity errors for M13 applications.

ESCPPorESPP: This parameter is the count of one-second intervals containing the occurrence of one or more CP-bit parity errors, one or more SEF defects, or one or more AIS defects, in the case of C-bit parity applications; or the count of one-second intervals containing the occurrence of one or more P-bit parity errors, one or more SEF defects, or one or more AIS defects in the case of M13 applications.

SESCPPorSESPP: This parameter is the count of one-second intervals containing the occurrence of 45 or more CP-bit parity errors, one or more SEF defects, or one or more AIS defects in the case of C-bit parity applications; or the count of one-second intervals

containing the occurrence of 45 or more P-bit parity errors, one or more SEF defects, or one or more AIS defects in the case of M13 applications.

UASCPPorUASPP: This parameter is a count of one-second unavailable intervals beginning with the onset of 10 contiguous severely errored seconds. It ends at the onset of 10 contiguous seconds with no severely errored seconds.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the PhysicalPathTPF managed entity of type "DS3" contained in a FSAN NE.

8.56 DS3SubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "DS3".

Attributes

OLTPtr: This attribute identifies the associated OLT.

8.57 DS3SubnetworkConnectionF

This managed entity is a type of subnetworkConnectionF and inherits all the attributes and relationships defined by subnetworkConnectionF.

8.58 DS3TTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a 44 736 kbit/s path trail. Characteristic information provided in this layer is set to "DS3". The following alarms can be detected at this managed entity: Loss of Frame (LOF), Alarm Indication Signal (AIS), Alarm Indication Signal – Customer Installation (AIS-CI), Signal Degraded (SD), Remote Alarm Indication (RAI).

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for each DS3CTPF. One of these managed entities exists for each PhysicalPathTPF of type "DS3".

8.59 E1CTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates a 2048 kbit/s link connection. Characteristic information provided in this layer is set to "E1".

Attributes

sncPtr: This attribute identifies the E1SubnetworkConnectionF terminated by this managed entity.

Relationships

There is zero or more of these managed entities contained within a terminating FSAN NE. One of these managed entities exists for each E1TTPF.

8.60 E1LayerNetworkDomainF

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. Characteristic information provided in this layer is set to "E1".

8.61 E1PMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected at the E1CTPF for near-end E1 path monitoring for both directions of traffic. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated E1CTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PhysicalPathTPFPtr: This attribute identifies the associated TPF.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

ErroredSecondsP: This parameter monitors the characteristic signal from the customer to the NE.

BurstyErroredSecondsP: This parameter monitors the characteristic signal from the customer to the NE.

SeverelyErroredSecondsP: This parameter monitors the characteristic signal from the customer to the NE.

UnavailableSecondsP: UAS provides the count of seconds of unavailability. This parameter monitors the characteristic signal from the customer to the NE.

ErroredSecondsPFE: This parameter monitors the characteristic signal from the network to the NE.

BurstyErroredSecondsPFE: This parameter monitors the characteristic signal from the network to the NE.

SeverelyErroredSecondsPFE: This parameter monitors the characteristic signal from the network to the NE.

UnavailableSecondsPFE: UAS provides the count of seconds of unavailability. This parameter monitors the characteristic signal from the network to the NE.

Relationships

Zero or more instance of this managed entity shall exist for each instance of E1CTPF.

8.62 E1SubnetworkConnectionF

This managed entity is a type of subnetworkConnectionF and inherits all the attributes and relationships defined by subnetworkConnectionF.

8.63 E1SubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "E1".

Attributes

OLTPtr: This attribute identifies the associated OLT.

8.64 E1TTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a 2048 kbit/s path trail. Characteristic information provided in this layer is set to "E1". The following alarms can be detected at this managed entity: Loss of Frame (LOF), Alarm Indication Signal (AIS), Signal Degraded (SD), Remote Alarm Indication (RAI).

Relationships

There is zero or more of these managed entities contained within a network terminating FSAN NE. One of these managed entities exists for each E1CTPF. One of these managed entities exists for each PhysicalPathTPF of type "E1".

8.65 E3CTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates a 34 368 kbit/s link connection. Characteristic information provided in this layer is set to "E3".

Attributes

E1CTPFPointerList: This attribute points to the E1CTPFs within a channelized E3 interface.

sncPtr: This attribute identifies the E3SubnetworkConnectionF terminated by this managed entity.

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for each E3TTPF. Zero or one of these managed entities exists for up to 16 E1CTPF(s) for a channelized E3 interface.

8.66 E3LayerNetworkDomainF

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. Characteristic information provided in this layer is set to "E3".

8.67 E3PMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected at the E3 interfaces to the OLT, ONT, or NT for near-end E3 line and path monitoring. Instances of this managed entity are created automatically whenever performance monitoring is requested by the managing system at the associated PhysicalPathTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PhysicalPathTPFPtr: This attribute identifies the associated PhysicalPathTPF.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the PhysicalPathTPF managed entity of type "E3" contained in a FSAN NE.

8.68 E3SubnetworkConnectionF

This managed entity is a type of subnetworkConnectionF and inherits all the attributes and relationships defined by subnetworkConnectionF.

8.69 E3SubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "E3".

Attributes

OLTPtr: This attribute identifies the associated OLT.

8.70 E3TTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a 34 368 kbit/s path trail. Characteristic information provided in this layer is set to "E3". The following alarms can be detected at this managed entity: Loss of Frame (LOF), Alarm Indication Signal (AIS), Signal Degraded (SD), Remote Alarm Indication (RAI).

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for each E3CTPF. One of these managed entities exists for each PhysicalPathTPF of type "E3".

8.71 EquipmentHolderF

This managed entity represents physical resources of the FSAN NE that are capable of holding other physical resources. Examples include slots in the ONT and bays, shelves, and slots associated with the OLT. An instance of this managed entity shall exist for each bay, shelf, and slot of the FSAN NE. Instances of this managed entity are created with FSAN NE initialization and reported by the FSAN EMS to the NMS. The managed entity supports the operational state and alarm status functions as defined in ITU-T Rec. X.731. Changes in status are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

EquipmentHolderType: This attribute indicates whether the EquipmentHolderF instance is being used to represent a bay, a shelf, or a slot.

EquipmentHolderAddress: This attribute identifies the physical location of resource represented by the EquipmentHolderF instance. In the case of slot type, this address provides the slot number reading from upper left to lower right. In the case of shelf type, this address provides the shelf number from top to bottom. In the case of bay, this attribute provides the central office bay location code.

SlotStatus: This attribute provides a Boolean indication as to whether or not the slot is full. This attribute only applies when the EquipmentHolderF type is slot.

ExpectedPlug-inTypes: This attribute provides a list of plug-in types that are acceptable in the slot. This attribute only applies when the EquipmentHolderF type is slot.

SoftwareLoad: This attribute identifies the software load (if there is any) that is currently designated as the one to be loaded to the plug-in unit whenever an automatic reload of software is required. This attribute only applies when the EquipmentHolderF type is slot.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

OperationalState: This attribute identifies whether or not the managed entity is capable of performing its normal functions (enabled or disabled).

Relationships

An instance of this managed entity supported nested containment relationships matching the physical resource nested containment relationships. Identification of instances of this managed entity is related to the identification of the FSAN NE. An instance of slot type equipment holder contains an instance of plug-in when the slot status is full (=TRUE).

8.72 EthernetCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. This managed entity terminates and originates an Ethernet section link connection. This managed entity is used to indicate a loopback location in a subscriber line card in the ONT. The attribute PointDirectionality has the value "bidirectional".

Relationships

There is one or more of these managed entities contained within an ONT. One of these managed entities exists for each PhysicalPathTPF of Type "Ethernet" and for each EthernetTTPF.

8.73 EthernetPhysicalPortResource

This managed entity collects key capacity metrics for NNI-side Ethernet Port of the OLT. One instance of this managed entity is created automatically when the port with PhysicalPathType equal to Ethernet is provisioned. The automatic creation of instances of this managed entity may be reported to the managing system. The managed entity shall be automatically deleted when the port is deleted.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PortManagedEntityId: This attribute identifies the associated port.

MaxVLANtags: This attribute identifies the maximum amount of VLAN tags assigned to the port of OLT.

ReservedVLANtags: This attribute identifies the reserved VLAN tags assigned to the port of OLT.

AssignedVLANtags: This attribute identifies the already-assigned VLAN tags assigned to the port of OLT.

MaxBW: This attribute identifies the maximum amount of bandwidth assigned to the port of OLT.

ReservedBW: This attribute identifies the reserved bandwidth assigned to the port of OLT.

AssignedBW: This attribute identifies the already-assigned bandwidth assigned to the port of OLT.

Relationships

One instance of this managed entity shall exist for each instance of the NNI-side OLT port with PhysicalPathType equal to Ethernet.

8.74 EthernetPMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected at Ethernet interfaces to the ONT. Instances of this managed entity are created automatically whenever performance monitoring is requested by a client application or NMS at the associated EthernetCTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

TPPointer: This attribute identifies the associated TP.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

Transmission side

SingleCollisionFrameCount: A count of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision.

MultipleCollisionFramesCount: A count of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.

SQECount: A count of times that the SQE TEST ERROR message is generated by the PLS sublayer for a particular interface.

DeferredTransmissionCount: A count of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy. The count represented by an instance of this object does not include frames involved in collisions.

LateCollisionCount: The number of times that a collision is detected on a particular interface later than 512 bit-times into the transmission of a packet.

ExcessiveCollisionCount: A count of frames for which transmission on a particular interface fails due to excessive collisions.

InternalMACTransmitErrorCount: A count of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error.

CarrierSenseErrorCount: The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface.

BufferOverflows: A count of the number of times that the buffer overflows.

Receiving side

AlignmentErrorCount: A count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check.

FrameTooLong: A count of frames received on a particular interface that exceed the maximum permitted frame size. The count is incremented when the frameTooLong status is returned by the MAC service to the LLC.

FCSErrors: A count of frames received on a particular interface that are an integral number of octets in length but do not pass the Frame Check Sequence (FCS) check. The count represented by an instance of this object is incremented when the frameCheckError status is returned by the MAC service to the Link Layer Control (LLC) or other MAC user. Received frames for which multiple error conditions obtain are counted exclusively according to the error status presented to the LLC.

InternalMACReceiveErrorCount: A count of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error.

BufferOverflows: A count of the number of times that the buffer overflows.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the PhysicalPathTPF managed entity of type "Ethernet".

8.75 EthernetProfileF

This managed entity groups together attributes for an Ethernet physical interface to the ONT. Instances of this managed entity are created and deleted by request of the managing system or operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance for all applications notified of its creation.

DuplexInd: This attribute indicates whether full-duplex (=TRUE) or half-duplex mode (=FALSE) is employed.

AutoDetectionInd: This Boolean attribute identifies whether or not data rate auto-detection is enabled.

DataRate: This attribute provides the data rate for the Ethernet connection. The valid values are 10 Mbit/s or 100 Mbit/s.

MaxFrameSize: This attribute denotes the maximum allowed frame size to be transmitted across this interface.[4]

DTEorDCEInd: This attribute indicates whether the Ethernet interface wiring is DTE or DCE.[5]

BridgedorIPInd: This attribute indicates whether the Ethernet interface is bridged or derived from an IP router function.

Relationships

This managed entity may be associated to zero or more instances of the Physical Path TP managed entity contained in an ONT.

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4 Currently, this value is fixed at 1518.

5 This attribute is maintained for inventory management and is not settable.

8.76 EthernetTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. This managed entity terminates and originates an Ethernet section trail. The attribute PointDirectionality has the value "bidirectional".

Relationships

There is one or more of these managed entities contained within an ONT. One of these managed entities exists for each EthernetCTPF managed entity.

8.77 filterProfileF

This "support" managed entity provides a filter construct upon which management actions are based. Instances of this managed entity are created and deleted by request of the managing system. The managed entity supports the operational state and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

OperationalState: This attribute identifies whether or not the managed entity is capable of performing its normal functions (enabled or disabled).

AdministrativeState: This attribute is used to inhibit (lock) and allow (unlock) the use of this profile entity.

FilterConstructList: This attribute provides a listing of the logical constraints describing the filter.

Relationships

One instance of this managed entity shall exist for each logF managed entity (to describe situations under which information is added as records to the logF). Filter profiles can also be associated with the forwarding of real-time information to the managing system.

8.78 LESServiceProfileF

This managed entity is used to organize data that describes voice grade Loop Emulation Service functions of the FSAN NE associated with AAL2 interworking. Instances of this managed entity are created and deleted by request of the managing system or operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

ELCPInd: This Boolean attribute indicates whether or not Emulated Loop Control Protocol is in use.

POTSSignalling: This attribute selects which signalling format should be used for POTS service. Valid values include but are not limited to PSTN, CAS, CCS, and other.

BRISignalling: This attribute selects which signalling format should be used for basic rate ISDN. Valid values include but are not limited to DSS1, CCS, and other.

MaxNumCIDs: This attribute specifies the maximum number of channels within the VCC that can be active.

MaxPacketLength: This attribute specifies the maximum packet length.

Channel&SSCSParameterPointerList: This attribute correlates channel Ids with SSCS parameter values.

NOTE – SSCS parameter sets are yet to be defined.

Relationships

This managed entity may be associated to zero or more instances of an interworking vcCTPF terminating AAL2.

8.79 layerNetworkDomainF

The layer network domain is defined to support the requirement for independent layer management. Each layer is concerned with the generation and transfer of characteristic information. The layer network domain managed entity represents the part of the layer that is available to an operator managing system. It contains only managed entities from a single layer. The layer domain includes all topological aspects of the transport network layer. It is assumed that a layerNetworkDomainF contains one and only one subnetworkF, which can be further decomposed. There may be several layer network domains within a single network. It is assumed that the layer network domain is created automatically at the installation of the superior networkF managed entity. The automatic creation of instances of this managed entity shall be reported to the operator managing system. The managing system may subsequently create and delete other instances of the layer network domain provided there are no dependent entities.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SignalIdentification: This attribute represents the characteristic information of the layer network domain.

SystemTitle: This attribute provides an operator-provided system name to identify the network.

UserLabel: This attribute allows a manager to represent additional information about the layer network domain.

Relationships

A layerNetworkDomainF is delineated by zero or more CTPF(s). A layerNetworkDomainF groups zero or more trailF(s). A layerNetworkDomainF is partitioned into one or more subnetworkF(s).

8.80 linkConnectionF

This managed entity is used to describe the transport entity transferring information between two CTPFs. A link connection can be a component of a trail. A sequence of one or more link connections and subnetwork connections may be pieced together to form a trail. A linkConnectionF cannot be created between a composite subnetwork and one of its component subnetworks. An instance of this managed entity is created automatically with the provisioning of information transfer in the network layer to which this link connection belongs. The managed entity can only be deleted when the provisioned bandwidth is taken out of service. The managed entity supports availability status and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

AvailabilityStatus: This attribute indicates whether or not a managed entity is capable of performing its task.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

ACTPPtr: This attribute is used to identify one end of the link connection.

ZCTPPtr: This attribute is used to identify the other end of the link connection.

Directionality: This attribute indicates whether or not a link is "unidirectional" or "bidirectional".

RecoverableInd: This attribute is used to identify the connection as recoverable (protected) or not.

Relationships

This managed entity is established between two CTPFs.

8.81 logF

This managed entity is used to store incoming event reports. It is used to group multiple instances of the same event type to form a logF. Examples include alarm logs, state change logs, attribute value change logs, managed entity creation logs, and managed entity deletion logs. This managed entity includes attributes that allow the FSAN upstream system or operator to control the behaviour of the logF. Instances of this managed entity are created automatically by the FSAN EMS upon initialization. The managed entity supports operational state and administrative state and alarm status functions as defined in ITU-T Rec. X.731. Changes in state or status are reported automatically or on demand to the managing system. In case of Threshold Crossing, an alarm is generated.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the logging function of this managed entity in the FSAN EMS.

OperationalState: This attribute indicates whether or not a managed entity is capable of performing its task, in this case logging. Valid values are "enabled" or "disabled".

AvailabilityStatus: This attribute provides more information on whether or not the managed entity is capable of performing its normal functions.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

FilterProfileId: This attribute points to a filter object that encapsulates constraints used by this managed entity in determining whether or not to logF a particular event instance.

EventType: This attribute identifies the event type recorded in the logF instance.

LogFullAction: This attribute identifies the action the logF recording should take when the log is full. Valid values are "stop" and "wraparound".

CapacityThreshold: This attribute identifies the log size, after crossing an alarm is generated.

MaxNumRecords: This attribute identifies the maximum number of records that can be stored in the log.

CurrentLogSize: This attribute identifies the current number of records stored in the log.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

Relationships

Instances of this managed entity are used to contain (multiple) instances of alarmLogRecordFs, managed entity creation records, managed entity deletion records, state change records, and attributeValueChangeRecordFs.

8.82 logicalLinkEndF

A logical link end contains CTPFs for the purposes of representing topology. It represents the end of a logicalLinkF or logicalMTPLinkF.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SignalIdentification: This attribute identifies the characteristic information of the layer to which this managed entity belongs.

LinkFPtr: This attribute identifies the logicalLinkF or logicalMTPLinkF associated with this end point.

LinkEndDirectionality: This attribute specifies whether this managed entity contains sink, source, bidirectional or undefined (combination of the above three) connection termination points.

CTPList: This attribute lists the CTPFs that are contained by this managed entity.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

Each logicalLinkF or logicalMTPLinkF has two or more logicalLinkEndF(s).

8.83 logicalLinkF

A logical link is administratively composed of link connections or bandwidth that may be provided by one or more topological links or other logical links. This entity may be explicitly created by the network management system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SignalIdentification: This attribute identifies the characteristic information of the layer to which this managed entity belongs.

LinkDirectionality: This attribute specifies whether this managed entity contains unidirectional, bidirectional or undefined (combination of the above two) link connections.

Aend: This pointer attribute identifies the link end at one extremity.

Zend: This pointer attribute identifies the link end or access group at the other extremity.

LinkConnectionList: This attribute lists the linkConnectionFs that are contained by this managed entity.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

A logicalLinkF is a group of link connections sharing two extremities. One logicalLinkF has a relationship with the two managed entities that it is linking. A logicalLinkF cannot exist without the subnetworkF being identified.

8.84 logicalMTPLinkF

A logicalMTPLinkF is administratively composed of link connections or bandwidth that may be provided by one or more topological links or other logical links where the links share a common Aend link end point. This entity may be explicitly created by the network management system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SignalIdentification: This attribute identifies the characteristic information of the layer to which this managed entity belongs.

LinkDirectionality: This attribute specifies whether this managed entity contains unidirectional, bidirectional or undefined (combination of the above two) link connections.

MTPLinkDirectionality: This attribute indicates whether or not a logicalMTPLink is "downstream" (from Aend), "upstream" (to Aend), or "bidirectional".

Aend: This pointer attribute identifies the shared link end.

ZendList: This pointer attribute identifies the list of terminating link ends or access groups.

LinkConnectionList: This attribute lists the linkConnectionFs that are contained by this managed entity.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

A logicalMTPLinkF is a group of link connections sharing one extremity. One logicalMTPLinkF has a relationship with the managed entities that it is linking. A logicalMTPLinkF cannot exist without the subnetworkF being identified.

8.85 MACBridgeConfigurationDataF

This managed entity is used to organize and record data that is associated with bridged LAN configurations. Some of the data is volatile. Instances of this managed entity are created automatically whenever an interworking vcCTPF is established for AAL5 on the ONT for a bridged LAN Ethernet PhysicalPathTPF.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

BridgeMACAddress: The MAC address used by the bridge.

BridgePriority: This attribute denotes the priority of the bridge and is positive integer-valued.[6]

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6 The range of values for this item is 0 to 65535 with default value 32768.

DesignatedRoot: This attribute provides the bridge identifier for the root of the spanning tree.

RootPathCost: This attribute provides the cost of the best path to the root as seen from the bridge.

BridgePortCount: This attribute counts the number of existing ports controlled by this bridge.

RootPortNum: This attribute provides the port number that has the lowest cost from the bridge to the root bridge.

TPManagedEntityIdPortList: This attribute identifies list of termination points for each of the ports controlled by the bridge and their association to the appropriate port number.

Relationships

This managed entity is associated with one instance of a PhysicalPathTPF of type "Ethernet".

8.86 MACBridgeF

This managed entity organizes the data associated with the configuration of a bridged Ethernet subscriber interface involving a learning function. Instances of this managed entity are created automatically whenever an interworking vcCTPF is established for AAL5 on the ONT for a learning bridged LAN Ethernet PhysicalPathTPF. The managed entity supports the operational state and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MACBridgeConfigurationDataPtr: This attribute identifies the associated configuration data.

MACBridgeServiceProfilePtr: This attribute identifies the associated service profile.

InterworkingVcCTPPtr: This attributes identifies the associated interworking vcCTP.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

OperationalState: This attribute identifies whether or not the managed entity is capable of performing its normal functions (enabled or disabled).

Relationships

There is zero or more of these managed entities contained within LAN subscriber card on an FSAN ONT. One or more of these managed entities exists for each EthernetTTPF, EthernetCTPF. Zero or more of these managed entities exists for each EthernetCTPF and EthernetTTPF.

8.87 MACBridgePMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected at a MAC bridging function supporting Ethernet interfaces on the ONT. Instances of this managed entity are created automatically whenever performance monitoring is requested by a client application or NMS at the associated BridgedLANCTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

TPPointer: This attribute identifies the associated TP.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

BridgeLearningEntryDiscardCount: This attribute records the number of forwarding database entries that have been or would have been learned but were discarded or replaced due to lack of space in the database table.

Relationships

Zero or more instances of this managed entity may be associated with an instance of BridgedLANCTPF.

8.88 MACBridgePortF

This managed entity is used to organize and record data that is associated with a bridge port. Some of the data is volatile. Instances of this managed entity are created automatically whenever an interworking vcCTPF is established for AAL5 on the ONT for a bridged LAN Ethernet PhysicalPathTPF.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

BridgeIdPointer: This attribute identifies the MAC bridge controlling the port.

PortNum: This attribute provides the port number.

PortPriority: This attribute denotes the priority of the port.

PortPathCost: This attribute provides the cost contribution of the port to the path cost towards the spanning tree root bridge.

PortSpanInd: This Boolean attribute indicates whether or not spanning tree algorithms are used by the bridge port.

PortState: This attribute provides status information on the port. Valid values include "disabled", "blocking", "listening", "learning", "forwarding", and "inoperable".

DesignatedBridgeRootCostPort: This attribute provides the Designated Root, Designated Cost, Designated Bridge, and Designated Port outputs of "Read port parameters" operation defined in 14.8.2.1 of IEEE 802.1D, i.e.:

- bridge identifier of the designated bridge for the port's segment;
- bridge identifier of the root transmitted by the designated bridge for the segment;
- port number of the designated port on the designated bridge considered to be part of this port's segment;
- path cost contribution of the designated port to this port's segment.

VcCTPManagedEntityId_LANPhysicalPathTPManagedEntityId: This attribute identifies either the virtual channel connection termination point or the LAN Physical Path Trail Termination Point associated with this port.

MACFilterTable: This attribute lists the destination MAC addresses, whether they are learned or statically assigned, whether packets having them as destination addresses are filtered or forwarded, and their age.

BridgeTable: This attribute lists for every MAC address of a terminal served by the bridge port the destination MAC addresses, whether they are learned or statically assigned, whether they are permanent or non-permanent, and their age.

Relationships

One or more instances of this managed entity are associated with an instance of the managed entity EthernetTTPF associated with a MAC bridging function in the ONT.

8.89 MACBridgePortPMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected at the port bridging function for Ethernet interfaces on the ONT. Instances of this managed entity are created automatically whenever performance monitoring is requested by a client application or NMS at the associated BridgedLANCTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

TPPointer: This attribute identifies the associated TP.

PortNum: This attribute identifies the port at which monitoring takes place.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

Transmission side

ForwardedFrameCount: A count of successfully transmitted frames on a particular port.

DelayExceededDiscardCount: A count of frames discarded on a particular port because transmission is delayed.

MTUExceededDiscardCount: A count of frames discarded on a particular port because MTU is exceeded.

Receiving side

ReceivedFrameCount: A count of frames received at the port.

ReceivedAndDiscardedCount: A count of frames received on a particular port that have been discarded due to errors.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the BridgedLANCTPF managed entity for each port that the MAC Bridge is controlling.

8.90 MACBridgeServiceProfileF

This managed entity is used to organize data that affects all ports on a MAC Bridge at a bridge LAN Ethernet UNI interface on the ONT. Instances of this managed entity are created and deleted by request of the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance for all applications notified of its creation.

SpanningTreeInd: This Boolean attribute indicates whether or not a spanning tree algorithm is enabled. The value TRUE means enabled.

LearningInd: This Boolean attribute indicates whether or not the learning functions of the bridge are enabled. The value TRUE means enabled.

MaxAge: This attribute indicates the maximum age (in seconds) for an entry in the spanning tree listing. It indicates the maximum age in seconds of received protocol information before it is discarded.

HelloTime: This attribute provides the time interval (in hundredths of a second) between hello packets. It is the time interval, in hundredths of a second, that a bridge advertises its presence while as a root or attempting to become a root.

ForwardDelay: This attribute gives the time (in hundredths of a second) that the bridge on the Ethernet card in the ONT (as a member of the community of all bridges in the Bridged Local Area Network) retains a packet before forwarding it. It is the parameter used as the timeout value for ageing Filtering Database dynamic entries following changes in active topology. This is equivalent to the value in hundredths of a second that the bridge uses for Forward Delay when the bridge acts as the root.

Relationships

This managed entity may be associated with zero or one instance of a PhysicalPathTPF of type "Ethernet".

8.91 managedEntityCreationLogRecordF

This managed entity is used to represent logged information that resulted from managed entity creation events. An instance of this managed entity is created automatically by the FSAN NE upon creation of other managed entities in the FSAN NE. Instances of this managed entity can be deleted by the FSAN NE or by request of the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

LoggingTime: This attribute identifies the time at which the record was entered into the log.

ManagedEntityAssertion: This attribute identifies the type and instance Id of the managed entity that was created.

Relationships

Multiple instances of this managed entity may be contained in an instance of the logF managed entity.

8.92 managedEntityDeletionLogRecordF

This managed entity is used to represent logged information that resulted from managed entity deletion events. An instance of this managed entity is created automatically by the FSAN NE upon deletion of other managed entities in the FSAN NE. Instances of this managed entity can be deleted by the FSAN NE or at the request of the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

LoggingTime: This attribute identifies the time at which the record was entered into the log.

ManagedEntityAssertion: This attribute identifies the type and instance Id of the managed entity that was deleted.

Relationships

Multiple instances of this managed entity may be contained in an instance of the logF managed entity.

8.93 MLTTestResultsF

This managed entity provides the results of conducting Metallic Loop Testing on the twisted pair connected to any RJ-11 port of the ONT. Instances of this managed entity are created by the EMS when an operator or OMS system invokes this test.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

VoiceCTPPtr: This attribute identifies the voice channel tested.

HazardousPotential: This Boolean attribute indicates whether or not the MLT test results have been compromised by a detected dangerously high voltage condition.

ForeignElectroMotiveForce: This attribute reports the results of checking for excess voltage on the drop. It either provides indication of a pass or a sequence of measurement values in units of volts for acVoltageTipToGround, acVoltageRingToGround, dcVoltageTipToGround, dcVoltageRingToGround.

ResistiveFaults: This attribute reports the results of checking for dc resistance faults across T-R, T-G, and R-G. It either provides indication of a pass or a sequence of items the first of which indicates whether a two- or three-terminal measurement was conducted followed by three measurement values in ohms for dcResistanceTipToRing, dcResitanceTipToGround, and dcResistanceRingToGround.

ReceiverOffHook: This attribute reports the results of testing to distinguish between a tip-ring resistive fault and an off-hook condition. It either provides indication of a pass or a sequence of measurements in ohms for dcResistance1TipToRing and dcResistance2TipToRing.

Ringer: This attribute reports the results of detection of appropriate ringer terminations on the customer's line. It either provides indication of pass or a sequence of measurements in ohms for acImpedenceTipToRing, acImpedenceTipToGround, acImpedenceRingToGround.

NetworkTermination1dcSignatureTest: This attribute reports the results of testing for the presence of a Network Termination 1. The NT1 is CPE that terminates an ISDN Basic Access Digital Subscriber Line. It either provides indication of pass or a sequence of measurements in volts for dcVoltage1TipToRing and dcVoltage2TipToRing.

TestCompletionTimeStamp: This attribute indicates when all the MLT testing was completed.

Relationships

Zero or more instance of this managed entity shall exist for each VoiceCTPF.

8.94 msCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. This managed entity terminates and originates a multiplex section link connection.

Attributes

StmLevel: This attribute provides the corresponding STM Level (e.g., STM1, STM4, …).

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exists for each rsTTPF and for each msTTPF.

8.95 msTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a multiplex section trail. The following alarms can be detected at this managed entity: Alarm Indication Signal (AIS), Far-End Receive Failure (FERF), Signal Degraded (SD) and Excessive Bit Error Rate (EBER).

Attributes

StmLevel: This attribute provides the corresponding STM Level (e.g., STM1, STM4, …).

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exist for each msCTPF and for each au4CTPF or for up to 3 au3CTPF.

8.96 NEFSAN

This managed entity is used to represent equipment that is found as part of the FSAN architecture and conforms to the definition as provided in ITU-T Rec. G.983.2. An instance of this managed entity is created when the equipment is initialized. The automatic creation of instances of this managed entity shall be reported to the managing system. The managed entity can only be deleted when the equipment is taken out of service and only by request of the managing system. The managed entity supports the operational state and administrative state and alarm status functions as defined in ITU-T Rec. X.731. Changes in state or status are reported automatically or on demand to the managing system. The managed entity also reports on appropriate equipment alarms. This managed entity is defined for the purposes of grouping together all common attributes of an FSAN NE, but only instances of specific FSAN nodes (OLT, ONT, ONU, NT) shall be implemented.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

OperationalState: This attribute indicates whether or not a managed entity is capable of performing its task. Valid values are "enabled" and "disabled".

ModelCode: This attribute stores the product model code of the Network Element. The product model code is the manufacturer's model identification information. It is vendor-provided information that the vendor uses to distinguish the network element among a family of products. This attribute is useful for OSSs performing equipment discovery and inventory processes.

ExternalTime: This attribute provides the time-of-day system time. The attribute functions as a reference for all time stamp activities in the NEFSAN.

LocationName: This attribute identifies the specific or general location of the NEFSAN.

SupplierName: This attribute identifies the supplier of the NEFSAN.

Version: This attribute identifies the version of the NEFSAN.

SerialNumber: This attribute provides the serial number for the NEFSAN used for inventory management.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an AlarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

ThresholdDataPtr: This attribute provides a pointer to an instance of the ThresholdDataF object that provides threshold values for monitored parameters to be used to generate Threshold Crossing Alert notifications whenever a monitored parameter crosses its associated threshold value for this managed entity.

SupportedByManagedEntityList: This attribute provides pointers to instances of managed entities that affect the performance and/or state of this managed entity.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

One instance of the NEFSAN managed entity would exist for each node in the FSAN architecture being managed. The NEFSAN contains zero or more EquipmentHolderF managed entities indicating "shelves". These shelves, in turn, contain zero or more EquipmentHolderF managed entities indicating slots.

8.97 networkF

The networkF managed entity groups all the managed entities visible over the NMS-EMS interface. The managed entities grouped under networkF may span several transport layers (e.g., the VP and VC layers). This managed entity is automatically created when the FSAN network is initialized. It is not created or deleted by the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SystemTitle: This attribute provides an operator-provided system name to identify the network.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

The networkF managed entity is made up of a set of transport and other managed entities (e.g., logF). This managed entity is a type of layerNetworkDomainF and inherits all the attributes and relationships defined by layerNetworkDomainF.

8.98 NT

This managed entity is one type of NEFSAN, and inherits all of the properties and relationships of this superclass. Instances can be created and deleted by request of the FSAN managing system. Additionally, the NT possesses an attribute identifying the ONU from which it is hosted.

Attributes

upstreamNEFSAN: This attribute identifies the FSAN ONU node hosting the NT equipment node.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the ONU.

8.99 OLT

This managed entity is one type of NEFSAN, and inherits all of the properties and relationships of this superclass. Additionally, the OLT possesses an extra attribute listing the FSAN ONTs and ONUs hosted by the OLT instance.

Attributes

subtendingNEFSANList: This attribute identifies the FSAN ONT and FSAN ONU instances for which the OLT acts as a head-end.

DCNAddress: This attribute identifies the address (normally IP address) for the OLT on the Data Communications Network of the SMS.

AdministrationDomain: This attribute identifies the name of the domain.

8.100 OLTResource

This managed entity collects key capacity metrics for the OLT system. One instance of this managed entity is created automatically when the OLT is initialized. The automatic creation of an instance of this managed entity may be reported to the managing system. The managed entity shall be automatically deleted when the OLT is taken out of service.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

OLTManagedEntityId: This attribute identifies the associated system.

UnassignedSlotList: This attribute lists the slot number within the OLT that has not been assigned yet.

AssignedSlotList: This attribute lists the slot number within the OLT that has already been assigned.

Relationships

One instance of this managed entity shall exist for each instance of the OLT.

8.101 ONT

This managed entity is one type of NEFSAN, and inherits all of the properties and relationships of this superclass. Instances can be created and deleted by request of the FSAN managing system. Additionally, the ONT possesses an attribute identifying the OLT from which it is hosted.

Attributes

upstreamNEFSAN: This attribute identifies the FSAN OLT node hosting the ONT equipment node.

SRIndicator: This Boolean attribute indicates the capability of status reporting. The value true means that the status reporting is available for all the T-CONT buffers which are associated with the APON-side PhysicalPathTPF of each ONT/ONU.

MaximumNumberOfTCONT: This attribute identifies the maximum number of T-CONT that the APON-side PhysicalPathTPF of each ONT/ONU is capable of. It ranges from 1 to 252.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the OLT.

8.102 ONU

This managed entity is one type of NEFSAN, and inherits all of the properties and relationships of this superclass. Instances can be created and deleted by request of the FSAN managing system. Additionally, the ONU possesses an attribute identifying the OLT from which it is hosted.

Attributes

upstreamNEFSAN: This attribute identifies the FSAN OLT node hosting the ONU equipment node.

SRIndicator: This Boolean attribute indicates the capability of status reporting. The value true means that the status reporting is available for all the T-CONT buffers which are associated with the APON-side PhysicalPathTPF of each ONT/ONU.

MaximumNumberOfTCONT: This attribute identifies the maximum number of T-CONT that the APON-side PhysicalPathTPF of each ONT/ONU is capable of. It ranges from 1 to 252.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the OLT.

8.103 PhysicalPathTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. This managed entity is used to represent the points in the FSAN NE where physical paths terminate and physical level functions (e.g., path overhead functions) are performed. The operational state reflects the perceived ability to generate and/or receive a valid signal. An instance of this managed entity is created automatically by the FSAN NE for each physical path terminating on the FSAN NE or by request of the managing system. The following alarms can be detected at this managed entity: Loss of Signal (LOS), Transmitter failure (detected by Laser Bias High, Laser Power Low, Laser Power High) and Physical Equipment Error (PEEi) specifically for PhysicalPathTPs. The managed entity supports the administrative and operational state and alarm status functions as defined in ITU-T Rec. X.731. Changes in state and status are reported automatically or on demand to the managing system. Although this managed entity is a type of TTPF, UpstreamConnectivityPointer and DownstreamConnectivityPointer will not be used. Instead, ConnectivityPtrList is used, because this managed entity models point-to-multipoint connectivity.

Attributes

PhysicalPathType: This attribute identifies the physical path type terminated at the PhysicalPathTP managed entity instance. Choices include but are not limited to DS1, DS3, OC-3c, STS-3c, Ethernet, STS-1, cellBased, E1, E3, and APON.

ATMBearerInd: This attribute indicates whether or not the interface designated by the managed entity is a bearer for ATM traffic.

OpticalReach: This attribute indicates the length the optical signal may travel before requiring termination or regeneration if the physical path is optical.

OpticalWaveLengthArray: This attribute specifies the optical wavelengths and directionality used by each optical physicalPathTTPF managed entity.

PortId: This attribute identifies the port on the line card or equipment where the physical path terminates.

FramingFormat: This attribute provides the physical framing format associated with the physical path being terminated.

ConnectivityPtrList: This attribute points to instance(s) of the far-end PhysicalPathTPF corresponding to this instance of the managed entity (either upstream or downstream). For example, in case that this managed entity resides in OLT, this attribute points to the corresponding PhysicalPathTPFs that reside in ONTs/ONUs.

ThresholdDataPtr: This attribute provides a pointer to an instance of the ThresholdDataF object that provides threshold values for monitored parameters to be used to generate Threshold Crossing Alert notifications whenever a monitored parameter crosses its associated threshold value.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

InterfaceSpeed: This attribute represents the physically available bandwidth at the interface.

Relationships

Instances of this managed entity shall be associated with an instance of the pluginUnitF managed entity.

8.104 PhysicalPONPortF

This managed entity represents the physical port of Passive Optical Network (PON) equipments at the PON side. This managed entity is derived from physicalPortF and inherits all the attributes and relationships of its super class.

Attributes

OpticalReach: This attribute indicates the length the optical signal may travel before requiring termination or regeneration.

OpticalWavelengthArray: This attribute specifies the optical wavelengths and their directionality for WDM based technologies. When single wavelength technology is applied, just one element is listed in this attribute.

Relationships

Zero or more instances of this managed entity can be contained within a plugInUnitF or NEFSAN in case of integrated ONT/ONU.

8.105 PhysicalPortF

This managed entity represents the characteristics of physical termination of network equipments. This managed entity is a collection of common attributes of physical ports, and it is defined for inheritance.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity. When the port is locked, all the logical entities supported by this physical port will not be available, unless this attribute is set to "unlocked".

SupportedTPList: This attribute is the list of the lowest server trail termination points (TTPs) supported by this physical port, such as PhysicalPathTPF.

PhysicalPortSignalRateAndMappingList: This attribute identifies the signal rate associated with an equipment port (e.g., port=0, rate=stm1) and its payload mapping (e.g., au3 or au4). The signal rate and payload mapping is provisionable. For example, a port with signal rate stm4 may have a payload mapping of au4-4. Another possible mapping of this rate is a sequence of four individual au4 (i.e., au4, au4, au4, au4) or a sequence of mixed au3 and au4 (e.g., au3, au3, au3, au4, au4, au3, au3, au3). This attribute supports two choices depending on whether the signal may be sent with the same rate in both directions, or depending on the direction. It is also possible to support only one direction for signal transfer, which is a special case of different rates in the two directions. In addition, if the port terminates an optical signal, different rates may be supported on different wavelengths.

ConnectorType: This attribute describes the connector type used for this port. The value of this attribute can be one of the following: Fibre Connector (FC), Lucent Connector (LC), Subscriber Connector (SC), etc.

PortDirectionality: This attribute indicates the capability of the port to support the directionality for data transfer. The value of this attribute may be one of the following: one way in, one way out, or two-way. The port mapping list shall be consistent with the value of this attribute. For example, if the directionality is one way out, "uniform" choice in the port mapping list is not a valid option.

Reach: This attribute indicates the length a signal may travel before requiring termination or regeneration.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

Zero or more instances of this managed entity or its derived managed entities can be contained within a plugInUnitF or NEFSAN in case of integrated ONT/ONU.

8.106 pluginUnitF

This managed entity is used to represent equipment that is inserted (plugged into) and removed from slots of the FSAN NE. The FSAN NE creates an instance of this managed entity automatically when a plug-in unit is inserted into the FSAN NE slot. Instances can also be created and deleted at the request of the managing system. The managed entity supports the operational state and administrative state and alarm status functions as defined in ITU-T Rec. X.731. Changes in state or status are reported automatically or on demand to the managing system. The managed entity reports on associated equipment alarms.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by the plug-in unit.

AvailabilityStatus: This attribute is used to further describe the state of the plug-in managed entity.

OperationalState: This attribute indicates whether or not a managed entity is capable of performing its task. Valid values are "enabled", "disabled", or "unknown".

ModelCode: This attribute stores the product model code of the Network Element. The product model code is the manufacturer's model identification information. It is vendor-provided information that the vendor uses to distinguish the network element among a family of products. This attribute is useful for OSSs performing equipment discovery and inventory processes.

SupplierName: This attribute identifies the supplier of the plug-in unit.

Version: This attribute identifies the version of the plug-in.

SerialNumber: This attribute provides the serial number for the plug-in unit used for inventory management.

PortCount: This attribute indicates the number of ports on the plug-in.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an AlarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

Relationships

An instance of this managed entity is associated with at least one instance of equipmentHolderF representing the slot that the plug-in occupies.

8.107 PriorityQueue

This managed entity specifies the priority queue in the ONT that is used for the vpCTPF.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

QueueConfigurationOption: This attribute identifies the buffer-partitioning policy. One value means that all the queues share one buffer size of Maximum Queue Size and the other value means that each queue uses its individual buffer size of Maximum Queue Size.

MaximumQueueSize: This attribute specifies the maximum size of the queue.

AllocatedQueueSize: This attribute identifies the allocated size of this queue.

DCsCounterResetInterval: This attribute represents the interval in milliseconds that the counter for discarded cells on this queue due to buffer overflow reset itself.

DCsThreshold: The threshold for the number of cells discarded on this queue due to buffer overflow.

TrafficSchedulerPtr: This attribute points to the Traffic Scheduler that is directly associated with this priority queue.

PriorityWeight: This attribute represents priority for HOL scheduling or the weight for WRR scheduling. This value is used by Traffic Scheduler pointed by TrafficSchedulerPtr.

If the indicated pointer has Policy = HOL, then this value is interpreted as a priority. If the indicated pointer has Policy = WRR, then this value is interpreted as a weight.

Relationships

This managed entity can be associated with TrafficScheduler.

8.108 rsCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates a regenerator section link connection.

Attributes

StmLevel: This attribute provides the corresponding STM Level (e.g., STM1, STM4 …).

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities exist for each rsTTPF.

8.109 rsTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a regenerator section trail. The following alarms can be detected at this managed entity: LOS of Frame (LOF), Signal Degraded (SD) and Excessive Bit Error Rate (EBER).

Attributes

StmLevel: This attribute provides the corresponding STM Level (e.g., STM1, STM4 …).

Relationships

There is zero or more of these managed entities contained within any FSAN NE. One of these managed entities exist for each PhysicalPathTPF of Type "SDH" and one for each rsCTPF and each msCTPF.

8.110 SSCSParameterProfile1F

These are managed entity groups default values for Service Specific Convergence Sublayer parameters for channels carried in an AAL2 VCC that provide control and management plane traffic. These parameters are defined in ITU-T Rec. I.366.1. Instances of this managed entity are created and deleted at the request of the NMS or Operators.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SegmentLength: This attribute provides the length of segment for the Segmentation and Reassembly Service Specific Convergence sublayer. It ranges from 0 to the maximum value provided by MaxCPS_SDULen attribute.

RASTimer: This attribute provides the reassembly time (in seconds) of the Segmentation and Reassembly Service Specific Convergence sublayer for ITU-T Rec. I.366.1.

MaxSSSARSDULen: This attribute provides the maximum length allowed for an SSSAR-SDU of the Segmentation and Reassembly Service Specific Convergence sublayer.

SSTEDInd: This Boolean attribute indicates whether or not the transmission error detection mechanisms have been selected, with value TRUE indicating selection.

SSADTInd: This Boolean attribute indicates whether or not the assured data transfer mechanism has been selected, with value TRUE indicating selection.

Relationships

One instance of this managed entity shall exist for each instance of the AAL2ParameterProfileF used within an NE. One instance of this managed entity may be associated with one or more instances of an interworking vcCTPF.

8.111 SSCSParameterProfile2F

These are managed entity groups default values for Service Specific Convergence Sublayer parameters for channels carried in an AAL2 VCC that provide media streams. These parameters are defined in ITU-T Rec. I.366.2. Instances of this managed entity are created and deleted at the request of the NMS or Operators.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

ServiceCatType: This attribute indicates the type of service category provided by AAL2. Valid values include but are not limited to "Audio" and "Multirate".

EncSrcType: This attribute indicates the source for the encoding profile format. Valid values include but are not limited to "ITU-T" and "ATM Forum".

EncProfileIndex: This attribute indicates the specific predefined encoding profile used.

AudioServInd: This Boolean attribute indicates whether or not audio service is transported, where the value TRUE implies the presence of this service.

PCMEncType: This attribute indicates the type of PCM coding. Valid values include but are not limited to "mu-law PCM coding" and "alpha-law PCM coding".

CMDataInd: This Boolean attribute indicates whether or not Circuit Mode Data is carried on this connection, where the value TRUE implies its presence.

CMMultiplierNum: This attribute provides the N value in N×64 kbit/s circuit mode data.

FMDataInd: This Boolean attribute indicates whether or not Frame Mode Data is carried on this connection, where the value TRUE implies its presence.

FMMaxFrameLen: This attribute provides the maximum length of a frame mode data unit.

CASInd: This Boolean attribute indicates whether or not Channel Associated Signalling is enabled on the connection, where the value TRUE implies it is enabled.

DTMFInd: This Boolean attribute indicates whether or not Dual Tone Multi-Frequency dialled digits is transported on the connection, where the value TRUE implies its presence.

MFR1Ind: This Boolean attribute indicates whether or not Multi-Frequency R1 dialled digits is transported on the connection, where the value TRUE implies its presence.

MFR2Ind: This Boolean attribute indicates whether or not Multi-Frequency R2 dialled digits is transported on the connection, where the value TRUE implies its presence.

RateControlInd: This Boolean attribute indicates whether or not rate control is transported on the connection, where the value TRUE implies its presence.

SynchChangeInd: This Boolean attribute indicates whether or not synchronization of change in SSCS operation is transported on the connection, where the value TRUE implies its presence.

Relationships

One instance of this managed entity shall exist for each instance of the AAL2ParameterProfileF used within an NE. One instance of this managed entity may be associated with one or more instances of an interworking vcCTPF.

8.112 softwareF

This managed entity is used to represent logical information stored in equipment, including programs and data tables. Instances of this managed entity are created and deleted by the FSAN NE or at the request of the managing system. The managed entity supports the operational state and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) softwareF that has been installed in the ATM NE. For example, this attribute may be used to administer the activation and deactivation of multiple softwareF entities in the ATM NE, particularly useful when downloading new software in the ATM NE.

OperationalState: This attribute identifies whether or not the softwareF being represented is capable of performing its normal functions (i.e., in-service or out-of-service).

SupplierName: This attribute identifies the supplier.

Version: This attribute identifies the version of the softwareF.

AffectedManagedEntityList: This attribute lists the managed entities (plug-ins, equipmentHolders, FSAN NEs, etc.) that can be directly affected by a change in state or deletion of this managed entity.

UserLabel: This attribute correlates the managed entity instance to an NMS-provided identifier. This attribute is required for managed entities associated with user-network interfaces.

Relationships

Multiple instances of this managed entity may be contained in an instance of the NEFSAN and PluginUnitF managed entities.

8.113 SONETSDHLinePMHistoryData

This is a managed entity that contains the past performance monitoring data collected at an rsTTPF for near-end regenerator section monitoring for both directions of traffic. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated rsTTPF managed entity, and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MonitoringMEPtr: This attribute identifies the monitored managed entity.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

ErroredSecondsP: An ES represents the count of seconds with one or more errored blocks during the available time of the monitored resource. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

SeverelyErroredSecondsP: A SES represents the count of one second periods containing greater than or equal to 30% of errored blocks, or at least one Severely Disturbed Period (SDP), that is one second, containing one or more defects during the available time of the monitored resource. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

BackgroundBlockErrorP: A BBE represents the count of the errored blocks (Estimated Errored Block on Bip-n violation) not occurring as part of an SES. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

OutOfFrameSecondsP: An OFS represents the count of seconds with at least one out of Frame Event during the available time of the monitored resource. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

UnavailableSecondsP: UAS provides the count of seconds of unavailability. A UAS state is declared when ten consecutive SESs occur. The ten SESs are subtracted from the SES count and added to the UAS count. Subsequent seconds are accrued to the UAS count until the UAS state is cleared. The UAS state is cleared when ten consecutive non-SESs occur. When that happens, the consecutive ten non-SESs are subtracted from the UAS count. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

Relationships

Zero or more instances of this managed entity shall exist for each instance of rsTTPF.

8.114 SONETSDHPhysicalPortResource

This managed entity collects key capacity metrics for NNI-side OC-3 or STS-1 or STS-3 port of the OLT. One instance of this managed entity is created automatically when the port with PhysicalPathType equal to OC-3 or STS-1 or STS-3 is provisioned. The automatic creation of instances of this managed entity may be reported to the managing system. The managed entity shall be automatically deleted when the port is deleted.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PortManagedEntityId: This attribute identifies the associated port.

MaxTSs: This attribute identifies the maximum amount of timeslots assigned to the port of OLT.

ReservedTSs: This attribute identifies the reserved timeslots assigned to the port of OLT.

AssignedTSs: This attribute identifies the already-assigned timeslots assigned to the port of OLT.

Relationships

One instance of this managed entity shall exist for each instance of the NNI-side OLT Port with PhysicalPathType equal to OC-3 or STS-1 or STS-3.

8.115 SONETSDHSectionAdaptationPMHistoryData

This is a managed entity that contains the past performance monitoring data collected at an au3CTPF or au4CTPF for near-end and far-end path monitoring for both directions of traffic. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated au3CTPF or au4CTPF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MonitoringMEPtr: This attribute identifies the monitored managed entity.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

PointerJustificationCountHighP: A pJCHigh represents the positive PJE count on one selectable outgoing AU within an STM-N signal after the AU has been resynchronized on the local clock. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

PointerJustificationCountLowP: A pJCLow represents the negative PJE count on one selectable outgoing AU within an STM-N signal after the AU has been resynchronized on the local clock. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

Relationships

Zero or more instances of this managed entity shall exist for each instance of au3CTPF or au4CTPF.

8.116 SONETSDHSectionPathPMHistoryData

This is a managed entity that contains the past performance monitoring data collected at an msTTPF or vc3TTPF or vc4TTPF for near-end and far-end multiplex section monitoring for both directions of traffic. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated msTTPF or vc3TTPF or vc4TTPF managed entity, and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MonitoringMEPtr: This attribute identifies the monitored managed entity.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

ErroredSecondsP: An ES represents the count of seconds with one or more errored blocks during the available time of the monitored resource. This parameter monitors the

characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

SeverelyErroredSecondsP: An SES represents the count of one second periods containing greater than or equal to 30% of errored blocks, or at least one Severely Disturbed Period (SDP) that is one second containing one or more defects during the available time of the monitored resource. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

BackgroundBlockErrorP: A BBE represents the count of the errored blocks (Estimated Errored Block on Bip-n violation) not occurring as part of an SES. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

UnavailableSecondsP: UAS provides the count of seconds of unavailability at the near end. A UAS state is declared when ten consecutive SESs occur. The ten SESs are subtracted from the SES count and added to the UAS count. Subsequent seconds are accrued to the UAS count until the UAS state is cleared. The UAS state is cleared when ten consecutive non-SESs occur. When that happens, the consecutive ten non-SESs are subtracted from the UAS count. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

FailureCountP: An FC represents a count of the number of occurrences of near-end failure events. This parameter monitors the characteristic signal either from the customer to the NE or from the NNI-side network to the NE.

ErroredSecondsTypeAP: An FC represents a count of errored seconds of type A at the near-end. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

ErroredSecondsTypeBP: An FC represents a count of errored seconds of type B at the near-end. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE.

ErroredSecondsPFE: An ES represents the count of seconds with one or more errored blocks during the available time of the monitored resource. This parameter monitors the characteristic signal either from the NE to the customer, or from the NE to the NNI-side network.

SeverelyErroredSecondsPFE: An SES represents the count of one second periods containing greater than or equal to 30% of errored blocks, or at least one Severely Disturbed Period (SDP) that is one second containing one or more defects during the available time of the monitored resource. This parameter monitors the characteristic signal either from the NE to the customer, or from the NE to the NNI-side network.

BackgroundBlockErrorPFE: A BBE represents the count of the errored blocks (Estimated Errored Block on Bip-n violation) not occurring as part of an SES. This parameter monitors the characteristic signal either from the NE to the customer, or from the NE to the NNI-side network.

UnavailableSecondsPFE: UAS provides the count of seconds of unavailability at the far end. A UAS state is declared when ten consecutive SESs occur. The ten SESs are subtracted from the SES count and added to the UAS count. Subsequent seconds are accrued to the UAS count until the UAS state is cleared. The UAS state is cleared when ten consecutive non-SESs occur. When that happens, the consecutive ten non-SESs are subtracted from the UAS count. This parameter monitors the characteristic signal either from the NE to the customer, or from the NE to the NNI-side network.

FailureCountPFE: An FC represents a count of the number of occurrences of far-end failure events. This parameter monitors the characteristic signal either from the NE to the customer, or from the NE to the NNI-side network.

ErroredSecondsTypeAPFE: An FC represents a count of errored seconds of type A at the far-end. This parameter monitors the characteristic signal either from the NE to the customer, or from the NE to the NNI-side network.

ErroredSecondsTypeBPFE: An FC represents a count of errored seconds of type B at the far-end. This parameter monitors the characteristic signal either from the NE to the customer, or from the NE to the NNI-side network.

Relationships

Zero or more instances of this managed entity shall exist for each instance of msTTPF or vc3TTPF or vc4TTPF.

8.117 subnetworkConnectionF

This managed entity represents a G.852.2 subnetwork connection (SNC), i.e., "a transport entity that transfers information across a subnetwork". A subnetwork connection is associated with two network termination points or a network termination point and a group of network termination points. The managed entity supports availability status and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

AvailabilityStatus: This attribute indicates whether or not a managed entity is capable of performing its task.

UserLabel: This attribute provides the listing of service Ids associated with this connection.

ATPPtr: This attribute is used to identify one end of the subnetwork connection.

ZTPPtr: This attribute is used to identify the other end of the subnetwork connection.

Directionality: This attribute indicates whether or not a link is "unidirectional", "bidirectional", or "undefined".

RecoverableInd: This attribute is used to identify the connection as recoverable (protected) or not.

Relationships

A subnetwork connection is associated with termination points or a termination point and a group of termination points. The termination points may be TTPFs or CTPFs.

8.118 subnetworkF

A subnetworkF (according to ITU-T Rec. G.852.2) is a topological component used for carrying characteristic information. Note that a subnetworkF may be empty. Subnetworks are used for making subnetwork connections. This Managed Entity is specialized per layer. The subnetworkF is delineated by CTPF and/or TTPF managed entities. Instances of this managed entity are automatically created when the OLT is installed. The managed entity supports administrative state and availability status functions as defined in ITU-T Rec. X.731. Changes in state and status are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

AvailabilityStatus: This attribute describes the degree to which the managed entity is able to perform its normal functions.

ContainedNetworkTPList: This attribute is a list of pointers to TPs that are contained in a subnetwork.

SignalIdentification: This attribute represents the specific format that the resource carries.

UserLabel: This attribute provides an operator-defined label.

Relationships

One or more of these managed entities exist for each installed or pre-provisioned FSAN NE.

8.119 TCAdaptorDbaFairnessPMHistoryData

This is a managed entity that contains the past performance monitoring data collected at a tcAdaptorF of OLT. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated tcAdaptorF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MonitoringMEPtr: This attribute identifies the monitored managed entity.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

Variance2: This attribute is a gauge providing the variance among all T-CONTs of Type 2 of the ratio of received cells to guaranteed cells per T-CONT. The sampling frequency is determined by supplier implementation.

Variance3: This attribute is a gauge providing the variance among all T-CONTs of Type 3 of the ratio of received cells to guaranteed cells per T-CONT. The sampling frequency is determined by supplier implementation.

Variance4: This attribute is a gauge providing the variance among all T-CONTs of Type 4 of the ratio of received cells to guaranteed cells per T-CONT. The sampling frequency is determined by supplier implementation.

Variance5: This attribute is a gauge providing the variance among all T-CONTs of Type 5 of the ratio of received cells to guaranteed cells per T-CONT. The sampling frequency is determined by supplier implementation.

Relationships

One managed entity may exist for each instance of PON-side tcAdaptorF of OLT.

8.120 tcAdaptorTTPF

An instance of this managed entity represents a point in the ATM NE where the adaptation of the ATM Layer to the underlying physical infrastructure takes place. This adaptation happens on PON interface ports at the OLT and ONT as well as on ATM Network Interfaces on the OLT and subscriber ATM interfaces on the ONT. ITU-T Rec. I.321 identifies this adaptation function as one of many functions performed at the Transmission Convergence (TC) sublayer of the B-ISDN protocol stack. This managed entity is responsible for generating alarms that report the (in)ability of the managed entity to delineate ATM cells from the payload of a terminated digital transmission path.

An instance of this managed entity is created automatically for each instance of the associated Physical Path Termination Point managed entity. Instances of this managed entity can also be created and deleted by request of the managing system. The managed entity supports the operational state and administrative state and alarm status functions as defined in ITU-T Rec. X.731. Changes in state and status are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by this managed entity.

OperationalState: This attribute identifies whether or not the managed entity is capable of performing its normal functions (i.e., in-service or out-of-service).

PhysicalPathTPFPtr: This pointer attribute identifies the associated instance of the physicalPathTPF managed entity.

APONTTPPtr: This pointer attribute identifies the associated instance of the APONTTP managed entity in case that this managed entity exits on APON-side of ONU or OLT.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an AlarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

ATMNetworkAccessProfileFORUNIInfoF: This attribute provides a pointer to the object instance of the associated ATMNetworkAccessProfileF object or UNIInfoF object.

CellScramblingControl: This attribute is used to activate/deactivate the ATM cell scrambling function. This attribute is only present for ATM interfaces where ATM cell scrambling may be controlled (i.e., activated/deactivated). The ATM Forum UNI specification requires cell scrambling for ATM/SONET interfaces but allows cell scrambling to be controlled (i.e., turned on and off) for ATM/DS3 interfaces.

Framerconfiguration: Some UNIs such as the ATM45 have two methods of mapping of ATM cells into the payload of a DS3 frame, physical layer convergence protocol (PLCP)-based mapping and HEC-based mapping. Valid values are "PLCP option" or "HEC option".

CellRateDecouplingType: This attribute is used to select the cell rate decoupling type whenever the ITU-T and ATM Forum standards give different definitions. Valid values are "ITU-T definition" and "ATM Forum definition". This attribute is needed for interfaces with decoupling options.

Relationships

Each instance of this managed entity is associated with one instance of the PhysicalPathTP managed entity through the physicalPathTPFPtr attribute. One instance of ATMNetworkAccessProfileF or uniInfoF shall be used to characterize this managed entity.

8.121 TCAdaptionProtocolMonitoringPMHistoryData

This is a managed entity that contains the past performance monitoring data collected at a tcAdaptorF for near-end TC sublayer monitoring for both directions of traffic. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated tcAdaptorF managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MonitoringMEPtr: This attribute identifies the monitored managed entity.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

DiscardedCellsHECViolationP: This attribute provides a count of the number of cells discarded due to uncorrectable header bit errors. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE, or from PON-side network to the NE.

ErroredCellsHECViolationP: This attribute provides a count of the number of cells with header bit errors. This parameter monitors the characteristic signal either from the customer to the NE, or from the NNI-side network to the NE, or from PON-side network to the NE.

Relationships

Zero or more instances of this managed entity shall exist for each instance of tcAdaptorF.

8.122 T-CONT

This managed entity is a type of logicalLinkEndF and inherits all the attributes and relationships defined by logicalLinkEndF. Signal identification is set to "VP" or "VC". It contains vpCTPFs or vcCTPFs for the purposes of DBA management. LinkFPtr points to vpLogicalLinkF or vcLogicalLinkF. LinkEndDirectionality is "source" in case that T-CONT resides in ONT/ONU, while it is "sink" in case that T-CONT resides in OLT. Note that although a contained vpCTPF or vcCTPF is bidirectional, only its source part in ONT/ONU or its sink part in OLT is affected by this TCONT.

Attributes

MaximumBandwidth: This attribute identifies the maximum amount of bandwidth assigned to the T-CONT.

GuaranteedBandwidth: This attribute identifies the summation of FixedBandwidth and "Assured Bandwidth" assigned to the link end. Note that "Assured Bandwidth" is the bandwidth that is always available to the ONU/ONT concerned, but can be used by other T-CONTs, when ONU/ONT concerned does not have cells to transmit.

FixedBandwidth: This attribute identifies the amount of entirely reserved bandwidth assigned to the link end in order to achieve a low cell transfer delay.

TcontType: This attribute identifies the T-CONT Type 1-5.

BandwidthUpdateFrequency: This attribute is used to decide the update frequency of the DBA bandwidth.

Relationships

vpLogicalLinkF or vcLogicalLinkF has two T-CONTs.

8.123 TCONTbuffer

This managed entity represents a logical object to the data grant provided by the OLT. A T-CONT buffer can accommodate ATM cells in Traffic Schedulers that exist in the ATM layer. Therefore, the T-CONT buffer is regarded as a logical buffer and it does not have the QoS control function.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PhysicalPathTPFPtr: This attribute points to the PhysicalPathTPF associated with this TCONTbuffer.

NEAssignmentPtr: This attribute identifies the T-CONT in the network view associated with this TCONTbuffer.

Relationships

This managed entity can be associated with the Traffic Scheduler. Moreover, it can be associated with corresponding T-CONT in the network view.

8.124 TCONTbufferPMHistoryData

This is a managed entity that contains the past performance monitoring data collected at a TCONTbuffer of OLT. Instances of this managed entity are created automatically whenever performance monitoring is requested by the management system at the associated TCONTbuffer managed entity, and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

MonitoringMEPtr: This attribute identifies the monitored managed entity.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

AverageReceive_AssignRate: This attribute is a gauge recording the average of received cells to cells allowed through the granting mechanism.

MaxReceive_AssignRate: This attribute is the maximum value achieved by AverageReceive_AssignRate gauge during the collection interval.

MinReceive_AssignRate: This attribute is the minimum value achieved by AverageReceive_AssignRate gauge during the collection interval.

Relationships

One managed entity may exist for each instance of PON-side TCONTbuffer of OLT.

8.125 thresholdDataF

This managed entity contains threshold values for the performance monitoring parameters maintained in one or more instances of other managed entities. The FSAN NE upon initialization creates instances of this managed entity automatically. Instances of this managed entity are also created and deleted at the request of the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

PMType: This attribute identifies the type of performance monitoring associated with these threshold values (e.g., AAL1, AAL5, DS1PhysicalLayer, …)

PerformanceParameterandThresholdValueList: This attribute identifies one or more performance monitoring parameters (e.g., Discarded Cells due to HEC Violations) and their associated threshold value.

Relationships

Relationship of this managed entity to one or more other managed entities is provided through the consistent use of a pointer mechanism.

8.126 topologicalLinkEndF

A topological link end contains CTPFs for the purposes of representing topology. It represents the end of a topological link. It is related to one and only one TTPF in the underlying server layer.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SignalIdentification: This attribute identifies the characteristic information of the layer to which this managed entity belongs.

ServerTTPFPtr: This attribute identifies the TTPF managed entity in the server layer supporting this end point.

TopologicalLinkFPtr: This attribute identifies the topological link or logicalMPTLinkF associated with this end point.

PointDirectionality: This attribute specifies whether this managed entity contains sink, source or bidirectional connection termination points.

CTPList: This attribute lists the CTPFs that are contained by this managed entity.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

Each topologicalLinkF has two topologicalLinkEndF(s).

8.127 topologicalLinkF

A topological link provides a topological description of capacity between two adjacent subnetworks (from one topological link end to another), or between a subnetwork and an access group. There can be multiple topological links between subnetworks. A topological link cannot be created between a composite subnetwork and one of its component subnetworks. This entity may be explicitly created by the network management system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

SignalIdentification: This attribute identifies the characteristic information of the layer to which this managed entity belongs.

ServerTrail: This attribute identifies the underlying trail in the layered network model for which this managed entity is its unique client.

Directionality: This attribute indicates whether or not a link is "unidirectional", "bidirectional".

Aend: This pointer attribute identifies the subnetwork, link end, or access group at one end of the topological link.

Zend: This pointer attribute identifies the subnetwork, link end, or access group at the other end of the topological link.

LinkConnectionList: This attribute lists the linkConnectionFs that are contained by this managed entity.

Weight: This attribute describes the relative weight of using the link. The specific value of this attribute is determined by the managing system. This attribute takes on a NULL value in cases where the link is not assigned a specific weight.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

Relationships

A topologicalLinkF is a group of link connections sharing the same extremities. This relationship involves one and only one instance of the topologicalLinkF managed entity, and zero or more instances of the linkConnectionF managed entity. One topologicalLinkF has a relationship with the two managed entities that it is linking. A topologicalLinkF cannot exist without the subnetworkF being identified.

8.128 trafficDescriptorProfileF

This managed entity specifies traffic parameters for virtual channel or virtual path connections. Where ingress and egress parameters are mentioned, they may take different values. Instances of this managed entity are provided for the FSAN NE upon FSAN NE initialization. Instances of this managed entity are also created and deleted at the request of the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

ServiceCategory: Indicates the service category as defined in ATM Forum Traffic Management 4.0. Valid values are CBR, rt-VBR, nrt-VBR, UBR, ABR, or GFR.

ConformanceDefinition: Indicates the type of conformance as defined in ATM Forum Traffic Management 4.0. Valid values are CBR.1, VBR.1, VBR.2, VBR.3, UBR.1, UBR.2, ABR, GFR.1, GFR.2. The NE should enforce the correspondence between Conformance Definition and Service Category as specified in ATM Forum Traffic Management 4.1.

PeakCellRate – Ingress and Egress: These parameters are required for traffic of all service categories. They apply to CLP=0 flow for ABR and apply to CLP=0+1 flow otherwise.

CellDelayVariationTolerancePCR – Ingress and Egress: These parameters are required for all service categories. They apply to CLP=0 flow for ABR and apply to CLP=0+1 flow otherwise.

CellDelayVariationToleranceSCR – Ingress and Egress: These parameters apply to real-time and non-real-time VBR. They apply to CLP=0+1 traffic flow for VBR.1 and apply to CLP=0 traffic flow VBR.2 and VBR.3.

SustainableCellRate – Ingress and Egress: These parameters are required for real-time and non-real-time VBR traffic. They apply to CLP=0+1 traffic flow for VBR.1 and apply to CLP=0 traffic flow for VBR.2 and VBR.3.

MaximumBurstSize – Ingress and Egress: These parameters are required for real-time and non-real-time VBR traffic and for GFR traffic. They apply to CLP=0+1 traffic flow for VBR.1, GFR.1, and GFR.2, and apply to CLP=0 traffic flow for VBR.2 and VBR.3.

MFS – Ingress and Egress: These parameters are required for GFR traffic only. They refer to maximum frame size.

MinimumCellRate – Ingress and Egress: These parameters are required for ABR and GFR traffic. In the case of GFR it is MCR applied to CLP=0.

InitialCellRate – Ingress and Egress: These parameters are required for ABR traffic.

TransientBufferExposure – Ingress and Egress: These parameters are required for ABR traffic.

RateDecreaseFactor – Ingress and Egress: These parameters are required for ABR traffic.

RateIncreaseFactor – Ingress and Egress: These parameters are required for ABR traffic.

FixedRoundTripTime: This parameter is required for ABR traffic.

Nrm – Ingress and Egress: These parameters apply to ABR and are optional in the ABR context (Default = 32).

Trm – Ingress and Egress: These parameters apply to ABR and are optional in the ABR context (Default = 100).

CDF – Ingress and Egress: These parameters apply to ABR and are optional in the ABR context (Default = 1/16).

ADTF – Ingress and Egress: These parameters apply to ABR and are optional in the ABR context (Default = 0.5).

Relationships

Each instance of this entity may be related to zero or more instances of vcCTPF or vpCTPF managed entities through a pointer attribute.

8.129 TrafficScheduler

This managed entity represents a logical object of some Traffic Scheduler to control upstream ATM cells. A Traffic Scheduler can accommodate ATM cells after priority queue or other Traffic Scheduler and transfer ATM cells toward the next Traffic Scheduler or T-CONT buffer

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

Policy: This attribute represents scheduling policy. Valid values include but are not limited to "Null", "HOL" or "WRR".

TrafficSchedulerPtr: This attribute points to the Traffic Scheduler instance that is directly associated with this Traffic Scheduler. This pointer is used only when this Traffic Scheduler is connected to another Traffic Scheduler.

PriorityWeight: This attribute represents priority for HOL scheduling or the weight for WRR scheduling. This value is used by Traffic Scheduler pointed by TrafficSchedulerPtr. If the indicated pointer has Policy = HOL, then this value is interpreted as a priority. If the indicated pointer has Policy = WRR, then this value is interpreted as a weight.

TCONTbufferPtr: This attribute points to the T-CONT Buffer instance that is directly associated with this Traffic Scheduler. This pointer is used only when this Traffic Scheduler is contained by the T-CONT buffer directly.

Relationships

This managed entity can be associated with another TrafficScheduler or TCONTbuffer.

8.130 trailF

This managed entity is used to describe the transport entity transferring information between two TTPFs. A sequence of one or more link connections and subnetwork connections may be pieced together to form a trail. An instance of this managed entity is created automatically with the provisioning of information transfer in the network layer to which this trail belongs. The managed entity can only be deleted when the provisioned service is taken out of service. The managed entity supports availability status and administrative state functions as defined in ITU-T Rec. X.731. Changes in state are reported automatically or on demand to the managing system.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

AvailabilityStatus: This attribute indicates whether or not a managed entity is capable of performing its task.

UserLabel: This attribute is used for an operator to assign a user-friendly name.

ATTPPtr: This attribute is used to identify one end of the trail.

ZTTPPtr: This attribute is used to identify the other end of the trail.

Directionality: This attribute indicates whether or not a trail is "unidirectional" or "bidirectional".

Relationships

There is one instance of this managed entity for the two TTPFs it joins.

8.131 TTPF

This managed entity terminates and originates a trail and can be used to represent the termination of subnetworkConnectionFs on an FSAN NE. Instances of this managed entity may be created and deleted at the request of the managing system or implicitly through a provisioning request. The managed entity supports the availability status, operational state and administrative state and alarm status functions as defined in ITU-T Rec. X.731. Changes in state and status are reported automatically or on demand to the managing system. This managed entity is defined for the purposes of grouping together all common attributes of connection termination point on an FSAN NE in the NE view, but only instances of specific TTPFs (e.g., adslTTPF, DS1TTPF, etc.) shall be implemented.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the functions performed by instances of this managed entity.

OperationalState: This attribute indicates whether or not a managed entity is capable of performing its task. The operational state reflects the perceived ability to receive or to generate a valid signal. Valid values are "enabled" and "disabled". If the termination point detects that a signal received has failed or it is unable to process the incoming signal, then the operational state will change from the value "enabled" to "disabled". If the termination point detects that a valid signal cannot be generated, then the operational state will also change from the value "enabled" to "disabled".

AvailabilityStatus: This attribute indicates whether or not a managed entity is capable of performing its task.

SupportedByPlug-inF: This attribute identifies the interface circuit pack to which this managed entity is associated.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

UpstreamConnectivityPointer: This attribute identifies the termination point managed entity that sends information (traffic) to this managed entity at the same layer.

DownstreamConnectivityPointer: This attribute identifies the termination point managed entity that receives information (traffic) from this managed entity at the same layer.

PointDirectionality: This attribute identifies whether the termination point is "source", "sink", or "bidirectional".

Relationships

There is zero or more of these managed entities contained within an FSAN NE. One of these managed entities must exist for each CTPF for a section link connection having the same characteristic signal. One of these managed entities must exist for each PhysicalPathTPF having the same characteristic signal type. Zero or more of these instances are associated with each subnetworkConnectionF. Two of these instances are associated with each trailF.

8.132 uniInfoF

This managed entity is used to organize data associated with the ATM User Network Interfaces (UNIs) supported by the ONT or NT. One instance of this managed entity shall exist for each ATM UNI supported by the ONT or NT. Instances of this managed entity are created and deleted at the request of the NMS or Operators.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AccessGroupPtr: This attribute provides a pointer to the TTPFs associated with the end users to which this profile applies.

TCAdaptorId: This attribute provides a Ptr to the associated instance of the TC Adaptor managed entity.

LocalMaximumNumberofVPCsSupportable: This attribute identifies the maximum number of VPCs that the ONT or NT can support at its end of the interface for the associated user.

LocalMaximumNumberofVCCsSupportable: This attribute identifies the maximum number of VCCs that the ONT or NT can support for the associated user.

LocalMaximumNumberofAllocatedVPIBits: This attribute identifies the number of allocated bits of the VPI sub-field that the ONT or NT can support at its end of the interface for the associated user.

LocalMaximumNumberofAllocatedVCIBits: This attribute identifies the number of allocated bits of the VCI sub-field that the ONT or NT can support at its end of the interface for the associated user.

LoopbackLocationCode: This attribute provides the code that identifies incoming ATM layer OAM loopback cells that are to be looped-back at this UNIF.

Relationships

One instance of this managed entity shall be associated with each local user interface supported by the ONT or NT.

8.133 upcNpcDisagreementPMHistoryDataF

An instance of this managed entity is used to record historical data associated with UPC/NPC Disagreement Monitoring functions performed by the OLT. UPC policing at the ONT or ONU as well as the corresponding performance monitoring capability will be expected in the future.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

CTPFPtr: This attribute identifies the associated vpCTPF or vcCTPF managed entity where performance monitoring occurs.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

DiscardedCellsduetoUPC/NPC: This attribute provides a raw count of the number of discarded cells due to combined CLP=0 and CLP=1 UPC/NPC policing.

DiscardedCLP=0CellsduetoUPC/NPC: This attribute provides a raw count of the number of discarded CLP=0 cells due to CLP=0 only UPC/NPC policing. This counter is only present if CLP=0 traffic is separately policed.

TaggedCLP=0Cells: This attribute provides a count of the number of cells that have been tagged.

Relationships

Zero or more instance of this managed entity may exist for each instance of the vpCTPF and vcCTPF managed entities.

8.134 vc3TTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a vc3 trail. Changes in state or status are reported automatically or on demand to the managing system. The following alarms can be detected at this managed entity: Far-End Receive Failure (FERF), Path Trace Mismatch and Signal Label Mismatch.

Attributes

J1PathTraceExpected: This attribute is used to specify the value of the expected Jl Byte VC Path Trace byte message for this managed entity.

J1PathTraceReceive: This attribute is used to indicate the value of the incoming Jl Byte VC Path Trace byte message for this managed entity.

J1PathTraceSend: This attribute is used to indicate the value of the outgoing Jl VC Path Trace byte message for this managed entity.

C2SignalLabelExpected: This attribute specifies the expected C2 VC Signal Label for this incoming vc3TTPF. See ITU-T Rec. G.709/Y.1331 for a list of valid values.

C2SignalLabelReceive: This attribute specifies the C2 VC Signal Label for this incoming vc3TTPF. See ITU-T Rec. G.709/Y.1331 for a list of valid values.

C2SignalLabelSend: This attribute specifies the C2 VC Signal Label for this outgoing vc3TTPF. See ITU-T Rec. G.709/Y.1331 for a list of valid values.

TcAdaptorPtr: This attribute points to the tcAdaptor managed entity that uses this managed entity as a server trail.

Relationships

There is zero or more of these managed entities contained within any FSAN NE. One of these managed entities exists for each au3CTPF.

8.135 vc4TTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a vc4 trail. The following alarms can be detected at this managed entity: Far End Receive Failure (FERF), Path Trace Mismatch and Signal Label Mismatch.

Attributes

J1PathTraceExpected: This attribute is used to specify the value of the expected Jl Byte VC Path Trace byte message for this managed entity.

J1PathTraceReceive: This attribute is used to indicate the value of the incoming Jl Byte VC Path Trace byte message for this managed entity.

J1PathTraceSend: This attribute is used to indicate the value of the outgoing Jl VC Path Trace byte message for this managed entity.

C2SignalLabelExpected: This attribute specifies the expected C2 VC Signal Label for this incoming vc4TTPF. See ITU-T Rec. G.709/Y.1331 for a list of valid values.

C2SignalLabelReceive: This attribute specifies the C2 VC Signal Label for this incoming vc4TTPF. See ITU-T Rec. G.709/Y.1331 for a list of valid values.

C2SignalLabelSend: This attribute specifies the C2 VC Signal Label for this outgoing vc4TTPF. See ITU-T Rec. G.709/Y.1331 for a list of valid values.

TcAdaptorPtr: This attribute points to the tcAdaptor managed entity that uses this managed entity as a server trail.

Relationships

There is zero or more of these managed entities contained within an OLT, an ONT or an NT. One of these managed entities exists for each au4CTPF.

8.136 vcCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. This managed entity is used to represent the termination of vcLinkConnectionF on an FSAN NE and (possibly) vcSubnetworkConnectionFs. A Traffic descriptor profile is used to characterize this managed entity. Represents the point in the FSAN NE where the VCC and associated overhead (F5 OAM cells) are terminated and originated. The following alarms can be detected at this managed entity: Cell Starvation, Alarm Indication Signal (AIS) and Remote Defect Indication (RDI).

Attributes

VPIVCIValue: This attribute identifies the VPI/VCI value associated with the link connection if the managed entity terminates a link connection.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

IngressTrafficDescriptorProfilePtr: This attribute identifies the ingress trafficDescriptorProfileF object associated with configuration of this TP.

EgressTrafficDescriptorProfilePtr: This attribute identifies the egress trafficDescriptorProfileF object associated with configuration of this TP.

IngressQualityOfServiceProfilePtr: This attribute identifies the ingress qualityOfServiceProfileF object associated with configuration of this TP.

EgressQualityOfServiceProfilePtr: This attribute identifies the egress qualityOfServiceProfileF object associated with configuration of this TP.

SegmentEndpoint: This Boolean attribute indicates whether or not the termination point has been configured to represent a segment end point.

PMOAMMethod: This attribute indicates the method used to set up and terminate the PM OAM monitoring activity. Valid values are "TMN", "OAM", or "notSupported". If the value is "notSupported", then PM OAM is not supported on the end point.

PMOAMDirection: This attribute indicates the desired direction(s) of transmission to monitor PM OAM. Valid directions are: away from activator (transmit), towards activator (receive), or both.

PMOAMBlockSize: This attribute indicates the PM OAM nominal block size choice for both the receive and transmit directions.

PMOAMForwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the forward direction by setting the value to TRUE.

PMOAMBackwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the backward direction by setting the value to TRUE.

AALProfilePtr: This attribute provides a pointer to an instance of the AAL Profile object associated with this managed entity (if any).

ServiceProfilePtr: This attribute provides a Ptr to the instance of a service profile, such as the CESServiceProfileF associated with this vcCTPF if it is interworking vcCTPF.

ThresholdDataPtr: This attribute provides a pointer to an instance of the ThresholdDataF object that provides threshold values for monitored parameters to be used to generate Threshold Crossing Alert notifications whenever a monitored parameter crosses its associated threshold value and this managed entity represents the monitoring point.

ServiceLevelCTPFList: This attribute provides a list of service level connection termination points that are being inter-worked if this vcCTPF is interworking ATM and AAL (e.g., the list of DS1 CTPFs for a channelized DS3 card on an OLT, the single DS1 CTPF associated with a port on a multi-port DS1 subscriber line card on an ONT, the single Ethernet CTPF associated with a port on a bridged LAN 10/100Base-T subscriber line card on an ONT, etc.).

Relationships

Zero or more instances of the managed entity shall exist for each instance of an FSAN NE. Each instance of this managed entity is associated with one instance of the vcTTPF managed entity. Two of these managed entities are associated with every vcLinkConnectionF. Zero or more of these managed entities may be associated with a vcSubnetworkConnectionF.

8.137 vcLayerNetworkDomainF

This managed entity is a type of layerNetworkDomainF and inherits all the attributes and relationships defined by layerNetworkDomainF. Characteristic information provided in this layer is set to "VC".

8.138 vcLinkConnectionF

This managed entity is a type of linkConnectionF and inherits all the attributes and relationships defined by linkConnectionF. This managed entity represents a vc layer link connection, derived from the G.852.2 definition, i.e., "the transparent capacity of transfer of information characterized by a given signal identification between two fixed points." Directionality is always set to "bidirectional".

Attributes

SignalIdentification: This fixed attribute describes the signal that is transferred across the link. Here, it is set to "VC".

RetainedResource: This Boolean attribute indicates if the managed entity instance needs to be retained when it is a component of a composite connection (involving a set of link connections and subnetwork connections) that has been deleted, or when supporting a trail that has been deleted.

CompositePtr: This pointer attribute identifies the vcSubnetworkConnectionF managed entity to which this managed entity belongs. It may be the null pointer.

Relationships

A topological link is a group of link connections sharing the same extremities. This relationship involves zero or more instances of the vcLinkConnectionF managed entity. A vcLinkConnectionF link is established between two vcCTPFs.

8.139 vcLogicalLinkF

This managed entity is a type of logicalLinkF and inherits all the attributes and relationships defined by logicalLinkF. Signal identification is set to "VC". It contains vcLinkConnectionFs for

the purposes of DBA management. LinkDirectionality is unidirectional from ONT/ONU to OLT. Note that although a contained vcLinkConnectionF is bidirectional, only its upstream part from ONT/ONU to OLT is affected by this vcLogicalLinkF.

8.140 vcSubnetworkConnectionF

This managed entity is a type of subnetworkConnectionF and inherits all the attributes and relationships defined by subnetworkConnectionF.

Attributes

ComponentPtrList: This pointer attribute identifies the vcSubnetworkConnectionF(s) and vcLinkConnectionF(s) that comprise this vcSubnetworkConnectionF. It may be the null pointer.

CompositePtr: This pointer attribute identifies the vcSubnetworkConnectionF managed entity to which this managed entity belongs. It may be the null pointer.

8.141 vcSubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "VC".

Attributes

OLTPtr: This attribute identifies the associated OLT.

ContainedLinkList: This attribute identifies the instances of vcTopologicalLinkF contained in this subnetwork.

ContainedSubnetworkList: This attribute identifies the instances of vcSubnetworkF contained in this subnetworkF.

ContainedAccessGroupList: This attribute identifies the instances of accessGroupF contained in this subnetworkF.

LinkPtrList: This attribute identifies the instances of vcTopologicalLinkF terminated by this subnetwork.

Relationships

One or more of these managed entities exist for each installed or pre-provisioned FSAN NE.

8.142 vcTopologicalLinkEndF

This managed entity is a type of topologicalLinkEndF and inherits all the attributes and relationships defined by topologicalLinkEndF. This managed entity is used to represent the termination of a topological Link at the VC-layer. In the vcLayerNetworkDomainF, a vcTopologicalLinkEndF represents an ATM interface associated with the underlying transport facility. The PointDirectionality attribute will be "unidirectional".

Attributes

LinkTPType: Describes the interface type that the managed entity supports: UNI, inter-NNI, intra-NNI, or unconfigured.

LoopbackLocationIdentifier: A code used for OAM cell loopback purposes. Incoming OAM Loopback cells with a Loopback Location field value that matches the value of the loopbackLocationIdentifier attribute shall be looped-back over the interface.

SupportedByPlug-inF: This attribute identifies the interface circuit pack to which this managed entity is associated.

PortId: This attribute indicates port Id on the plug-in associated with the vcTopologicalLinkEndF.

CellScramblingEnable: This attribute allows cell scrambling to be activated or deactivated on the ATM Interface represented by the vcTopologicalLinkEndF.

Relationships

Each vcTopologicalLinkF may be terminated by two instances of the vcTopologicalLinkEndF managed entity. One vcTopologicalLinkEndF managed entity is associated with one or more vcSubnetworkFs. Each vcTopologicalLinkEndF may be supported by one instance of a server vpTTPF managed entity in the server layer. vcCTPFs are contained in vcTopologicalLinkEndF.

8.143 vcTopologicalLinkF

This managed entity is a type of topologicalLinkF and inherits all the attributes and relationships defined by topologicalLinkF. Signal identification is set to "VC".

Attributes

RestorationMode: This attribute is used to configure the restoration mode of a link as: "unavailable for routing and re-routing", "available for routing and not re-routing"; "available for re-routing and not routing"; or "available for both routing and re-routing".

8.144 vcTrailF

This managed entity is a type of trailF and inherits all the attributes and relationships defined by trailF. This managed entity represents an I.326-defined trail in the VC layer domain. The vcTrailF is always bidirectional.

Attributes

RestoreableInd: This attribute is used to identify the connection as restorable or not.

Relationships

Each vcTrailF is terminated by at least two vcTTPFs.

8.145 vcTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It represents the point in the ATM subnetwork where the vcTrail and associated overhead (F5 OAM cells) are terminated/originated. The following alarms can be detected at this managed entity: Alarm Indication Signal (AIS) and Remote Defect Indication (RDI).

Attributes

PMOAMMethod: This attribute indicates the method used to set up and terminate the PM OAM monitoring activity. Valid values are "TMN", "OAM", or "notSupported". If the value is "notSupported", then PM OAM is not supported on the end point.

PMOAMDirection: This attribute indicates the desired direction(s) of transmission to monitor PM OAM. Valid directions are: away from activator (transmit), towards activator (receive), or both.

PMOAMBlockSize: This attribute indicates the PM OAM nominal block size choice for both the receive and transmit directions.

PMOAMForwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the forward direction by setting the value to TRUE.

PMOAMBackwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the backward direction by setting the value to TRUE.

Relationships

Zero or one instance of the vcTTPF managed entity may exist for each instance of a vcCTPF managed entity. A vcTrailF is terminated by two vcTTPFs.

8.146 vdslCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. It terminates and originates a VDSL section link connection.

Relationships

One or more of these managed entities exist for each PhysicalPathTPF of type "VDSL". There is zero or more of these managed entities contained within an ONU or an NT FSAN NE. One of these managed entities exists for each vdslTTPF.

8.147 vdslLayerNetworkDomainF

This managed entity is a type of layerNetworkDomainF and inherits all the attributes and relationships defined by layerNetworkDomainF. ITU-T Rec. G.993.1 defines the characteristic signal associated with this layer.

8.148 vdslLinkConnectionF

This managed entity is a type of linkConnectionF and inherits all the attributes and relationships defined by linkConnectionF. This managed entity represents a VDSL link connection, derived from the G.852.2 definition, i.e., "the transparent capacity of transfer of information characterized by a given signal identification between two fixed points". Directionality is always set to "bidirectional".

Attributes

SignalIdentification: This fixed attribute describes the signal that is transferred across the link. Here, it is set to "VDSL".

Relationships

A topological link is a group of link connections sharing the same extremities. This relationship involves zero or more instances of the managed entity vdslLinkConnectionF. A vdslLinkConnectionF links two vdslCTPFs.

8.149 vdslSubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "VDSL".

Attributes

ONUPtr: This attribute identifies the associated ONU.

ContainedLinkList: This attribute identifies the instances of vdslTopologicalLinkF contained in this subnetwork.

8.150 vdslTopologicalLinkEndF

This managed entity is a type of topologicalLinkEndF and inherits all the attributes and relationships defined by topologicalLinkEndF. Signal identification is set to "VDSL".

8.151 vdslTopologicalLinkF

This managed entity is a type of topologicalLinkF and inherits all the attributes and relationships defined by topologicalLinkF. Signal identification is set to "VDSL".

8.152 vdslTrailF

This managed entity is a type of trailF and inherits all the attributes and relationships defined by trailF.

Relationships

Each vdslTrailF is terminated by vdslTTPs.

8.153 vdslTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It terminates and originates a VDSL section trail. The following alarms can be detected at this managed entity: Loss of Frame (LOF), Remote Failure Indication (RFI), Signal Degraded (SD) fast datastream, Signal Degraded (SD) interleave datastream, Signal Degraded (SD) fast datastream far end, Signal Degraded (SD) interleave datastream far end, Initialization failed (detected by dataInitFailure, configInitFailure, protocolInitFailure, noPeerAtuPresent), Loss of Link, and Loss of Power.

Attributes

TcAdaptorPtr: This attribute points to the tcAdaptor managed entity that uses this managed entity as a server trail.

Relationships

There is zero or more of these managed entities contained within an ONU or an NT FSAN NE. One of these managed entities exists for each vdslCTPF managed entity. One of these managed entities exists for each PhysicalPathTPF of Type "VDSL".

8.154 voiceCTPF

This managed entity is a type of CTP and inherits all the attributes and relationships defined by CTP. It represents the point in the FSAN NE where the voice channel is terminated/originated. The attribute PointDirectionality has the value "bidirectional".

Attributes

TelephoneNumber: This attribute provides the network owner supplied value for the end user telephone number.

SSCSParameterProfile2Ptr: This attribute identifies the SSCS parameter values used to provision this voice connection if AAL2 is employed.

InterworkingVCCTPPtr: This attribute identifies the interworking VCC carrying this voice channel.

ChannelId: This attribute identifies the logical Channel Id for this service if AAL2 is employed. This attribute is null if another type of adaptation is employed.

SignallingCode: This attribute specifies whether "loop start" or "ground start" signalling is employed.

RobbedBitSignalling: This attribute describes the robbed bit signalling in use on the telephony port. Valid values include "a", "ab", "abcd", "transparent", and "other".

FlashInd: This Boolean attribute indicates whether or not flash detection is enabled.

SilenceSuppressionInd: This Boolean attribute indicates whether or not silence suppression is on or off.

EchoCancelInd: This Boolean attribute indicates whether or not echo cancellation is on or off.

VoiceCompressionType: This attribute identifies the voice compression applied to the voice channel. Valid values include but are not limited to the following: PCM-64, ADPCM-32, LD-CELP16, CS-ACELP8, unknown.

VoiceInterfaceGroupPtr: This attribute identifies the GR-303 interface group to which this voice channel belongs.

CRVIndex: This attribute identifies the Call Reference Value within the Voice Interface Group associated with this voice circuit.

Relationships

Zero or more of these instances is associated with an ONT. One of these managed entities exists for each voiceTTPF. One or more of these instances is associated with a voice channel.

8.155 voiceLayerNetworkDomainF

This managed entity is a type of LayerNetworkDomainF and inherits all the attributes and relationships defined by LayerNetworkDomainF. Characteristic information provided in this layer is set to "Voice".

8.156 voicePMHistoryDataF

This is a managed entity that contains the past performance monitoring data collected as a result of monitoring a voice port on an ONT. Instances of this managed entity are created automatically whenever the client requests performance monitoring or NMS at the associated voiceCTPF managed entity and the data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

VoiceCTPPtr: This attribute identifies the monitoring point.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

IncomingCallAttempts: This attribute provides the cumulative count of incoming call attempts for this voice port.

OutgoingCallAttempts: This attribute provides the cumulative count of outgoing call attempts for this voice port.

VoicePortBufferOverflows: A count of the number of times that the voice port buffer overflows.

VoicePortBufferUnderflows: A count of the number of times that the voice port buffer underflows.

Relationships

Zero or more instances of this managed entity shall exist for each instance of a voiceCTPF.

8.157 voiceServiceProfileAAL1F

This managed entity is used to organize data that describes the Voice Service functions of the FSAN NE if supported by AAL1. Instances of this managed entity are created and deleted at the request of the managing system or operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AnnouncementType: This attribute provides the announcement to the customer going off-hook when no call has been attempted. Valid values include but are not limited to "silence", "reorderTone", "fastBusy", "voiceAnnouncement".

Relationships

This managed entity may be associated to zero or more instances of an interworking vcCTPF terminating AAL1 and carrying voice services.

8.158 voiceServiceProfileAAL2F

This managed entity is used to organize data that describes the voice service functions of the FSAN NE if supported by AAL2. Instances of this managed entity are created and deleted by request of the managing system or operator.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

AnnouncementType: This attribute provides the announcement to the customer going off-hook when no call has been attempted. Valid values include but are not limited to "silence", "reorderTone", "fastBusy", "voiceAnnouncement".

JitterTarget: This attribute provides the target value of the jitter buffer. The system will try to maintain the jitter buffer at the target value. Units are in milliseconds.

JitterBufferMax: This attribute provides the maximum depth of the jitter buffer associated with this service. Units are in milliseconds.

TimingReference: This attribute defines how the internal timing is derived. Valid values include "Network Timing Reference", "Adaptive Voice", and "Free Run".

Relationships

This managed entity may be associated to zero or more instances of an interworking vcCTPF terminating AAL2 and carrying voice services.

8.159 voiceSubnetworkConnectionF

This managed entity is a type of SubnetworkConnectionF and inherits all the attributes and relationships defined by SubnetworkConnectionF. If the FSAN system has a non-integrated voice gateway, then this managed entity is never instantiated. Characteristic information provided in this layer is set to "Voice". A voiceSubnetworkConnectionF is terminated by two voiceCTPFs.

8.160 voiceSubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. If a system has a non-integrated voice gateway, then this managed entity cannot be further decomposed. Characteristic information provided in this layer is set to "Voice".

8.161 voiceTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It represents the point in FSAN network where the voice trail terminated or originates. The following alarms can be detected at this managed entity: Alarm Indication Signal (AIS) and Remote Defect Indication (RDI). The attribute PointDirectionality has the value "bidirectional".

Attributes

TelephoneNumber: This attribute provides the network-owner-supplied value for the end-user telephone number.

InterworkingVCCTPPtr: This attribute identifies the interworking VCC carrying this voice channel.

ChannelId: This attribute identifies the logical Channel Id for this service if AAL2 is employed. This attribute is null if another type of adaptation is employed.

Relationships

Zero or one instance of the voiceTTPF managed entity may exist for each instance of a voiceCTPF managed entity. One or more of these instances is associated with a voice channel on an ONT.

8.162 vpCTPF

This managed entity is a type of CTPF and inherits all the attributes and relationships defined by CTPF. This managed element is used to represent the termination of vpLinkConnectionF on an FSAN NE and (possibly) vpSubnetworkConnections. A Traffic descriptor profile is used to characterize this managed entity. It represents the point in the FSAN NE where the virtual private connection and associated overhead (F4 OAM cells) are terminated/originated. The following alarms can be detected at this managed entity: Alarm Indication Signal (AIS) and Remote Defect Indication (RDI).

Attributes

VPIValue: This attribute identifies the VPI values associated with this vpCTPF.

AlarmSeverityAssignmentProfileFPtr: This attribute provides a pointer relationship to an alarmSeverityAssignmentProfileF managed entity.

AlarmStatus: This attribute provides information to the managing system on the alarm condition of the managed entity. Valid values include "under repair", "critical", "major", "minor", "alarm outstanding", and "null". Interpretation of these values is found in ITU-T Rec. X.731.

IngressTrafficDescriptorProfilePtr: This attribute identifies the ingress trafficDescriptorProfileF object associated with configuration of this TP.

EgressTrafficDescriptorProfilePtr: This attribute identifies the egress trafficDescriptorProfileF object associated with configuration of this TP.

IngressQualityOfServiceProfilePtr: This attribute identifies the ingress qualityOfServiceProfileF object associated with configuration of this TP.

EgressQualityOfServiceProfilePtr: This attribute identifies the egress qualityOfServiceProfileF object associated with configuration of this TP.

SupportedServiceCategories: This attribute specifies the set of service categories that are supported by the virtual path for virtual channel connections.

PropagationDelay: This attribute indicates the expected propagation delay (in micro seconds).

SegmentEndpoint: This Boolean attribute indicates whether or not the termination point has been configured to represent a segment end point.

PMOAMMethod: This attribute indicates the method used to set up and terminate the PM OAM monitoring activity. Valid values are "TMN", "OAM", or "notSupported". If the value is "notSupported", then PM OAM is not supported on the end point.

PMOAMDirection: This attribute indicates the desired direction(s) of transmission to monitor PM OAM. Valid directions are: away from activator (transmit), towards activator (receive), or both.

PMOAMBlockSize: This attribute indicates the PM OAM nominal block size choice for both the receive and transmit directions.

PMOAMForwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the forward direction by setting the value to TRUE.

PMOAMBackwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the backward direction by setting the value to TRUE.

Relationships

Zero or more instances of the vpCTPF managed entity shall exist for each instance of a FSAN NE. One instance of the vpCTPF shall exist for each instance of vpTTPF. Two of these management entities are associated with every vpLinkConnectionF. Zero or more of these managed entities may be associated with a vpSubnetworkConnectionF.

8.163 vpLayerNetworkDomainF

This managed entity is a type of layerNetworkDomainF and inherits all the attributes and relationships defined by layerNetworkDomainF. Characteristic information provided in this layer is set to "VP".

8.164 vpLinkConnectionF

This managed entity is a type of linkConnectionF and inherits all the attributes and relationships defined by linkConnectionF. This managed entity represents an I.326 link connection, derived from the G.852.2 definition, i.e., "the transparent capacity of transfer of information characterized by a given signal identification between two fixed points." Directionality is always set to "bidirectional".

Attributes

SignalIdentification: This fixed attribute describes the signal that is transferred across the link. Here, it is set to "VP".

RetainedResource: This Boolean attribute indicates if the managed entity instance needs to be retained when it is a component of a composite connection (involving a set of link connections and subnetwork connections) that has been deleted or when supporting a trail that has been deleted.

CompositePtr: This pointer attribute identifies the vcSubnetworkConnectionF managed entity to which this managed entity belongs. It may be the null pointer.

Relationships

A topological link is a group of link connections sharing the same extremities. This relationship involves zero or more instances of the vpLinkConnectionF managed entity. A vpLinkConnectionF link is established between two vpCTPFs.

8.165 vpLogicalLinkF

This managed entity is a type of logicalLinkF and inherits all the attributes and relationships defined by logicalLinkF. Signal identification is set to "VP". It contains vpLinkConnectionFs for the purposes of DBA management. LinkDirectionality is unidirectional from ONT/ONU to OLT. Note that although a contained vpLinkConnectionF is bidirectional, only its upstream part from ONT/ONU to OLT is affected by this vpLogicalLinkF.

8.166 vpSubnetworkConnectionF

This managed entity is a type of subnetworkConnectionF and inherits all the attributes and relationships defined by subnetworkConnectionF.

Attributes

ComponentPtrList: This pointer attribute identifies the vpSubnetworkConnectionF(s) and vpLinkConnectionF(s) that comprise this vpSubnetworkConnectionF. It may be the null pointer.

CompositePtr: This pointer attribute identifies the vpSubnetworkConnectionF managed entity to which this managed entity belongs. It may be the null pointer.

8.167 vpSubnetworkF

This managed entity is a type of subnetworkF and inherits all the attributes and relationships defined by subnetworkF. Signal identification is set to "VP".

Attributes

OLTPtr: This attribute identifies the associated OLT.

ContainedLinkList: This attribute identifies the instances of vpTopologicalLinkF contained in this subnetworkF.

ContainedSubnetworkList: This attribute identifies the instances of vpSubnetworkF contained in this subnetworkF.

LinkPtrList: This attribute identifies the instances of vpTopologicalLinkF terminated by this subnetworkF.

Relationships

One or more of these managed entities exist for each installed or pre-provisioned FSAN NE.

8.168 vpTopologicalLinkEndF

This managed entity is a type of topologicalLinkEndF and inherits all the attributes and relationships defined by topologicalLinkEndF. This managed entity is used to represent the termination of a topological link at the VP-layer. In the vpLayerNetworkDomainF, a vpTopologicalLinkEndF represents an ATM interface associated with the underlying transport facility. The PointDirectionality attribute will be either "sink" or "source".

Attributes

LinkTPType: Describes the interface type that the managed entity supports: UNI, inter-NNI, intra-NNI, or unconfigured.

LoopbackLocationIdentifier: A code used for OAM cell loopback purposes. Incoming OAM Loopback cells with a Loopback Location field value that matches the value of the loopbackLocationIdentifier attribute shall be looped-back over the interface.

SupportedByPlug-inF: This attribute identifies the interface circuit pack to which this managed entity is associated.

PortId: This attribute indicates port Id on the plug-in associated with the vpTopologicalLinkEndF.

CellScramblingEnable: This attribute allows cell scrambling to be activated or deactivated on the ATM Interface represented by the vcTopologicalLinkEndF.

Relationships

Each vpTopologicalLinkF may be terminated by two instances of the vpTopologicalLinkEndF managed entity. One vpTopologicalLinkEndF managed entity is associated with one or more vpSubnetworkFs. Each vpTopologicalLinkEndF may be supported by one instance of a server APONTTP managed entity in the server layer. vpCTPFs are contained in vpTopologicalLinkEndF.

8.169 vpTopologicalLinkF

This managed entity is a type of topologicalLinkF and inherits all the attributes and relationships defined by topologicalLinkF. Signal identification is set to "VP".

Attributes

RestorationMode: This attribute is used to configure the restoration mode of a link as: unavailable for routing and re-routing, available for routing and not re-routing; available for re-routing and not routing; or available for both routing and rerouting.

8.170 vpTrailF

This managed entity is a type of trailF and inherits all the attributes and relationships defined by trailF. This managed entity represents an I.326-defined trail in the VP layer domain. The vpTrailF is always bidirectional.

Attributes

RestoreableInd: This attribute is used to identify the connection as restorable or not.

ClientLinkList: This attribute is used to identify the vpLinkConnectionFs supported by the vpTrailF.

Relationships

Each vpTrailF is terminated by at least two vpTTPFs.

8.171 vpTTPF

This managed entity is a type of TTPF and inherits all the attributes and relationships defined by TTPF. It represents the point in the ATM subnetwork where the vpTrail and associated overhead (F4 OAM cells) are terminated/originated. The following alarms can be detected at this managed entity: Alarm Indication Signal (AIS) and Remote Defect Indication (RDI).

Attributes

PMOAMMethod: This attribute indicates the method used to setup and terminate the PM OAM monitoring activity. Valid values are "TMN", "OAM", or "notSupported". If the value is "notSupported", then PM OAM is not supported on the end point.

PMOAMDirection: This attribute indicates the desired direction(s) of transmission to monitor PM OAM. Valid directions are: away from activator (transmit), towards activator (receive), or both.

PMOAMBlockSize: This attribute indicates the PM OAM nominal block size choice for both the receive and transmit directions.

PMOAMForwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the forward direction by setting the value to TRUE.

PMOAMBackwardActive: This Boolean attribute is used to initiate generation of PM OAM cells in the backward direction by setting the value to TRUE.

Relationships

Zero or one instance of the vpTTPF managed entity may exist for each instance of a vpCTPF managed entity. A vcTrailF is terminated by two vpTTPFs.

8.172 vpvcPMHistoryDataF

This is a managed entity that contains the historical performance monitoring data collected for a VPC or VCC connection, related to VP and VC OAM flows. Instances of this managed entity are created automatically whenever the client requests performance monitoring or NMS for the VPC connection managed entity and a data collection interval is completed.

Attributes

ManagedEntityId: This attribute provides a unique name for the managed entity instance.

CTPFPtr: This attribute identifies the associated vpCTPF or vcCTPF managed entity where performance monitoring occurs.

SuspectIntervalFlag: This attribute is used to indicate that the performance data for the current period may not be reliable.

ThresholdDataName: This attribute provides the name of the Threshold Data profile containing the threshold values for the performance monitoring data contained in this managed entity.

PeriodEndTime: This attribute records the time at the end of the data collection interval.

Lost0+1UserInformationCells: This attribute measures background cell loss. It cannot distinguish between cells lost because of header bit errors, ATM-level header errors, cell policing, or buffer overflows. It records only loss of genuine user information independent of the priority of the user cell.

Lost0UserInformationCells: This attribute measures background cell loss. It cannot distinguish between cells lost because of header bit errors, ATM-level header errors, cell policing, or buffer overflows. It records only loss of genuine user information of high priority.

MisinsertedUserInformationCells: This attribute is used to measure small occurrences of when a cell is mis-routed to an active VP/VC that is being monitored.

Transmitted0+1UserInformationCells: A count of all the user cells that are originated at a monitored connection by the transmitting end point (i.e., backward reporting is assumed).

Transmitted0UserInformation Cells: A count of all the user cells of high priority that are originated at a monitored connection by the transmitting end point (i.e., backward reporting is assumed).

ImpairedBlock: The severely errored cell block counter will be incremented whenever one of the following events takes place: the number of misinserted user cells exceeds $M_{misinserted}$, the number of bipolar violations exceeds $M_{errored}$, or the number of lost user cells exceeds M_{lost}.

Relationships

Zero or more instance of this managed entity shall exist for each instance of the associated TPF managed entity.

Annex A

Tables of possible faults

A.1 DCN alarms for the FSAN element management system

Table A.1/Q.834.1 – DCN alarms

Problem group	Problem	Detected by[7]		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
DCN	Communication error if1	NML (-OS)	physicalPathTPF	Communication	Communication subsystem failure/LAN error	Major	Attributes are protocol dependent
	Communication error if2	EML (-OS)	physicalPathTPF	Communication	Communication subsystem failure/LAN error	Major	Attributes are protocol dependent

[7] "Detected by" column shows managed entities that detect the alarm.

A.2 Equipment alarms

Table A.2/Q.834.1 – Equipment alarms

Problem group	Problem	Detected by[7]		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
Equipment	Functional failure on an internal interface	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Equipment	Equipment malfunction	Critical	Equipment alarm
	Loss of external power	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Equipment	Power problem	Major	Powering alarm
	Voltage dropped below defined threshold	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Equipment	Battery problem	Major	Battery alarm
	Room/cabinet/ enclosure door open	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Environmental	Door open	Major	Door open
	Fire detected	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Environmental	Fire detected	Major	Fire
	Humidity too high	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Environmental	Humidity	Minor	Humidity
	Temperature high/low	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Environmental	Temperature unacceptable	Minor	Temperature high Temperature low
	Heating/ventilation/ cooling system problem	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Environmental	See Problem	Minor	See Problem
	Environment flooded	OLT/ONT/ ONU/NT	OLT/ONT/ ONU/NT	Environmental	Flood detected		Flood detected

Table A.2/Q.834.1 – Equipment alarms

Problem group	Problem	Detected by[7]		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
Subscriber line card Holder	Configured plug-in Line Interface Module (LIM) not present	OLT/NT	EquipmentHolderF	Equipment	Line-card not present	Minor	Line-card not present
	Inserted plug-in LIM wrong type	OLT/NT	EquipmentHolderF	Equipment	Line-card mismatch	Minor	Line-card mismatch
Subscriber line card	Failure on an internal interface or failed selftest	OLT/NT	pluginUnitF	Equipment	Line-card malfunction	Major	Self-test failed
	LIM fuse failure or failure on LIM DC/DC converter	OLT/NT	pluginUnitF	Equipment	Line-card power problem	Major	Line-card power problem

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
PH Layer SDH SNI ATM-UNI (SDH and Sonet) ITU-T Rec. G.774	Loss of communication bidirectional section level	OLT/ONT/NT	Physical PathTPF	Communication	LOS	Critical	LOS
		OLT/ONT/NT	rsTTPF	Communication	LOF	Critical	LOF
		OLT/ONT/NT	msTTPF	Communication	AIS	Major	ms-AIS
	Loss of communication far-end section level	OLT/ONT/NT	msTTPF	Communication	RDI	Minor	ms-RDI
	Bit errors section level	OLT/ONT/NT	msTTPF	Communication	SD	Warning	ms-SD
	Bit errors far-end section level	OLT/ONT/NT	msTTPF	Communication	SD far end	Warning	ms-SD far end
	Loss of communication bidirectional path level	OLT/ONT/NT	au3CTPF/ au4CTPF	Communication	LOP	Critical	au-LOP
	Bit errors far-end section level	OLT/ONT/NT	au3CTPF/ au4CTPF	Communication	AIS	Major	au-AIS
	Loss of communication far-end path level	OLT/ONT/NT	vc3TTPF/ vc4TTPF	Communication	RDI	Minor	path-RDI
	Bit errors path level	OLT/ONT/NT	vc3TTPF/ vc4TTPF	Communication	SD	Warning	path-SD
	Bit errors far-end path level	OLT/ONT/NT	vc3TTPF/ vc4TTPF	Communication	SD far end	Warning	path-SD far end
	Wrong path	OLT/ONT/NT	vc3TTPF/ vc4TTPF	Communication	Path Trace ID Mismatch	Critical	TIM (Trace Identifier Mismatch)

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
	Wrong signal	OLT/ONT/NT	vc3TTPF/ vc4TTPF	Communication	Payload Mismatch	Critical	PLM (Payload Mismatch)
	Transmitter failure	OLT/ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Warning	Laser Bias High
		OLT/ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Minor	Laser Power High
		OLT/ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Minor	Laser Power Low
PH Layer SDH (ATM UNI Cell based) ITU-T Rec. I.432.2	Loss of communication bidirectional	ONT/NT	PhysicalPathTPF	Communication	LOS	Major	LOS
	Loss of maintenance flow	ONT/NT	cellBasedTTPF	Communication	LOM	Major	Loss of PLOAM-Cell
	Loss of maintenance flow	ONT/NT	cellBasedTTPF	Communication	AIS	Minor	AIS
	Bit errors	ONT/NT	cellBasedTTPF	Communication	SD	Warning	SD
	Loss of communication far end	ONT/NT	cellBasedTTPF	Communication	RDI	Minor	RDI
	Transmitter failure	ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Warning	Laser Bias High
		ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Minor	Laser Power High
		ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Minor	Laser Power Low

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
PH Layer PON (OLT Side) ITU-T Rec. G.983.2	Loss of communication bidirectional	OLT	PhysicalPathTPF	Communication	LOS	Critical	LOSi
		OLT	aponTTP	Communication	Loss of physical layer	Critical	LOAi (Loss of acknowledge-ment)
		OLT	aponTTP	Communication	Loss of physical layer	Critical	OAMLi (PLOAM cell loss)
		OLT	aponTTP	Communication	Loss of physical layer	Critical	CPEi (Cell Phase Error)
	Bit errors	OLT	aponTTP	Communication	SDi	Minor	SDi
	Bit errors far end (ONUi)	OLT	aponTTP	Communication	SDi fare end	Minor	SDi far end
	Activation of communication to ONUi failed	OLT	aponTTP	Communication	Loss of physical layer	Critical	SUFi (Start up failure)
	Power shutdown in ONUi	OLT	aponTTP	Communication	Loss of physical layer	Critical	REC-INH (Receive Alarm inhibition)
	ONUi unable to transfer ATM cells	OLT	aponTTP	Equipment	Transmit failure	Critical	PEEi (Physical Equipment Error)
	Link mismatch of ONUi	OLT	aponTTP	Communication	Link mismatch	Critical	MISi (Link mismatch of ONUi)

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
	Transmitter failure OLT	OLT	PhysicalPathTPF	Equipment	Transmitter failure	Minor	Laser Bias High
		OLT	PhysicalPathTPF	Equipment	Transmitter failure	Critical	Laser Power High
		OLT	PhysicalPathTPF	Equipment	Transmitter failure	Major	Laser Power Low
PH Layer PON – ONU Side	Transmitter failure ONUi (no message to OLT defined)	ONU/ONT	PhysicalPathTPF	Equipment	Transmitter failure	Minor	Laser Bias High
		ONU/ONT	PhysicalPathTPF	Equipment	Transmitter failure	Critical	Laser Power High
		ONU/ONT	PhysicalPathTPF	Equipment	Transmitter failure	Major	Laser Power Low
PH Layer ADSL	Loss of communication bidirectional	ONU	PhysicalPathTPF	Communication	LOS	Critical	LOS
		ONU	ADSLTTPF	Communication	LOF	Critical	LOF
	Loss of communication far end (NT)	ONU	ADSLTTPF	Communication	RFI (Remote Failure Indication)	Critical	RFI (Remote Failure Indication)
	Bit errors (Fast)	ONU	ADSLTTPF	Communication	SD (fast)	Minor	SD (fast)
	Bit errors (Interleave)	ONU	ADSLTTPF	Communication	SD (interleave)	Minor	SD (interleave)
	Bit errors far end (Fast) (NT)	ONU	ADSLTTPF	Communication	SD far end (fast)	Minor	SD far end (fast)
	Bit errors far end (Interleave) (NT)	ONU	ADSLTTPF	Communication	SD far end (interleave)	Minor	SD far end (interleave)

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
	Activation of communication to NT failed	ONU	ADSLTTPF	Communication	Initialization failed	Critical	datalnitFailure
		ONU	ADSLTTPF				configllnit Failure
		ONU	ADSLTTPF				protocollnit Failure
		ONU	ADSLTTPF				noPeer AtuPresent
	Deactivated communication from NT (NT)	ONU	ADSLTTPF	Communication	Loss of Link	Major	Loss of Link
	Loss of power far end (NT)	ONU	ADSLTTPF	Equipment	Power problem	Major	Loss of Power
PH Layer VDSL	Loss of communication bidirectional	ONU	PhysicalPathTPF	Communication	LOS	Critical	LOS
		ONU	VDSLTTPF	Communication	LOF	Critical	LOF
	Loss of communication far end (NT)	ONU	VDSLTTPF	Communication	RFI (Remote Failure Indication)	Critical	RFI (Remote Failure Indication)
	Bit errors (Fast)	ONU	VDSLTTPF	Communication	SD (fast)	Minor	SD (fast)
	Bit errors (Interleave)	ONU	VDSLTTPF	Communication	SD (interleave)	Minor	SD (interleave)
	Bit errors far end (Fast) (NT)	ONU	VDSLTTPF	Communication	SD far end (fast)	Minor	SD far end (fast)
	Bit errors far end (Interleave) (NT)	ONU	VDSLTTPF	Communication	SD far end (interleave)	Minor	SD far end (interleave)

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
	Activation of communication to NT failed	ONU	VDSLTTPF	Communication	Initialization failed	Critical	datalnitFailure
		ONU	VDSLTTPF				configllnit Failure
		ONU	VDSLTTPF				protocollnit Failure
		ONU	VDSLTTPF				noPeer AtuPresent
	Deactivated communication from NT (NT)	ONU	VDSLTTPF	Communication	Loss of Link	Major	Loss of Link
	Loss of power far end (NT)	ONU	VDSLTTPF	Equipment	Power problem	Major	Loss of Power

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
Circuit emulation service UNI	Loss of communication bidirectional	ONT/NT	PhysicalPathTPF	Communication	LOS	Critical	LOS
		ONT/NT	DS1TTPF, E1TTPF DS3TTPF, E3TTPF	Communication	LOF	Critical	Loss of PLOAMCell
		ONT/NT	DS1TTPF, E1TTPF DS3TTPF, E3TTPF	Communication	AIS	Critical	AIS
	Bit errors	ONT/NT	DS1TTPF, E1TTPF DS3TTPF, E3TTPF	Communication	SD	Minor	SD
	Loss of communication far end	ONT/NT	DS1TTPF, E1TTPF, DS3TTPF, E3TTPF	Communication	RAI	Critical	RAI
	Transmitter failure (if optical interface)	ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Minor	Laser Bias High
		ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Critical	Laser Power High
		ONT/NT	PhysicalPathTPF	Equipment	Transmitter failure	Major	Laser Power Low
TC-Adapter	Loss of communication	OLT/ONT/ ONU/NT	tcAdaptorF	Communication	LCD	Critical	Loss of Cell delineation
ATM Layer "Inter-working VPC Termination Point"	Loss of communication bidirectional	OLT/ONT/ ONU/NT	vpCTPF	Communication	AIS	Major	VP AIS
	Loss of communication far end	OLT/ONT/ ONU/NT	vpCTPF	Communication	RDI	Minor	VP RDI

Table A.3/Q.834.1 – Network faults

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
ATM Layer, VP level	Loss of communication bidirectional	OLT/ONT/ ONU/NT	vpTTPF	Communication	AIS	Major	VP AIS
	Loss of communication far end	OLT/ONT/ ONU/NT	vpTTPF	Communication	RDI	Minor	VP RDI
ATM Layer "Inter-working VCC Termination Point"	Loss of communication bidirectional	OLT/ONT/NT	vcCTPF	Communication	AIS	Major	VC AIS
	Loss of communication far end	OLT/ONT/NT	vcCTPF	Communication	RDI	Minor	VC RDI
ATM Layer, VC level	Loss of communication bidirectional	OLT/ONT/NT	vcTTPF	Communication	AIS	Major	VC AIS
	Loss of communication far end	OLT/ONT/NT	vcTTPF	Communication	RDI	Minor	VC RDI

A.3 Quality of Service alarms

Table A.4/Q.834.1 – QoS alarms

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
ATM Adoption Layer 1	Header errors threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	Header errors	Minor	Header errors
	Sequence Violation threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	Sequence Violation	Minor	Sequence Violation
	Cell loss threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	Cell loss	Minor	Cell loss
	Cell misinsertion threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	Cell misinsertion	Minor	Cell misinsertion
	Buffer Underflows threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	Buffer Underflows	Minor	Buffer Underflows
	Buffer Overflows threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	Buffer Overflows	Minor	Buffer Overflows
	STD Pointer Reframes threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	STD Pointer Reframes	Minor	STD Pointer Reframes
	STD Pointer Parity Check Failures threshold crossing	OLT/NT	AAL1PM CurrentDataF	Quality of Service	STD Pointer Parity Check Failures	Minor	STD Pointer Parity Check Failures
	Cell starvation alarm	OLT/NT	AAL1PM CurrentDataF	Quality of Service	CSA	Minor	CSA

Table A.4/Q.834.1 – QoS alarms

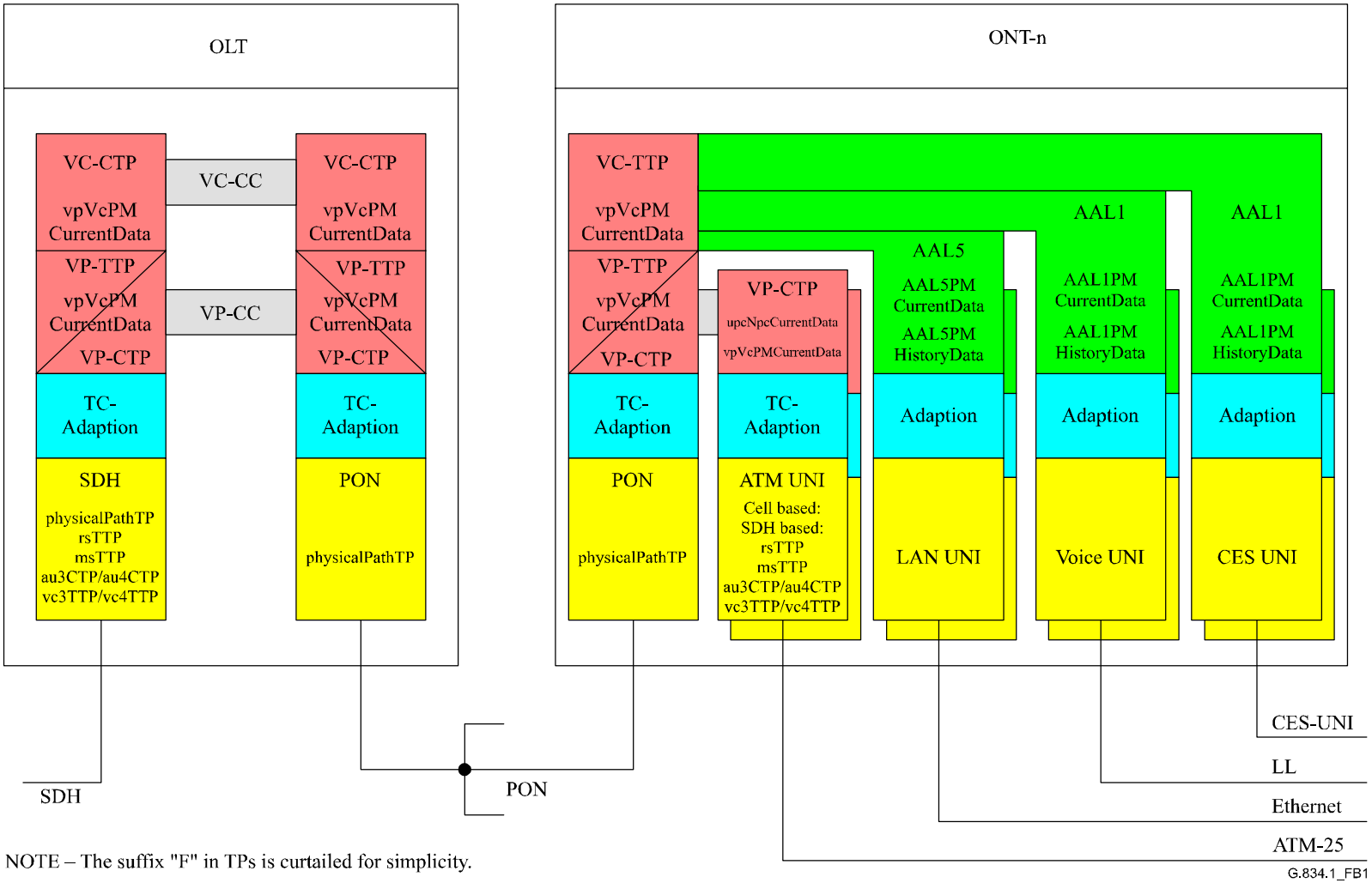
Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
ATM Adoption Layer 5	Threshold crossing Invalid Field	OLT/NT	AAL5PM CurrentDataF	Quality of Service	Invalid Field	Minor	Invalid Field
	Threshold crossing CRC Violation	OLT/NT	AAL5PM CurrentDataF	Quality of Service	CRC Violation	Minor	CRC Violation
	Threshold crossing Reassembly Timer Expirations	OLT/NT	AAL5PM CurrentDataF	Quality of Service	Reassembly Timer Expirations	Minor	Reassembly Timer Expirations
Traffic Management	Threshold crossing maximum Queue Size	OLT/NT	priorityQueueF	Quality of Service	Priority Queue	Major	Maximum Queue Size
	Threshold crossing discarded cells	OLT/NT	upcNpc Disagreement CurrentDataF	Quality of Service	Discarded Cells	Warning	Discarded Cells
	Threshold crossing discarded CLP0 cells	OLT/NT	upcNpc Disagreement CurrentDataF	Quality of Service	Discarded CLP0 Cells	Minor	Discarded CLP0 Cells
ATM Layer VP/VC PM	Threshold crossing lost cells	OLT/ONT/ ONU/NT	vpvcPMCurent DataF	Quality of Service	Lost cells	Minor	Lost cells
	Threshold crossing far end lost cells	OLT/ONT/ NT	vpvcPMCurent DataF	Quality of Service	Far end lost cells	Minor	Far end lost cells

Table A.4/Q.834.1 – QoS alarms

Problem group	Problem	Detected by		Generated notification			Caused by attribute value
		Network element	Managed entity	Event type	Probable cause	Default severity	
Circuit Emulation Service UNI PM	Errored Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	ES	Minor	Errored Seconds
	Severely Errored Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	SES	Minor	Severely Errored Seconds
	Bursty Errored Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	BES	Minor	Bursty Errored Seconds
	Unavailable Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	UAS	Minor	Unavailable Seconds
	Controlled Slip Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	CSS	Minor	Controlled Slip Seconds

Annex B

Communication network



NOTE – The suffix "F" in TPs is curtailed for simplicity.

Figure B.1/Q.834.1 – PON network layer structure (OLT-ONT)

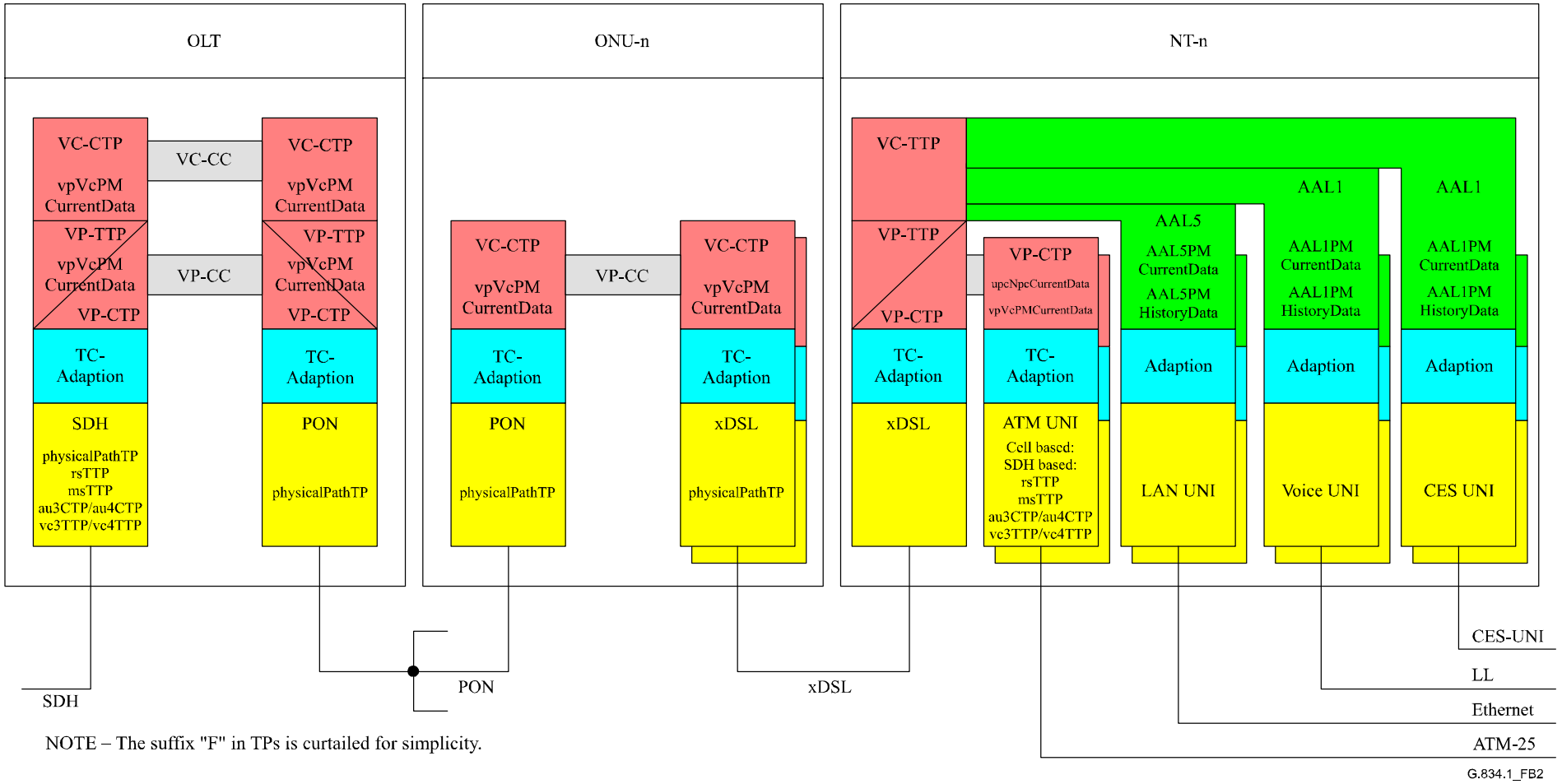


Figure B.2/Q.834.1 – PON network layer structure (OLT-ONT)

Annex C

Entity relationship diagram

Notation is found in Figures C.1 to C.9. This notation is defined as follows:

A ———————— B A is associated with B. Relationships can be indicated by pointer attributes that are listed on the line

A ———————— ◊B A is contained by B

A ———————— <B B inherits from A

C.1 Inventory management

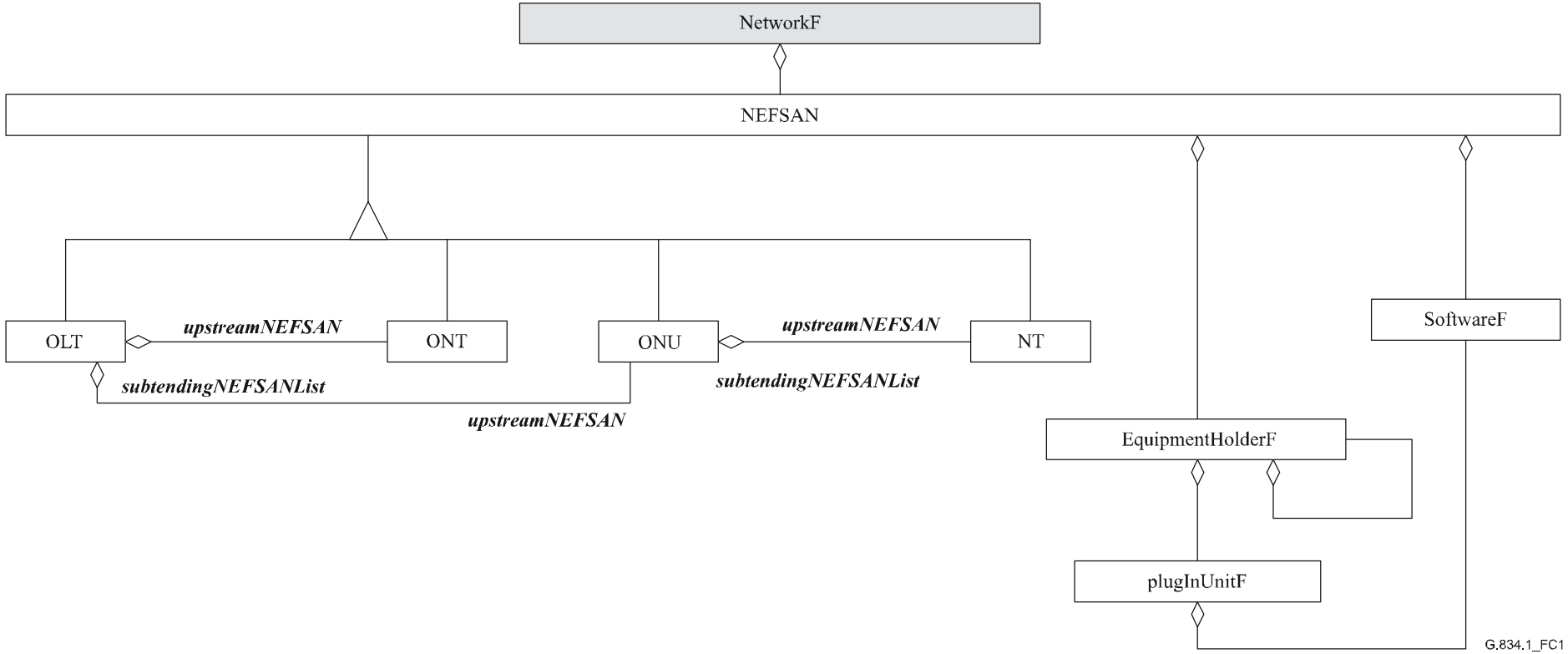


Figure C.1/Q.834.1 – E-R diagram for inventory management

C.2 Termination points

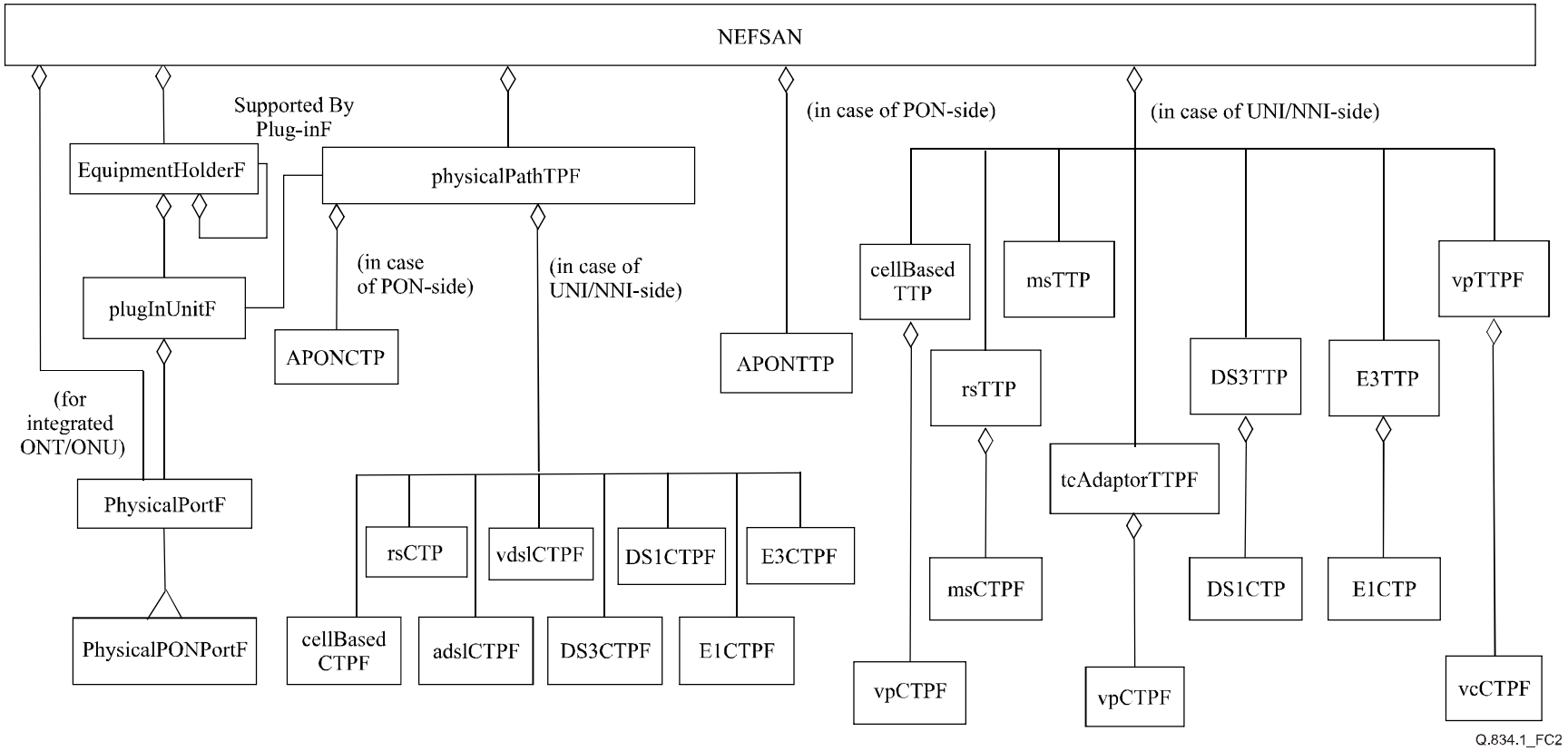


Figure C.2/Q.834.1 – E-R diagram for termination points

C.3 AAL

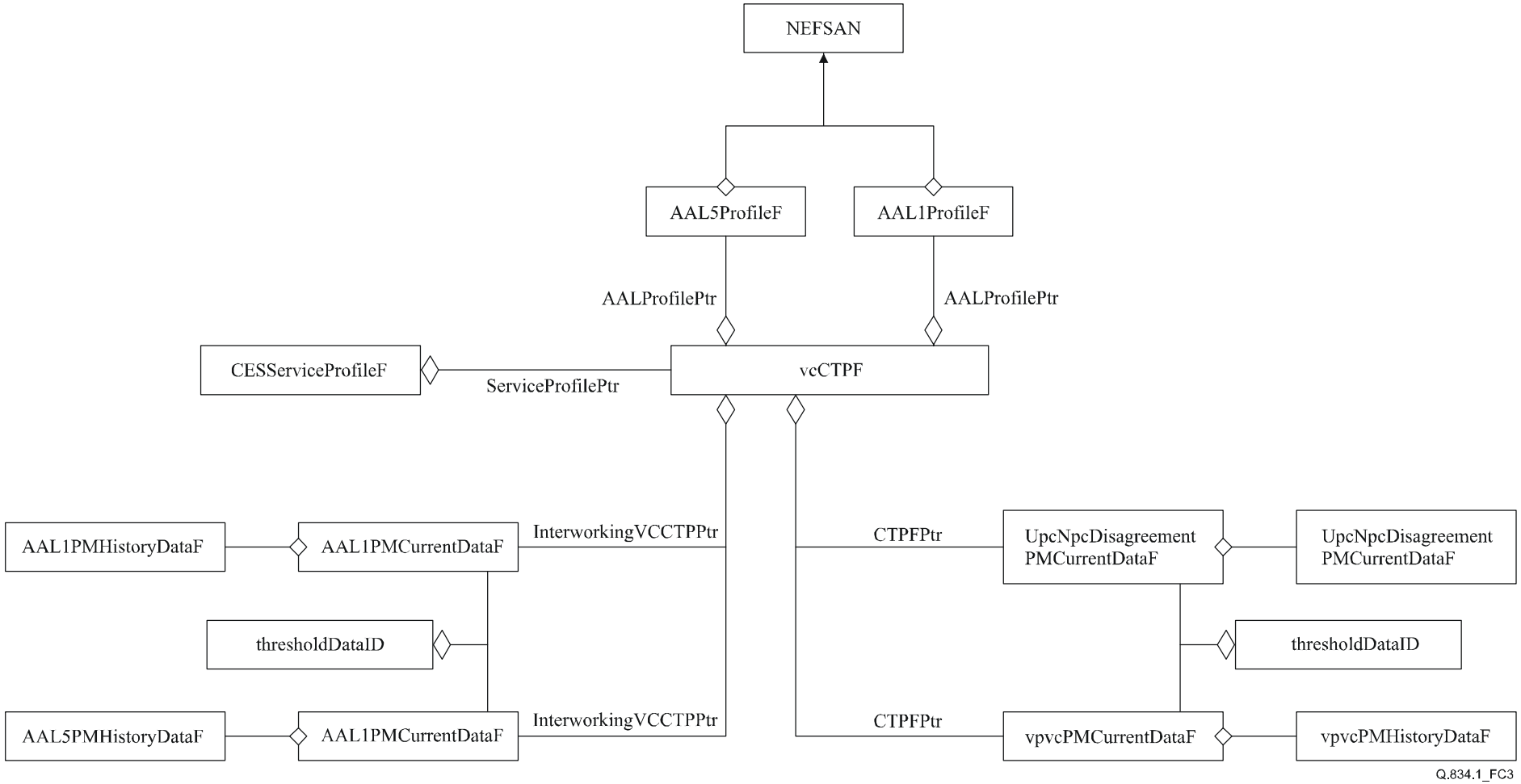


Figure C.3/Q.834.1 – E-R diagram for AAL

C.4 Physical performance monitor

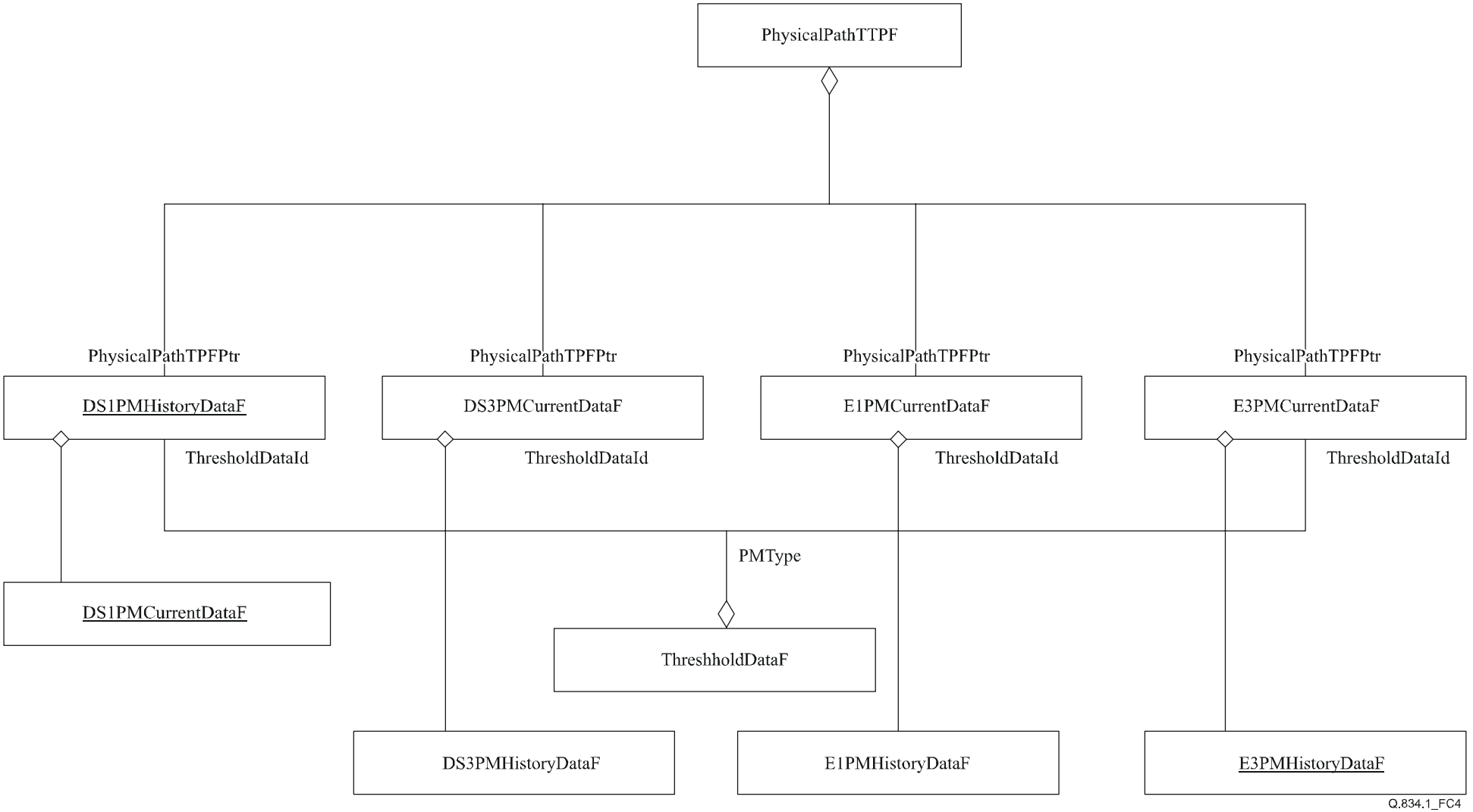


Figure C.4/Q.834.1 – E-R diagram for physical performance monitor

C.5 TCAdaptor E-R diagram

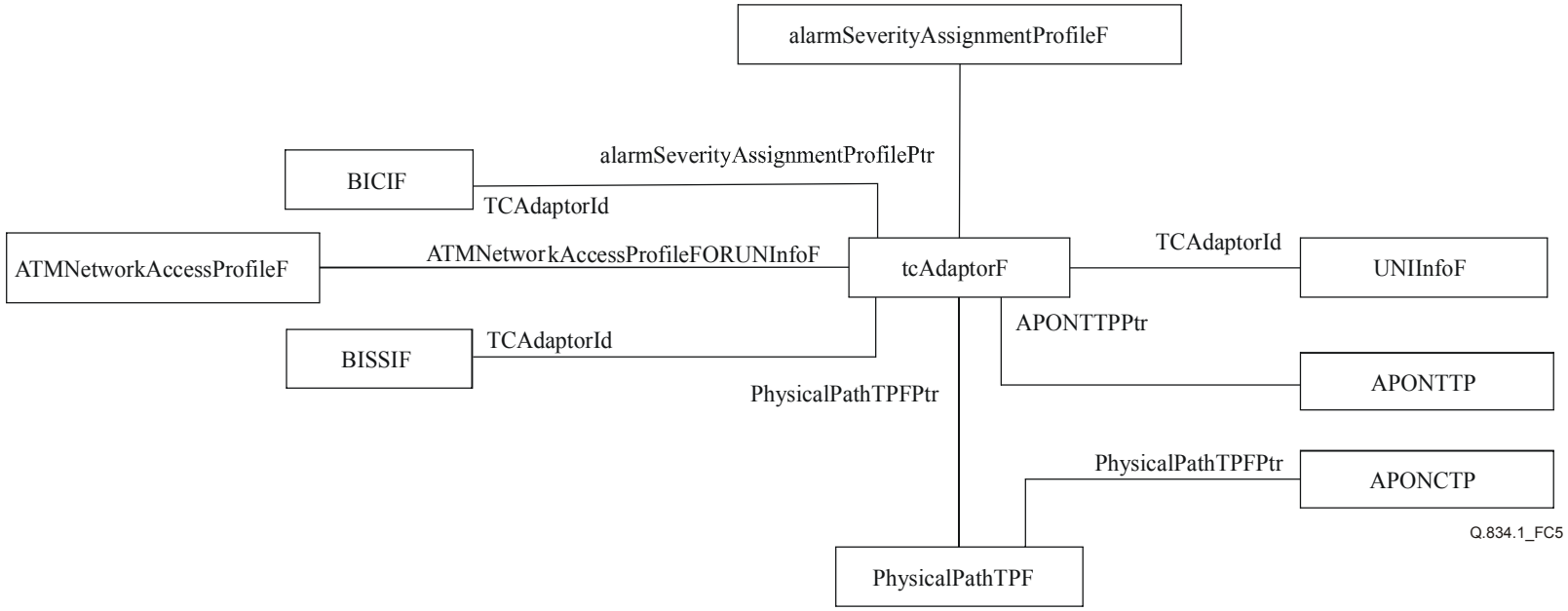


Figure C.5/Q.834.1 – E-R diagram for TCAdaptor

C.6 ATM cross-connection E-R diagram

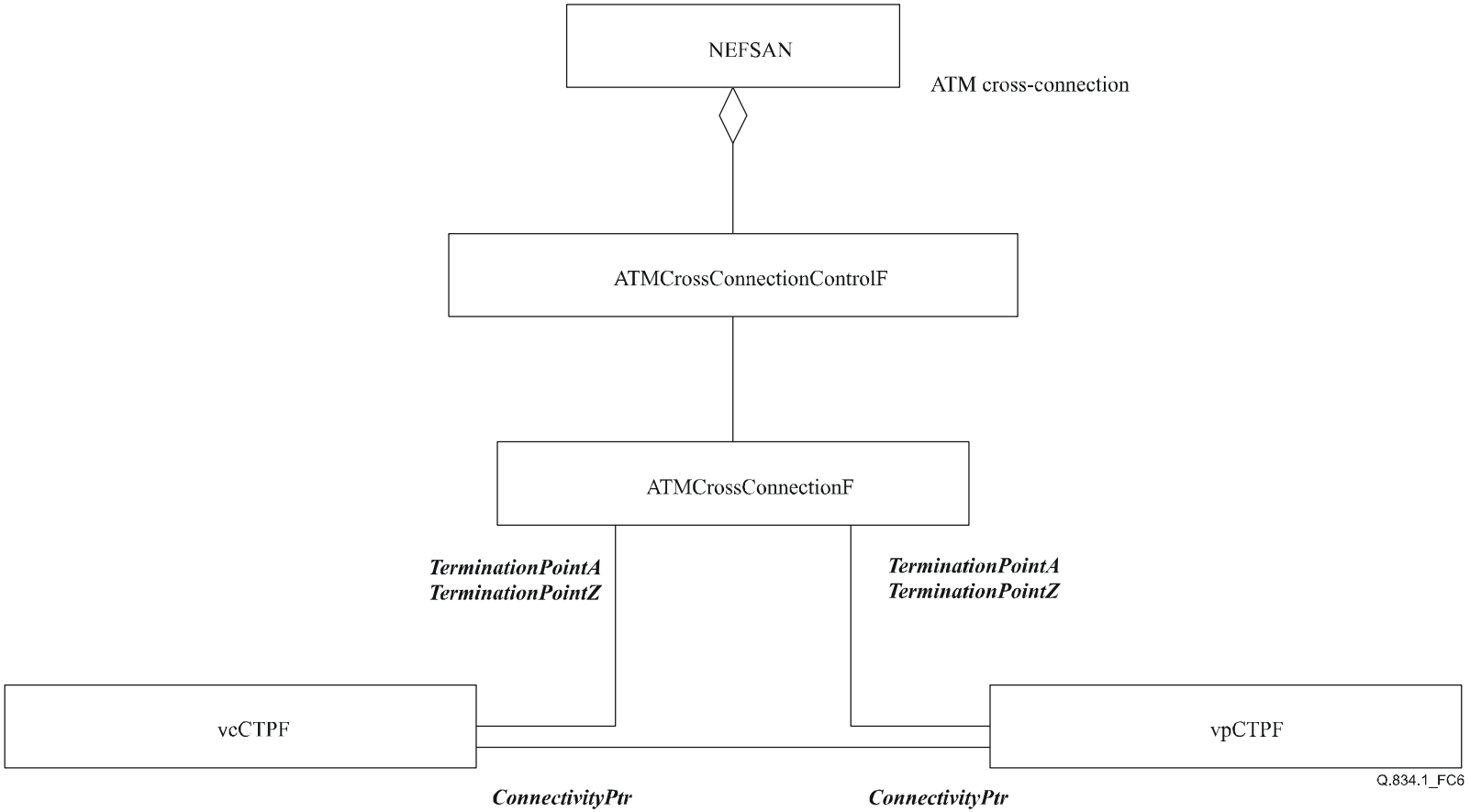


Figure C.6/Q.834.1 – E-R diagram for ATM cross-connection

C.7 Traffic characterization E-R diagram

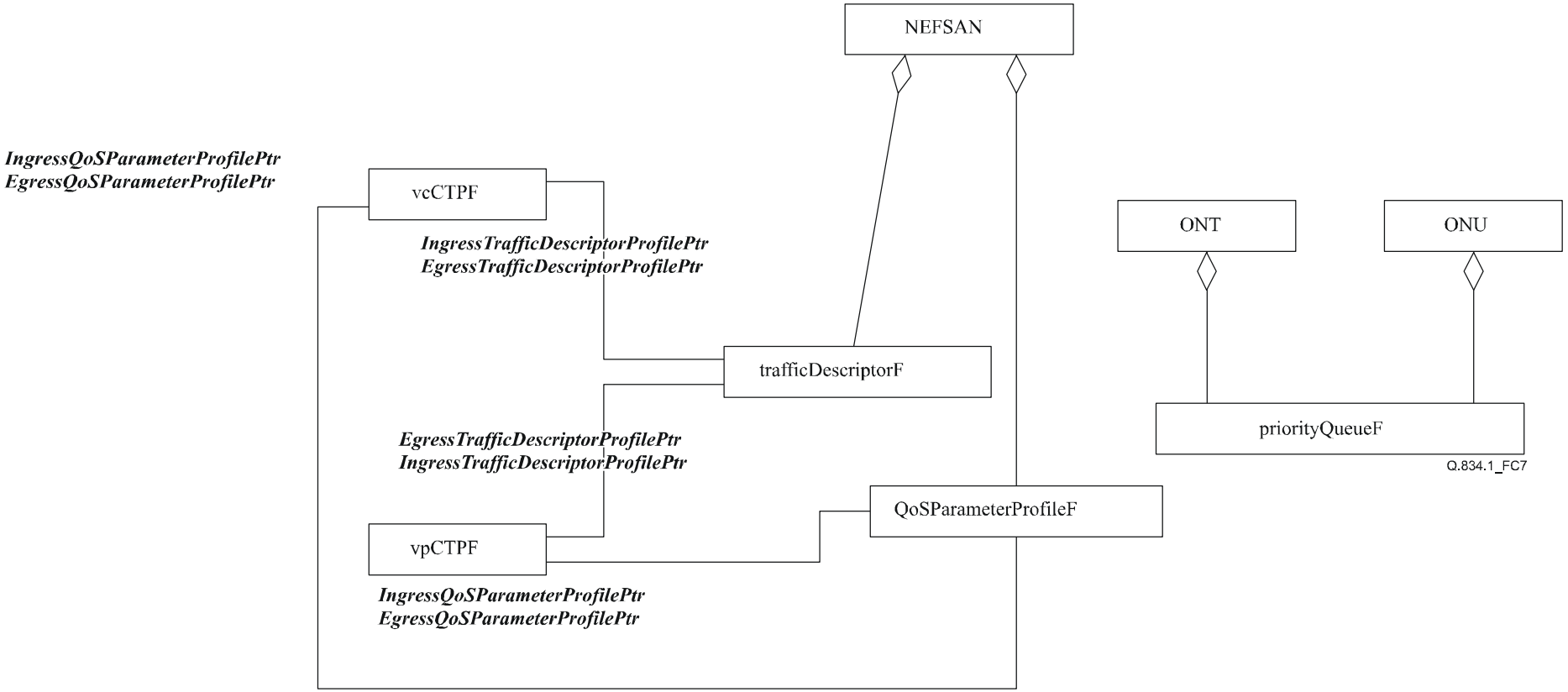


Figure C.7/Q.834.1 – E-R diagram for traffic characterization

C.8 Log

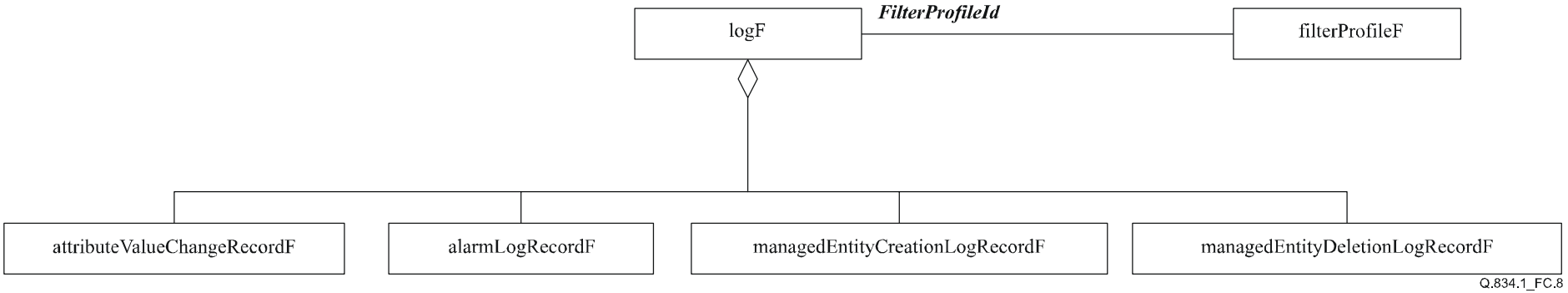


Figure C.8/Q.834.1 – E-R diagram for log

C.9 ATM traffic load

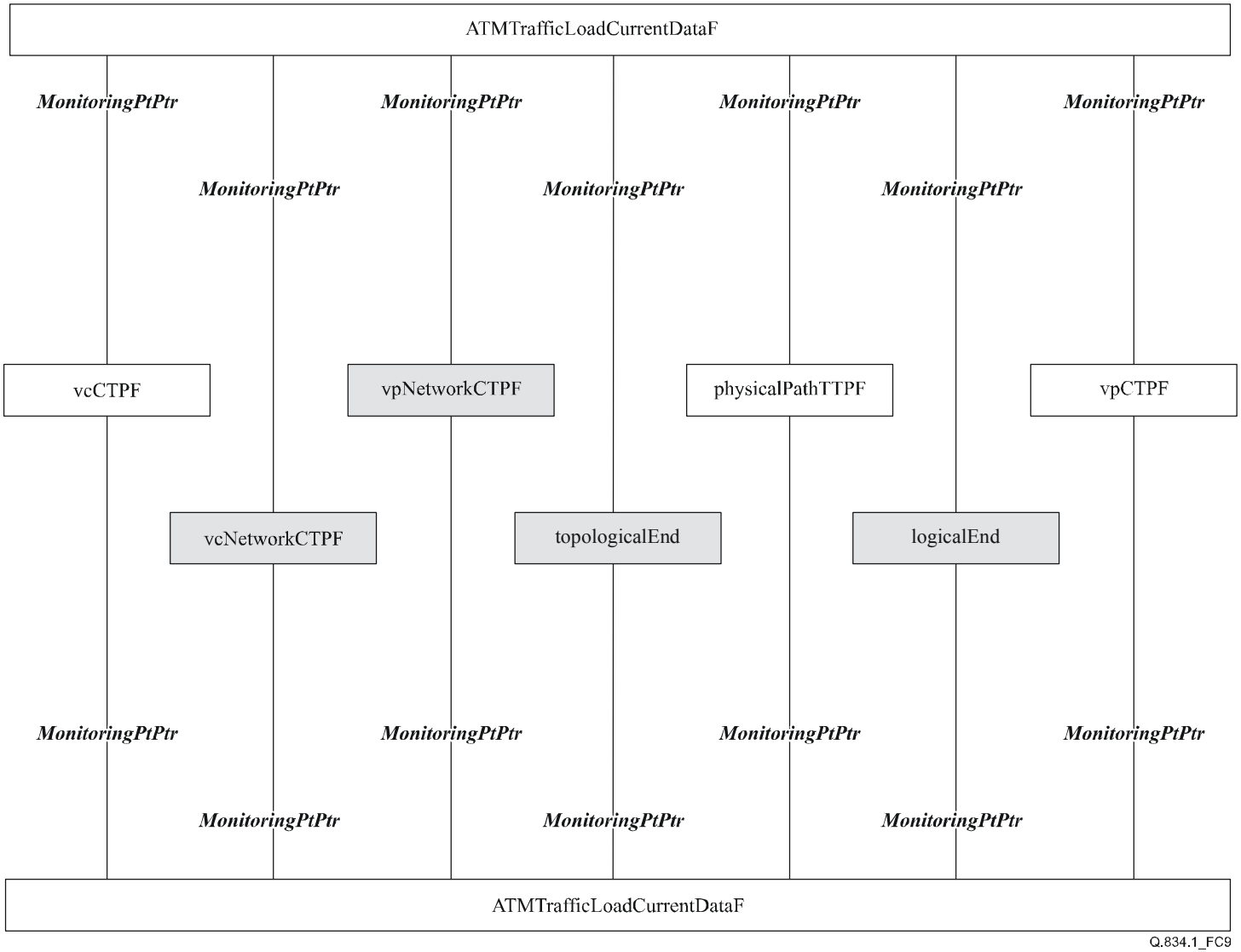
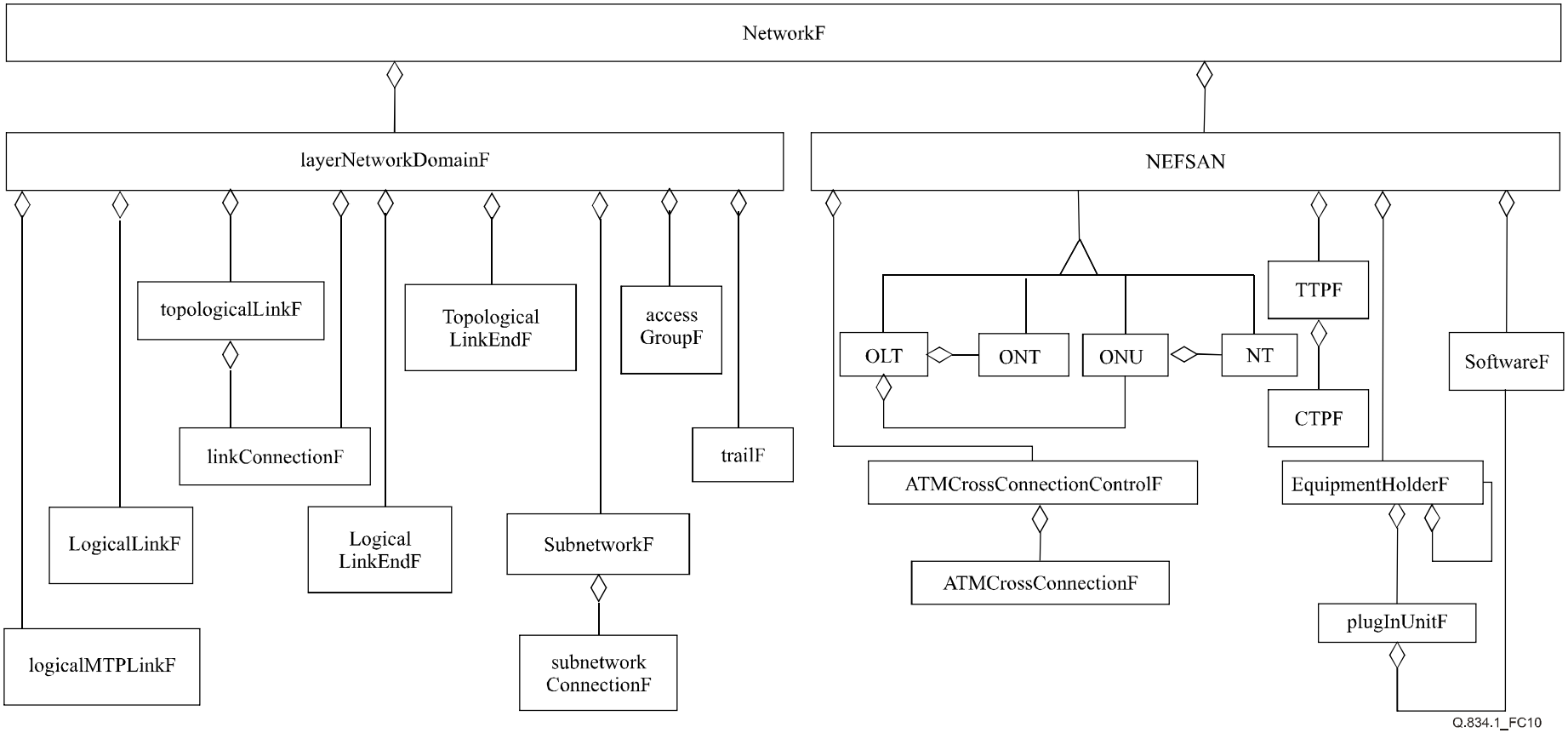


Figure C.9/Q.834.1 – E-R diagram for ATM traffic load

C.10 Combined view managed entities



This figure shows containment relationships.

Figure C.10/Q.834.1 – E-R Combined view managed entities

C.11 Layer network domain and subnetwork

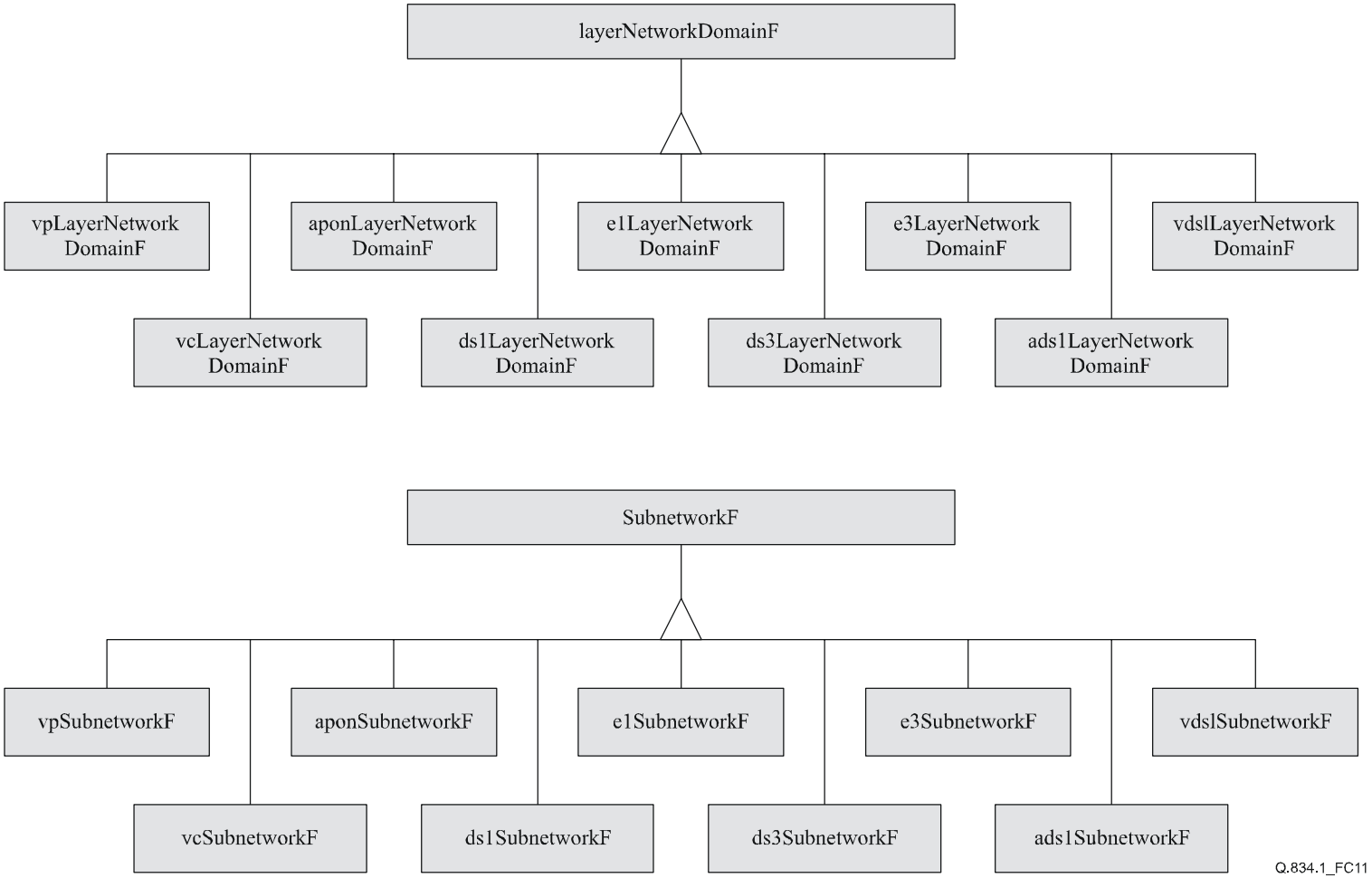


Figure C.11/Q.834.1 – E-R diagrams for layer network domain and subnetwork

C.12 Link connection

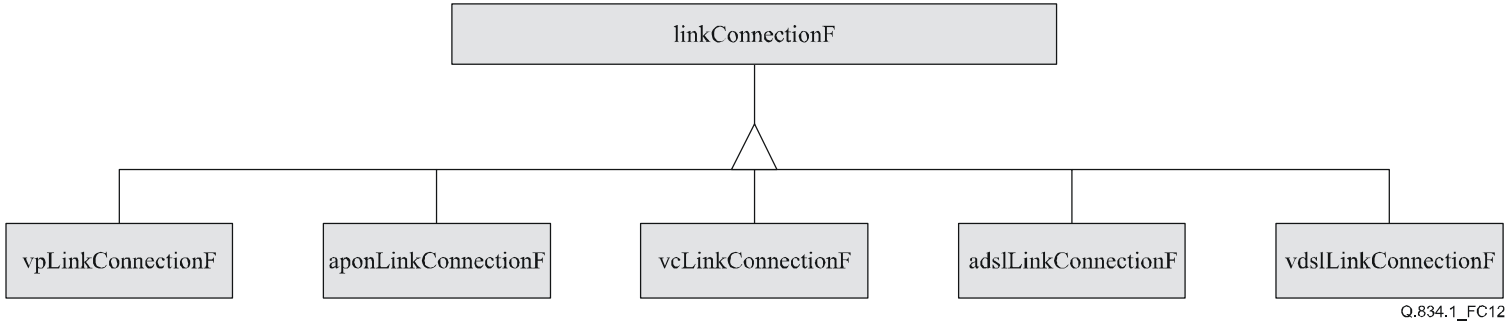


Figure C.12/Q.834.1 – E-R diagram for link connection

C.13 Subnetwork connection

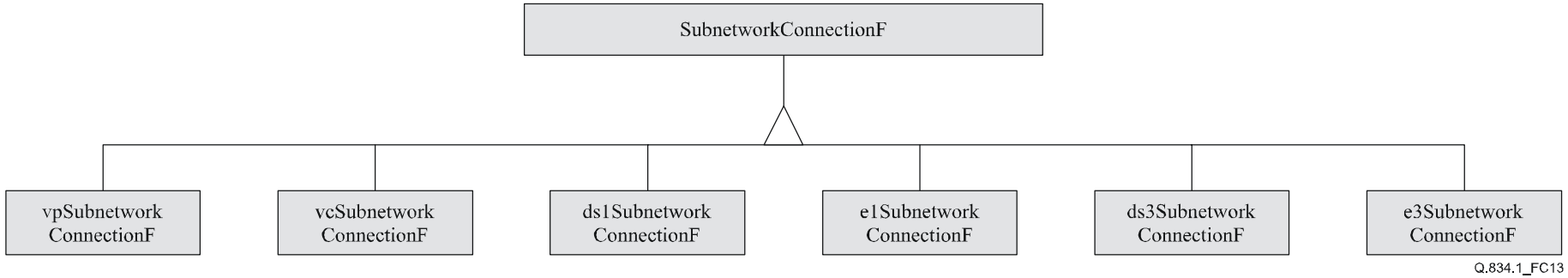


Figure C.13/Q.834.1 – E-R diagram for subnetwork connection

Appendix I

FSAN operations requirements

I.1 Introduction

1 I Since early 1995 a number of operators and suppliers have collaborated on developing solutions and designs for delivering a low-cost full-services access network (FSAN). The operator members of this collaboration believe that agreement on a common set of requirements on as many aspects as possible will lead to a cost-effective solution. It was also decided that involving suppliers at an early stage of the discussions would enable them to deliver the required solutions. A number of working groups were set up to facilitate this, each covering a specific area of the FSAN [I-1].

2 I This appendix describes the set of common requirements which have been developed by the OAM group members (both operators and suppliers). The requirements cover the following aspects of OAM:

a) High-level business processes;

b) Network Management Architecture;

c) Operational requirements;

d) OAM of the transmission medium.

3 I Requirements from the other FSAN working groups have also been used as an input to this work [I-2].

4 I NOTE – All statements in this appendix are numbered "n x" to aid traceability where "n" is an integer number starting from 1 and "x" indicates the type of statement. The statement can be an (I)nformation statement, a (M)andatory requirement or an (O)ptional requirement.

I.2 Processes

5 I Operators are increasingly using process engineering methods to describe the flow of fundamental business activities to assist them in defining the required operational system functionality. Once these processes are understood it is possible to determine which activities can be automated to provide improvements in operations.

6 I A process can be viewed as a series of tasks that describe the operations functions and the relationship between the functions. Processes also identify the instances of data that are manipulated by the operations functions.

7 I Every operator defines processes suitable for his organization and infrastructure by grouping tasks in different ways to form unique business processes. This makes it difficult to define a set of common detailed processes that are applicable to every operator. For this reason, this appendix describes a small set of high-level processes which cover most of the tasks for specific operations as an aid to understanding the source of the management requirements. Although the names of the processes may need to be translated to equivalent names within each operator's organization, they are considered to be generally applicable to each operator. Process work by the Network Management Forum (NMF) [I-3] may also help to understand the set of activities that every operator has to address.

8 I Some of the key activities involve planning and engineering, service and network provisioning, network repair, network testing and accounting.

9 I The following clauses describe high-level examples of some of the key processes which can be used to provision and maintain the FSAN and to manage services. These, together with operators' experience, have been used as a baseline for developing the management requirements described in this appendix.

I.2.1 Planning and engineering

10 I This process ensures that sufficient network resources are available to meet overall customers needs (see Figure I.1). The process performs trend analysis of customer network usage and generates demand forecasts on network resources. The process will be used to determine access network capacity such as PON bandwidth, OLT/ONU/ONT line cards, VP/VC switch and cross-connect requirements. The process requires network usage, planning and engineering data for analysis.

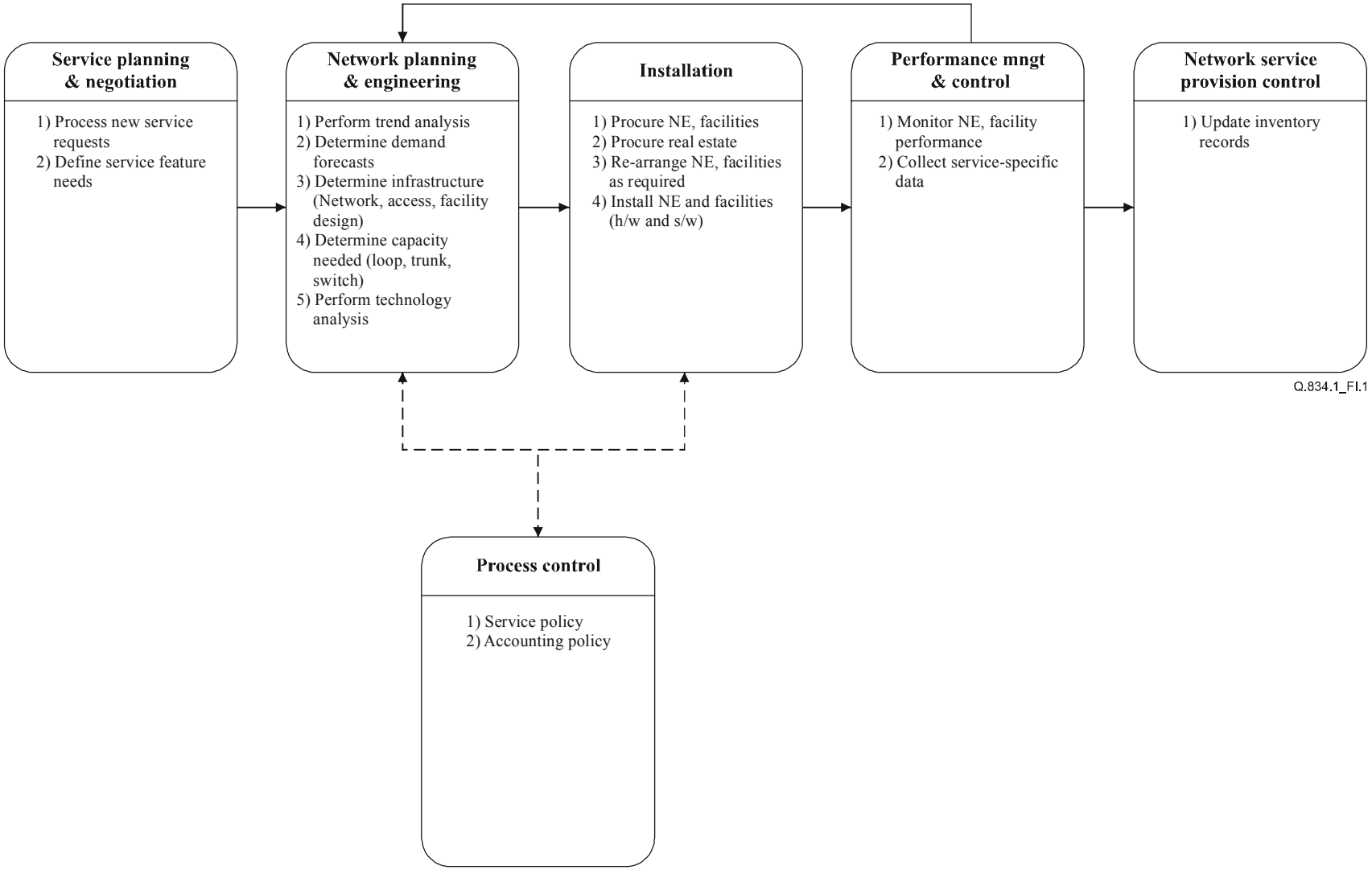


Figure I.1/Q.834.1 – High-level planning and engineering process

I.2.2 Service provision

11 I This process covers the set of tasks required to deliver service to customers across the FSAN. The process is illustrated in Figure I.2. This process begins with customer interaction to record customer data and service data to meet the customer's request. Other activities of this process are responsible for tracking the progress of the request and for updating (interacting with other functions) at particular times. For example, it may be necessary to verify the customer's credit history prior to progressing an order. On completion of the order, accounting data is updated to ensure that the customer can be effectively billed for the service. Other functions covered include network planning, work force scheduling and the provisioning of network equipment (OLTs, ONUs, ONTs, NTs, Service cards and so on).

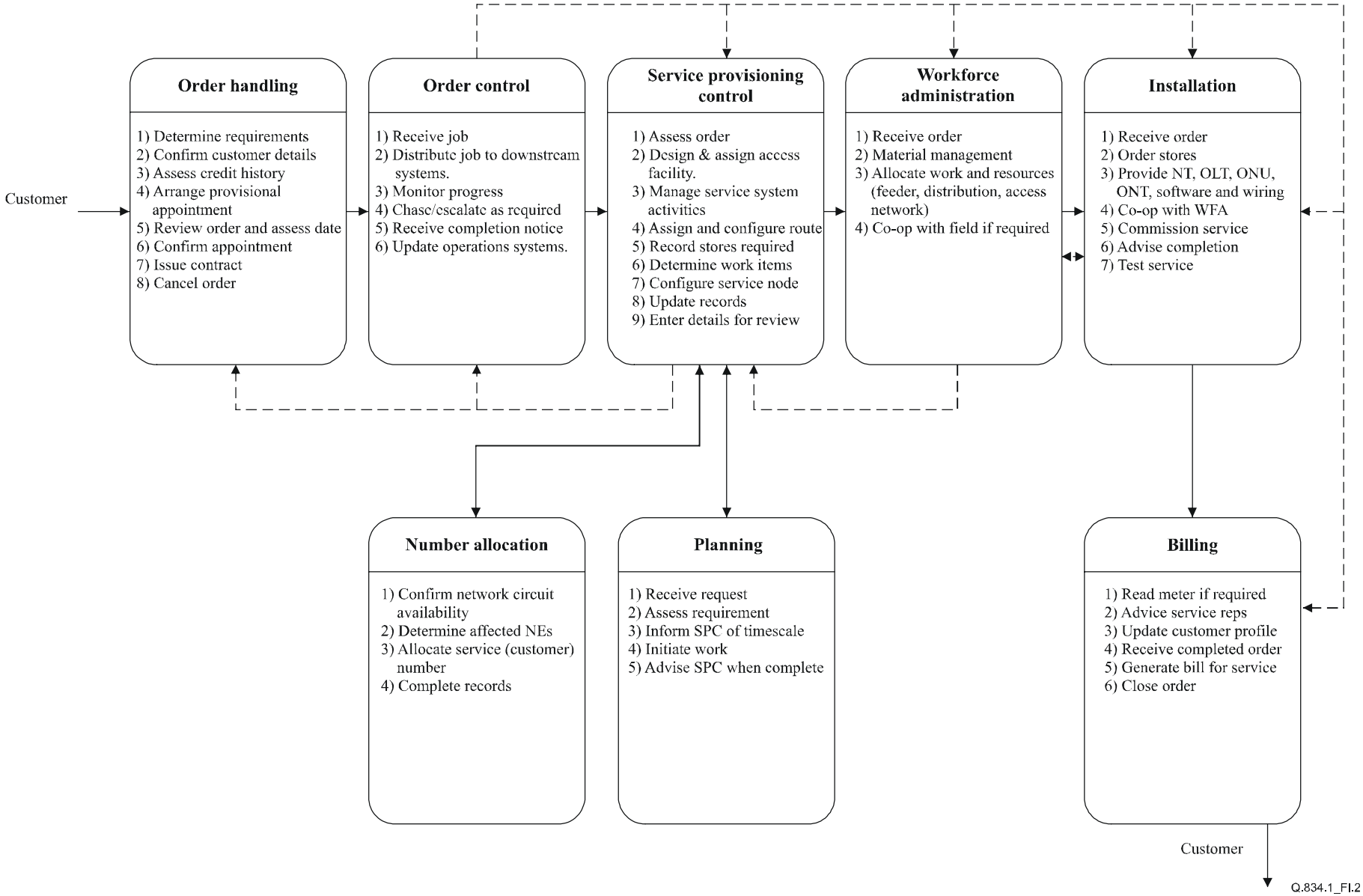


Figure I.2/Q.834.1 – High-level service provision process

I.2.3 Network repair

12 I Network repair involves the set of tasks required to determine the cause and location of faults in the FSAN and the tasks needed to restore service at the contracted service level. Network repair can be proactive or reactive. Proactive repair can be initiated as a result of network self-diagnostics in terms of hardware, software or traffic conditions. A network operator will normally initiate reactive repair on receipt of a report from a customer indicating a degradation or fault in the service being delivered over the network.

13 I Figure I.3 shows the tasks for reactive repair of the network. Particular functions involved include trouble administration, surveillance, performance monitoring and testing. Proactive repair will contain similar steps except that the process will be driven by event reports from the network rather than from a report by the customer.

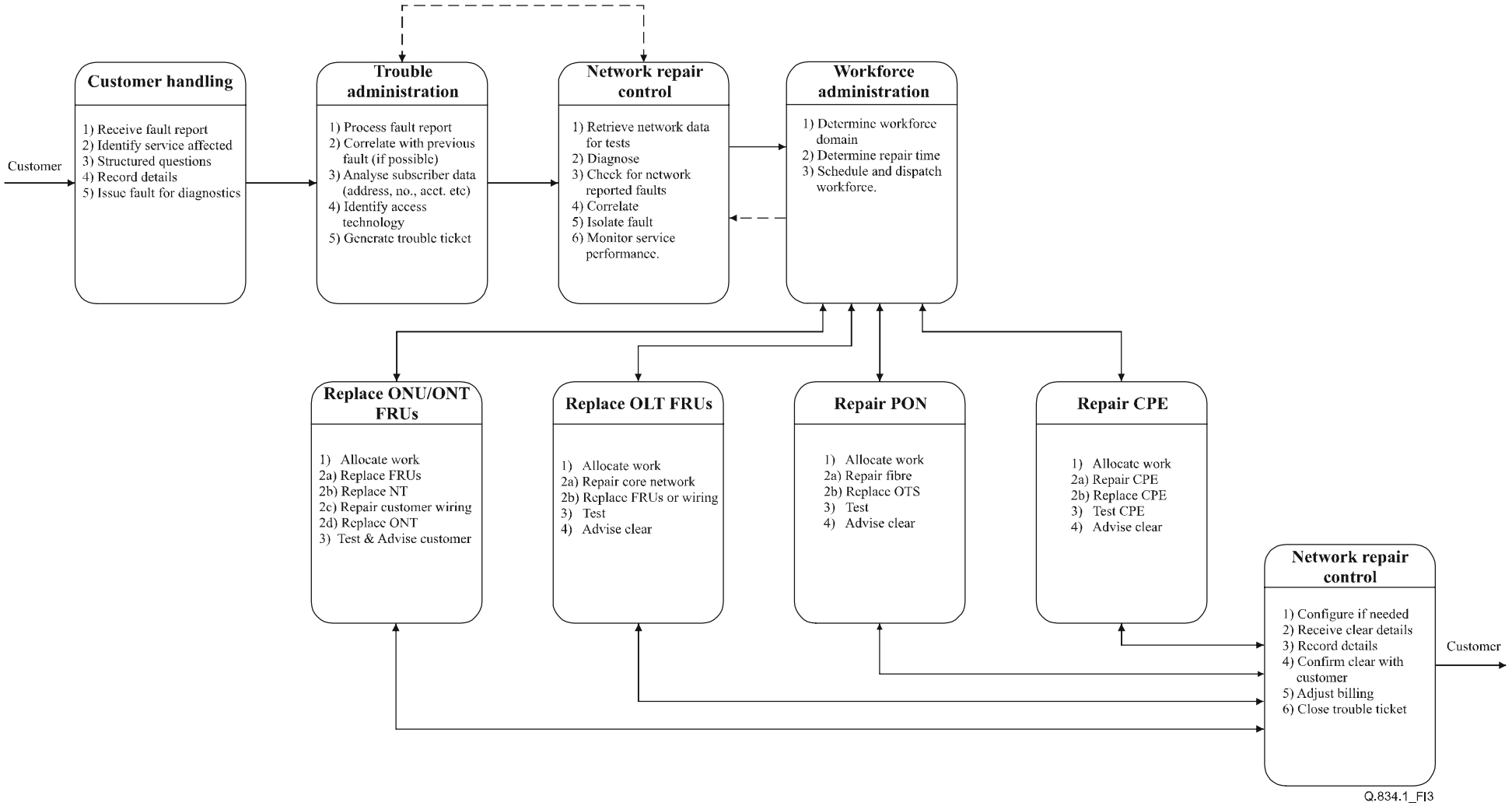


Figure I.3/Q.834.1 – High-level repair process

I.3 Management architecture

14 I This clause provides a definition of the management terms used in this appendix, the FSAN target management architecture, and the management interfaces.

15 I A definition of the terms (see Table I.1) is necessary to ensure a common understanding. Where necessary, the definitions are based on those used in ITU-T Recs M.3010 [I-4], M.3013 [I-14], G.902 [I-5] and G.982 [I-6].

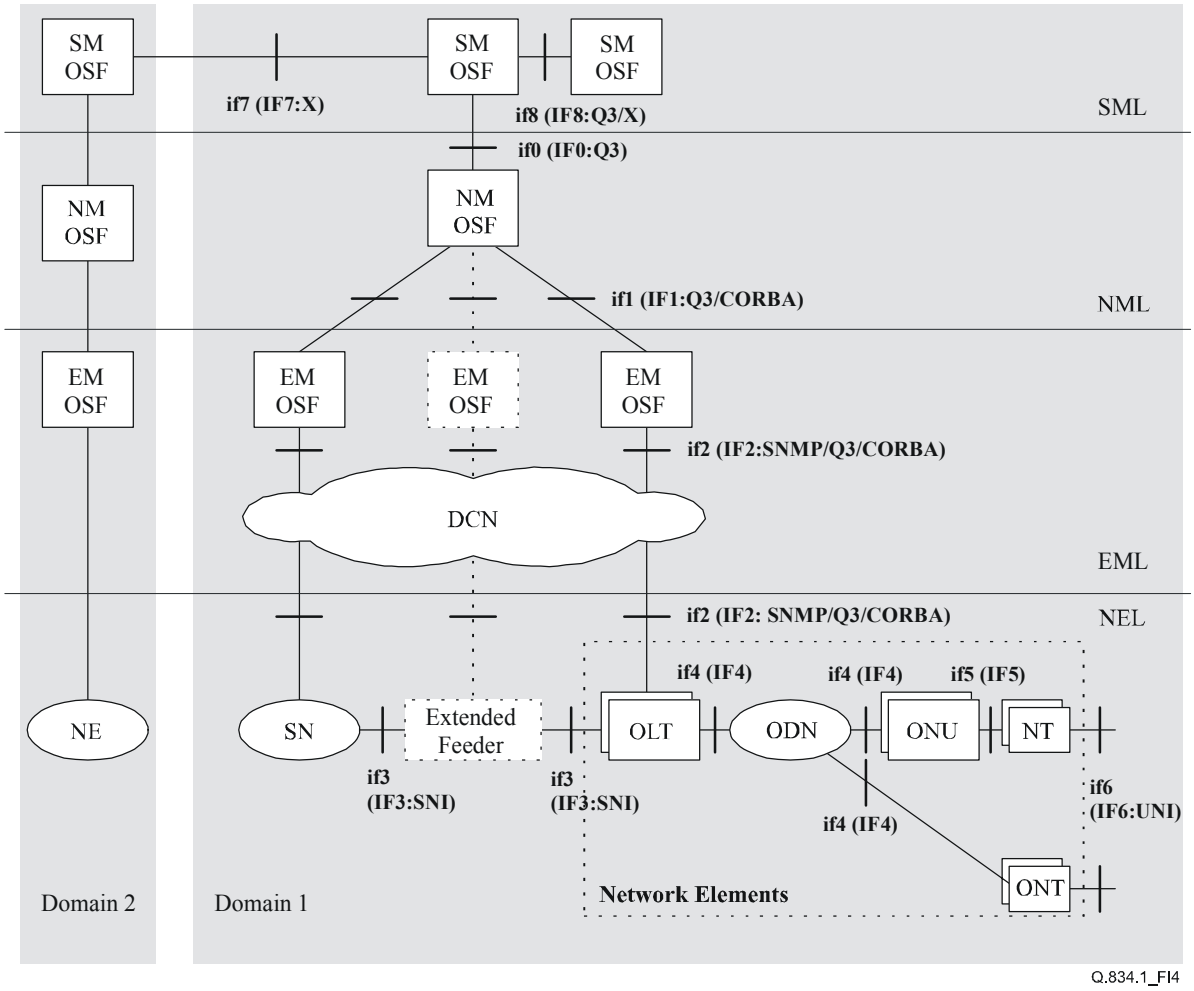
Table I.1/Q.834.1 – Definition of terms

Term	Source	Description
Operations System Function (OSF)	M.3010	This is the collection of similar functions which provide different levels of management capability. Three kinds of OSFs are shown in Figure 1: Element management layer – OSF (E-OSF), Network management layer-OSF (N-OSF) and Service management layer – OSF (S-OSF). Each OSF provides management services to the layer above.
Network Element Layer (NEL)	M.3010 M.3013	Refers to the physical resources that reside in the Access Network.
Element management layer – Operations System Function (E-OSF)	M.3010	E-OSF manages the physical resources which reside in the access network. Typical management functions at this level are configuration, fault management and performance monitoring. E-OSF is responsible for understanding the details of transmission technology information and equipment thus removing the need for this complexity of information to be held by higher-layer management functions.
Network management layer – Operations System Function (N-OSF)	M.3010	N-OSF coordinates the management of network elements to provide a user-to-user or service node to user path in order to transport telecommunication services. NM functions will coordinate multiple E-OSFs to provide overall network supervision.
Service management layer – Operations System Function (S-OSF)	M.3010	S-OSF manages the services supported by the network. It is not concerned with the physical nature of the network. Typical functions of this layer are service creation, provision, cessation, billing and accounting information.
FSAN Element Management System	FSAN	The collection of E-OSF, N-OSF and S-OSF is implemented on one Operations System (OS).
Service Node (SN)	G.902	A network element that provides access to various switched and/or permanent telecommunication services. For switched services, the SN provides call control, connection control and resource handling functions.
Access Network (AN)	G.902	The collection of network equipment which provides a transport capability for the provision of telecommunication services between a Service Node Interface (SNI) and one or more associated User Network Interfaces (UNI). User signalling is carried transparently by the AN.
Optical Access Network (OAN)	G.983.1	The set of access links sharing the same network-side interfaces and supported by optical access transmission systems. The OAN may include a number of ODNs connected to the same OLT.

Table I.1/Q.834.1 – Definition of terms

Term	Source	Description
Extended Feeder	FSAN	Provides the physical resources to extend the AN over larger distances. These physical resources will not alter the transmission on the SNI and will require minimal management. This is not considered to be part of the Network Element.
Optical Line Termination (OLT)	G.982	An OLT provides the network-side interface of the OAN. It is connected to one or more ODNs.
Optical Distribution Network (ODN)	G.982	Refers to the point-to-multipoint fibre network used to transport services in a common format from the OLT to the ONU/ONT. It utilizes passive optical components.
Optical Network Unit (ONU)	G.983.1	An ONU provides (directly or remotely) the user-side interface of the OAN, and is connected to the ODN.
Network Termination (NT)	FSAN	Physical resource, which resides in the customers premises and forms the boundary of the access network (UNI). It provides onward transmission of services over building wiring to customer premises equipment.
Optical Network Termination (ONT)	G.983.1 FSAN	An ONU used for FTTH and includes the User Port function. For some operators, the ONU and NT functions will be combined in one physical resource which is called an ONT.
Drop Medium	FSAN	Refers to the network used to transport services in a common format from the OLT to the NT.
Data Communications Network (DCN)	M.3010	Refers to the management communications network which is needed to transfer management information between OSFs and between OSFs and the NEL.
User	FSAN	A crafts person interacting with the management system.
Customer	FSAN	The person or organization that uses the services provided by the network provider or the service provider. A customer can be a service provider as well.

16 I The target management architecture is shown in Figure I.4 which also shows the management interfaces that will need to be supported. The architecture shows the different layers of management functionality that is required to manage the FSAN. Each layer consists of one or more operations system functions (OSFs).



NOTE – The F interface as defined in ITU-T Rec. M.3010 is not shown in this figure but is implicit where there is an OSF.

Figure I.4/Q.834.1 – Target network management architecture

17 I An OSF should not be interpreted as a physical systems implementation. One or more OSFs may reside on one or more physical platforms.

18 M Each interface is shown with a lower case reference point (e.g., if1) and an uppercase implementation option of that interface (e.g., IF:Q3/CORBA) if it physically exists between two systems. This requirement specifically refers to reference points if1, if3, if4 and if6 in Figure I.4.

19 M Where a Q3 implementation is adopted, this shall be based on the Telecommunications Management Network (TMN) interface [I-7] using the Common Management Interface Protocol (CMIP) [I-8] and [I-9]. With this approach, a high-layer management function will contain a "manager" function and a lower-layer management function will contain an "agent" function. Management operations are communicated between the manager and agent functions using CMIP. It is not necessary to implement a Q3 interface if the management functions reside on the same physical system.

20 I The purpose of showing these interfaces is to determine the management information flows and data which will pass between the management functions. Information flows will be realized through management services between operations functions. Table I.2 gives a brief description of the possible management services provided at each reference point. The management flows are currently under study.

Table I.2/Q.834.1 – Services provided over management interfaces

Reference point	Management services	Comments on implementation of reference point
if0	Topology, service configuration and provisioning; Trouble/test administration; Account/billing/QoS performance reporting.	Q3
if1	Configuration/provisioning/test/fault/performance management of transport resources; Equipment management; Configuration/fault/performance management of transmission system.	Either Q3 based on the TMN Q3 interface using the Common Management Interface Protocol (CMIP) Network Management Hierarchy or CORBA
if2	Configuration/fault/performance/test management of network element; Network element consistency checks; Network element initialization/authentication/security management.	SNMP initially but does not preclude migration to Q3 or CORBA
if3	Termination of SNI; Management/control/maintenance/testing of interface; Connection establishment; Mapping of bearer services to access transport resources.	SNI
if4	Multiplexing of bearer services; Management communications; Connection/fault/performance management; Link initialization; Media access control; Security and user data encryption.	Management communications between OLT and ONU/ONT is via management channel over this interface [I-6].
if5	Error detection/reporting; Fault detection/reporting; Reset control; Configuration/activation/deactivation of NT resource.	This reference point may not be implemented if the ONU and NT are combined as in the case of the ONT
if6	Termination of UNI; Management/control/maintenance/testing of interface; Activation/deactivation.	UNI
if7	Ordering, service configuration and provisioning; Trouble/test administration; Account/billing/QoS performance reporting.	X This interface should have special security aspects because it links two different domains.
if8	Topology, ordering, service configuration and provisioning; Trouble/test administration; Account/billing/QoS performance reporting for the purposes of the service user.	Q3/X This interface should have special security aspects because it links a customer OSF to a network provider OSF.

I.4 Management requirements

I.4.1 Scope

21 I This clause defines the management requirements for Network Element and Element Management layers, as shown in the logical architecture. The requirements have been further subdivided under the Configuration, Fault, Performance, Accounting and Security management functions within each layer. In addition, some requirements have been included for the Network Management and Service Management Layer.

I.4.2 Common management requirements

22 I This clause defines requirements that are considered to be common for all layers in the FSAN architecture. All management functions and interfaces shall be based on existing standard information models and interfaces where possible.

23 M All management functions are required to support the range of services defined in [I-10].

I.4.2.1 Fault management

24 M FSAN fault management refers to the broad set of functions associated with the detection, isolation, reporting and correction of abnormal operational conditions in the FSAN network. In this context, fault management consists of the following:

- alarm surveillance (detecting/receiving events);
- event processing (correlation and filtering);
- fault localization;
- event logging;
- testing.

I.4.2.2 Security

25 M Access to management functions and data at any layer, either by users or external systems, shall require authentication and access control.

26 M Users or external systems shall be authenticated through a challenge-response mechanism. This mechanism involves authentication through the use of identification and passwords. The mechanism may include use of devices such as smart cards for user identification.

27 M It shall be possible to configure the identification, the minimum length of the password, the expiry time of the password, the maximum allowed attempts "m" to enter the password and the retry expiry timeout for each individual user or external system.

28 M A user failing "m" attempts to enter the correct password shall be denied further attempts to gain access until expiry of the retry time-out. In this case, a security violation event shall be logged and a message shall be displayed, if appropriate, to indicate that access has been denied.

29 M Passwords shall not be echoed when entered and shall be encrypted if transmitted over any communications link.

30 M It shall be possible to configure the management functions and data available to a user or external system. The access parameters shall be based on read/write/modify/execute/delete privileges, geographic location, service type, time period over which access is allowed, functions available, data available and user profile and/or system name.

31 M Illegal attempts to access functions and or data shall be reported as a security violation. All accesses shall be logged.

32 M If a security violation is detected, the security function shall isolate the user or external system to prevent any further access attempts.

I.4.2.3 Logs

33 O All OSF log(s) shall operate in a first-in first-out basis in case of overflow. It shall be possible to configure a log to send an event, to a higher-layer management system, when a log full threshold has been exceeded or an overflow occurs.

34 M It shall be possible to archive logs periodically using back-up mechanisms. Archiving shall not affect current logs.

35 M It shall be possible to read all OSF logs (current or archived) from the user interface.

I.4.3 Network element layer requirements

I.4.3.1 Configuration management

36 M All network equipment shall be modular in design so that it is easy to install, remove, replace or upgrade without affecting existing services to other customers.

37 M The NE shall automatically detect the installation and removal of network equipment.

38 M For equipment installation, automatic detection shall include the following sequence of activities: installation, power-up self test, equipment authentication, read inventory information, report installation to the EM-OSF, and download of configuration information. Inventory information shall be read and sent to the EM-OSF, where possible, regardless of whether the equipment is of the correct type.

39 M Download of configuration information shall be performed automatically following successful installation or on request from the EM-OSF. The configuration information shall include service-specific software where appropriate. Configuration of the equipment shall not be allowed if the associated logical resources do not exist in the EM database.

40 M For equipment removal, the NE is only required to report the event to the EM-OSF.

41 M An event report shall be sent to the EM-OSF to indicate the success or failure of the equipment installation or removal. This event shall contain the following information:

a) type of network equipment (known, unknown or incompatible);

b) an indication of whether the installation/removal succeeded or failed; and

c) inventory of the network equipment (e.g., equipment id, hardware and software version) if the equipment is known or incompatible. No inventory information if the equipment is unknown.

42 M Any change of equipment state and relationship information shall be communicated to the EM-OSF by event reports. This information shall accurately reflect the status of the network equipment that exists or has been built in the NE database.

43 M The NE shall store all operational and service-related parameters (e.g., slot assignments, power levels, cross-connections, etc.) in the NE database.

I.4.3.2 Fault management

44 M The NE shall continue to function if it loses management communications with the EM-OSF.

45 O The NE should perform a connection test from the SNI port on the OLT to the UNI port on the NT when the NT/ONT is installed to ensure that the path between the SNI and UNI is correctly configured.

46 M There shall be simple visual indications (e.g., light-emitting diode) to confirm faults on the network equipment and to aid local maintenance procedures, where appropriate. All visual indications shall be consistent with the state of the network equipment. Where appropriate, the following shall be indicated:

- faults on the equipment;
- status of external interface(s), if present (e.g., signal present/not present);
- equipment synchronizing/synchronized;
- whether equipment is main or standby.

47 M It shall be possible to identify (via an LED) which is a main (currently operating) resource and which is the standby for those resources which are protected. A protection switching function shall be provided to switch to the standby resource if there is a fault on the main resource. On switch-over, the standby resource shall become the main resource and the main resource shall become the standby resource. The protection switch event shall be reported to the EM-OSF.

48 M Events indicating faults should be reported as soon as a fault has been detected following any persistence checks and correlation performed by the NE. A single event should be raised following correlation.

49 M Event reports shall not be raised against equipment that has been created in the NE database but has not yet been installed.

50 M Network equipment is required to automatically perform a self-test (where applicable) when connected to the network. Completion of the self-test should leave the network equipment in a known state. An event shall be sent to the EM-OSF to indicate failure of the self-test.

51 M The network equipment shall not require the manual use of specialized fault-finding techniques or tools to diagnose faults in the OLT, ODN, ONU or NT.

52 M The NE shall support network or customer facing loops to determine the integrity of the access network or parts of the access network. Logical loops shall be provided at the ATM layer for maintenance and performance management using OAM cells. It shall be possible for the EM-OSF to request application of logical loops on the FSAN NE.

53 O Physical loops shall be provided on the interfaces at the OLT and ONU/ONT. Physical loops shall be applied on request from the EM-OSF.

54 M A bit error rate test source shall be provided in the OLT. Activation and de-activation of the test source shall be carried out on request from the EM-OSF.

55 M It shall be possible to perform service-specific tests associated with the transport medium between the ONU and NT, where the ONU and NT are separate. The test functions, where possible, should also be able to determine if the customer's equipment is present or absent. Any faults detected during testing shall be reported to the EM-OSF.

56 M Detection of failures in the received transport signal at the OLT or ONU/ONT shall cause the NE to report the fault to the EM-OSF. If the failure is detected at the OLT, an immediate switch shall be performed to a standby ODN interface if available. A failure on the received signal (downstream) at the ONU/ONT shall not result in the corruption of data on the ODN in the upstream signal to the OLT. In this case, the ONU shall attempt to indicate the failure to the OLT.

57 M It shall be possible to accurately distinguish between faults on the ODN and faults on the ONU possibly through the use of internal event correlation and test functions.

58 M Any outstanding new event shall be made available to the EM-OSF following restoration of communications with the NE.

59 M A local craft terminal interface shall only be used for equipment installation.

60 O Any test function which is employed shall accurately report the location of a fault on the ODN.

61 O The NE shall automatically re-configure its internal resources (software) to rectify a fault where possible.

I.4.3.3 Performance management

62 M Once installed, the network equipment shall be monitored to provide information on Network Performance and Service Performance. Measurements shall be based on monitoring network or service parameters. An event shall be sent to the EM-OSF when the monitoring function detects that a threshold for a parameter has been exceeded. Monitoring shall not affect customer traffic.

63 M Performance data shall be generated based on performance parameters that have been configured.

64 M Error-rate performance measurements shall be provided at specific points in the NE.

65 M It shall be possible to activate and deactivate scheduled reporting of current and historical performance data of the network from the EM-OSF. The parameters used for monitoring shall be configured with network defaults and shall be modifiable where applicable. It shall not be possible to modify any parameters once all monitoring criteria are set and monitoring has been activated without first deactivating.

66 M When a monitoring function is activated, it shall be possible to specify a time period over which performance information is to be recorded. The time period shall be configurable.

67 M The transport function in the OLT, ONU/ONT and NT shall monitor the receive and transmit bit-error rates over the corresponding physical layer to determine the transport integrity. Errors above a configured threshold shall be reported to the EM-OSF.

68 M The NE shall suppress all monitoring intervals that have zero counts within any scheduled report that is sent to the EM-OSF.

69 O Performance monitoring shall involve gathering current and historical statistical data relating to 15-minute intervals over a 24-hour period for the purpose of monitoring and correcting the behaviour and effectiveness of the network. This information should also assist network analysis, network planning, capacity management and billing processes.

70 M The EM-OSF shall collect the following performance data:

- OLT and ONU/ONT common equipment performance (e.g., line cards, buffers, CPUs, etc.);
- SDH interface statistics (e.g., LOS, LCD, errored seconds, severely errored seconds, code violations, line errored seconds, line code violations, utilization);
- OAM cells transmitted;
- ATM protocol layer (e.g., cells discarded due to HEC violations, cells discarded due to protocol errors);
- AAL protocol layer (e.g., invalid fields, CRC-32 violations, reassembly timer expiry, sequence violations, buffer under/overflow);
- cells discarded due to UPC/NPC disagreement for each virtual connection;
- SDH, PON and xDSL interface statistics (e.g., LOS, LCD, error second).

I.4.3.4 Accounting management

71 O The NE shall collect usage data at the SNI and UNI for billing purposes.

I.4.3.5 Security management

72 M Where applicable, network equipment shall perform an authentication handshake upon connection to the NE. The authentication handshake is implementation dependent but would include such actions that verify the equipment is of the right type, checking for manufacturer-specific information, compatibility of software and hardware version information, etc. Resources that fail this authentication check shall not be configured or allowed to use network capacity.

73 M The NE shall perform a consistency check of its data upon request from the EM-OSF. This check shall compare the data held in the NE and EM-OSF databases. Inconsistencies shall be reported to the EM-OSF. The NE shall prevent reporting of events from a resource until it has completed the consistency check.

74 M The NE shall not configure any equipment that has been identified as unknown by the integrity check.

I.4.4 Element management layer requirements

I.4.4.1 Configuration management

75 M The EM-OSF shall provide functions to support management of Network Planning and Engineering and Network and Service provision.

76 M It shall be possible to manage all variants of an NE (both new version of the same product and FTTx products from the same range) from a single vendor using the same EM-OSF. The EM-OSF shall also be able to manage NEs from multiple vendors.

77 M The EM-OSF shall be able to create, modify, display and delete the logical representations of the resources required to manage the network and services. All necessary network and service parameters shall be supplied in the appropriate request. Table I.3 shows examples of logical NE resources and Table I.4 shows logical connection resources that shall be held by the EM-OSF.

Table I.3/Q.834.1 – FSAN logical NE resources

Logical resource	Description
OLT	Represents the physical shelf in the exchange
ONU	Represents the physical FTTx cabinet and its inherent functions
Transmission System (TS)	Represents the card(s) which support the Bit Transport functions. There will be a transmission system resource in the OLT and ONU
Transmission Interface (TI)	Represents the ODN interface card(s). There will be a transmission interface resource in the OLT and ONU
SN Interface (SI)	Represents the service specific interface cards to the service node
Customer Interface (CI)	Represents the service specific customer interface cards
Power Supply Unit (PSU)	Represents the Power Supply Unit card(s)
Network Termination (NT)	Represents the physical unit to which customer premises equipment is connected. This resource may only exist for some service types
Management Function (MF)	Represents the card(s) which perform the management functions. This resource will exist on the OLT and may exist on the ONU
Test Function (TF)	Represents the test facility card(s)
Outlets	Represents the physical connectors on the SI, CI and TI
Slots	Represents the physical locations into which cards are inserted. Both OLT and ONU can have slots

Table I.4/Q.834.1 – FSAN logical connection resources

Logical resource	Description
Channels	Represents a subdivision of the service-specific bandwidth provided at a SI or CI outlet
Path	Represents a path from an OLT to an ONU or from an ONU to an NT. Can represent a virtual path
Circuit	Represents a circuit from a SI outlet to an CI or NT outlet. Can represent a virtual circuit

78 M The EM-OSF shall maintain a database containing the logical representations, state and relationship of the resources being managed.

79 M It shall be possible to create the logical resources in the EM-OSF database without the need for equipment to be physically present in the network.

80 M The EM-OSF shall maintain and respond to state and relationship information changes for all resources.

81 M Any management operation which violates a resource relationship or causes an invalid state transition shall not be allowed. An example of this is a request to create an SI before creating an OLT. In all such cases, the request should be rejected with a useful message to the source of the request.

82 M The EM-OSF shall automatically allocate the required resources if they are not identified in the provision request.

83 M If all spare and installed resources are in use, the EM-OSF shall use the next available spare and not installed resources.

84 M If there are no spare resources awaiting installation, then the EM-OSF shall propose a list of the equipment that needs to be installed to allow the request to be fulfilled. The equipment list shall indicate:

- the type of equipment to be installed;
- the location where it is to be installed (rack/shelf/slot, OLT or ONU etc.);
- the software and hardware versions which are compatible with the existing version of installed hardware.

85 M Each equipment list shall be stored in the EM-OSF until an event is received from the NE to indicate that the network equipment has been physically installed and has been correctly authenticated.

86 M It shall be possible to pre-configure equipment prior to its installation by providing the required data when the logical representation is created.

87 M It shall be possible to modify service parameters (such as bit rate, service type, error checking as applicable) for individual UNI(s) or Virtual Paths (VPs).

88 M The EM-OSF shall support download of configuration information when equipment is installed. Where multi-service equipment is used, it shall be possible to download service-specific software.

89 M It shall be possible to change the UNI or SNI of a path to use spare resources, thus enabling the path to be re-configured.

90 M A new network or service provision request shall not affect service to other customers on the network.

91 M All resource state information shall be consistent with the visual indications and state of the NE.

92 M A capacity management function shall be provided by the EM-OSF to monitor NE usage. The rate of take-up of network resources shall be monitored by the EM-OSF. This function shall provide the information listed below to assist with network planning:

- the network equipment that is in use;
- the network equipment that is spare;
- the network equipment that is faulty;
- the amount of PON bandwidth that is in use for permanently configured paths;
- the amount of PON bandwidth that is spare for permanently configured paths;
- the location of network equipment;
- the types of service that can be supported by the spare bandwidth.

93 M The EM-OSF shall determine the increase or decrease in capacity based on the equipment installation event report from the NE. The inventory information in this event report shall be recorded in the EM-OSF database. This information shall only be deleted when the logical resource has been marked for removal and the equipment is physically removed from the network.

94 M The capacity management function shall take account of any modification to the network or service which creates new capacity, releases capacity, or uses spare capacity. The impact of planning and rearrangement of the network shall also be evaluated by this function.

95 M All requests to create, modify and delete network resources shall be logged. Each request shall be recorded with the identity of the source that originated the request and the date of the request.

96 M The EM-OSF shall provide functions for storage, backup, restoration and maintenance of NE configuration, connectivity and service-related information.

97 M Restoration of network element information from storage media shall be accomplished through software download from the EM-OSF to the NE via the data communications network.

98 M The monitoring function shall allow a user or NM-OSF to set/modify capacity thresholds. An event shall be generated to the user or NM-OSF when a capacity threshold is exceeded. The threshold exceeded event shall remain visible to the user or NM-OSF until it is acknowledged.

I.4.4.2 Fault management

99 M The EM-OSF shall provide network surveillance and network testing functions to support network maintenance.

100 M Detection of a fault, through network surveillance or network testing, which is affecting service shall cause the related equipment to be placed in an unavailable state for provisioning purposes.

101 M It shall be possible to block and unblock resources which provide service to allow equipment to be maintained. Whilst a resource is blocked for maintenance purposes it shall not be possible to use the service supported by that resource. The event report shall use the format described in [I-13].

102 M The EM-OSF shall be capable of reporting the following categories of faults to the NM-OSF:

- faults on the network equipment;
- faults on interfaces;
- environmental conditions within the network element where applicable.

103 M Fault reports shall accurately indicate the cause, severity, time and location of conditions detected by the network down to specific replaceable equipment.

104 M Fault information shall be presented to the user in a human-readable and easy-to-understand format.

105 M The EM-OSF shall allow a user or NM-OSF to acknowledge and mark outstanding faults as cleared where this is not detected automatically.

106 M It shall be possible to invoke self-tests on specific network equipment from the EM-OSF.

107 O It shall be possible to verify the correct configuration of a service by requesting a connection test from the EM-OSF to the NE.

108 M Where there is an occurrence of a large number of faults, the EM-OSF shall analyse and correlate the faults within its domain to determine the underlying cause of the problem. This should result in the escalation of one fault report with an appropriate repair action to a user or NM-OSF.

109 M It shall be possible to set and modify service-specific failure thresholds. A fault shall be reported to the specified users or NM-OSF when a threshold is exceeded.

110 M The EM-OSF is required to use all available information (such as known network faults and performance data) to support proactive fault location and hence reduce the need for the use of test functions.

111 M All fault reports shall be logged.

112 M The EM-OSF shall accept and act on requests to permit/inhibit fault reports from the NM-OSF.

113 M It shall be possible to apply test loops to the NE manually on a demand basis during fault diagnosis, or automatically as part of background test routines to aid proactive fault location. It shall be possible to activate/deactivate a bit error rate test source in the NE to check for errors on the path between the loops.

114 O The EM-OSF shall take account of the impact on network capacity as a result of automatic reconfiguration performed by the NE to rectify a fault. It shall be possible to manually invoke this capability from the EM-OSF.

I.4.4.3 Performance management

115 M It shall be possible to activate and deactivate the performance monitoring functions from the EM-OSF. When a monitoring function is activated, it shall be possible to specify a time period over which performance information is to be recorded. The time period shall be configurable.

116 M Certain performance monitoring data shall be collected automatically to support the generation of Quality of Service (QoS) information. The management system shall provide QoS information for each of the ATM Constant Bit Rate (CBR), Variable Bit Rate (VBR) and Available Bit Rate (ABR) class of service supported by the network. This information shall include cells discarded, CLP=0 cells discarded, cells successfully passed and CLP=0 cells successfully passed.

117 O Performance management shall involve gathering statistical data for the purpose of monitoring and correcting the behaviour and effectiveness of the network. This information should also assist network analysis, network planning, capacity management and billing processes.

118 M The EM-OSF shall provide performance data on demand via the user interface, or shall generate performance reports periodically as reports according to a pre-established schedule.

I.4.4.4 Accounting management

119 O The EM-OSF shall provide the capability to collect data on the use of the access network which will be used to determine access network usage charges. This data will be provided by the NE.

I.4.4.5 Security management

120 M It shall be possible to request an integrity check of data held by the NE with the data held by the EM-OSF.

I.4.5 Network management layer requirements

I.4.5.1 Configuration management

121 M The NM-OSF shall be able to create, modify, display and delete logical resources and paths for end-to-end network and service provision. All necessary parameters shall be supplied in the appropriate request.

122 M The NM-OSF shall maintain a database containing the logical representations, state and relationship of the NML resources being managed.

123 M It shall be possible to create the logical resources in the NM-OSF database without the need for the EM-OSF to be present.

124 M The NM-OSF shall maintain and respond to state and relationship information changes for all NML resources.

125 O The NM-OSF shall partition logical and physical inventory data by service domains.

126 M It shall be possible to access the management facilities on the EM-OSF via a remote login facility on the NM-OSF.

127 M The NM-OSF user shall receive an indication on the success or failure of all create, modify, delete or display operations.

I.4.5.2 Fault management

128 M The NM-OSF shall correlate faults from a number of EM-OSF domains to determine the actual location of a network problem.

129 M The NM-OSF shall parse and filter all faults received from an EM-OSF based on service criteria.

130 M It shall be possible to acknowledge and/or clear a fault received by the NM-OSF via the user interface.

131 O A facility shall be provided to monitor faults that have not been acknowledged by a user. An alert shall be raised for any fault which has not been dealt with within a configured time.

132 M The NM-OSF shall maintain a mapping of all faults which have been received and which have not been cleared. This requirement should contain a list of services impacted.

133 M It shall be possible for a NM-OSF to permit/inhibit fault reports to/from an EM-OSF.

I.4.5.3 Performance management

134 M The NM-OSF shall provide end-to-end network performance reports based on the performance information collected by the EM-OSFs.

I.4.5.4 Accounting management

135 I This area is for further study.

I.4.5.5 Security management

136 I This area is for further study.

I.5 Data communications network

137 I The Data Communications Network (DCN) which conveys the management information between the operations functions is a key component of the management architecture.

138 I The DCN between the NE and the EM-OSF must take into account traffic volumes, security and the geographically dispersed nature of the physical resources being managed.

139 M The DCN between the NE and EM-OSF shall be based on IP or ITU-T Rec. X.25.

140 M The NMS shall periodically check the communication to the EMS. The EMS shall periodically check the communication to the FSAN NE.

I.6 Element management platform

141 I This clause defines the requirements of the system platform on which an EM-OSF will reside and execute.

I.6.1 Operating system

142 M The operating system shall be based on supported versions of UNIX or Windows NT.

I.6.2 Availability

143 I Non-availability shall be considered as loss of any part of the functionality of the system platform for whatever reason.

144 M The system platform should have an availability of over 99.9% of planned operation time.

I.6.3 Portability

145 M The management software shall be portable from one supported version of an operating system to a new version of the same operating system on the same or higher specification system platform. It shall be possible to port management software across the last 4 versions of an operating system.

I.6.4 Scalability

146 M The management software should be designed so that it can be economically provisioned in small to large deployments. For example, to increase management capacity it would only be necessary to increase hard disk capacity and/or provide additional memory.

147 M For a fibre-to-the-home architecture, the system platform should be dimensioned to be capable of managing a minimum of 50 OLTs and the maximum number of subtending ONTs as specified in the architecture section in the FSAN specification [I-2]. For a fibre-to-the-building/office/curb architecture, the system platform should be dimensioned to be capable of managing a minimum of 100 OLTs including the maximum number of subtending ONUs and NTs.

I.6.5 Maintainability

148 M The system platform shall provide administration functions which facilitate effective and efficient system maintenance such as back up and restoration of data, simple upgrade procedures, simple installation procedures, simple recovery procedures, etc.

I.6.6 Performance

149 M Typical system platform response times shall be as follows:

- less than 3 minutes for system startup (for warm restart of a configured system);
- less than 1 minute for user log-in.

150 M Typical application response times shall be as follows:

- less than 2 seconds between sending a command and confirmation of receipt of the command;

– execution of a command within 6 seconds of receipt.

151 I NOTE – The above times do not take account of delays due to the DCN.

I.6.7 Migration strategy

152 M The supplier shall provide a migration strategy if there is a need to move to a different platform or software application during the life of the product. This specifically covers the rebuilding of network data from an existing database to a new database. This capability shall remove the need for re-entering network data that has already been entered.

I.6.8 Overload

153 M Overload conditions shall not cause the complete failure of the system platform to function. Overload shall only result in a graceful degradation of the system platform performance.

I.6.9 Evolution/Upgrade

154 M System platform hardware and software upgrades and evolution shall not impact quality of service to customers.

155 M Any system platform software and hardware upgrades should support "backwards compatibility".

156 M It shall be possible to roll-back gracefully to the former software version under manual control if a problem occurs during system platform upgrade.

157 M The system platform shall provide a software download function to upgrade software in the NE.

I.6.10 User interface requirements

158 M It shall be possible to access the management functions on the system platform from remote locations. Access to management functions shall be form-based or icon-based as appropriate to the facility and shall be supported via a Graphical User Interface (GUI) or from a Hypertext Mark-up Language (HTML)-based World Wide Web (WWW) interface.

159 M The system platform shall allow configuration of different user profiles. It shall be only be possible to create/display/modify/delete user profiles from a privileged user profile. This facility shall allow the privileged user to set/modify the user identification, password, access rights to applications and data, password expiry and number of attempts to enter a password.

160 M The interface between the system platform and the user shall be designed in a manner that allows reusability across different OSFs from the same vendor.

161 M The interface between the system platform and the user shall support hierarchical advancement displays. An example would be to display the network as an icon; by clicking on this icon the user is presented with more icons that provide details of the components in the network (e.g., OLTs and ONU/ONTs). Selection of the OLT or ONU/ONT would show the details of the cards. This type of view will also be needed for the VPs and VCs (e.g., list all VCs associated with a VP or list all VPs which are associated with a given service).

162 M System administration functions shall be executable from a workstation/terminal connected directly to the management system platform.

163 M It shall be possible to copy information from one window to another on the system platform to reduce operator retyping.

164 M The system platform should provide acknowledgement that user commands have been completed. A suitable indication shall show that a command is being processed when this means further entry to the system cannot take place until its completion.

I.6.11 DCN interface requirements

165 M The system platform shall provide interfaces to either an IP or X.25 networks for communications with the NE. In addition, the system platform shall provide an alternative to IP and X.25 where these networks do not exist.

I.7 Fault and performance management of the transmission medium

166 M The following functions shall be provided for maintenance of the transmission medium (passive optical network and copper drop medium):

- monitoring of transport integrity;
- detection and reporting of defects and failures;
- protection switching;
- location of faults using test systems;
- ability to run diagnostics;
- automatic restoration;
- test access.

I.7.1 Passive Optical Network

167 M The transport function in the OLT and ONU/ONT shall monitor the bit error rates at the source and sink of the PON to determine the transport integrity. Errors above a configured threshold shall be reported to the management system.

168 M Detection of failures in the received signal at the OLT or ONU/ONT shall cause the OLT to report the fault to the management system. If the failure is detected by the OLT, an immediate switch shall be performed to a standby PON if one is available. A failure on the received signal at the ONU shall cause the ONU to switch off until communication between OLT and ONU/ONT can be re-established.

169 M Protection switching capability shall be available at the OLT to switch between a main and standby PON.

170 M The management system is required to distinguish between faults on the PON or ONU/ONT.

171 O Any test function which is employed shall accurately report the location of a fault on the PON.

172 M The network shall support the five OAM hierarchical levels associated with the physical and ATM layers of the B-ISDN protocol reference model as described in ITU-T Rec. I.610 [I-12].

173 M The physical layer transmission system shall support the F1, F2 and F3 flows and their associated OAM functions (see Table I.5). These flows shall be carried in maintenance cells at the physical layer which conforms to the cell format described in ITU-T Rec. I.432 [I-13].

Table I.5/Q.834.1 – Physical layer OAM flows

Flow	Functions
F1	Signal detection and frame alignment (e.g., Loss of signal or frame, laser switch-off)
F2/F3	Error monitoring, automatic protection switching, cell slot allocation and ranging error monitoring

174 M The ATM Layer shall support the F4 and F5 OAM flows (see Table I.6).

Table I.6/Q.834.1 – ATM layer OAM flows

Flow	Functions
F4	Fault and performance monitoring information on virtual path connections
F5	Fault and performance monitoring information on virtual channel connections

175 M It shall be possible to configure segment AIS/RDI for F4 and F5 flows. In addition, it shall be possible to enable and disable the emission of AIS/RDI in the F4 and F5 flows. The AIS/RDI message shall report the conditions described in Table I.7.

Table I.7/Q.834.1 – F4 and F5 OAM conditions

Function	Description	Direction ONU/ONT OLT
Alarm Indication Signal (AIS)	All 1's bit pattern. Reported by the end that has lost its received signal. Sent as VP-AIS/VC-AIS at ATM layer.	←→
Remote Defect Indication (RDI)	Indicates that the remote end has detected loss of signal or AIS. Sent as VP-RDI/VC-RDI at ATM layer.	←→

Figure I.5 shows examples of OAM flows and is not all inclusive of possible flows. Where the service node is owned by a different operator, cooperation is required on F5 to the service node. All OAM flows across the T reference point will need to be allowed where the TE is managed as part of the access network.

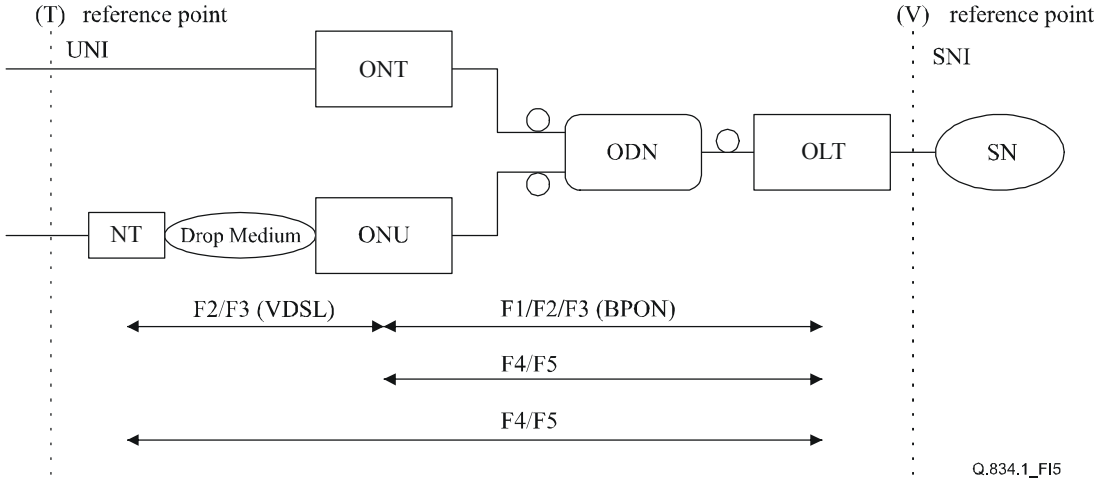


Figure I.5/Q.834.1 – FSAN OAM flows

I.7.2 Drop medium between ONU and NT

176 I VDSL modem technology on existing copper facilities would be a typical application.

177 M Table I.8 lists the required OAM functions for the VDSL interface which will be used on the copper drop medium. It shall be possible to activate/deactivate these functions depending on the needs of the service being delivered to the customer.

Table I.8/Q.834.1 – List of OAM functions to be supported by VDSL

Function	Description	Direction NT ONU
Loss of signal	Indicates no recognized signal at receiver	←→
Loss of sync	Indicates loss of synchronization clock	←→
Reset control	Allows NT to be reset	←
Error detection (Far/Near end)	Detection of error rates in transmit and received signals	←→
Error reporting (Far/Near end)	Reporting of the errors detected to an OS or locally (e.g., LED)	←→
Loopback control	Allows loops to be set up at NT or ONU	←
Number of far/near end block error corrections	Indication of number of block errors for performance purposes	←→
Dying Gasp	Indicates impending loss of power	→
Error correction switch on/off mechanism	Ability to switch error correction mechanisms on or off depending on whether it is needed or not	←
Channel quality (Signal-to-Noise margin)	Comparison of incoming signal with configured value to estimate channel quality. Can be used also for proactive maintenance	→
Data integrity check	The NT shall have the capability to notify the management system when it receives invalid data	→
NT Loopback capabilities	The NT shall be capable to support the I.610 ATM layer loopback capabilities	←→
F1, F2, F3, F4 and F5	The VDSL should support the F1 to F5 information flows	←→
NT configuration	Ability to modify bit rates and other configurations in the NT	←
Activation/deactivation	Ability to set NT in sleep mode to reduce power consumption when there is no activity	←→

I.8 References

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[I-8] ITU-T Recommendation X.710 (1997) | ISO/IEC 9595:1998, *Information technology – Open Systems Interconnection – Common Management Information service*.

[I-9] ITU-T Recommendation X.711 | ISO/IEC 9596-1:1998, *Information technology – Open Systems Interconnection – Common Management Information Protocol: Specification*.

[I-10] Service Requirements – Minutes of FSAN SCP Working Group.

[I-11] SCP directory, BellSouth FSAN server November 1997, Draft 1.

[I-12] ITU-T Recommendation I.610 (1999), *B-ISDN operation and maintenance principles and functions*.

[I-13] ITU-T Recommendation I.432.x (1999), *B-ISDN User-network interface – Physical layer specification*.

[I-14] ITU-T Recommendation M.3013 (2000), *Considerations for a telecommunications management network.*

Appendix II

Tables of managed entities

II.1 NE view

Table II.1/Q.834.1 – Usage of managed entities name (NE View)

Managed entity name in this Recommendation	Related managed object name in other ITU-T Recommendations	Ref.
AAL1PMCurrentDataF	AALProtocolCurrentData (Q.824.6)	AF20
AAL1PMHistoryDataF	AALProtocolHistoryData (Q.824.6)	AF20
AAL1ProfileF	AALProfile (Q.824.6)	AF20
AAL2PMCurrentDataF		new
AAL2PMHistoryDataF		new
AAL2ProfileF		new
AAL2PVCProfileF		new
AAL5PMCurrentDataF	AALProtocolCurrentData (Q.824.6)	AF20
AAL5PMHistoryDataF	AALProtocolHistoryData (Q.824.6)	AF20
AAL5ProfileF	AALProfile (Q.824.6)	AF20
adslCTPF		new
adslTTPF		new
alarmLogRecordF	alarmRecord (X.721)	AF20
alarmSeverityAssignmentProfileF	alarmSeverityAssignmentProfile (M.3100)	AF20
APONCTP		new
APONStaticBW		new
APONPMCurrentData		new
APONPMHistoryData		new
APONTTP		new

Table II.1/Q.834.1 – Usage of managed entities name (NE View)

Managed entity name in this Recommendation	Related managed object name in other ITU-T Recommendations	Ref.
ATMCrossConnectionControlF	atmFabric (I.751)	AF20
ATMCrossConnectionF	atmCrossConnection (I.751)	AF20
ATMNetworkAccessProfileF		new
ATMTrafficLoadCurrentDataF	atmTrafficLoadCurrentData (I.751)	AF20
ATMTrafficLoadHistoryDataF	atmTrafficLoadHistoryData (I.751)	AF20
attributeValueChangeRecordF	AttributeValueChangeRecord (X.721)	AF20
au3CTPF	au3CTP (G.774)	
au4CTPF	au4CTP (G.774)	
BICIF	InterNNI (I.751)	AF20
BISSIF	IntraNNI (I.751)	AF20
bridgedLANServiceProfileF		new
cellBasedCTPF		new
cellBasedTTPF		new
CESServiceProfileF		AF20
CTPF		new
DS1CTPF		new
DS1PMCurrentDataF		new
DS1PMHistoryDataF		new
DS1TTPF		new
DS3CTPF		new
DS3PMCurrentDataF		new
DS3PMHistoryDataF		new
DS3TTPF		new
E1CTPF		new
E1PMCurrentDataF		new
E1PMHistoryDataF		new
E1TTPF		new
E3CTPF		new
E3PMCurrentDataF		new
E3PMHistoryDataF		new
E3TTPF		new
equipmentHolderF	equipmentHolder (M.3100)	AF20
EthernetCTPF		new
EthernetPMCurrentDataF		new
EthernetPMHistoryDataF		new
EthernetProfileF		new
EthernetTTPF		new

Table II.1/Q.834.1 – Usage of managed entities name (NE View)

Managed entity name in this Recommendation	Related managed object name in other ITU-T Recommendations	Ref.
filterProfileF		new
LESServiceProfileF		new
logF	log (X.721)	AF20
MACBridgeConfigurationDataF		new
MACBridgeF		new
MACBridgePMCurrentDataF		new
MACBridgePMHistoryDataF		new
MACBridgePortConfigurationDataF		new
MACBridgePortPMCurrentDataF		new
MACBridgePortPMHistoryDataF		new
MACBridgeServiceProfileF		new
managedEntityCreationLogRecordF	objectCreationRecord (X.721)	AF20
managedEntityDeletionLogRecordF	objectDeletionRecord (X.721)	AF20
MLTTestResultsF		new
msCTPF	msCTP (G.774)	
msTTPF	msTTP (G.774)	
NEFSAN		new
NT	equipmentR1 (M.3100)	
OLT	managedElementR1 (M.3100)	
ONT	managedElementR1 (M.3100)	
ONU	managedElementR1 (M.3100)	
PhysicalPathTPF		AF20
pluginUnitF	cirquitPack (M.3100)	AF20
rsCTPF	rsCTP (G.774)	
rsTTPF	rsTTP (G.774)	
softwareF	softwareR1 (M.3100)	AF20
SSCSParameterProfile1F	SSCSParameterProfile1 (I.366.1)	
SSCSParameterProfile2F	SSCSParameterProfile2 (I.366.2)	
tcAdaptorF	tcAdaptorTTP (I.751)	AF20
thresholdDataF	thresholdData (Q.822)	AF20
trafficDescriptorProfileF		AF20
TTPF		new
uniF	uni (I.751)	AF20
uniInfoF		new
upcNpcDisagreementPMCurrentDataF	upcNpcCurrentData (I.751)	AF20
upcNpcDisagreementPMHistoryDataF	upcNpcHistoryData (I.751)	AF20
vc3TTPF	vc3TTP (G.774)	

Table II.1/Q.834.1 – Usage of managed entities name (NE View)

Managed entity name in this Recommendation	Related managed object name in other ITU-T Recommendations	Ref.
vc4TTPF	vc4TTP (G.774)	
vcCTPF	vcCTP (I.751)	AF20
vcTTPF	vcTTP (I.751)	
vdslCTPF		new
vdslTTPF		new
VoiceCTPF		new
VoicePMCurrentDataF		new
VoicePMHistoryDataF		new
VoiceServiceProfileAAL1F		new
VoiceServiceProfileAAL2F		new
VoiceTTPF		new
vpCTPF	vpCTP (I.751)	AF20
vpTTPF	vpTTP (I.751)	
vpvcPMCurrentDataF	vpvcPMCurrentData (I.751)	
vpvcPMHistoryDataF	vpvcPMHistoryData (I.751)	
Ref. References other than ITU-T Recommendations: AF-NM-0020.001 new Newly defined		

II.2 Network view

Table II.2/Q.834.1 – Usage of managed entities name (Network View)

Managed entity name in ITU-T Rec. Q.834.2	Related managed object in other ITU-T Recommendations	Ref.
accessGroupF	AccessGroup (M3100amd)	
adslLayerNetworkDomainF		new
adslLinkConnectionF		new
adslSubnetworkF		new
adslTopologicalLinkEndF		new
adslTopologicalLinkF		new
APONLayerNetworkDomain		new
APONLink		new
APONLinkConnection		new
APONSubNetwork		new
APONTrail		new
BridgedLANLayerNetworkDomainF		new
BridgedLANNetworkCTPF		new
BridgedLANNetworkTTPF		new

Table II.2/Q.834.1 – Usage of managed entities name (Network View)

Managed entity name in ITU-T Rec. Q.834.2	Related managed object in other ITU-T Recommendations	Ref.
BridgedLANSubnetworkF		new
DS1LayerNetworkDomainF		new
DS1SubnetworkConnectionF		new
DS1SubnetworkF		new
DS3LayerNetworkDomainF		new
DS3SubnetworkConnectionF		new
DS3SubnetworkF		new
E1LayerNetworkDomainF		new
E1SubnetworkConnectionF		new
E1SubnetworkF		new
E3LayerNetworkDomainF		new
E3SubnetworkConnectionF		new
E3SubnetworkF		new
layerNetworkDomainF	LayerNetworkDomain (M3100amd)	AF58
linkConnectionF	LinkConnection (M3100amd)	AF58
logicalLinkEndF	LogicalLinkEnd (M3100amd)	
logicalLinkF	LogicalLink (M3100amd)	
logicalMTPLinkF		new
tworkF	networkR1 (M.3100)	AF58
subnetworkConnectionF	SubnetworkConnection (M3100amd)	AF58
subnetworkF	Subnetwork (M3100amd)	AF58
topologicalLinkEndF	TopologicalLinkEnd (M.3100amd)	AF58
topologicalLinkF	TopologicalLink (M.3100amd)	AF58
trailF	TrailR2 (M.3100amd)	AF58
vcLayerNetworkDomainF	LayerNetworkDomain (M.3100amd)	AF58
vcLinkConnectionF	LinkConnection (M.3100amd)	AF58
vcLogicalLinkF	LogicalLink (M3100amd)	
vcSubnetworkConnectionF	SubnetworkConnection (M.3100amd)	AF58
vcSubnetworkF	Subnetwork (M.3100amd)	AF58
vcTopologicalLinkEndF	TopologicalLinkEnd (M.3100amd)	AF58
vcTopologicalLinkF	TopologicalLink (M.3100amd)	AF58
vcTrailF	TrailR2 (M.3100amd)	AF58
vdslLayerNetworkDomainF		new
vdslLinkConnectionF		new
vdslSubnetworkF		new
vdslTopologicalLinkEndF		new
vdslTopologicalLinkF		new

Table II.2/Q.834.1 – Usage of managed entities name (Network View)

Managed entity name in ITU-T Rec. Q.834.2	Related managed object in other ITU-T Recommendations	Ref.
voiceLayerNetworkDomainF		new
voiceSubnetworkConnectionF		new
voiceSubnetworkF		new
vpLayerNetworkDomainF	LayerNetworkDomain (M100amd)	AF58
vpLinkConnectionF	LinkConnection (M.3100amd)	AF58
vpLogicalLinkF	LogicalLink (M3100amd)	
vpSubnetworkConnectionF	SubnetworkConnection (M.3100amd)	AF58
vpSubnetworkF	Subnetwork (M.3100amd)	AF58
vpTopologicalLinkEndF	TopologicalLinkEnd (M.3100amd)	AF58
vpTopologicalLinkF	TopologicalLink (M.3100amd)	AF58
vpTrailF	TrailR2 (M.3100amd)	AF58
Ref References other than ITU-T Recommendations: AF-NM-0058.001 new Newly defined		

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