INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.834.1
(04/2001)

SERIES Q: SWITCHING AND SIGNALLING

Q3 interface

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

ITU-T Recommendation Q.834.1

ITU-T Q-SERIES RECOMMENDATIONS

SWITCHING AND SIGNALLING

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 element view

Summary

This Recommendation defines the managed entities that are required to support the requirements for the management of ATM-PON (Passive Optical Network). These definitions are to be used to develop a protocol-neutral information model. A network element 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.

FOREWORD

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ITU-T Recommendation Q.834.1

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

1 Scope

This Recommendation specifies an information of ATM-PON system at a Q interface at a reference point beyond an element management layer [1]. This Q interface is defined as the network element view.

This Recommendation provides 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.

2.1 Normative references

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

[2]   ITU-T G.983.1 (1998), *Broadband optical access systems based on Passive Optical Networks (PON)*.

[3]   ITU-T G.983.2 (2000), *ONT management and control interface specification for ATM PON*.

2.2 Other references

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

3 Definitions

This Recommendation defines the following terms:

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
ADSL	Asymmetrical Digital Subscriber Line
AN	Access Network
APON	ATM-PON
ATM	Asynchronous Transfer Mode
BICI	Broadband Inter-Carrier Interface
BISSI	Broadband Inter-Switching System Interface
CCITT	Consultative Committee for International Telephone and Telegraph
CES	Circuit Emulation Service
CMIP	Common Management Information Protocol
CORBA	Common Object Request Broker Architecture
CTP	Connection Termination Point
DCN	Data Communications Network
DSx	Digital Signal x (x: number)
EM	Element Management
EML	Element Management Layer
EMS	Element Management System
ETSI	European Telecommunications Standards Institute
FSAN	Full Service Access Network
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
LBLID	Loop Back Location Identifier
ME	Managed Entity
MIB	Management Information Base
NE	Network Element
NEL	Network Element Layer
NM	Network Management
NML	Network Management Layer
NMS	Network Management System
NT	Network Termination
OAM	Operations, Administration and Maintenance
OAN	Optical Access Network
ODN	Optical Distribution Network

OLT	Optical Line Terminal
OMG	Object Management Group
ONT	Optical Network Terminal
ONU	Optical Network Unit
OSF	Operations System Function
PDH	Plesiochronous Digital Hierarchy
PM	Performance Management
PON	Passive Optical Network
PVC	Permanent Virtual Circuit
QoS	Quality of Service
SCP	Service Capability and Performance
SDH	Synchronous Digital Hierarchy
SM	Service Management
SML	Service Management Layer
SN	Service Node
SNC	SubNetwork Connection
SNI	Service Node Interface
SNMP	Simple Network Management Protocol
TBD	To Be Determined
TMN	Telecommunication Management Network
TP	Termination Point
TTP	Trail Termination Point
UML	Unified Modelling Language
UNI	User-Network Interface
VC	Virtual Channel
VCC	Virtual Channel Connection
VCI	Virtual Channel Identifier
VCL	Virtual Channel Link
VDSL	Very high speed Digital Subscriber Line
VP	Virtual Path
VPC	Virtual Path Connection
VPI	Virtual Path Identifier
VPL	Virtual Path Link

5 General overview

5.1 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 by means of managing OLT through the Q interface. FSAN network elements include OLT, ODN, ONU, NT and ONT [2] 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 [3].

The FSAN Element Management System (FSAN EMS) consists of E-OSF and includes a little N-OSF and S-OSF [1] and manages both FSAN network element shown in Figure 2. The Q interface specifies the network element view. This interface is called IF1 in the FSAN operations requirements in Appendix I.
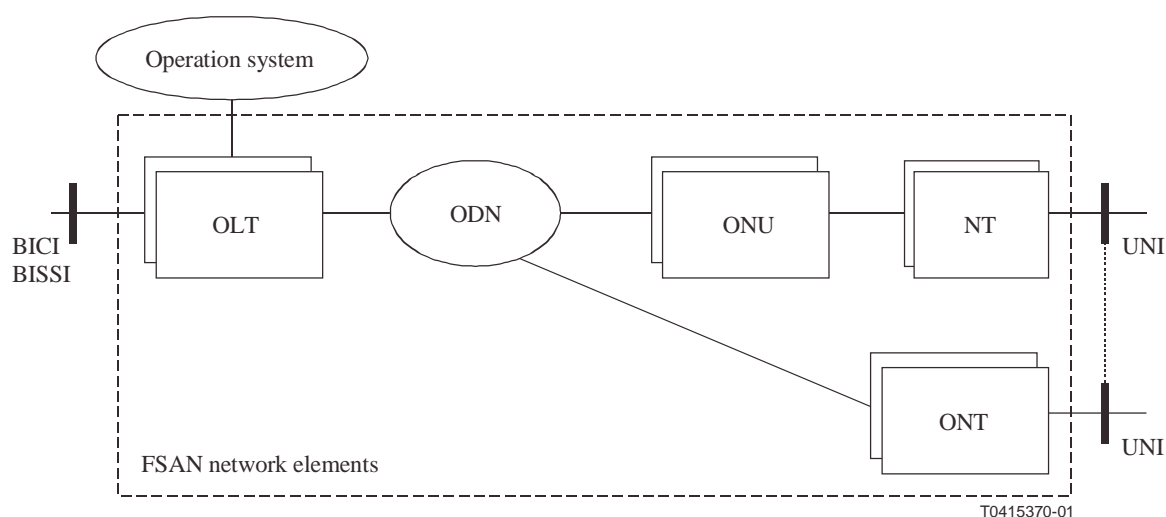
Figure 1/Q.834.1 − FSAN network elements
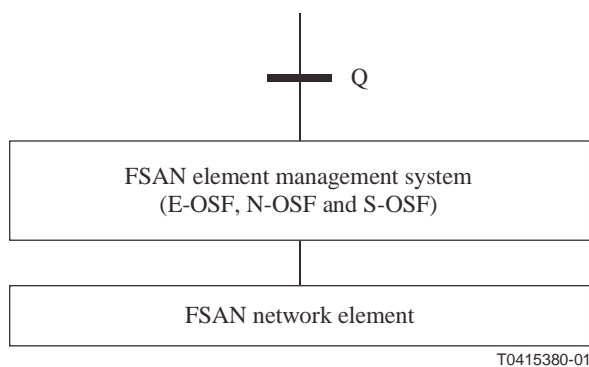
Figure 2/Q.834.1 − Target interface of operations architecture

5.2 Approach to information modelling

We have taken a black box approach on the two ends of the interface in order to make progress. The assumption of the approach is that as long as the model indicates the objects and attributes, albeit at a high level, it should be possible to arrive at a common specification of the Q interface.

6 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.

6.1 Related requirements

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

6.1.1 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)

6.1.2   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. (24M)

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 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 a NM-OSF to permit/inhibit fault reports to/from an FSAN EMS. (133 M)

6.1.3   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)

6.1.4   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)

6.2 Fault processing

Figure 3 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. So, 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.

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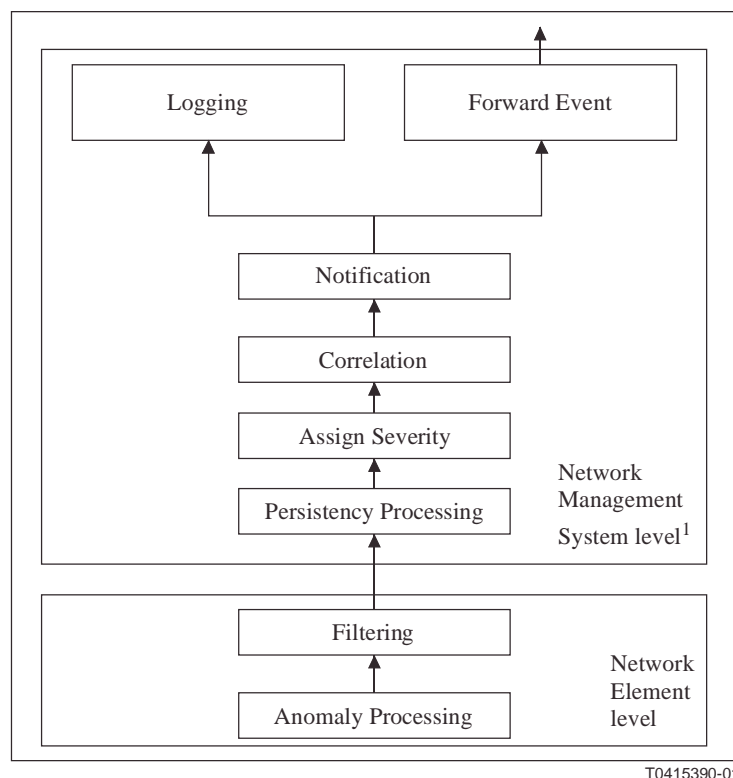
[1] This does not imply that any implementation part of the network management functionality may not be realized within the network element.

Figure 3/Q.834.1 – Fault processing sequence

6.3 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 4, 5 and 6.
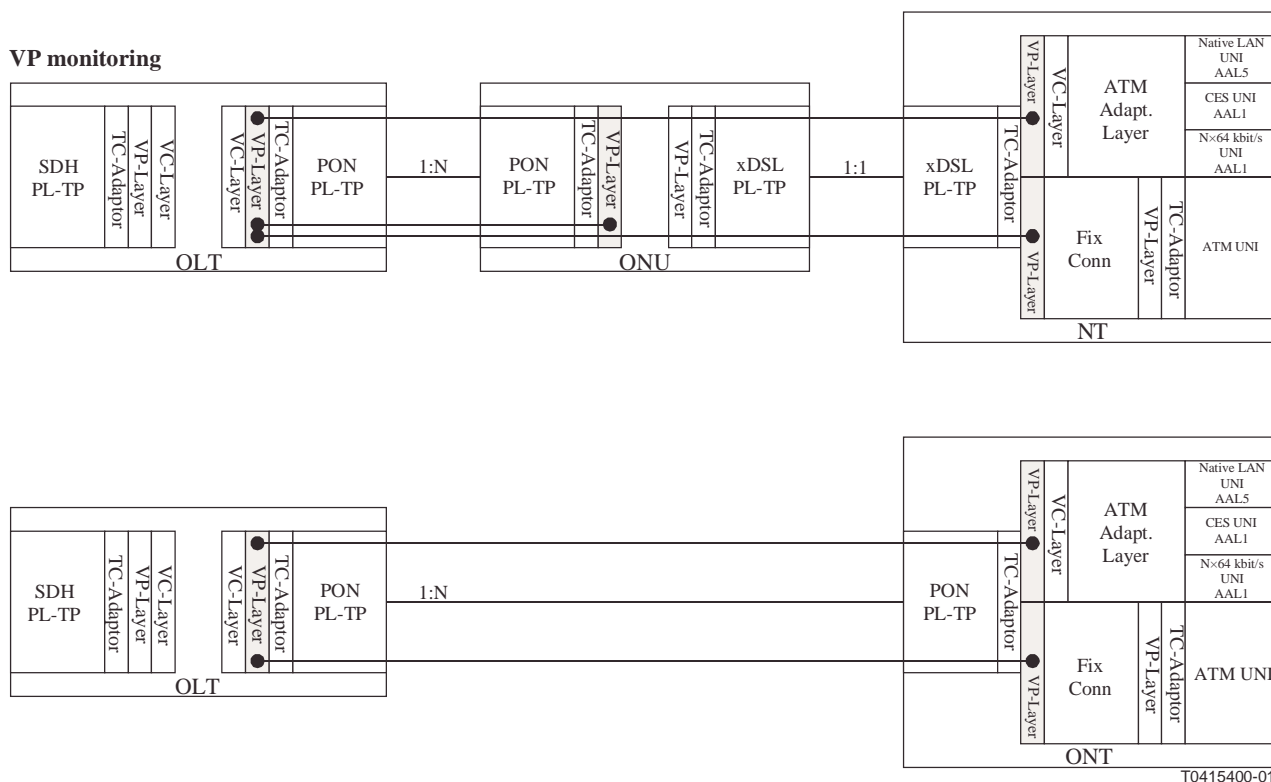
Figure 4/Q.834.1 – Performance monitoring on VP Layer
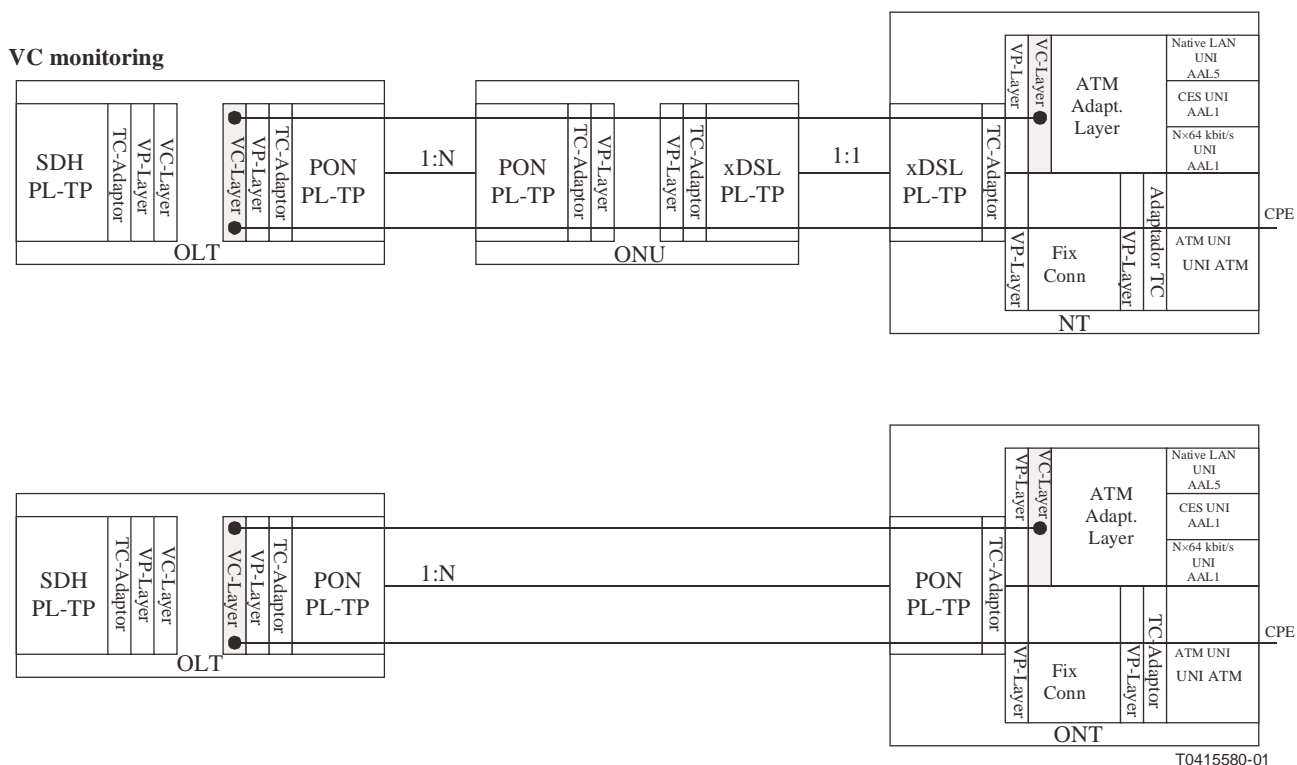
Figure 5/Q.834.1 – Performance monitoring on VC Layer
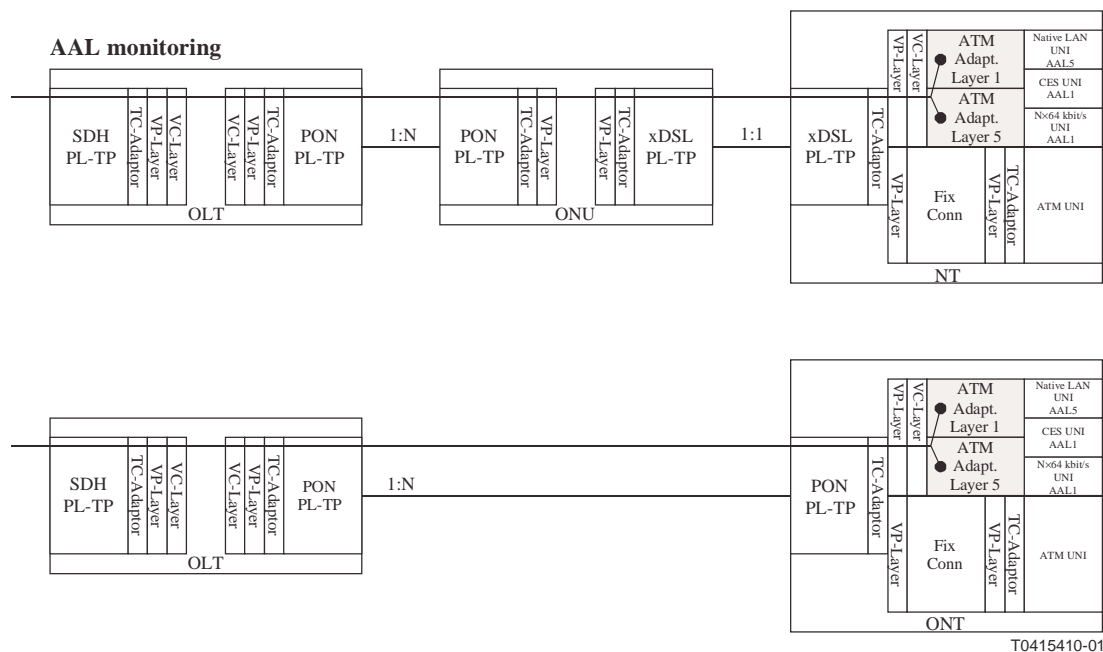
Figure 6/Q.834.1 – Performance monitoring on AAL

Performance monitoring is a function to produce user or service depending information to indicate the state of connections for maintenance. For Performance Monitoring will be considered the source of connection/link and the sink of connection/link. 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 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 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	
	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	

Table 1/Q.834.1 – Performance Parameters

Monitoring Group	Descriptions	Network element	Attribute	Managed entity
ATM Adaptation Layer 5 (AAL5)	Sum-of-errors count for invalid Convergence Sublayer (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
	Number of CRC violations that were detected for the incoming SAR PDUs.	OLT/ONT	CRC Violation	Monitoring Period 15 min/24 h
	Count of reassembly timer expirations. A negative value indicates that this attribute is not supported.	OLT/ONT	Reassembly Timer Expirations	
Traffic Measurement	Counter 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/I.751)
	Counter 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	Monitoring Period 15 min/24 h
	Counter 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	

Table 1/Q.834.1 – Performance Parameters

Monitoring Group	Descriptions	Network element	Attribute	Managed entity
ATM Layer VP/VC Performance Management	Counter for incoming user information cells processed on the termination point being monitored.	OLT/ONU/ ONT/NT	User cells	vpVcPMCurrentDatavpVcPMHistoryData (7.2.24/I.751)
	Counter of detected lost cells.	OLT/ONU/ ONT/NT	Lost cells	
	Counter 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	Monitoring Period 15 min/24 h
	Counter of detected lost cells.	OLT/ONU/ ONT/NT	Far-end Lost cells	
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 G.826)
	Number of Severely Errored Seconds encountered by a DS1/E1/J1 interface in the current 15-minute interval.	OLT/ONT	Severely Errored Seconds	Monitoring Period 15 min/24 h
	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	

7 Managed Entities

This clause describes the managed entities that are visible across IF1. 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 [4]. New specific classes are so indicated.

7.1 AAL1PMCurrentDataF

This managed entity contains the current performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR) Level and Convergence Sublayer (CS) protocol monitoring.

The FSAN NE creates instances of this managed entity automatically whenever an instance of an interworking vcCTPF managed entity is created that represents AAL1 functions. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

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

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing AAL1PMHistoryDataF managed entity creation when the current interval terminates with "all-zeros" performance measurements.

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: Counts of the number of times that the reassembly buffer underflows.

BufferOverflows: Counts 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 one instance of this managed entity shall exist for each instance of an interworking vcCTPF managed entity that represents AAL1 functions.

7.2 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 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 vcCTPF representing the AAL1 functions.

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: Counts of the number of times that the reassembly buffer underflows.

BufferOverflows: Counts 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.

7.3 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 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.

7.4   AAL2PMCurrentDataF

This is a managed entity that contains the current 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 reporting or NMS at the associated interworking vcCTP managed entity. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

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

InterworkingVCCTPPtr: This attribute identifies the associated vcCTPF representing the AAL2 functions.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing AAL2PMHistoryDataF managed entity creation when the current interval terminates with "all-zeros " performance measurements.

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 field.

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

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 field.

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

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

7.5 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.

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 field.

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

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 field.

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

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.

7.6   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.

7.7   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 Inter-Working 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.

7.8   AAL5PMCurrentDataF

This managed entity contains the current performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR) Level and Convergence Sublayer (CS) protocol monitoring.

The FSAN NE creates instances of this managed entity automatically whenever an instance of an interworking vcCTPF managed entity is created that represents the AAL5 functions. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 is used to activate (unlock) and deactivate (lock) the data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

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

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing AAL5PMHistoryDataF managed entity creation when the current interval terminates with "all-zeros" performance measurements.

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 one instance of this managed entity shall exist for each instance of an interworking vcCTPF managed entity that represents AAL5 functions.

7.9   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.

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.

7.10   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.

7.11   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.

NEAssignmentPtr: This attribute identifies the adslNetworkCTPF in the network view associated by this adslCTPF.

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.

7.12   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: LOF (Loss of Frame), RFI (Remote Failure Indication), SD (Signal Degraded) fast datastream, SD (Signal Degraded) interleave datastream, SD (Signal Degraded) fast datastream far end, SD (Signal Degraded) 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.

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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.

NEAssignmentPtr: This attribute identifies the adslNetworkTTPF in the network view associated by this adslTTPF.

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".

7.13 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.

7.14 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.).

7.15   APONCTP

This managed entity is a type of CTPF and possesses all the attributes and relationships defined by CTPF.

Attributes

NEAssignmentPtr: This attribute identifies the APONNetworkCTP in the network view associated by this APONCTP.

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.

7.16   APONStaticBW

This managed entity will be used to by the FSAN EMS to manage dynamic bandwidth assignment to the set of ONTs associated with a particular OLT PON interface. An instance of this managed entity shall be created or deleted by the APON managing system.

Attributes

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

BandwidthAssignList: This attribute lists the following:
- TCAdaptorId: the identity of the ONT tcAdaptorF.
- MinimumGrant: the amount of minimum guaranteed bandwidth assigned to the ONT tcAdaptorF identified.
- MaximumGrant: the amount of assignable bandwidth available to the ONT tcAdaptorF identified.
- SustainableGrant: the available sustainable cell rate to the ONT tcAdaptorF identified.
- AvailableCDV: the available CDV to the ONT tcAdaptorF identified.

Relationships

There is zero or one instance of APONStaticBW managed entity associated with each PON section termination point on the PON interface on the OLT.

7.17   APONPMCurrentData

This managed entity is used to collect performance monitoring data at PON sections. OLT measures errored second on OLT and each ONU/ONT. This entity is created when performance data is collected. Performance monitoring data managed in this class is currently measured.

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 are detected at OLT during a current measurement period.

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

ElapsedTime: This attribute represents the passage of time of measurement.

SuspendIntervalFlag: Reliability of performance data is represented by TRUE (no reliability) or FALSE (enough reliability).

Relationships

Zero or one instance of this managed entity can exist for each instance of the TCAdaptorF of PON sections.

7.18 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 ONU/ONT during a past measurement period.

SuspectIntercalFlag: Reliability of performance data is represented by TRUE (no reliability) or FALSE (enough reliability).

PeriodEndTime: Collection completed time is represented.

Relationships

Multiple instances can be contained towards APONPMCurrentDataF.

7.19 APONTTP

This managed entity is a type of TTPF and possesses all the attributes and relationships defined by TTPF. 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)], SDi (Signal Degraded) and SD (Signal Degraded far end).

Attributes

NEAssignmentPtr: This attribute identifies the APONNetworkTTP in the network view associated by this APONTTP.

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.

7.20 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 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.

7.21 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 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.

7.22   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.

LocalMaximum NumberofVPCsSupportable: 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.

7.23   ATMTrafficLoadCurrentDataF

An instance of this managed entity is used to collect and report data associated with the traffic load carried by the FSAN NE, its interfaces, and selected instances of its supported virtual connections that are private virtual connections. Instances of this managed entity are created by the FSAN NE or by request of the managing system for selected monitoring points that are associated with PVCs and for individual UNIF, BICIF and BISSIF managed entities. Instances of this managed entity are deleted by the FSAN NE or by request of the managing system. The managed entity supports the administrative state function as defined in ITU-T 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 is used to activate (unlock) and deactivate (lock) the data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

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

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing ATMTrafficLoadHistoryDataF creation when the current interval terminates with "all-zeros" performance measurements.

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

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

Relationships

One instance of this managed entity may be created on demand for each instance of a CTPF or TTPF that is a monitoring point. One instance of this managed entity may exist for each instance of the UNIF, BICIF and BISSIF managed entities.

7.24   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.

7.25 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.

7.26 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: AIS (Alarm Indication Signal) and LOP (Loss of Pointer).

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 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.

7.27 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: AIS (Alarm Indication Signal) and LOP (Loss of Pointer).

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 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.

7.28   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.

7.29   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.

7.30 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.

7.31 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.

7.32 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: LOF (Loss of Frame), LOM (Loss of Multiframe), AIS (Alarm Indication Signal), SD (Signal Degraded) and RDI (Remote Defect Indication).

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.

7.33 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.

7.34 CTPF

This managed entity terminates and originates a link connection. Instances of this managed entity can be 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 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.

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".

ConnectivityPointerList: This attribute identifies the TTPF supported 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 any TTPF supported by it.

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

7.35   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. The following alarms can be detected at this managed entity: LOF (Loss of Frame), AIS (Alarm Indication Signal), SD (Signal Degraded), and RAI (Remote Alarm Indication).

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 X.731.

NEAssignmentPtr: This attribute identifies the DS1NetworkCTPF in the DS-1 layer domain network view associated with this CTPF.

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.

7.36   DS1PMCurrentDataF

This is a managed entity that contains the current performance monitoring data collected at a DS1CTPF for near end DS1 path monitoring for both directions of traffic. An instance of this managed entity may be created automatically whenever the associated DS1CTPF managed entity is created. Instances of this managed entity are deleted by the FSAN NE. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing DS1PMHistoryDataF managed entity creation when the current interval terminates with "all-zeros" performance measurements.

PhysicalPathTPFPtr: This attribute identifies the associated TPF.

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 CRC6 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 10 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 CRC6 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 10 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 one instance of this managed entity shall exist for each instance of DS1CTPF.

7.37 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.

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 CRC6 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 CRC6 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.

7.38   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. The following alarms can be detected at this managed entity: LOF (Loss of Frame), AIS (Alarm Indication Signal), AIS-CI (Alarm Indication Signal – Customer Installation), SD (Signal Degraded), RAI (Remote Alarm Indication).

Attributes

NEAssignmentPtr: This attribute identifies the DS1NetworkCTPF in the network view associated with this TTPF.

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".

7.39   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.

Attributes

NEAssignmentPtr: This attribute identifies the DS3NetworkCTPF in the DS-3 layer domain network view associated with this CTPF.

DS1CTPFPointerList: This attribute points to the DS1CTPs within a channelized DS-3 interface.

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 DS-3 interface.

7.40   DS3PMCurrentDataF

This is a managed entity that contains the current 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 instances of the associated PhysicalPathTPF managed entity are created. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing DS3PMHistoryDataF managed entity creation when the current interval terminates with "all-zeros" performance measurements.

PhysicalPathTPFPtr: This attribute identifies the associated PhysicalPathTPF.

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

7.41   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.

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.

7.42   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. The following alarms can be detected at this managed entity: LOF (Loss of Frame), AIS (Alarm Indication Signal), AIS-CI (Alarm Indication Signal – Customer Installation), SD (Signal Degraded), RAI (Remote Alarm Indication).

Attributes

NEAssignmentPtr: This attribute identifies the DS3NetworkCTPF in the network view associated with this TTPF.

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".

7.43   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.

Attributes

NEAssignmentPtr: This attribute identifies the e1NetworkCTPF in the E1 layer domain network view associated with this CTPF.

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.

7.44 E1PMCurrentDataF

This is a managed entity that contains the current performance monitoring data collected at an E1CTPF for near-end E1 path monitoring for both directions of traffic. An instance of this managed entity is created automatically whenever the associated E1CTPF managed entity is created. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing E1PMHistoryDataF managed entity creation when the current interval terminates with "all-zeros" performance measurements.

CTPFPtr: This attribute identifies the associated E1CTPF.

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 one instance of this managed entity shall exist for each instance of the E1CTPF managed entity of type E1.

7.45   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.

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.

7.46   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. The following alarms can be detected at this managed entity: LOF (Loss of Frame), AIS (Alarm Indication Signal), SD (Signal Degraded), RAI (Remote Alarm Indication).

Attributes

NEAssignmentPtr: This attribute identifies the E1NetworkCTPF in the network view associated with this TTPF.

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".

7.47 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.

Attributes

NEAssignmentPtr: This attribute identifies the e1NetworkCTPF in the E1 layer domain network view associated with this CTPF.

E1CTPFPointerList: This attribute points to the E1CTPFs within a channelized E-3 interface.

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 E-3 interface.

7.48 E3PMCurrentDataF

This is a managed entity that contains the current 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 instances of the associated PhysicalPathTPF managed entity are created. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing E3PMHistoryDataF managed entity creation when the current interval terminates with "all-zeros" performance measurements.

PhysicalPathTPFPtr: This attribute identifies the associated PhysicalPathTPF.

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

Relationships

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

7.49 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.

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.

7.50 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. The following alarms can be detected at this managed entity: LOF (Loss of Frame), AIS (Alarm Indication Signal), SD (Signal Degraded), RAI (Remote Alarm Indication).

Attributes

NEAssignmentPtr: This attribute identifies the E1NetworkCTPF in the network view associated with this TTPF.

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".

7.51 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 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 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).

7.52   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.

Attributes

NEAssignmentPtr: This attribute identifies the BridgedLANNetworkCTPF in the network view associated with this network element view CTPF.

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.

7.53   EthernetPMCurrentDataF

This is a managed entity that contains the current performance monitoring data collected at Ethernet interfaces to the ONT or NT. Instances of this managed entity are created automatically whenever performance monitoring reporting is requested by a client application or NMS at the associated EthernetCTPF managed entity. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

TPPointer: This attribute identifies the associated TP.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing EthernetPMHistoryData managed entity creation when the current interval terminates with "all-zeros" performance measurements.

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: Counts 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.

FrameTooLongs: 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: Counts of the number of times that the buffer overflows.

Relationships

Zero or one instance of this managed entity shall exist for each instance of the managed entity EthernetCTP.

7.54 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.

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: Counts 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.

FrameTooLongs: 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: Counts 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".

7.55   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.

7.56   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.

Attributes

NEAssignmentPtr: This attribute identifies the BridgedLANNetworkTTPF in the network view associated with this network element view TTPF.

Relationships

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

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[4]   Currently, this value is fixed at 1518.

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

7.57   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 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.

7.58   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.

7.59 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 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 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.

7.60 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]

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".

7.61   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 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 BridgedLANTTPF, BridgedLANCTPF. Zero or more of these managed entities exists for each BridgedLANNetworkCTPF and BridgedLANNetworkTTPF.

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

7.62   MACBridgePMCurrentDataF

This is a managed entity that contains the current performance monitoring data collected at a MAC bridging function supporting Ethernet interfaces on the ONT or NT. Instances of this managed entity are created automatically whenever performance monitoring reporting is requested by a client application or NMS at the associated BridgedLANCTPF managed entity. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

TPPointer: This attribute identifies the associated TP.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing MACBridgePMHistoryData managed entity creation when the current interval terminates with "all-zeros" performance measurements.

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 one instance of this managed entity may be associated with an instance of BridgedLANCTPF.

7.63   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.

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.

7.64 MACBridgePortConfigurationDataF

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 IEE 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.

7.65   MACBridgePortPMCurrentDataF

This is a managed entity that contains the current performance monitoring data collected at the port bridging function for Ethernet interfaces on the ONT or NT. 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. The FSAN NE deletes instances of this managed entity. The managed entity supports administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

TPPointer: This attribute identifies the associated TP.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing MACBridgePortPMHistoryData managed entity creation when the current interval terminates with "all-zeros" performance measurements.

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

7.66   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.

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.

7.67   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".

7.68 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.

7.69 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 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 deleted.

Relationships

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

7.70 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.

7.71   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.

7.72   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: AIS (Alarm Indication Signal), FERF (Far-End Receive Failure), SD (Signal Degraded) and EBER (Excessive Bit Error Rate).

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.

7.73   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 G.983.2. An instance of this managed entity is created automatically 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 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".

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 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.

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.

7.74   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.

7.75 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.

7.76 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.

Relationships

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

7.77 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.

Relationships

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

7.78 PhysicalPathTPF

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: LOS (Loss of Signal), Transmitter failure (detected by Laser Bias High, Laser Power Low, Laser Power Low) and PEEi (Physical Equipment Error) specifically for PhysicalPathTPs. The managed entity supports the administrative and operational state and alarm status function as defined in ITU-T 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.

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".

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 PhysicalPathTPF physically connected to the instance of the managed entity (either upstream or downstream).

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 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.

SupportedByObjectList: This attribute references the managed entity instances that affect the functioning of the PhysicalPathTPF. This attribute identifies at minimum the pluginUnitF managed entity instance supporting the termination point for any of the physical path types mentioned above.

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.

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.

7.79 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 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 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".

EquipmentCode: This attribute identifies the plug-in unit type. It can be any printable string.

FunctionCode: This attribute identifies the plug-in function code. It can be any printable string.

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 by the NMS to supplement the inventory process with additional associations. One use of the attribute might be to indicate ownership of the plug-in.

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 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.

7.80 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.

7.81 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: LOF (LOS of Frame), SD (Signal Degraded) and EBER (Excessive Bit Error Rate).

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.

7.82 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 I.366.1. 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.

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 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.

7.83 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 I.366.2. 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.

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 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 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.

7.84 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 by request of the managing system. The managed entity supports the operational state and administrative state functions as defined in ITU-T 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, …) 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.

7.85   tcAdaptorF

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 I.321 identifies this adaptation function as one of many functions performed at the Transmission Convergence (TC) Sublayer of the BISDN 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 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.

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 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 Physical Path TP managed entity through the physicalPathTPFPtr attribute. One instance of ATMNetworkAccessProfileF or uniInfoF shall be used to characterize this managed entity.

7.86   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 by 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.

7.87   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 by 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, GRF.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 parameters 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.

7.88 TTPF

This managed entity terminates and originates a trail on an FSAN NE. Instances of this managed entity may 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 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.

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".

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

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 X.731.

ConnectivityPtr: This attribute identifies the CTPF supporting the TTPF.

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.

7.89   UNIF

This managed entity is used to organize data associated with User Network Interfaces (UNIs) terminating on the FSAN NE, in this case User Network Interfaces terminating on the ONT or the NT. One instance of this managed entity shall exist for each UNI terminating on the ATM NE. A UNI may be single-user or multiple-user (one or more VCCs). Multiple user UNIs are used for interfaces with VP multiplexers that support one or more UNIs. Instances of this managed entity are created and deleted by request of the managing system either explicitly or implicitly.

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 UNIF termination point represented by the managed entity.

Relationships

Multiple instances of the UNI managed entity may exist for each instance of the FSAN NE managed entity terminating service interfaces to customers. Each instance of the UNI managed entity is related to a tcAdaptorF managed entity by the TCAdaptorId pointer attribute.

7.90 uniInfoF

This managed entity is used to organize data associated with the ATM User Network Interfaces (UNIs) supported by the ONT or NT. For non-ATM UNIs this is used as a logical ATM UNI. One instance of this managed entity shall exist for each UNI supported by the ONT. 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.

AccessGroupPtr: This attribute provides a pointer to the NetworkTTPs associated with the end users to which this profile applies.

UNIFPtr: This attribute provides a pointer to the user network-interface on the ONT or NT.

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.

7.91 upcNpcDisagreementPMCurrentDataF

An instance of this managed entity is used to collect and report data associated with UPC/NPC Disagreement Monitoring functions performed by the ATM NE on individual vpNetworkCTPF and vcNetworkCTPF managed entities. Instances of this managed entity are created and deleted by the ATM NE or by request of the managing system. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

CTPFPtr: This attribute identifies the associated vpNetworkCTPF or vcNetworkCTPF 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.

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

ThresholdDataPtr: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing UpcNpcDisagreementPMHistoryDataF creation when the current interval terminates with "all-zeros" performance measurements.

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 one instance of this managed entity may exist for each instance of the vpNetworkCTP and vcNetworkCTP managed entities. Each instance of this managed entity is associated with zero or one instance of the Threshold Data managed entity by the ThresholdDataPtr attribute.

7.92   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 vpNetworkCTPF or vcNetworkCTPF managed entity where performance monitoring occurs.

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 vpNetworkCTP and vcNetworkCTP managed entities.

7.93 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: FERF (Far-End Receive Failure), 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 G.709 for a list of valid values.

C2SignalLabelReceive: This attribute specifies the C2 VC Signal Label for this incoming vc3TTPF. See ITU-T G.709 for a list of valid values.

C2SignalLabelSend: This attribute specifies the C2 VC Signal Label for this incoming vc3TTPF. See Recommendation G.709 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.

7.94 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: FERF (Far End Receive Failure), 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 G.709 for a list of valid values.

C2SignalLabelReceive: This attribute specifies the C2 VC Signal Label for this incoming vc3TTPF. See ITU-T G.709 for a list of valid values.

C2SignalLabelSend: This attribute specifies the C2 VC Signal Label for this incoming vc3TTPF. See ITU-T G.709 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.

7.95   vcCTPF

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

VCIValue: This attribute identifies the VCI values associated with this vcCTPF.

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 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.

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 DS-1 CTPFs for a channelized DS-3 card on an OLT, the single DS-1 CTPF associated with a port on a multi-port DS-1 subscriber line card on an ONT, the single Ethernet CTPF associated with a port on a bridged LAN 10/100 Base T subscriber line card on an ONT, etc.)

NEAssignmentPtr: This attribute identifies the vcNetworkCTPF in the ATM network view associated with this vcCTPF.

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.

7.96 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

NEAssignmentPtr: This attribute identifies the vcNetworkTTPF in the ATM network view associated by this vcTTPF.

Relationships

Zero or one instance of the vcTTPF managed entity may exist for each instance of a vcCTPF managed entity.

7.97 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.

Attributes

NEAssignmentPtr: This attribute identifies the vdslNetworkCTPF in the network view associated by this vdslCTPF.

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 vdslTTPF.

7.98 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: LOF (Loss of Frame), RFI (Remote Failure Indication), SD (Signal Degraded) fast datastream, SD (Signal Degraded) interleave datastream, SD (Signal Degraded) fast datastream far end, SD (Signal Degraded) 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.

NEAssignmentPtr: This attribute identifies the vdslNetworkTTPF in the network view associated by this vdslTTPF.

Relationships

There is zero or more of these managed entities contained within an ONU or an NT FSAN NE. One of these managed entities exist for each vdslCTPF managed entity. One of these managed entities exists for each PhysicalPathTPF of Type "VDSL".

7.99 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.

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.

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 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.

NEAssignmentPtr: This attribute identifies the voiceNetworkCTPF in the network view associated by this network element view CTPF.

Relationships

Zero or more of these instances is associated with an ONT. One of these managed entities exists for each voiceTTPF.

7.100 voiceCurrentDataF

This is a managed entity that contains the current 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. The FSAN NE deletes instances of this managed entity. The managed entity supports the administrative state function as defined in ITU-T 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 data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

TPPointer: This attribute identifies the associated TP.

ThresholdDataId: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing VoicePMHistoryData managed entity creation when the current interval terminates with "all-zeros" performance measurements.

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: Counts of the number of times that the voice port buffer overflows.

VoicePortBufferUnderflows: Counts of the number of times that the voice port buffer underflows.

Relationships

Zero or one instance of this managed entity shall exist for each instance of a voiceCTPF.

7.101   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.

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: Counts of the number of times that the voice port buffer overflows.

VoicePortBufferUnderflows: Counts 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.

7.102   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 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".

Relationships

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

7.103 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.

7.104 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).

Attributes

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.

TelephoneNumber: This attribute provides the network owner supplied value for the end user telephone number.

NEAssignmentPtr: This attribute identifies the voiceNetworkTTPF in the network view associated by this network element view TTPF.

Relationships

Zero or one instance of the voiceTTPF managed entity may exist for each instance of a voiceCTPF managed entity.

7.105 vpCTPF

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

NEAssignmentPtr: This attribute identifies the vpNetworkCTPF in the ATM network view associated by this vpCTPF.

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.

7.106 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

NEAssignmentPtr: This attribute identifies the vpNetworkTTPF in the ATM network view associated with this vpTTPF.

Relationships

Zero or one instance of the vpTTPF managed entity may exist for each instance of a vpCTPF managed entity.

7.107 vpvcPMCurrentDataF

This managed entity contains the current PM data collected for the connection being monitored, related to VP and VC OAM flows. OAM PM data is described in ITU-T I.610. The ATM NE creates instances of this managed entity. Instances of this managed entity are deleted by the ATM NE or by request of the managing system. The managed entity supports the administrative state function as defined in ITU-T 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.

CTPFPtr: This attribute identifies the associated vpCTPF or vcCTPF managed entity where performance monitoring occurs.

AdministrativeState: This attribute is used to activate (unlock) and deactivate (lock) the data collection function performed by this managed entity.

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

ElapsedTime: This attribute represents the difference between the current time and the start of the present summary interval.

ThresholdDataID: This attribute provides a pointer to an instance of the Threshold Data managed entity that contains the threshold values for the performance monitoring data collected by this managed entity.

NumberofSuppressedIntervals: This attribute is non-zero only if the FSAN NE is suppressing vpvcPMHistoryDataF managed entity creation when the current interval terminates with "all-zeros" performance measurements.

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 one instance of this managed entity may be contained by each CTPF managed entity indicating the location for performance monitoring. This managed entity is related with one instance of the Threshold Data managed entity through its pointer attribute ThresholdDataId.

7.108 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.

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

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[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
Subscriber Line Car 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

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	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 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)
	Wrong signal	OLT/ONT/NT	vc3TTPF/ vc4TTPF	Communication	Payload Mismatch	Critical	PLM (Payload 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	
	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 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 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	
PH Layer PON – ONU Side	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
	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
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

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	
		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 "Interworking 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
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

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, 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

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	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
	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	Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	ES	Minor	Errored Seconds
	Severely Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	SES	Minor	Severely Error Seconds
	Bursty 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	AUS	Minor	Unavailable Seconds
	Controlled Slip Seconds	OLT/NT	DS1PMCurrentDataF, DS3PMCurrentDataF, E1PMCurrentDataF, E3PMCurrentDataF	Quality of Service	CSS	Minor	Controlled Slip Seconds

Communication network
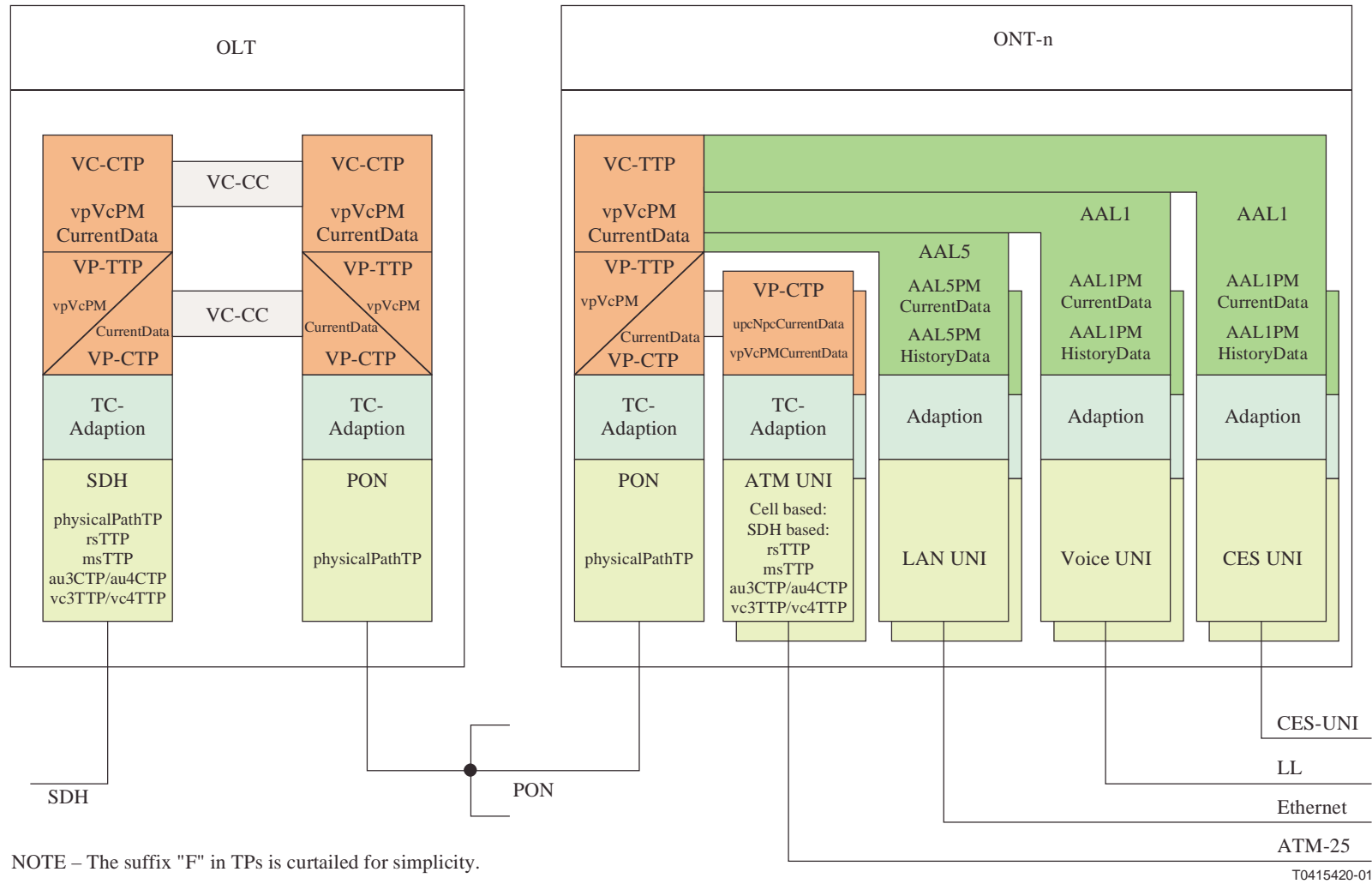
Figure B.1/Q.834.1 – PON network layer structure (OLT-ONT)

NOTE – The suffix "F" in TPs is curtailed for simplicity.
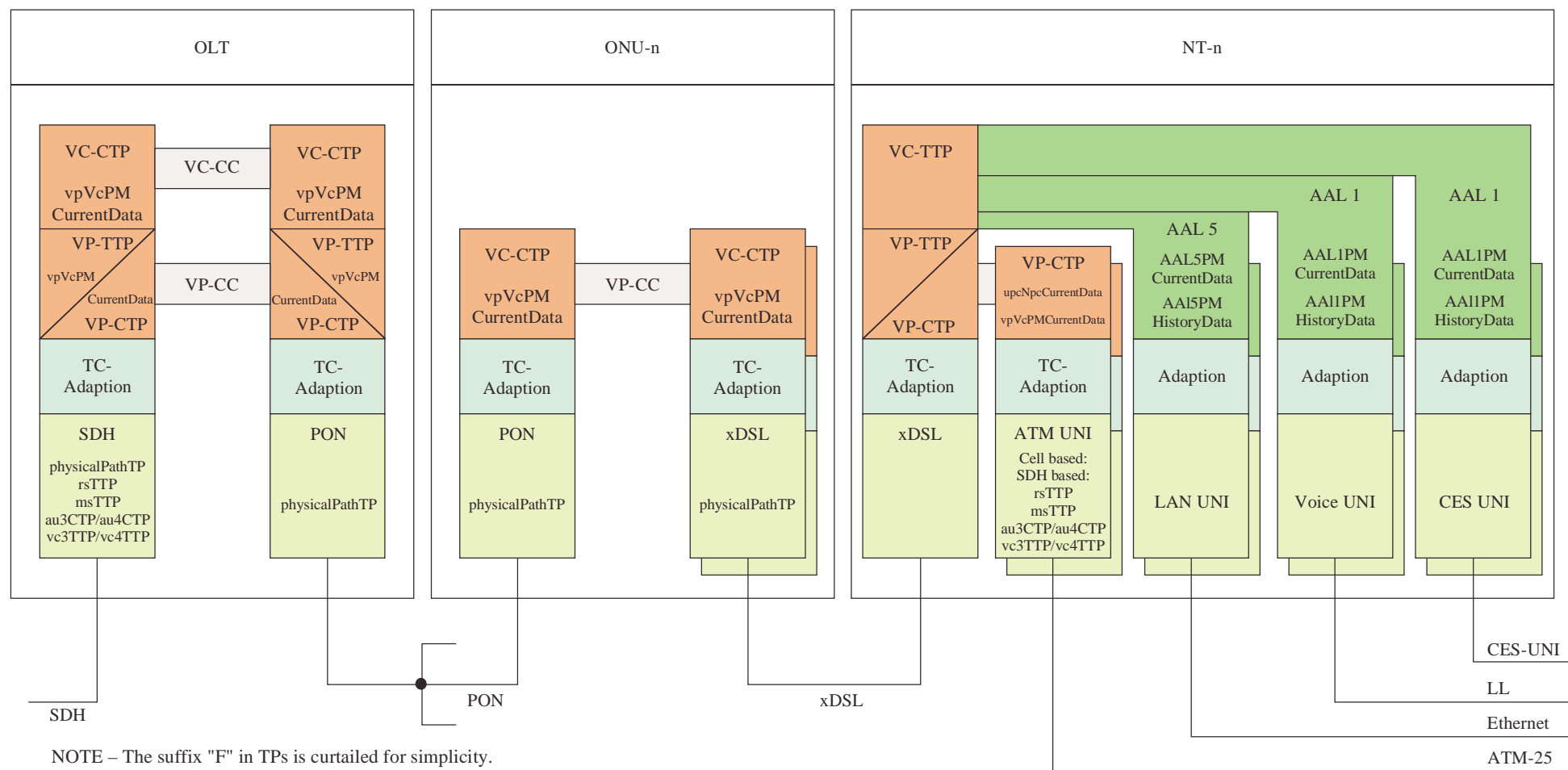
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Figure B.2/Q.834.1 – PON network layer structure (OLT-ONT)

Diagram labels:

OLT panel:
- VC-CTP / vpVcPM CurrentData
- VC-CC
- VC-CTP / vpVcPM CurrentData
- VP-TTP / vpVcPM CurrentData / VP-CTP
- VP-CC
- VP-TTP / vpVcPM CurrentData / VP-CTP
- TC-Adaption
- TC-Adaption
- SDH: physicalPathTP, rsTTP, msTTP, au3CTP/au4CTP, vc3TTP/vc4TTP
- PON: physicalPathTP

ONU-n panel:
- VC-CTP / vpVcPM CurrentData
- VP-CC
- VC-CTP / vpVcPM CurrentData
- TC-Adaption
- TC-Adaption
- PON: physicalPathTP
- xDSL: physicalPathTP

NT-n panel:
- VC-TTP
- VP-TTP / VP-CTP
- VP-CTP: upcNpcCurrentData, vpVcPMCurrentData
- AAL 5: AAL5PM CurrentData, AAl5PM HistoryData
- AAL 1: AAL1PM CurrentData, AAl1PM HistoryData
- AAL 1: AAL1PM CurrentData, AAl1PM HistoryData
- TC-Adaption
- TC-Adaption
- Adaption
- Adaption
- Adaption
- xDSL
- ATM UNI: Cell based: SDH based: rsTTP, msTTP, au3CTP/au4CTP, vc3TTP/vc4TTP
- LAN UNI
- Voice UNI
- CES UNI

Connections: SDH, PON, xDSL, CES-UNI, LL, Ethernet, ATM-25

NOTE – The suffix "F" in TPs is curtailed for simplicity.

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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
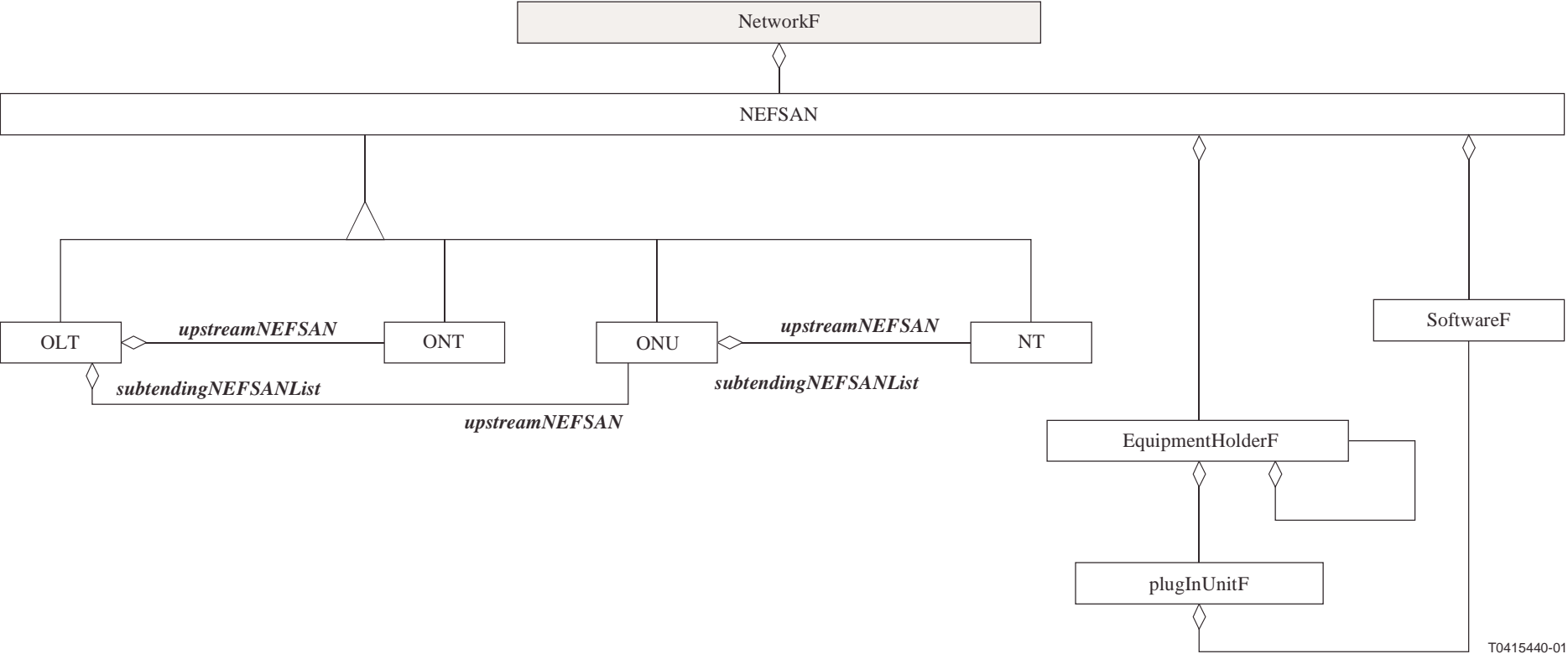
Figure C.1/Q.834.1 – E-R diagram for inventory management

C.2 Termination points (NE view)
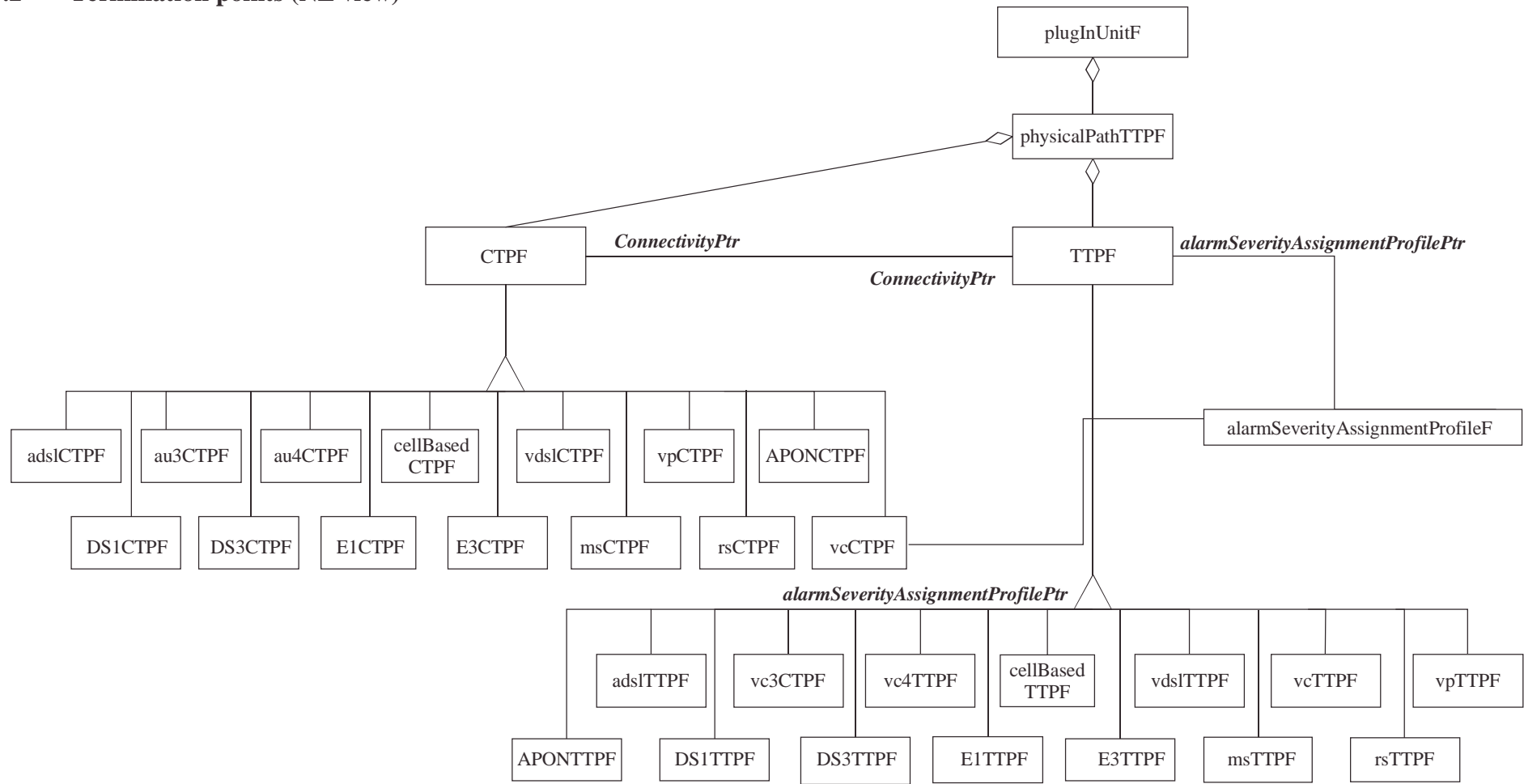
Figure C.2/Q.834.1 – E-R diagram for termination points (NE view)

C.3 AAL
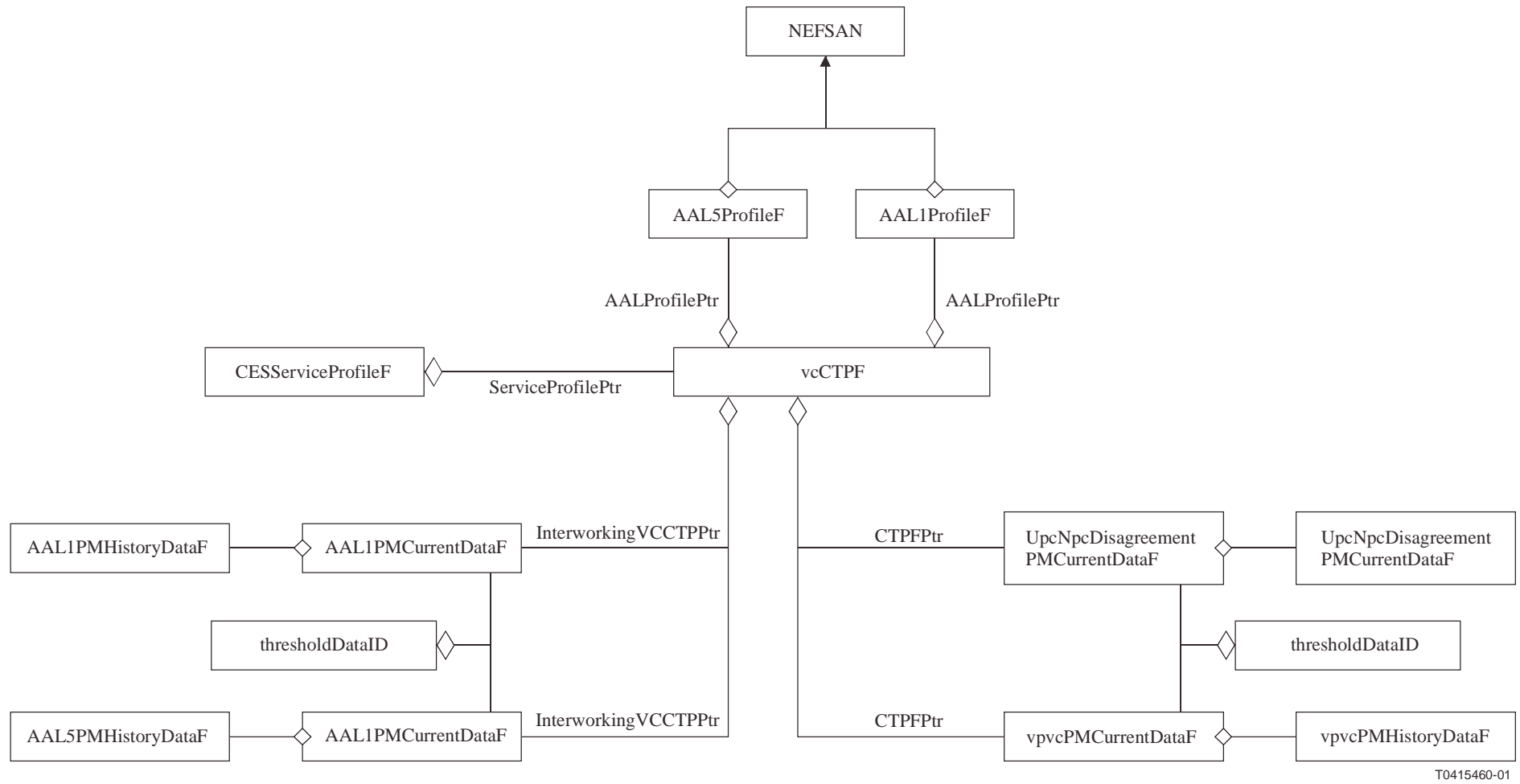
Figure C.3/Q.834.1 – E-R diagram for AAL

C.4 Physical performance monitor
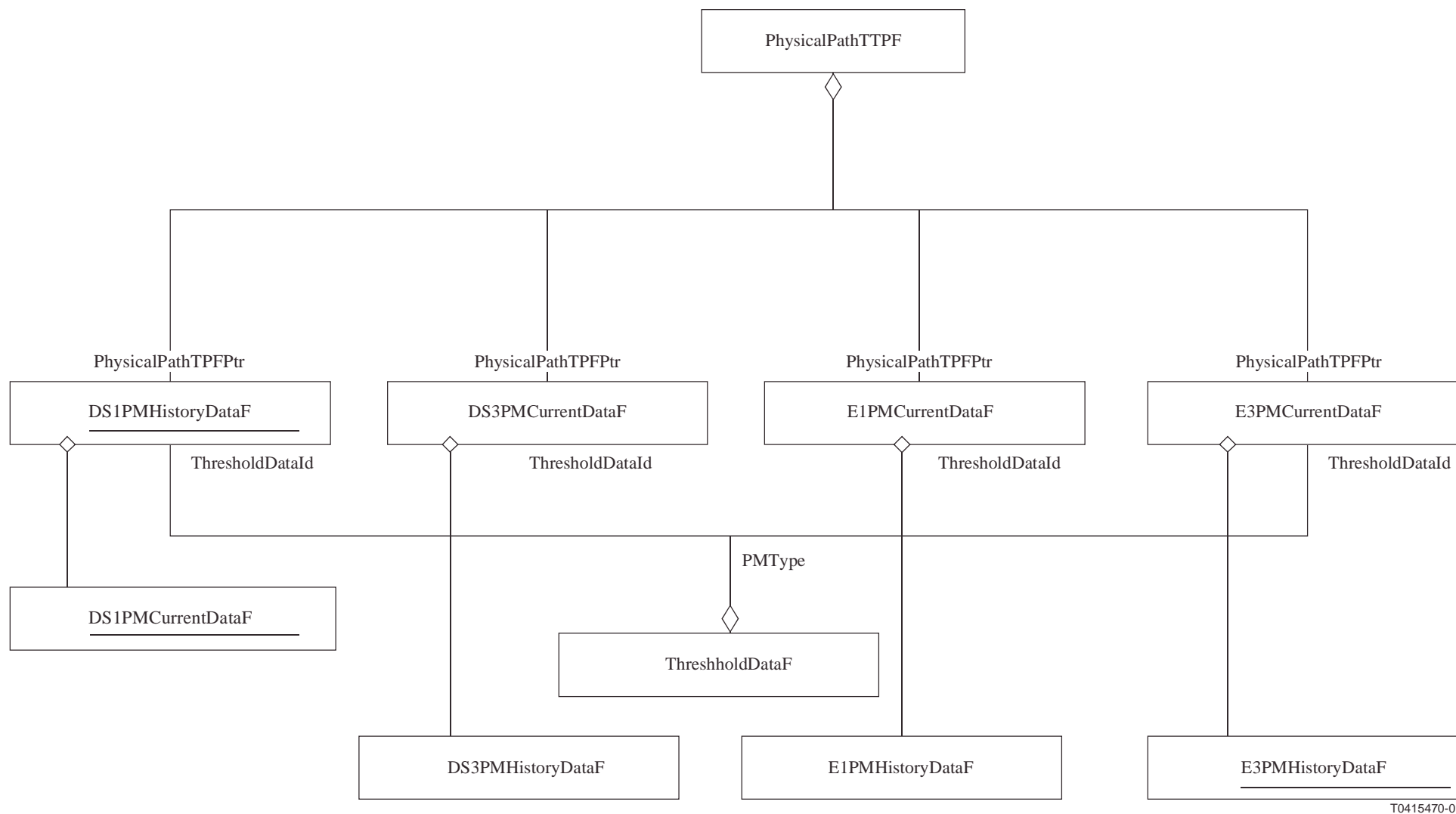
Figure C.4/Q.834.1 – E-R diagram for physical performance monitor

C.5   TCAdaptor E-R diagram
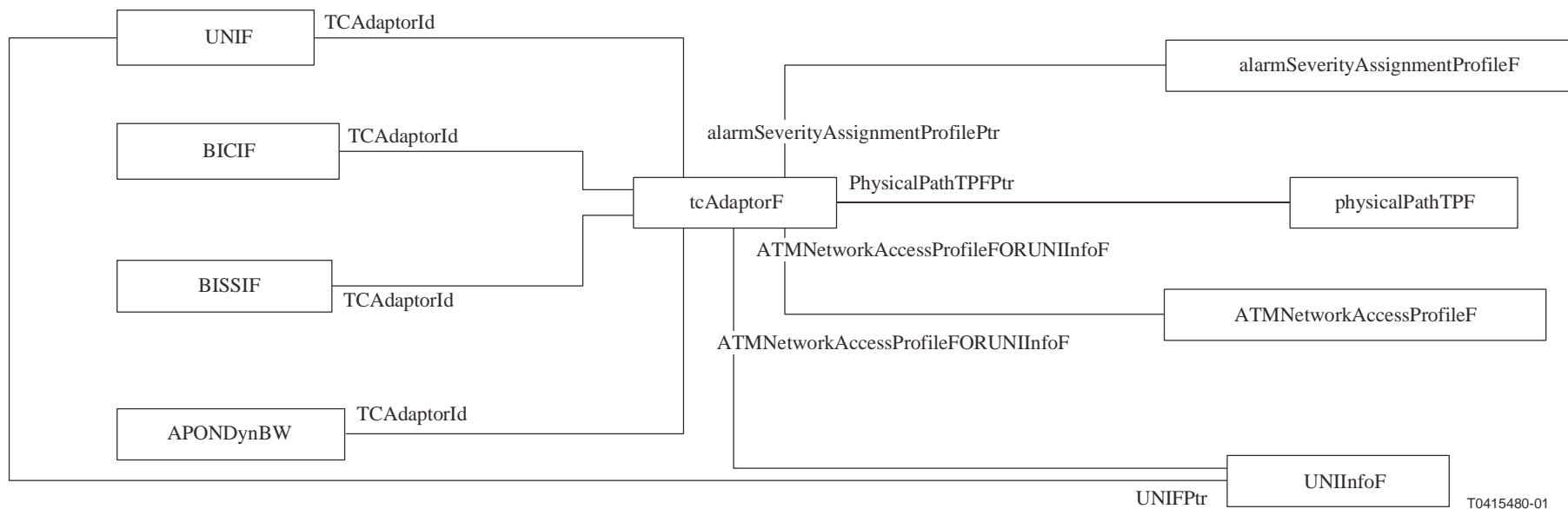
Figure C.5/Q.834.1 – E-R diagram for TCAdaptor

C.6   ATM cross-connection E-R diagram
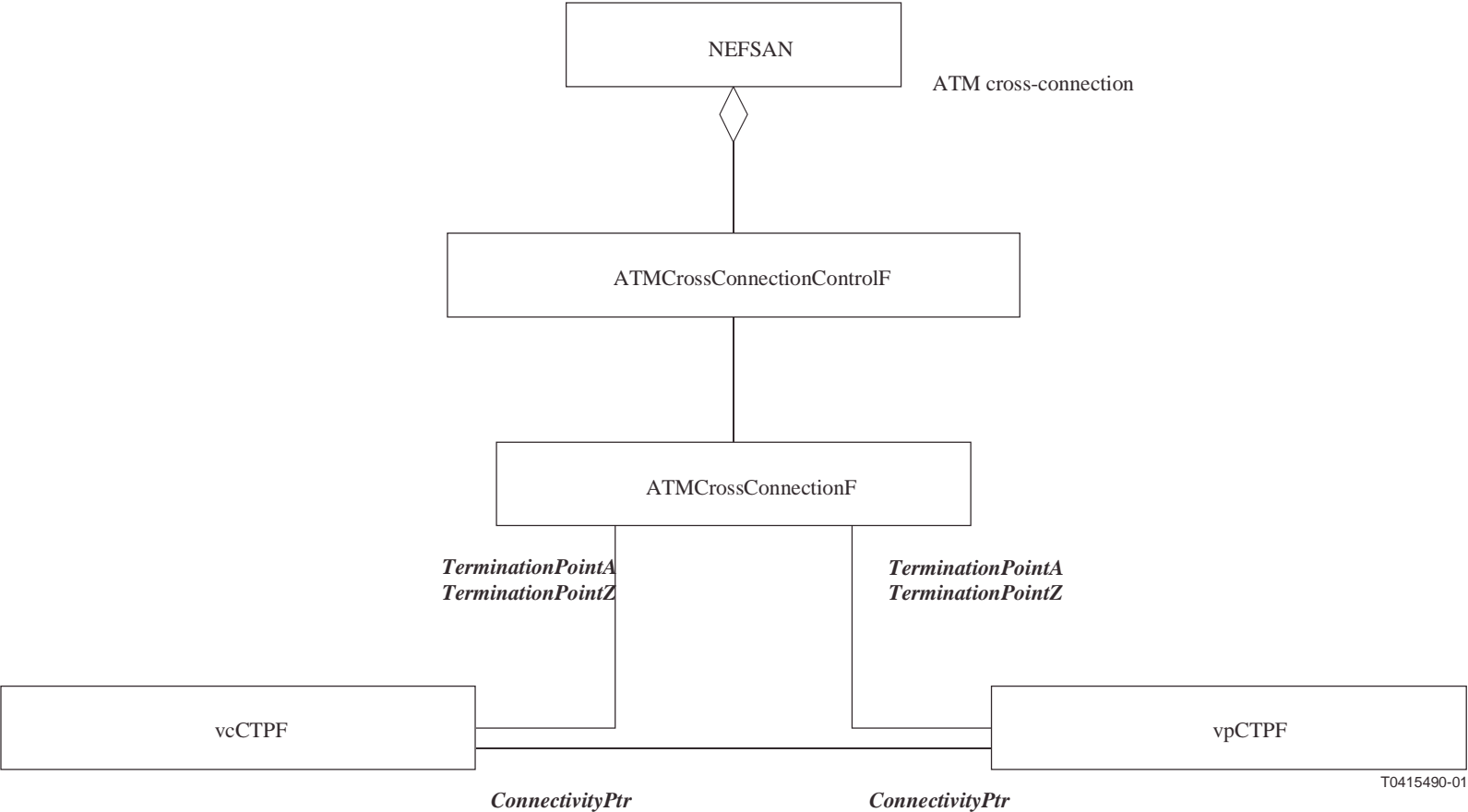
Figure C.6/Q.834.1 – E-R diagram for ATM cross-connection

C.7 Traffic characterization E-R diagram
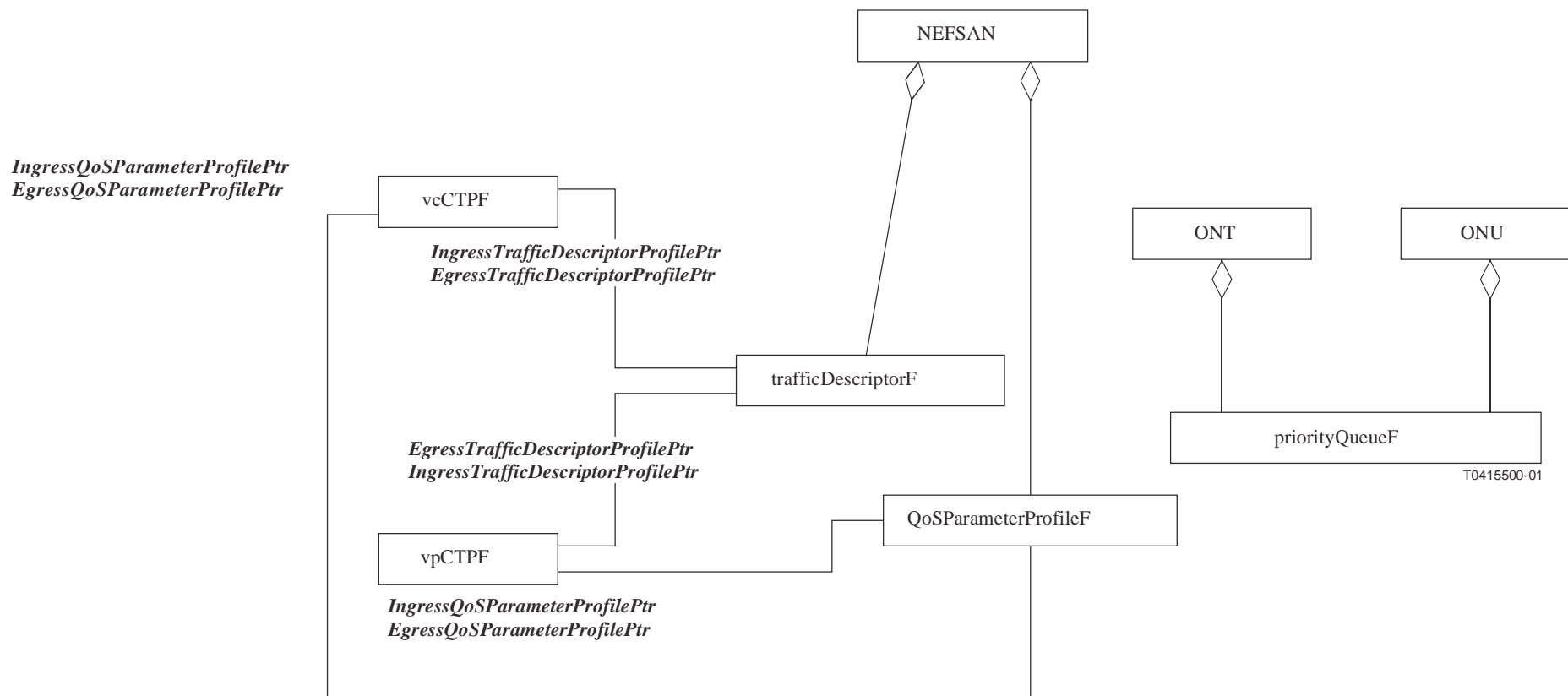
Figure C.7/Q.834.1 – E-R diagram for traffic characterization

C.8   Log
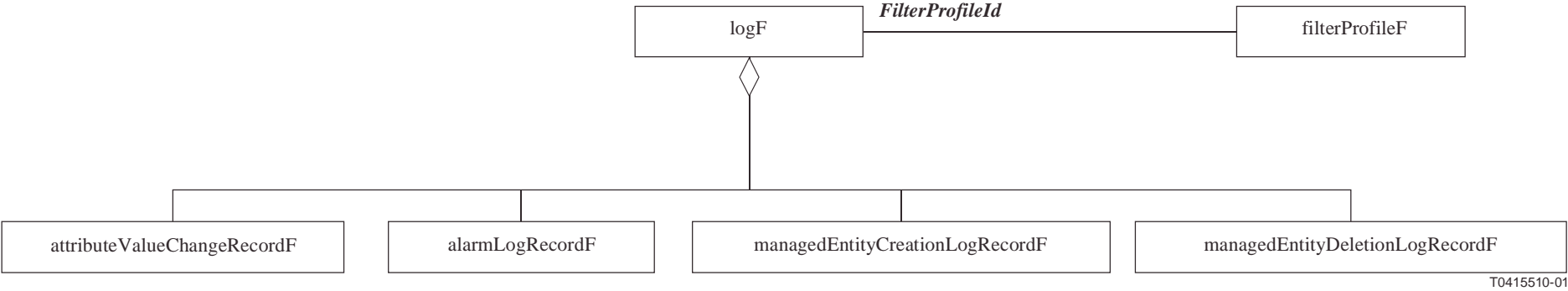
Figure C.8/Q.834.1 – E-R diagram for log

C.9   ATM traffic load
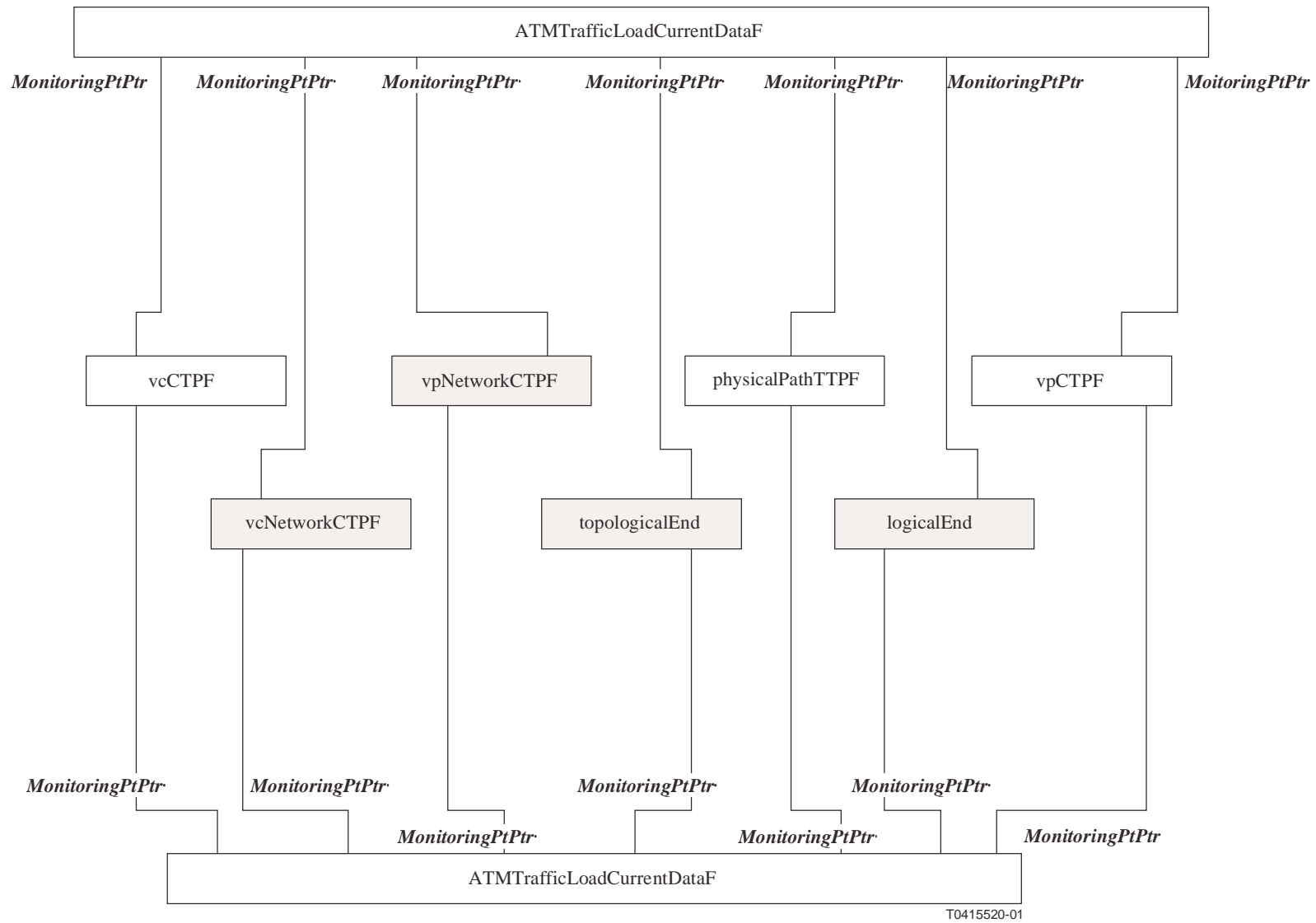
Figure C.9/Q.834.1 – E-R diagram for ATM traffic load

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.
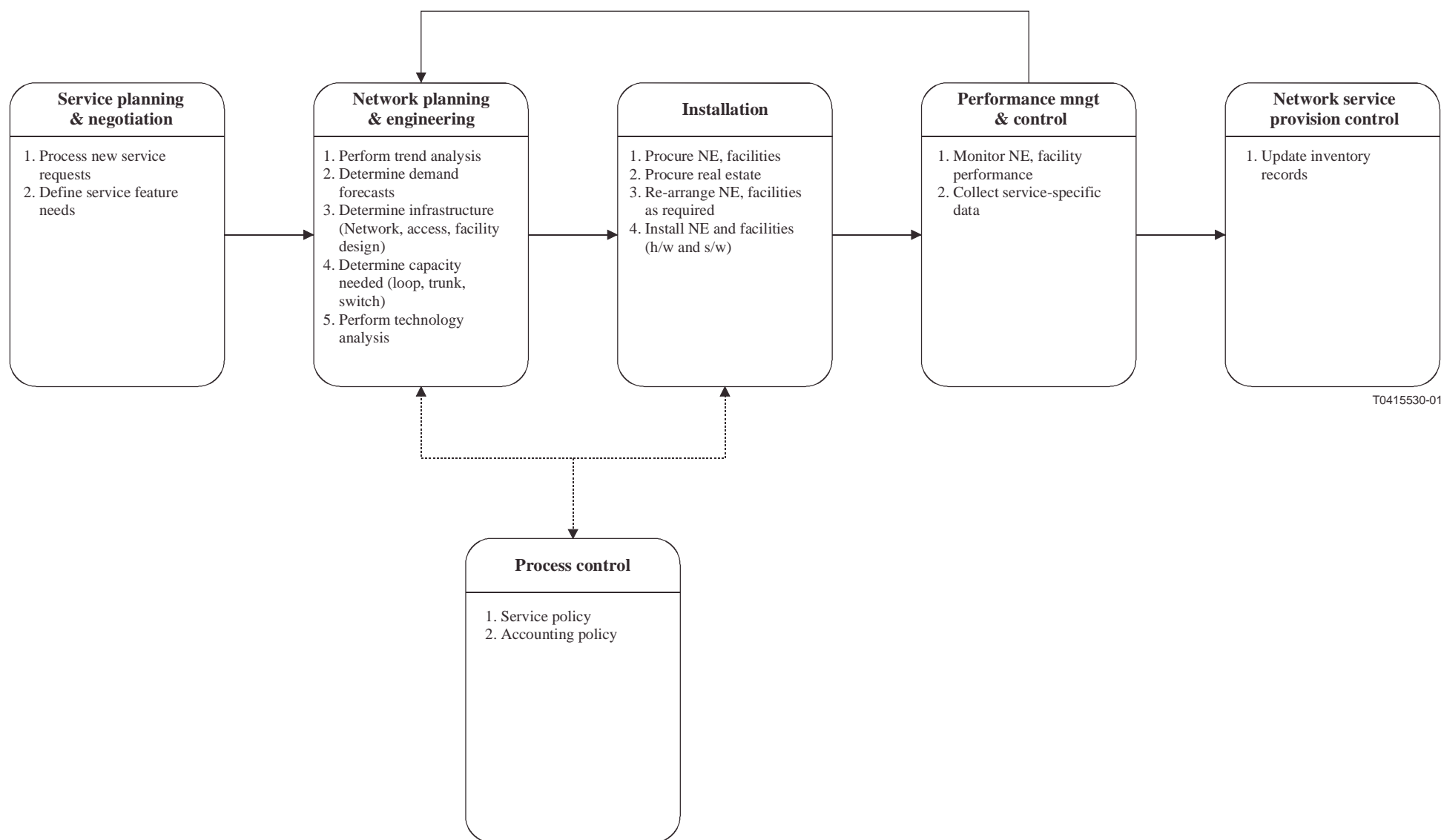
Figure I.1/Q.834.1 – High-level Planning and engineering process

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).

Order handling

1. Determine requirements
2. Confirm Customer details
3. Assess credit history
4. Arrange provisional appointment
5. Review order and assess date
6. Confirm appointment
7. Issue contract
8. Cancel order

Order control

1. Receive job
2. Distribute job to downstream systems.
3. Monitor progress
4. Chase/escalate as required
5. Receive Completion Notice
6. Update operations systems.

Service provisioning control

1. Assess order
2. Design & assign access facility.
3. Manage service system activities
4. Assign and configure route
5. Record stores required
6. Determine work items
7. Configure Service node
8. Update records
9. Enter details for review

Workforce administration

1. Receive order
2. Material management
3. Allocate work and resources (feeder, distribution, access network)
4. Co-op with field if required

Installation

1. Receive order
2. Order stores
3. Provide NT, OLT, ONU, ONT, software and wiring
4. Co-op with WFA
5. Commission service
6. Advise completion
7. Test Service

Customer

Number allocation

1. Confirm network circuit availability
2. Determine affected NEs
3. Allocate service (customer) number
4. Complete records

Planning

1. Receive request
2. Assess requirement
3. Inform SPC of timescale
4. Initiate work
5. Advise SPC when complete

Billing

1. Read Meter if required
2. Advice service reps
3. Update customer profile
4. Receive completed order
5. Generate bill for service
6. Close order

Customer

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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.
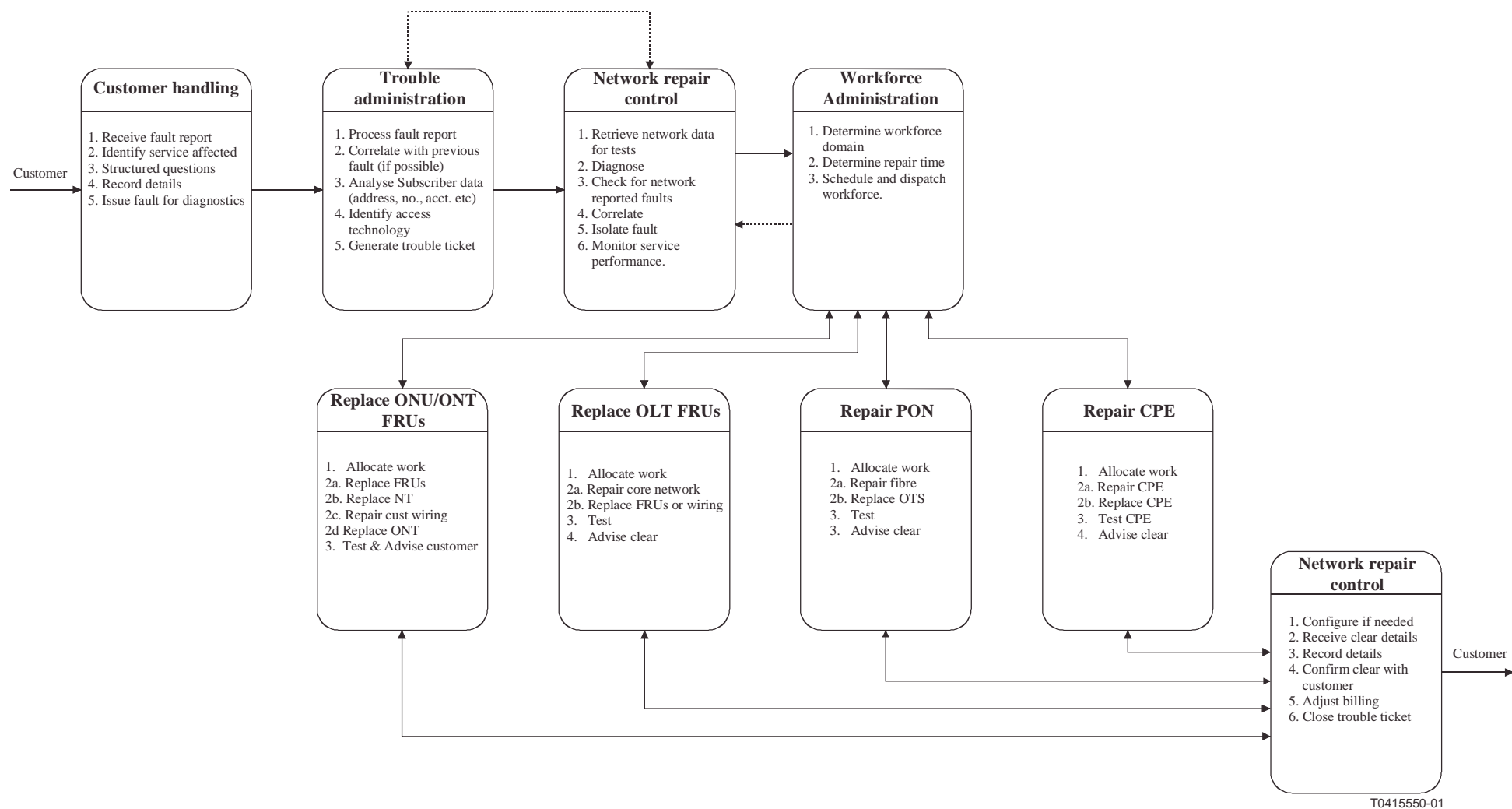
Figure I.3/Q.834.1 – High-level repair process

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 M.3010 [I-4], ITU-T G.902 [I-5] and ITU-T 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. Four layers of management capability are shown in Figure I.1: Network Element (NE), Element Management (EM), Network Management (NM) and Service Management (SM). Each layer provides management services to the layer above.
Network Element Layer (NEL)	M.3010	Refers to the physical resources that reside in the Access Network.
Element Management Layer (EML)	M.3010	EM functions manage the physical resources which reside in the access network. Typical management functions at this level are configuration, fault management and performance monitoring. EM functions are 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 (NML)	M.3010	NM functions coordinate the management of network elements to provide a user to user or service node to user path in order to transport telecommunications services. NM functions will coordinate multiple EM OSFs to provide overall network supervision.
Service Management (SML)	M.3010	SM functions manage the services supported by the network. These functions are not concerned with the physical nature of the network. Typical functions of this layer are service creation, provision, cessation, billing and accounting information.
Element/Network/ Service Management System	FSAN	The collection of functions at a specific layer which are implemented on a physical platform.
Service Node (SN)	G.902	A network element that provides access to various switched and/or permanent telecommunications 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 telecommunications services between a Service Node Interface (SNI) and one or more associated User Network Interfaces (UNI). User signalling is carried transparently by the AN.

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 AN. 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/Termination (ONU/ONT)	G.982	An ONU provides (directly or remotely) the customer-side interface of the AN. It is connected to the ODN. For some operators the ONU and NT functions will be combined in one physical resource which is called an ONT.
Network Termination (NT)	G.982	Physical resource which resides in the customers premises and forms the boundary of the access network (UNI). Provides onward transmission of services over building wiring to customer premises equipment.
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).
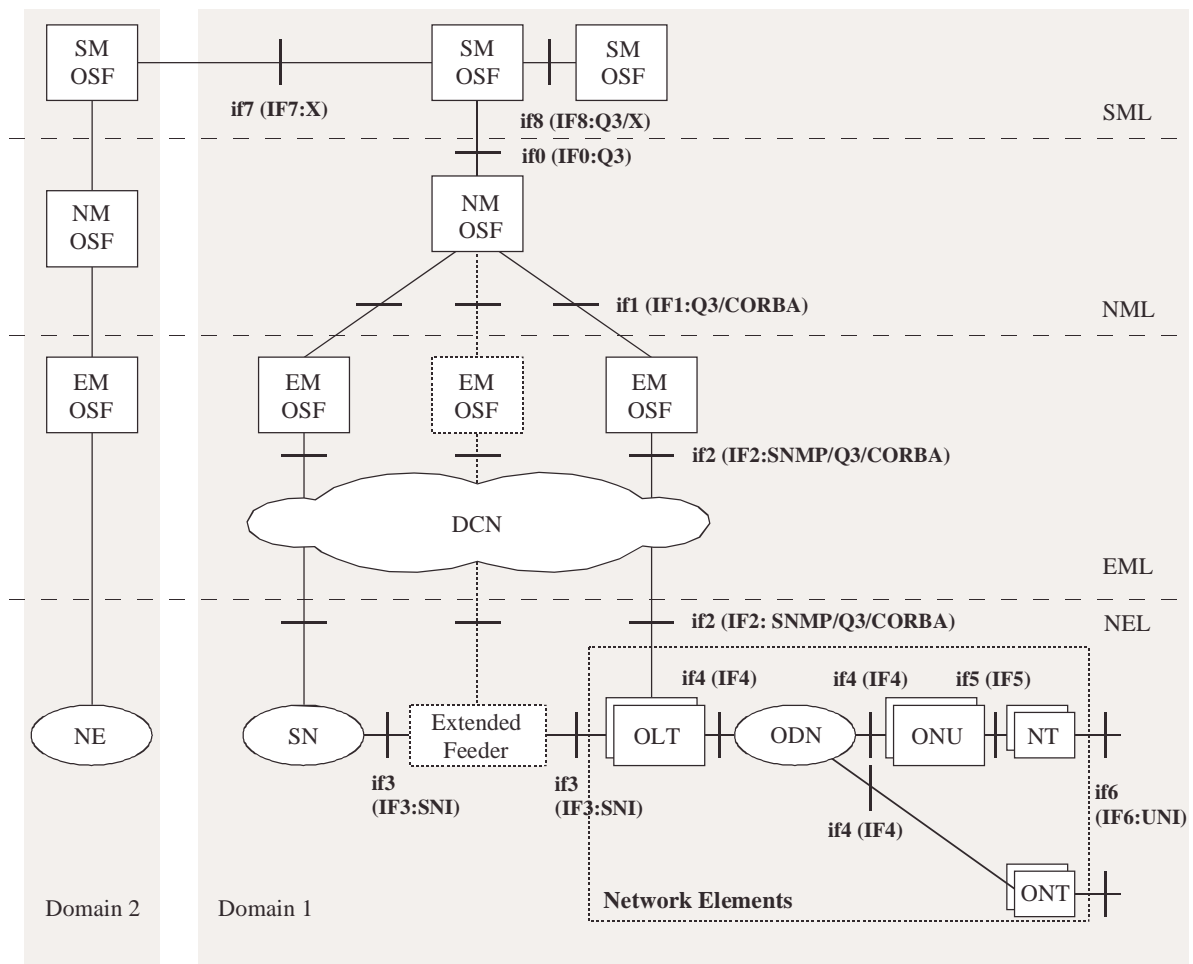
NOTE – The F interface as defined in ITU-T M.3010 is not shown in this figure but is implicit where there is an OSF.

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 resource is main (currently operating) and which is 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 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 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 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 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 conform to the cell format described in ITU-T 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.
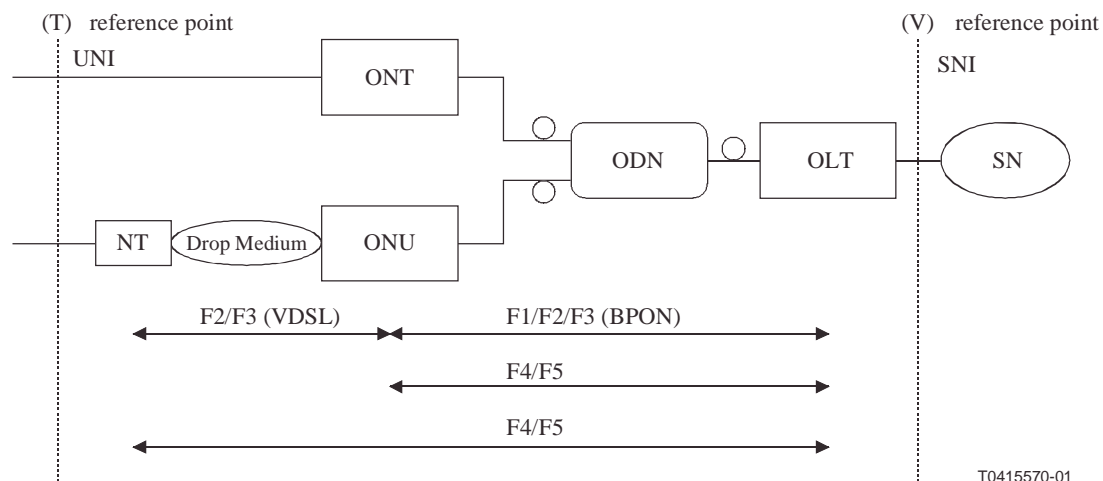
Figure I.5/Q.834.1 – FSAN OAM flows

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

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[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 I.610 (1999), *B-ISDN operation and maintenance principles and functions.*

[I-13]   ITU-T I.432 (1993), *B-ISDN User-network interface − Physical layer specification.*

APPENDIX II

Tables of managed entities

II.1   ITU-T Q.834.1

Table II.1/Q.834.1 − Usage of managed entities name

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
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

Table II.1/Q.834.1 – Usage of managed entities name

Managed entity name in this Recommendation	Related managed object name in other ITU-T Recommendations	Ref.
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
filterProfileF		new
LESServiceProfileF		new
logF	log (X.721)	AF20
MACBridgeConfigurationDataF		new
MACBridgeF		new
MACBridgePMCurrentDataF		new

Table II.1/Q.834.1 – Usage of managed entities name

Managed entity name in this Recommendation	Related managed object name in other ITU-T Recommendations	Ref.
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)	
vc4TTPF	vc4TTP (G.774)	
vcCTPF	vcCTP (I.751)	AF20
vcTTPF	vcTTP (I.751)	
vdslCTPF		new
vdslTTPF		new
VoiceCTPF		new

Table II.1/Q.834.1 – Usage of managed entities name

Managed entity name in this Recommendation	Related managed object name in other ITU-T Recommendations	Ref.
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   ITU-T Q.834.2

Table II.2/Q.834.1 – Usage of managed entities name (NW view)

Managed entity name in ITU-T Q.834.2	Related managed object in other ITU-T Recommendations	Ref.
accessGroupF	AccessGroup (M3100amd)	
adslLayerNetworkDomainF		new
adslLinkConnectionF		new
adslNetworkCTPF		new
adslSubnetworkF		new
adslTopologicalLinkEndF		new
adslTopologicalLinkF		new
APONLayerNetworkDomain		new
APONLink		new
APONLinkConnection		new
APONNetworkCTP		new
APONNetworkTTP		new
APONSubNetwork		new
APONTrail		new
BridgedLANLayerNetworkDomainF		new
BridgedLANNetworkCTPF		new
BridgedLANNetworkTTPF		new
BridgedLANSubnetworkF		new
DS1LayerNetworkDomainF		new
DS1NetworkCTPF		new

Table II.2/Q.834.1 – Usage of managed entities name (NW view)

Managed entity name in ITU-T Q.834.2	Related managed object in other ITU-T Recommendations	Ref.
DS1NetworkTTPF		new
DS1SubnetworkConnectionF		new
DS1SubnetworkF		new
DS3LayerNetworkDomainF		new
DS3NetworkCTPF		new
DS3NetworkTTPF		new
DS3SubnetworkConnectionF		new
DS3SubnetworkF		new
E1LayerNetworkDomainF		new
E1NetworkCTPF		new
E1NetworkTTPF		new
E1SubnetworkConnectionF		new
E1SubnetworkF		new
E3LayerNetworkDomainF		new
E3NetworkCTPF		new
E3NetworkTTPF		new
E3SubnetworkConnectionF		new
E3SubnetworkF		new
layerNetworkDomainF	LayerNetworkDomain (M3100amd)	AF58
linkConnectionF	LinkConnection (M3100amd)	AF58
logicalLinkEndF	LogicalLinkEnd (M3100amd)	
logicalLinkF	LogicalLink (M3100amd)	
logicalMTPLinkF		new
networkCTPF	NetworkCTP (M3100amd)	
networkF	networkR1 (M.3100)	AF58
networkTTPF	NetworkTTP (M3100amd)	
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)	
vcNetworkCTPF	vcNetworkCTP (M3100amd)	
vcNetworkTTPF	vcNetworkTTP (M3100amd)	

Table II.2/Q.834.1 – Usage of managed entities name (NW view)

Managed entity name in ITU-T Q.834.2	Related managed object in other ITU-T Recommendations	Ref.
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
vdslNetworkCTPF		new
vdslSubnetworkF		new
vdslTopologicalLinkEndF		new
vdslTopologicalLinkF		new
voiceLayerNetworkDomainF		new
voiceNetworkCTPF		new
voiceNetworkTTPF		new
voiceSubnetworkConnectionF		new
voiceSubnetworkF		new
vpLayerNetworkDomainF	LayerNetworkDomain (M.3100amd)	AF58
vpLinkConnectionF	LinkConnection (M.3100amd)	AF58
vpLogicalLinkF	LogicalLink (M3100amd)	
vpNetworkCTPF	vpNetworkCTP (M3100amd)	
vpNetworkTTPF	vpNetworkTTP (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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