The ATM Forum
Technical Committee

CMIP Specification for the M4 Interface

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1. Introduction

This document specifies an ATM information model that provides a formal representation of the information exchanged between a managed system (e.g., an ATM NE) and a managing system using Guidelines for the Definition of Managed Objects (GDMO) templates, Abstract Syntax Notation One (ASN.1) syntax, and the Common Management Information Service Element (CMISE) services and protocol. This information model was specifically designed to meet the criteria defined in the ATM Forum's M4 Interface Specification[1].

The model presented in this document reuses existing ITU-T Recommendations and other standards on information modeling where applicable. The ITU-T Recommendations referenced in this model are as follows:

- ITU-T Recommendation G.774 and G.774-01[2]
- ITU-T Recommendation M.3100[3]
- ITU-T Recommendation Q.822[4]
- ITU-T Recommendation X.721[5]
- ITU-T Recommendation X.739[6]

Other information modeling documents such as Bellcore's GR-836-IMD[7] and ANSI's T1.247[8] have been applied here for specific objects that have not yet been addressed in ITU-T.

The information model presented in this document was defined specifically to meet the functional requirements of the M4 Interface as set forth by the ATM Forum in 94-388R4[1]. When possible, the ATM Forum drew upon existing ATM CMIP modeling work in this area. Two models in particular that served as significant sources of input in the creation of this Information Model were ETSI's NA5-2210[9], "B-ISDN Management Architecture and Management Information Model for the ATM cross-connect", and Bellcore's TA-NWT-001114 Issue 2[10], "Generic Requirements for Operations Interfaces Using OSI Tools: ATM/Broadband Network Management".

The focus of this specification is on the definition of a Management Information Base (MIB) for CMIP implementations of the M4 Interface. See Annex A for recommended communication stacks to support the CMIP-based M4 Interface.

2. ATM NE Management Information Model

This document defines an information model that provides a formal representation of the information exchanged across the CMIP-based interface used to manage ATM Network Elements (NEs).

Note that the terminology used in the information modeling community to describe ATM/SDH based networks is not always the same as the terminology used by the broader range of ATM/SDH subject matter experts. Table 2-1 has been provided to assist the reader in understanding the mapping between these terms.

Table 2-1: Mapping of Equivalent Terms

Information Modeling Term	Commonly Used Equivalent
ATM Virtual Channel (VC) Connection	ATM Virtual Channel Link (VCL)
ATM Virtual Channel (VC) Trail	ATM Virtual Channel Connection (VCC)
ATM Virtual Path (VP) Connection	ATM Virtual Path Link (VPL)
ATM Virtual Path (VP) Trail	ATM Virtual Path Connection (VPC)
Inter-NNI	Broadband Inter Carrier Interface (BICI)
Intra-NNI	Broadband Inter Switching System Interface (BISSI)
SDH Administrative Unit Group (aug)	SONET STS-3 Group
SDH Administrative Unit 4 (au4) Connection	SONET STS-3c Channel
SDH Regenerator Section (rs) Connection	SONET Section
SDH Multiplex Section (ms) Connection	SONET Line
SDH Virtual Container 4 (vc4) Trail	SONET STS-3c Path

The similarity in the two sets of terminology can be a source of confusion for the first time reader, especially the terminology used to describe ATM VPs and VCs. The reader is urged to become familiar with the above mapping before delving into the details of the information model presented here.

Figures 2-1a, b, c and d illustrate the containment relationships between the managed object classes identified here for support of ATM NE management. Note that an arrow pointing from one object class to another object class represents the subordinate/superior relationship used as the basis for naming managed object classes.

Figures 2-2a, b, c, d, e, and f illustrate the inheritance relationships between these managed object classes.

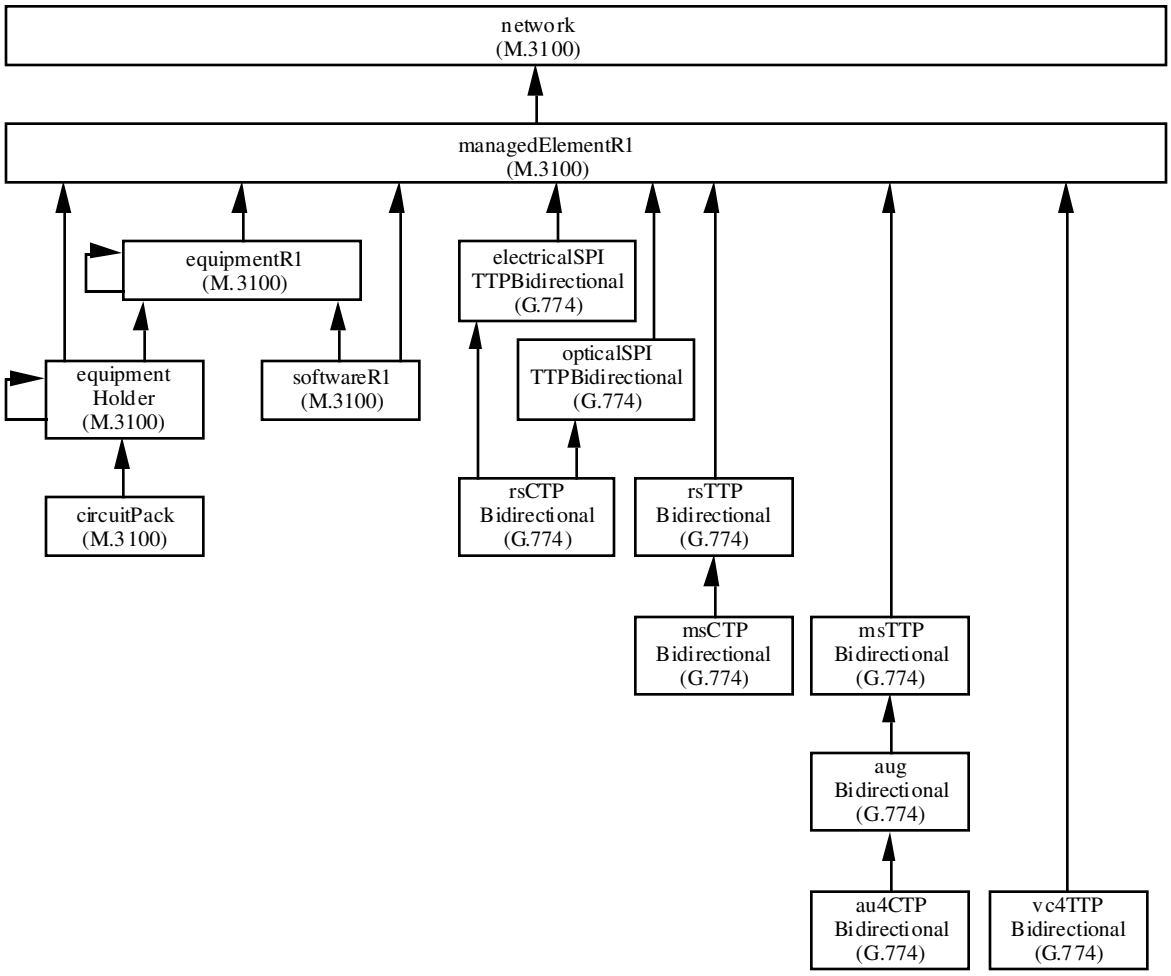


Figure 2-1a: Containment Tree Diagram (1 of 4)

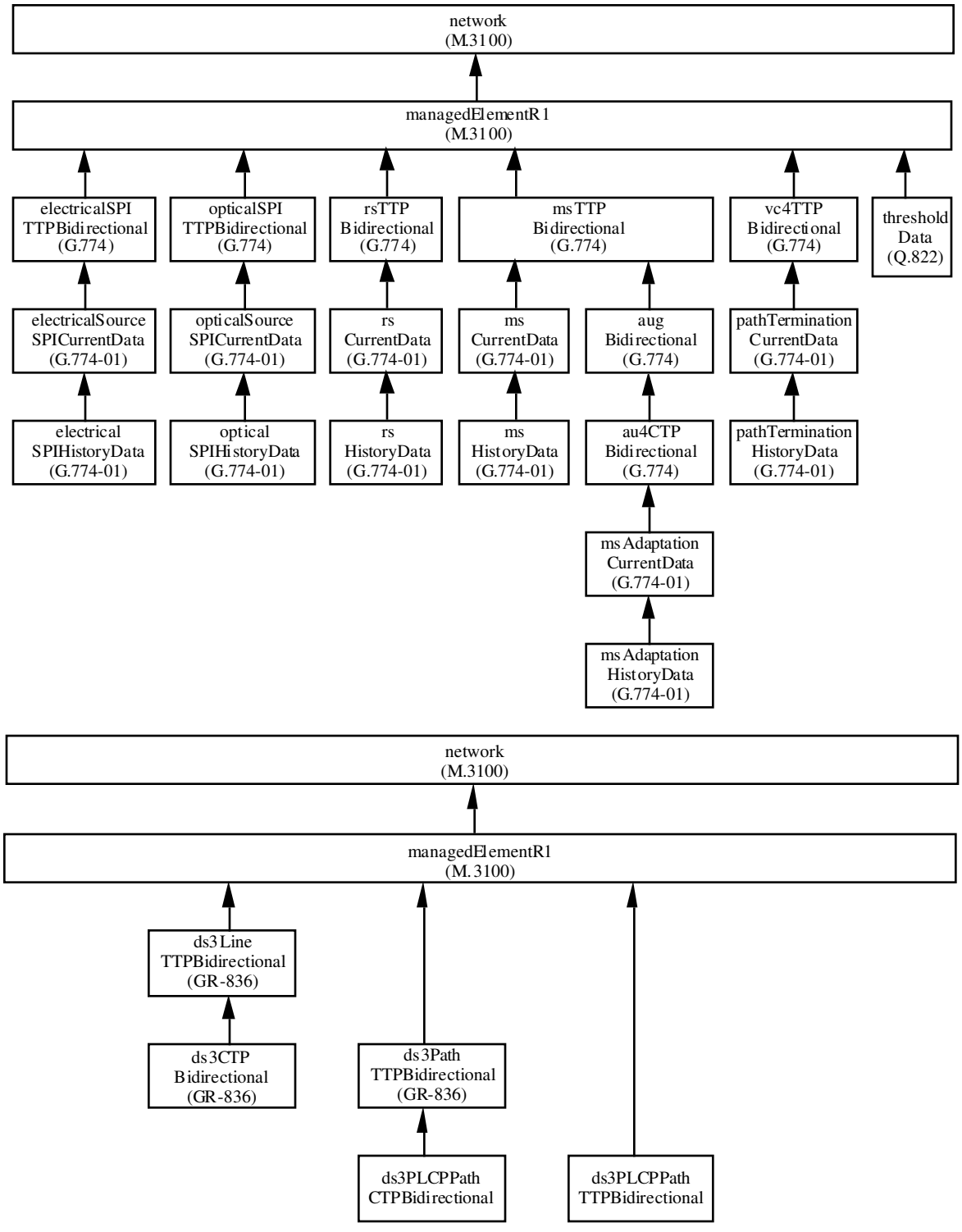


Figure 2-1b: Containment Tree Diagram (2 of 4)

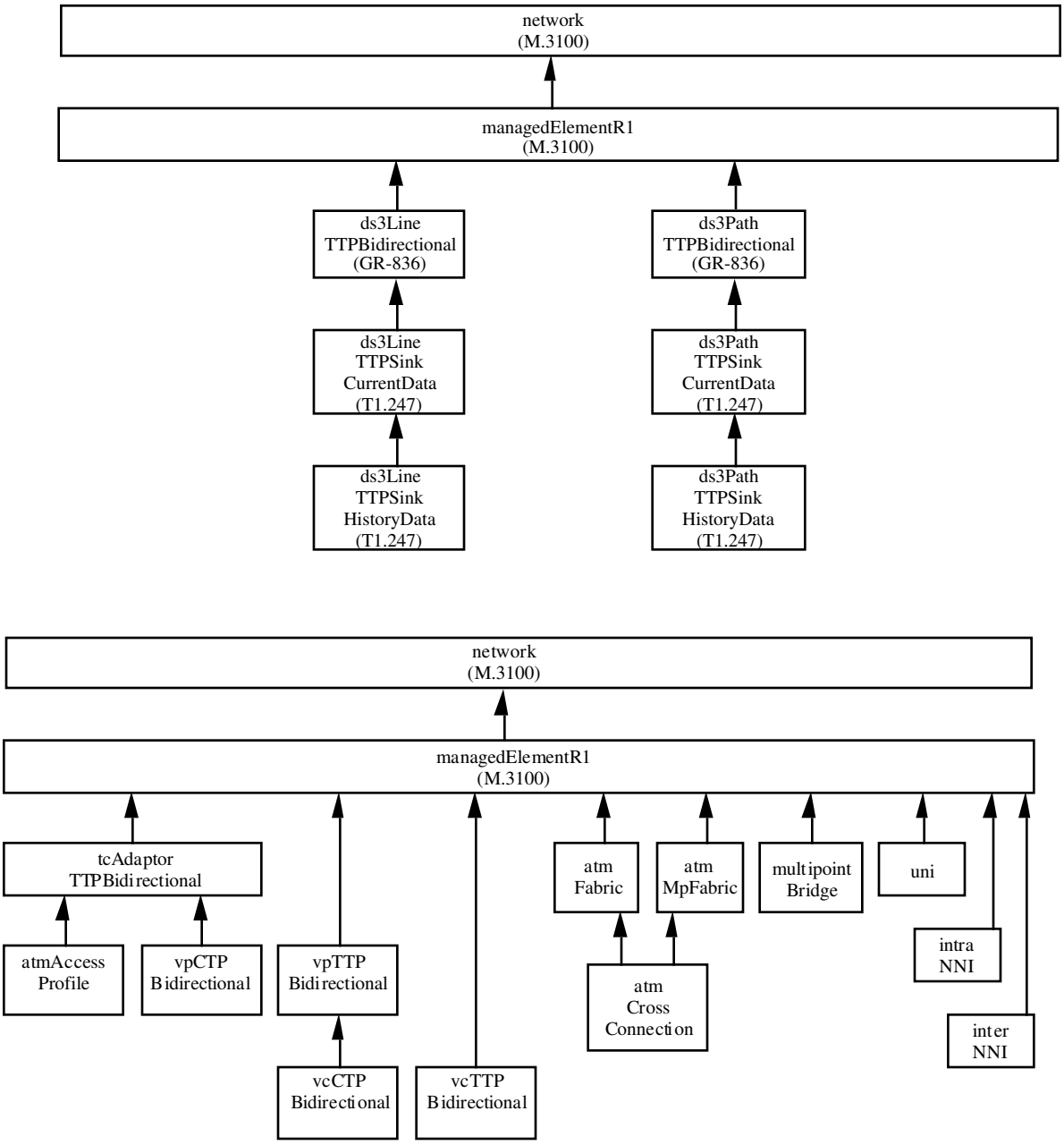


Figure 2-1c: Containment Tree Diagram (3 of 4)

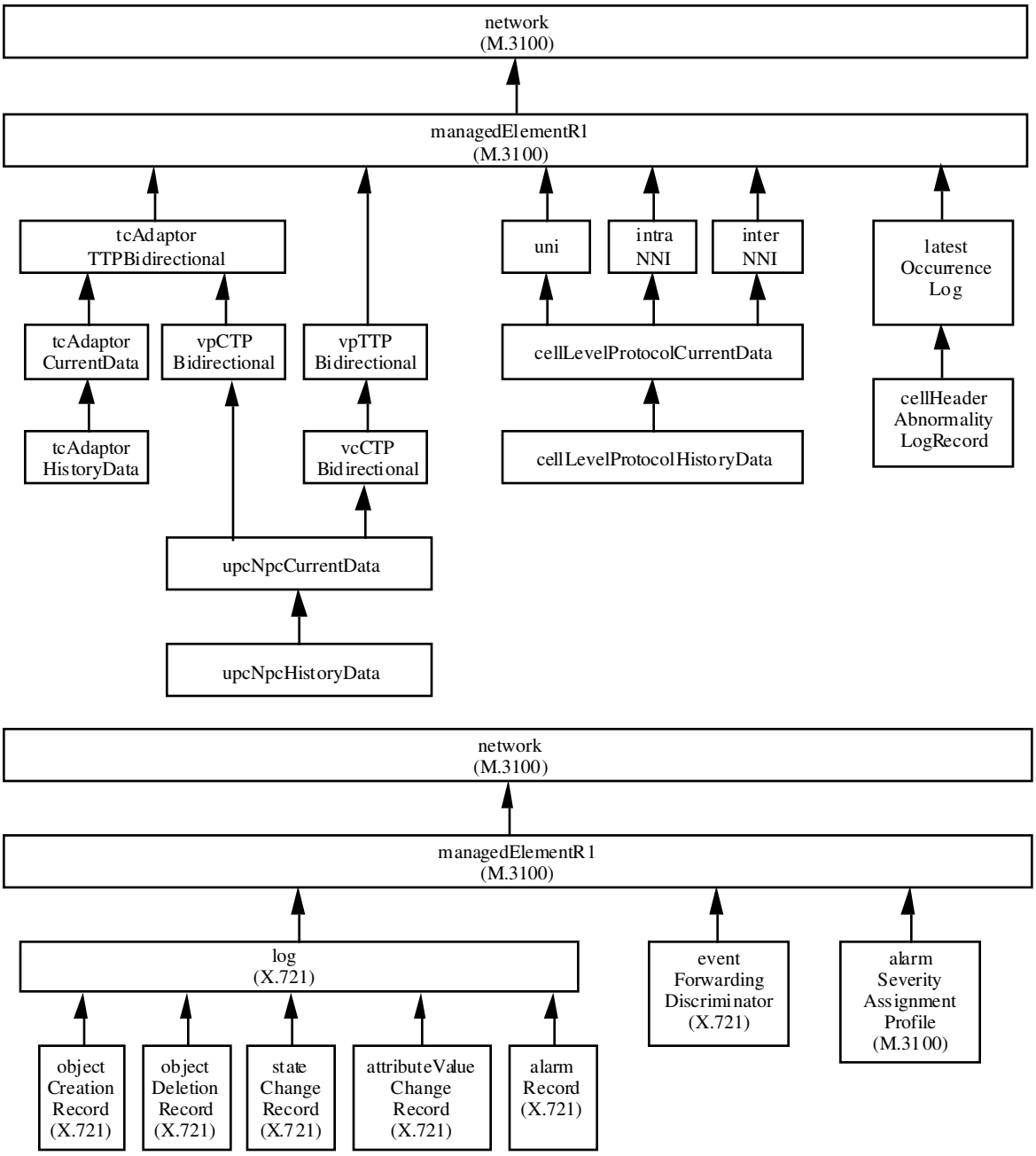


Figure 2-1d: Containment Tree Diagram (4 of 4)

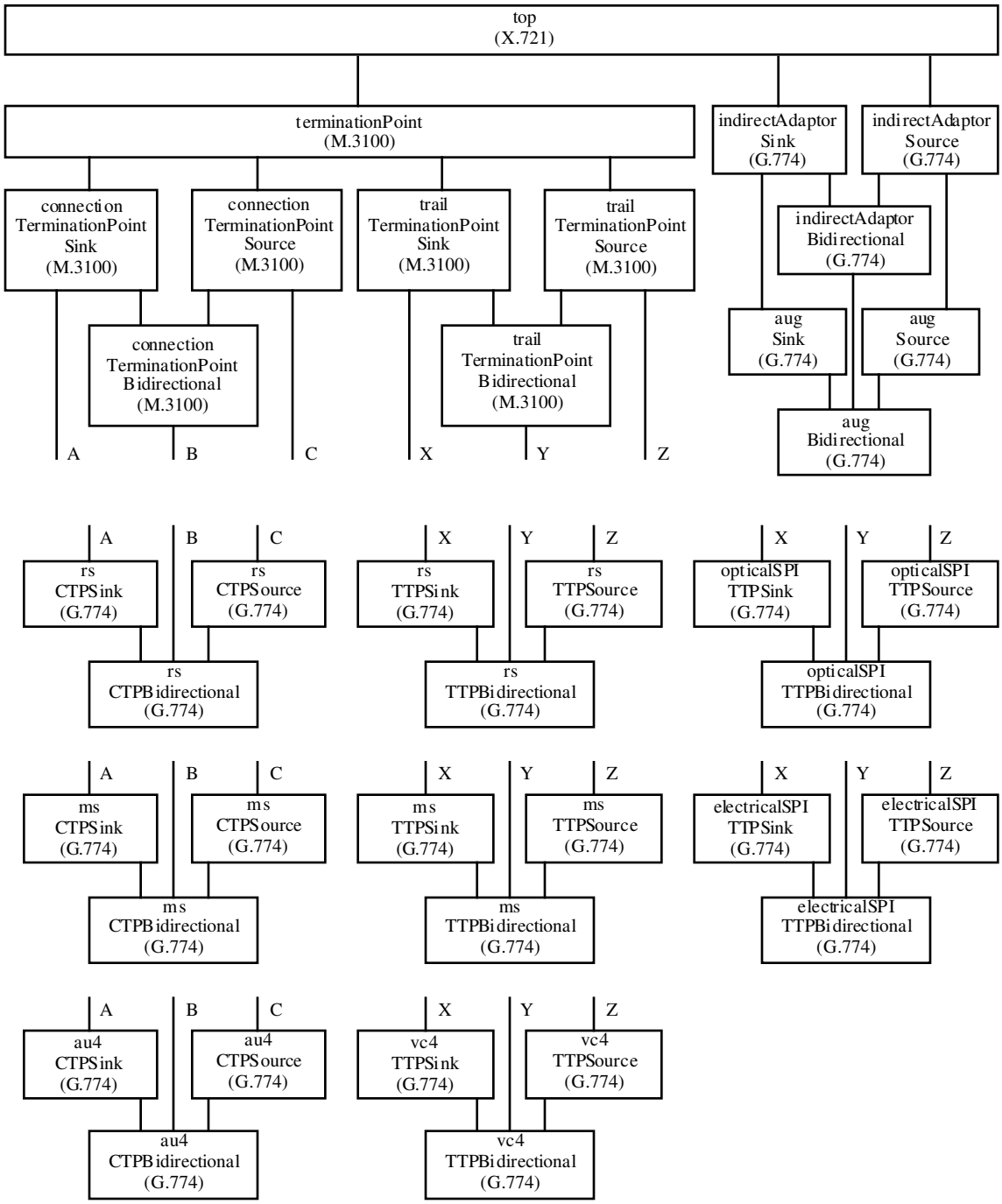


Figure 2-2a: Inheritance Tree Diagram (1 of 6)

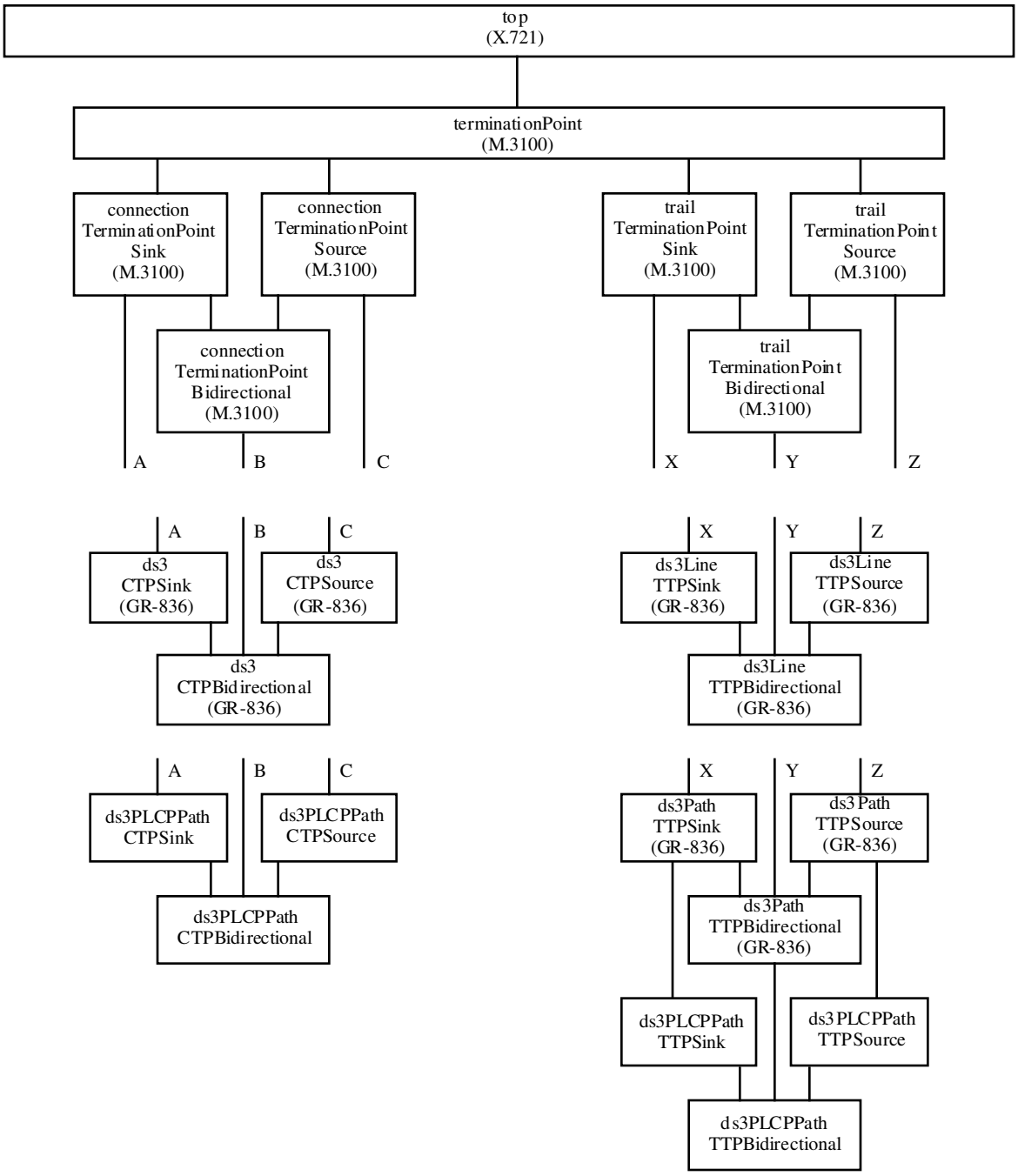


Figure 2-2b: Inheritance Tree Diagram (2 of 6)

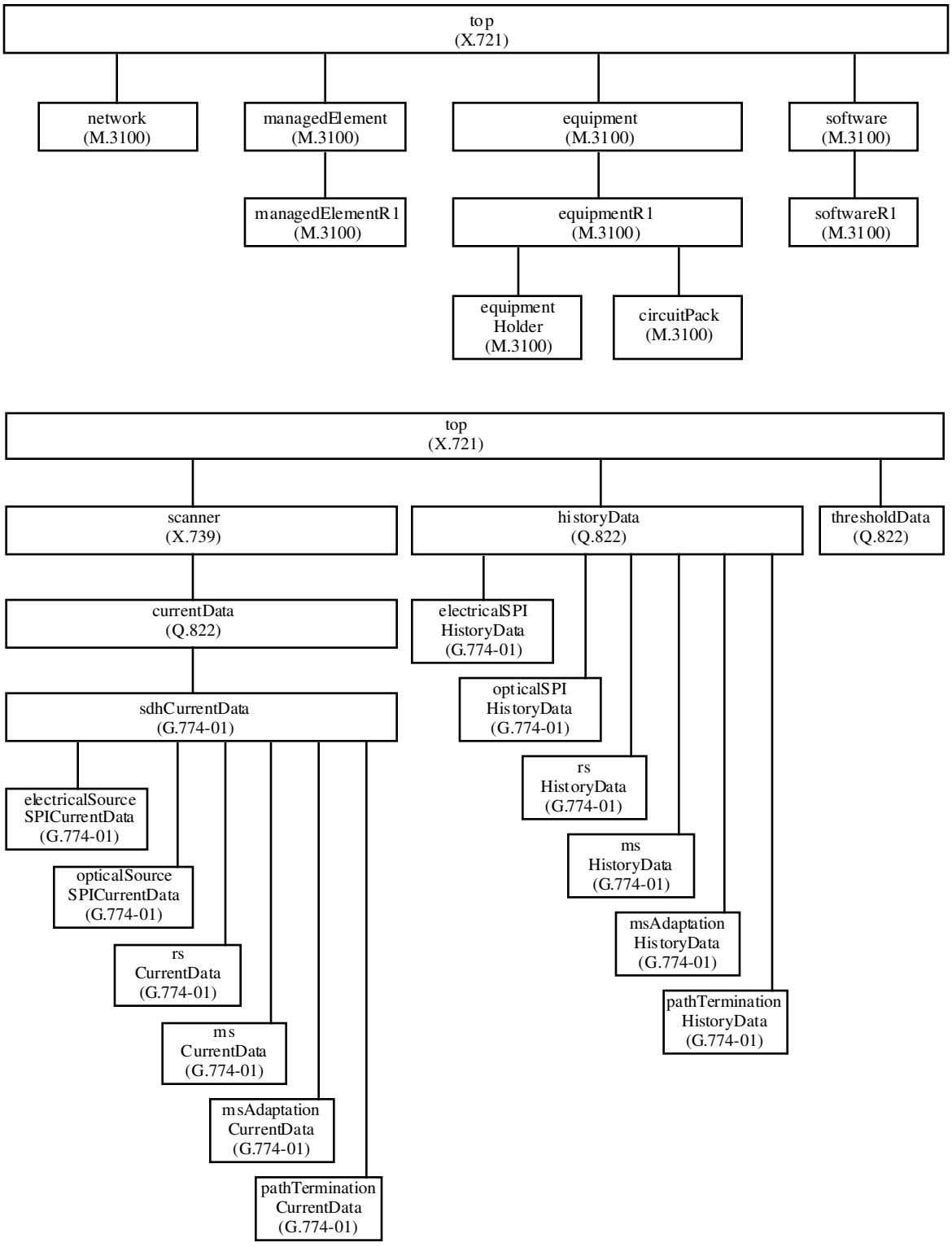


Figure 2-2c: Inheritance Tree Diagram (3 of 6)

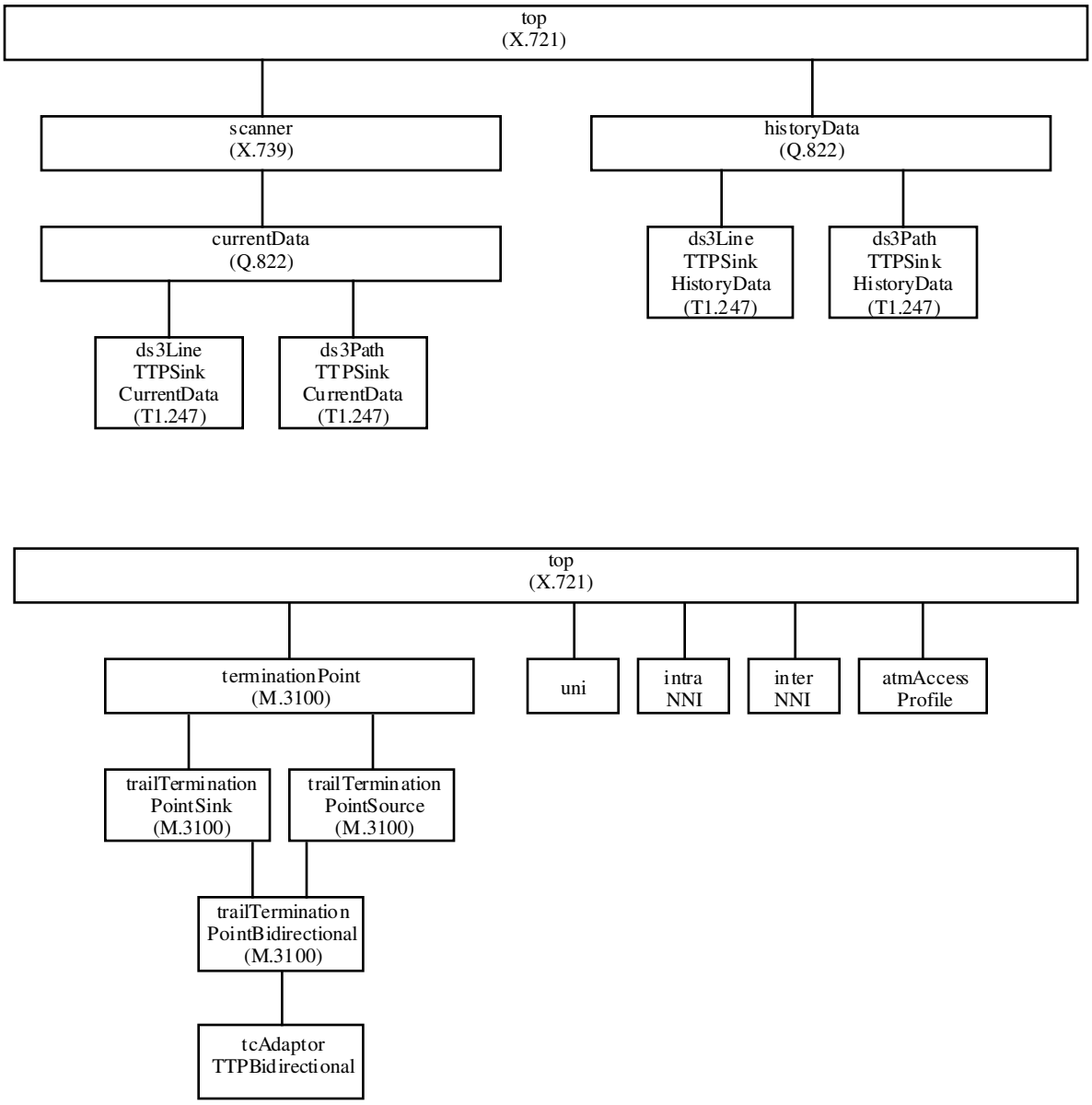
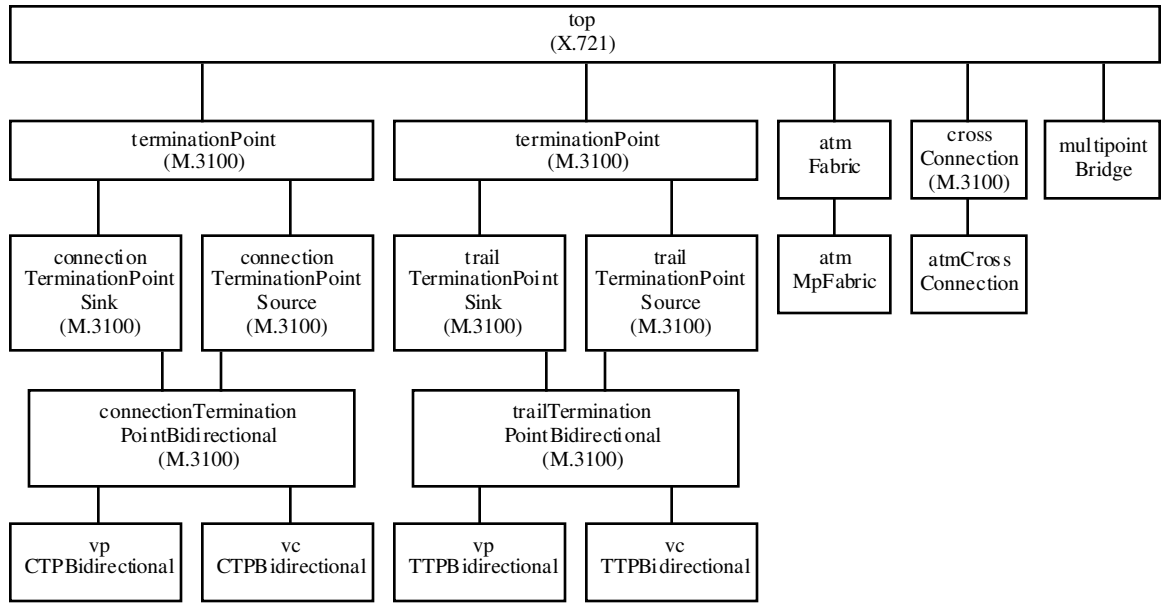


Figure 2-2d: Inheritance Tree Diagram (4 of 6)



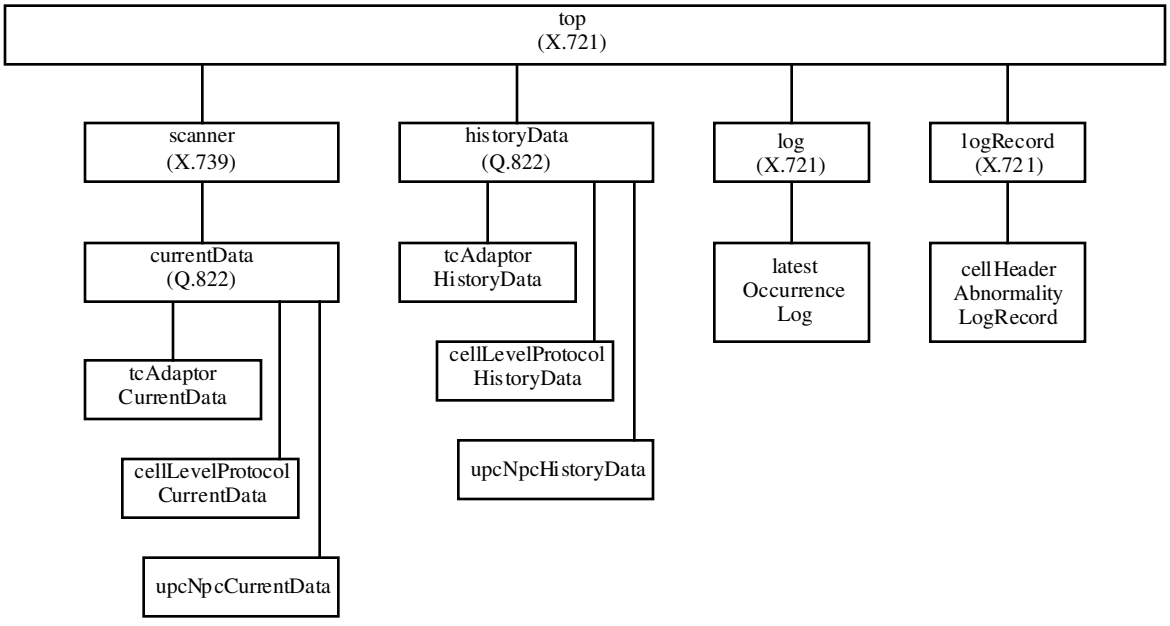


Figure 2-2e: Inheritance Tree Diagram (5 of 6)

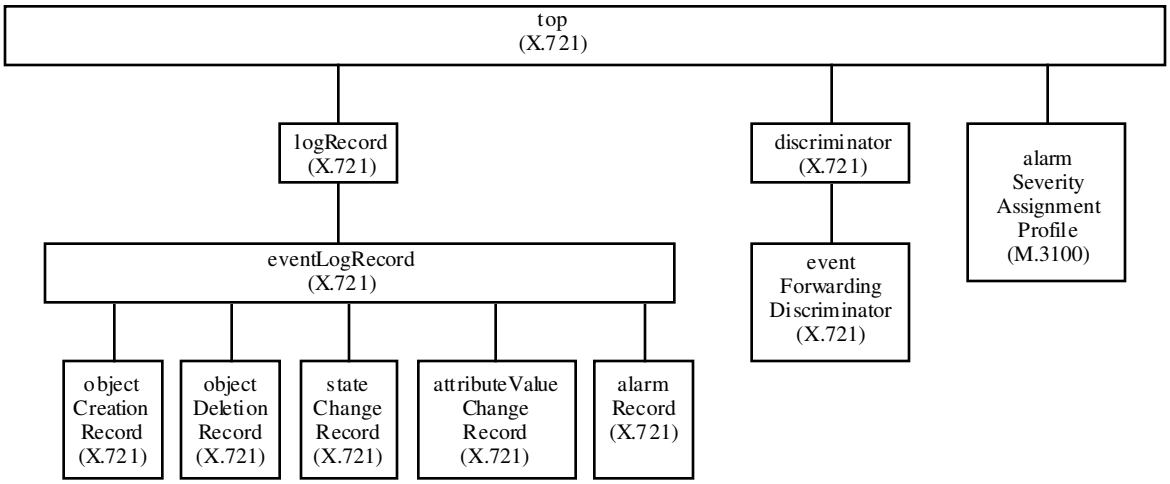


Figure 2-2f: Inheritance Tree Diagram (6 of 6)

2.1. Managed Objects

2.1.1. atmAccessProfile

```
atmAccessProfile MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        "ITU-T M.3100": attributeValueChangeNotificationPackage,
        "ITU-T M.3100": createDeleteNotificationsPackage,
        atmAccessProfilePkg PACKAGE
            BEHAVIOUR atmAccessProfileBeh;
            ATTRIBUTES
                atmAccessProfileId
                    GET;;;
        CONDITIONAL PACKAGES
            vpLevelProfilePackage
                PRESENT IF      "profiling of the VP level at the ATM interface is
                                supported",
            vcLevelProfilePackage
                PRESENT IF      "profiling of the VC level at the ATM interface is
                                supported";
REGISTERED AS {atmfM4ObjectClass 1};

atmAccessProfileBeh BEHAVIOUR
    DEFINED AS
        " The atmAccessProfile object class is a class of managed objects that characterize the client/server
        relationship at the VP and/or VC level.

        Instances of this managed object class are explicitly created and deleted by the managing system
        using the CMIS M-CREATE and M- DELETE services, respectively. ";
```

2.1.2. atmCrossConnection

```
atmCrossConnection MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": crossConnection;
    CHARACTERIZED BY
        "ITU-T M.3100": createDeleteNotificationsPackage,
        atmCrossConnectionPkg PACKAGE
            BEHAVIOUR atmCrossConnectionBeh;
            ATTRIBUTES
                recoveryType
                    GET-REPLACE;;;
REGISTERED AS {atmfM4ObjectClass 2};

atmCrossConnectionBeh BEHAVIOUR
    DEFINED AS
        "For point-to-point ATM VP and VC cross-connections, this managed object identifies the cross-connection
        relationship between two instances of the vpCTPBidirectional object class or vcCTPBidirectional object
        class, respectively. The vpCTPBidirectional or vcCTPBidirectional object instances being cross-connected
```

are identified by the fromTermination and toTermination attributes inherited from the crossConnection object class defined in ITU-T Recommendation M.3100.

For multipoint ATM VP and VC cross-connections, this managed object identifies the cross-connect relationship between an instance of the vpCTPBidirectional object class or vcCTPBidirectional object class and an instance of the multipointBridge object class. For multipoint ATM VP and VC cross-connections, each vpCTPBidirectional or vcCTPBidirectional object instance connected to the multipointBridge object is identified by the fromTermination attribute of the atmCrossConnection object, while the instance of the multipointBridge object class is identified by the toTermination attribute. Note that multipoint ATM cross-connections are established by cross-connecting multiple instances of the vpCTPBidirectional or vcCTPBidirectional object class (each with its own atmCrossConnection object) to a single instance of the multipointBridge object class.

The administrativeState attribute inherited by this managed object may be used by the managing system to inhibit (lock) and allow (unlock) ATM cell flow through the ATM cross-connection being represented.

The recoveryType attribute identifies whether the ATM cross-connection is recoverable (default) or non-recoverable. Recoverable cross-connections remain intact regardless of the operational state of the cross-connection. Non-recoverable ATM cross-connections are cross-connections that are automatically released by the managed system upon detection of a service affecting failure.

Instances of this object class are automatically created and deleted by the managed system based on operations performed on the containing atmFabric or atmMpFabric object.

All ATM VP/VC cross-connections are, by definition, bi-directional; therefore, the directionality attribute, inherited from the crossConnection object class, shall be set to the fixed value of bidirectional.

The value of the signalType attribute is for further study. ";

2.1.3. atmFabric

```
atmFabric MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        atmFabricPackage  PACKAGE
            BEHAVIOUR atmFabricBeh;
            ATTRIBUTES
                atmFabricId
                    GET,
                "Rec. X.721 | ISO/IEC 10165-2":administrativeState
                    GET-REPLACE,
                "Rec. X.721 | ISO/IEC 10165-2":operationalState
                    GET,
                "Rec. X.721 | ISO/IEC 10165-2":availabilityStatus
                    GET;
            ACTIONS
                connect,
                disconnect;;;
REGISTERED AS {atmfM4ObjectClass 3};

atmFabricBeh BEHAVIOUR
    DEFINED AS
```

"This object class represents the function of managing the establishment and release of ATM cross-connections.

Administrative State:

- Unlocked: The atmFabric is allowed to perform its normal functions. ACTIONS will be accepted to setup or remove cross-connections.

- Locked: The atmFabric is not allowed to perform its normal functions. No ACTIONS will be accepted. No new cross-connection can be setup or removed.

Operational State:

- Enabled: When the atmFabric is in the enabled operational state, it may be fully operational or partially operational (partially operational is indicated by the availability status attribute).

- Disabled: The atmFabric is incapable of performing its normal function. For instance, the managing system will not be able to setup or remove any cross-connection.

Availability Status, the supported values are:

- Degraded: The atmFabric is degraded in some respect. For instance, the atmFabric cannot perform the function of establishing new cross-connections while it can still accept ACTIONs to tear down existing connections. The atmFabric remains available for service (i.e. its operational state is enabled) while it is degraded.

- Empty SET (none of the availableStatus conditions exist).

One instance of the atmFabric object class shall be automatically created by the managed system upon completion of system initialization. Further creation and deletion of such objects is not supported.";

2.1.4. atmMpFabric

```
atmMpFabric MANAGED OBJECT CLASS
    DERIVED FROM atmFabric;
    CHARACTERIZED BY
        atmMpFabricPackage  PACKAGE
            BEHAVIOUR atmMpFabricBeh;
            ACTIONS
                connectMultipointBridge,
                disconnectMultipointBridge,
                addTpsToMultipointBridge,
                removeTpsFromMultipointBridge;;;
REGISTERED AS {atmfM4ObjectClass 4};

atmMpFabricBeh BEHAVIOUR
```

DEFINED AS
"This object class is derived from the atmFabric object class. In addition to all the functionality supported by the super classes, this object class manages the establishment and release of multipoint ATM cross connections.

Administrative State:

- Unlocked: The atmMpFabric is allowed to perform its normal functions. ACTIONS will be accepted to setup or remove multipoint cross-connections, or to rearrange multipoint cross-connections.

- Locked: The atmMpFabric is not allowed to perform its normal functions. No ACTIONS will be accepted. No new multipoint cross-connection can be setup or removed and no multipoint connections may be rearranged.

Operational State:

- Enabled: When the atmMpFabric is in the enabled operational state, it may be fully operational or partially operational (partially operational is indicated by the availability status attribute).

- Disabled: The atmMpFabric is incapable of performing its normal function. For instance, the managing system will not be able to setup or remove any multipoint cross-connection.

Availability Status, the supported values for this attribute are:

- Degraded: The atmMpFabric is degraded in some respect. For instance, the atmMpFabric cannot perform the function of establishing new cross-connections while it can still accept ACTIONs to rearrange existing connections. The atmMpFabric remains available for service (i.e. its operational state is enabled) while it is degraded.

- Empty SET (none of the availableStatus conditions exist).";

2.1.5. cellHeaderAbnormalityLogRecord

```
cellHeaderAbnormalityLogRecord MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":logRecord;
    CHARACTERIZED BY
        cellHeaderAbnormalityLogRecordPkg PACKAGE
            BEHAVIOUR cellHeaderAbnormalityLogRecordBeh;
            ATTRIBUTES
                cellHeaderAbnormalityType
                    GET,
                interfacePointer
                    GET,
                vpiValue
                    GET,
```

```
                vciValue
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 5};

cellHeaderAbnormalityLogRecordBeh BEHAVIOUR
    DEFINED AS
        " The cellHeaderAbnormalityLogRecord object class is a class of managed support objects used to
        log information that describes ATM cell header protocol abnormality events detected by the
        managed system.

        Attributes have been defined so that each record of the log conveys the following information:

        • Abnormality Type (Unassigned VPI/VCI Value, or Out-of-Range VPI/VCI
          Value)
        • VPI/VCI Value
        • ATM Interface (i.e., pointer to the associated uni, interNNI, or intraNNI
          object)
        • Date and Time of Log Entry

        The latestOccurrenceLog containing this managed object class shall have the keyAttributeList attribute set
        to include cellHeaderAbnormalityType and interfacePointer.

        Instances of this managed object class shall exist to record the latest occurrence of each
        abnormality type per UNI, Inter-NNI, and Intra-NNI. Therefore, the maximum number of instances of this
        object class that can exist in the managed system is equal to twice the number of interfaces supported by the
        managed system. As new instances of this managed object class are created by the managed
        system, previous instances with the same cellHeaderAbnormalityType and interfacePointer attribute
        values shall be automatically deleted.";
```

2.1.6. cellLevelProtocolCurrentData

```
cellLevelProtocolCurrentData MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T Q.822":currentData;
    CHARACTERIZED BY
        "ITU-T M.3100": createDeleteNotificationsPackage,
        cellLevelProtocolCurrentDataPkg PACKAGE
            BEHAVIOUR cellLevelProtocolCurrentDataBeh;
            ATTRIBUTES
                discardedCellsInvalidHeader
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE AtmMIBMod.integerZero
                    GET,
                numReceivedOAMCells
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE AtmMIBMod.integerZero
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 6};

cellLevelProtocolCurrentDataBeh BEHAVIOUR
    DEFINED AS
```

" Instances of the cellLevelProtocolCurrentData object class are used to hold the current (15 minute) register counts reflecting the protocol monitoring functions performed per ATM UNI, Inter-NNI, and Intra-NNI.

Each instance of this managed object shall maintain a thresholded count of the number of cells discarded due to the detection of ATM Layer protocol violations (e.g., unassigned VPI/VCI value, out-of-range VPI/VCI value, or undefined Payload Type Indication value). In addition, an unthresholded count of the number of OAM cells received and processed (per ATM Interface) shall be maintained by this object.

Instances of this object class should be inherently created by the managed system whenever an instance of the uni, interNNI, or intraNNI object class is created.

This managed object class uses the cellLevelProtocolHistoryData managed object class for history retention. ";

2.1.7. cellLevelProtocolHistoryData

```
cellLevelProtocolHistoryData MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T Q.822":historyData;
    CHARACTERIZED BY
        cellLevelProtocolHistoryDataPkg PACKAGE
            BEHAVIOUR cellLevelProtocolHistoryDataBeh;
            ATTRIBUTES
                discardedCellsInvalidHeader
                    GET,
                numReceivedOAMCells
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 7};

cellLevelProtocolHistoryDataBeh BEHAVIOUR
    DEFINED AS
        " Instances of the cellLevelProtocolHistoryData object class are used to store the observed events
        of a cellLevelProtocolCurrentData object at the end of the 15-minute granularity period. Instances
        of this managed object class are contained by an instance of the cellLevelProtocolCurrentData
        managed object class. ";
```

2.1.8. ds3PLCPPathCTPBidirectional

```
ds3PLCPPathCTPBidirectional  MANAGED OBJECT CLASS
    DERIVED FROM      ds3PLCPPathCTPSink,
                          ds3PLCPPathCTPSource,
                          "ITU-T M.3100": connectionTerminationPointBidirectional;
    CHARACTERIZED BY
        ds3PLCPPathCTPBidirectionalPkg PACKAGE
            BEHAVIOUR  ds3PLCPPathCTPBidirectionalBeh;;;
REGISTERED AS {atmfM4ObjectClass 8};

ds3PLCPPathCTPBidirectionalBeh  BEHAVIOUR
```

DEFINED AS
"This object class represents a termination point where a DS3 PLCP link connection is both originated and terminated.

The downstreamConnectivityPointer and upstreamConnectivityPointer attributes point to an instance of the ds3PLCPPathTTPBidirectional object class.

The supportedByObjectList attribute, inherited from the terminationPoint object class, shall be set equal to the empty set.";

2.1.9. ds3PLCPPathCTPSink

```
ds3PLCPPathCTPSink  MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": connectionTerminationPointSink;
    CHARACTERIZED BY
        ds3PLCPPathCTPSinkPkg      PACKAGE
            BEHAVIOUR  ds3PLCPPathCTPSinkBeh;
            ATTRIBUTES
                ds3PLCPPathCTPId
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 9};

ds3PLCPPathCTPSinkBeh  BEHAVIOUR
    DEFINED AS
        "This object class represents a termination point where a DS3 PLCP link connection is terminated.

        This object class is used for inheritance purposes only.";
```

2.1.10. ds3PLCPPathCTPSource

```
ds3PLCPPathCTPSource  MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": connectionTerminationPointSource;
    CHARACTERIZED BY
        ds3PLCPPathCTPSourcePkg   PACKAGE
            BEHAVIOUR  ds3PLCPPathCTPSourceBeh;
            ATTRIBUTES
                ds3PLCPPathCTPId
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 10};

ds3PLCPPathCTPSourceBeh  BEHAVIOUR
    DEFINED AS
        "This object class represents a termination point where a DS3 PLCP link connection is originated.

        This object class is used for inheritance purposes only.";
```

2.1.11. ds3PLCPPathTTPBidirectional

```
ds3PLCPPathTTPBidirectional  MANAGED OBJECT CLASS
    DERIVED FROM      ds3PLCPPathTTPSink,
                              ds3PLCPPathTTPSource,
                              "Bellcore GR-836": ds3PathTTPBidirectional;
    CHARACTERIZED BY
        ds3PLCPPathTTPBidirectionalPkg  PACKAGE
            BEHAVIOUR  ds3PLCPPathTTPBidirectionalBeh;;;
REGISTERED AS {atmfM4ObjectClass 11};

ds3PLCPPathTTPBidirectionalBeh  BEHAVIOUR
    DEFINED AS
        "This object class represents a termination point where a DS3 PLCP trail is both originated and terminated.

        The downstreamConnectivityPointer and upstreamConnectivityPointer attributes point to an instance of the
        ds3PLCPPathCTPBidirectional object class.

        The supportedByObjectList attribute, inherited from the terminationPoint object class, shall point to the
        supporting instance of the ds3PathTTPBidirectional object class.  This attribute may also point to the
        equipment object that supports the DS3 PLCP trail termination point.

        The tmnCommunicationsAlarmInformationPackage shall be used to report loss-of-frame events and the
        clearing of these events.";
```

2.1.12. ds3PLCPPathTTPSink

```
ds3PLCPPathTTPSink  MANAGED OBJECT CLASS
    DERIVED FROM "Bellcore GR-836":ds3PathTTPSink;
    CHARACTERIZED BY
        ds3PLCPPathTTPSinkPkg      PACKAGE
            BEHAVIOUR  ds3PLCPPathTTPSinkBeh;;;
REGISTERED AS {atmfM4ObjectClass 12};

ds3PLCPPathTTPSinkBeh  BEHAVIOUR
    DEFINED AS
        "This object class represents a termination point where a DS3 PLCP trail is terminated.

        This object class is used for inheritance purposes only.";
```

2.1.13. ds3PLCPPathTTPSource

```
ds3PLCPPathTTPSource  MANAGED OBJECT CLASS
    DERIVED FROM "Bellcore GR-836":ds3PathTTPSource;
    CHARACTERIZED BY
        ds3PLCPPathTTPSourcePkg   PACKAGE
            BEHAVIOUR  ds3PLCPPathTTPSourceBeh;;;
REGISTERED AS {atmfM4ObjectClass 13};

ds3PLCPPathTTPSourceBeh  BEHAVIOUR
    DEFINED AS
```

"This object class represents a termination point where a DS3 PLCP trail is originated.

This object class is used for inheritance purposes only.";

2.1.14. interNNI

```
interNNI MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        interNNIPkg PACKAGE
            BEHAVIOUR interNNIBeh;
            ATTRIBUTES
                interNNIId
                    GET,
                underlyingTTPPointer
                    GET;;;
        CONDITIONAL PACKAGES
            "ITU-T M.3100: 1992": createDeleteNotificationsPackage
                PRESENT IF      "the objectCreation and objectDeletion notifications
                                defined in Recommendation X.721 are supported by an
                                instance of this class.",
            farEndCarrierNetworkPkg
                PRESENT IF      "call processing functions supporting exchange access
                                service over the Inter-NNI are performed in the managed
                                system",
            loopbackLocationIdentifierPkg
                PRESENT IF      "supplied by the managing system";
REGISTERED AS {atmfM4ObjectClass 14};

interNNIBeh BEHAVIOUR
    DEFINED AS
        " This managed object is used to configure and identify an ATM Interface on the managed system
        as an Inter-NNI.

        The underlyingTTPPointer attribute provides a pointer relationship to the tcAdaptorTTPBidirectional
        object that represents the location in the managed system where ATM is adapted to the physical
        transmission path.

        The loopbackLocationIdentifierPkg provides a read/write code used for OAM cell loopback purposes.
        Incoming OAM Loopback cells with a Loopback Location field value that matches the value of the
        loopbackLocationIdentifier attribute shall be looped-back over the Inter-NNI.

        An instance of this object class shall exist for each Inter-NNI on the managed system. Instances
        of this object class are explicitly created and deleted by the managing system using the CMIS
        M-CREATE and M- DELETE services, respectively. ";
```

2.1.15. intraNNI

```
intraNNI MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":top;
```

```
    CHARACTERIZED BY
        intraNNIPkg PACKAGE
            BEHAVIOUR intraNNIBeh;
            ATTRIBUTES
                intraNNIId
                    GET,
                underlyingTTPPointer
                    GET;;;
        CONDITIONAL PACKAGES
            "ITU-T M.3100: 1992": createDeleteNotificationsPackage
                PRESENT IF      "the objectCreation and objectDeletion notifications
                                defined in Recommendation X.721 are supported by an
                                instance of this class.",
            loopbackLocationIdentifierPkg
                PRESENT IF      "supplied by the managing system";
REGISTERED AS {atmfM4ObjectClass 15};

intraNNIBeh BEHAVIOUR
    DEFINED AS
        " This managed object is used to configure and identify an ATM Interface on the managed system
        as an Intra-NNI.

        The underlyingTTPPointer attribute provides a pointer relationship to the tcAdaptorTTPBidirectional
        object that represents the location in the managed system where ATM is adapted to the physical
        transmission path.

        The loopbackLocationIdentifierPkg provides a read/write code used for OAM cell loopback purposes.
        Incoming OAM Loopback cells with a Loopback Location field value that matches the value of the
        loopbackLocationIdentifier attribute shall be looped-back over the Intra-NNI.

        An instance of this object class shall exist for each Intra-NNI on the managed system. Instances
        of this object class are explicitly created and deleted by the managing system using the CMIS
        M-CREATE and M-DELETE services, respectively. ";
```

2.1.16. latestOccurrenceLog

```
latestOccurrenceLog MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":log;
    CHARACTERIZED BY
        latestOccurrenceLogPkg    PACKAGE
            BEHAVIOUR latestOccurrenceLogBeh;
            ATTRIBUTES
                keyAttributeList
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 16};

latestOccurrenceLogBeh BEHAVIOUR
    DEFINED AS
        "The latestOccurrenceLog object class is a specialization of the log object class.  New behaviour introduced
        in this object class includes the ability to store log records based on the keyAttributeList attribute.
        Specifically, log records shall be automatically created and deleted such that for each keyAttributeList value,
        only the latest log record exists.
```

The inherited maxLogSize attribute of an instance of the latestOccurrenceLog object must be large enough to contain all possible combinations of values that can be placed on the attributes identified by the keyAttributeList attribute.";

2.1.17. multipointBridge

```
multipointBridge MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        "ITU-T M.3100": createDeleteNotificationsPackage,
        "ITU-T M.3100": attributeValueChangeNotificationPackage,
        "ITU-T M.3100": stateChangeNotificationPackage,
        multipointBridgePkg PACKAGE
            BEHAVIOUR multipointBridgeBeh;
            ATTRIBUTES
                multipointBridgeId
                    GET,
                "Rec. X.721 | ISO/IEC 10165-2": administrativeState
                    GET-REPLACE,
                primaryCTP
                    GET,
                commonCTPs
                    GET,
                multipointConnectionType
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 17};

multipointBridgeBeh BEHAVIOUR
    DEFINED AS
        " The multipointBridge object class is a class of managed objects that represent the multipoint
        bridging function used to support multipoint VP/VC cross-connections. An instance of this object
        class shall exist for each multipoint VP/VC cross-connection supported by the managed system.

        Instances of this object class shall be explicitly created and deleted by the managing system
        using the CMIS M-CREATE and M-DELETE services, respectively. Instances of this object class
        shall not be deleted until all associated instances of the atmCrossConnection object class are also
        deleted. When explicitly created by a managing system, the primaryCTP and
        multipointConnectionType attributes shall be set to NULL and the commonCTPs attribute shall
        be set to the EMPTY SET.

        This object class is used to support four types of multipoint VP/VC connections. They are as
        follows:

            • broadcast
            • merge
            • composite
            • full multipoint

        The primaryCTP attribute identifies the vpCTPBidirectional or vcCTPBidirectional object that generates
        traffic to broadcast and/or receives merged traffic for broadcast, merge, or composite multipoint cross-
        connection types. For full multipoint connections (i.e., all legs communicate with all other legs),
```

the value of this attribute shall be set to NULL. The primaryCTP attribute value shall remain fixed during the life of the multipoint cross-connection.

The commonCTPs attribute identifies all legs of the multipoint connection except the leg identified via the primaryCTP attribute. This attribute provides a pointer to one or more instances of the vpCTPBidirectional object class or vcCTPBidirectional object class. For full multipoint cross-connections, all the legs of the multipoint cross-connection shall be identfied by this attribute. The legs represented by the commonCTPs attribute may be added or removed from an existing multipoint connection by performing the addTpsToMultipointBridge and removeTpsFromMultipointBridge operations, respectively, on the appropriate instance of the atmMpFabric object class.

The administrativeState attribute may be used by the management system to inhibit (lock) and allow (unlock) ATM cell flow through all multipoint cross-connections supported by the multipointBridge.";

2.1.18. tcAdaptorCurrentData

```
tcAdaptorCurrentData MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T Q.822":currentData;
    CHARACTERIZED BY
        "ITU-T M.3100": createDeleteNotificationsPackage,
        tcAdaptorCurrentDataPkg PACKAGE
            BEHAVIOUR tcAdaptorCurrentDataBeh;
            ATTRIBUTES
                discardedCellsHECViolation
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE AtmMIBMod.integerZero
                    GET,
                erroredCellsHECViolation
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE AtmMIBMod.integerZero
                    GET;;;
REGISTERED AS {atmfM4ObjectClass 18};

tcAdaptorCurrentDataBeh BEHAVIOUR
    DEFINED AS
        "This managed object contains the current protocol monitoring data collected for its superior
        tcAdaptorTTPBidirectional object. Specifically, this managed object maintains a count of the number
        of received cells for which an HEC error was detected as well as a count of the number of received cells
        that were discarded due to an HEC error during the current 15-minute granularity period.

        This object shall be automatically created whenever an instance of the tcAdaptorTTPBidirectional
        object class is created. ";
```

2.1.19. tcAdaptorHistoryData

```
tcAdaptorHistoryData MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T Q.822":historyData;
    CHARACTERIZED BY
        tcAdaptorHistoryDataPkg PACKAGE
            BEHAVIOUR tcAdaptorHistoryDataBeh;
```

```
        ATTRIBUTES
            discardedCellsHECViolation
                GET,
            erroredCellsHECViolation
                GET;;;
REGISTERED AS {atmfM4ObjectClass 19};

tcAdaptorHistoryDataBeh BEHAVIOUR
    DEFINED AS
        "Instances of the tcAdaptorHistoryData object class are used to store the observed events of a
        tcAdaptorCurrentData object at the end of the 15-minute granularity period. Instances of this
        managed object class are contained by an instance of the tcAdaptorCurrentData object class.  ";
```

2.1.20. tcAdaptorTTPBidirectional

```
tcAdaptorTTPBidirectional MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": trailTerminationPointBidirectional;
    CHARACTERIZED BY
        "ITU-T M.3100": tmnCommunicationsAlarmInformationPackage,
        "ITU-T M.3100": createDeleteNotificationsPackage,
        "ITU-T M.3100": stateChangeNotificationPackage,
        tcAdaptorTTPBidirectionalPkg PACKAGE
            BEHAVIOUR tcAdaptorTTPBidirectionalBeh;
            ATTRIBUTES
                tcTTPId
                    GET;;;
        CONDITIONAL PACKAGES
            cellScramblingEnabledPkg
                PRESENT IF      "cell scrambling may be activated and deactivated for
                the supporting ATM interface.";
REGISTERED AS {atmfM4ObjectClass 20};

tcAdaptorTTPBidirectionalBeh BEHAVIOUR
    DEFINED AS
        " This managed object represents a point in the managed system where the adaptation of the
        ATM Layer to the underlying physical infrastructure (e.g., SDH or PDH transport network) takes
        place. ITU-T Recommendation I.321[11] identifies this adaptation function as one of many
        functions performed at the Transmission Convergence (TC) Sublayer of the BISDN protocol stack.

        This object is responsible for generating communicationsAlarm notifications that report the
        inability of the managed system to delineate ATM cells from the payload of a terminated digital
        transmission path.

        The supportedByObjectList attribute inherited from the trailTerminationPoint managed object shall
        include a pointer to the underlying, path-level trail termination point managed object (e.g.,
        vc4TTPBidirectional object).

        Instances of this object class should be automatically created and deleted by the managed system.";
```

2.1.21. uni

```
uni MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        uniPkg PACKAGE
            BEHAVIOUR uniBeh;
            ATTRIBUTES
                uniId
                    GET,
                underlyingTTPPointer
                    GET;;;
        CONDITIONAL PACKAGES
            "ITU-T M.3100": createDeleteNotificationsPackage
                PRESENT IF      "the objectCreation and objectDeletion notifications
                                defined in Recommendation X.721 are supported by an
                    instance of this object class.",
            atmSubscriberAddressPkg
                PRESENT IF      "an address or list of addresses are assigned to the UNI",
            ilmiPkg
                PRESENT IF      "the ILMI capability is supported",
            loopbackLocationIdentifierPkg
                PRESENT IF      "supplied by the managing system",
            preferredCarrierPkg
                PRESENT IF      "call processing functions supporting exchange access
                                service for the UNI subscriber are performed in the
                managed system";
REGISTERED AS {atmfM4ObjectClass 21};

uniBeh BEHAVIOUR
    DEFINED AS
        " This managed object is used to configure and identify an ATM interface on the managed system as
        a Public User Network Interface (UNI), embracing the physical characteristics corresponding to the UB
        reference point.

        The underlyingTTPPointer attribute provides a pointer relationship to the tcAdaptorTTPBidirectional
        object that represents the location in the managed system where ATM is adapted to the physical
        transmission path.

        The ilmiPkg shall be instantiated if the ILMI capability is supported by the UNI. This package
        identifies the VPI/VCI value used over the UNI to support ILMI.

        The loopbackLocationIdentifierPkg provides a read/write code used for OAM cell loopback purposes.
        Incoming OAM Loopback cells with a Loopback Location field value that matches the value of the
        loopbackLocationIdentifier attribute shall be looped-back over the UNI.

        An instance of this object class shall exist for each Public UNI on the managed system. Instances
        of this object class are explicitly created and deleted by the managing system using the CMIS
        M-CREATE and M- DELETE services, respectively. ";
```

2.1.22. upcNpcCurrentData

```
upcNpcCurrentData MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T Q.822":currentData;
    CHARACTERIZED BY
        "ITU-T M.3100": createDeleteNotificationsPackage,
        upcNpcCurrentDataPkg PACKAGE
            BEHAVIOUR upcNpcCurrentDataBeh;
            ATTRIBUTES
                discardedCells
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE AtmMIBMod.integerZero
                    GET,
                successfullyPassedCells
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE AtmMIBMod.integerZero
                    GET;;;
        CONDITIONAL PACKAGES
            discardedCLP0CellsPkg
                PRESENT IF      "the managed system performs UPC/NPC functions
                                separately for high Cell Loss Priority (CLP) cells (i..e.,
                    cells with CLP=0)",
            successfullyPassedCLP0CellsPkg
                PRESENT IF      " if the managed system supports high priority only
                policing and has the ability to count cells that are
            successfully passed by the CLP=0 UPC/NPC policing
        function",
            taggedCLP0CellsPkg
                PRESENT IF      "the managed system supports Cell Loss Priority (CLP)
                    tagging";
REGISTERED AS {atmfM4ObjectClass 22};

upcNpcCurrentDataBeh BEHAVIOUR
    DEFINED AS
        " An instance of this managed object class is used to collect 15-minute current data associated
        with UPC/NPC functions performed on its superior managed object.

        All instances of this managed object are required to count and threshold the number of cells that
        were discarded due to UPC/NPC policing of the combined high and low cell loss priority traffic. In
        addition, all instances of this object class are required to maintain a count of the number of cells that were
        passed by the aggregate (i.e., CLP=0,1) UPC/NPC policing function.

        If the managed system performs UPC/NPC separately for CLP=0 traffic, then an additional count
        shall be maintained and thresholded for discarded CLP=0 cells due to UPC/NPC policing of high
        priority (CLP=0) traffic only.

        If Cell Loss Priority (CLP) tagging is performed by the managed system, the
        taggedCLP0CellsPkg conditional package should be present for maintaining a thresholded count of
        the number of CLP=0 cells that were tagged by the managed system.

        This object also provides an optional attribute for counting the number of cells successfully passed
        by the high priority only policing functions of the UPC/NPC. This parameter, however, shall not be
        thresholded by the managed system.
```

Instances of this object class shall be automatically created by the managed system for each instance of the vpCTPBidirectional and vcCTPBidirectional object class where UPC/NPC functions take place (e.g., at UNI and Inter-NNI access points).

These objects shall be automatically deleted when the containing instance of the vpCTPBidirectional and vcCTPBidirectional object class is deleted.

This managed object class uses the upcNpcHistoryData managed object class for history retention.";

2.1.23. upcNpcHistoryData

```
upcNpcHistoryData MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T Q.822":historyData;
    CHARACTERIZED BY
        upcNpcHistoryDataPkg PACKAGE
            BEHAVIOUR upcNpcHistoryDataBeh;
            ATTRIBUTES
                discardedCells
                    GET,
                successfullyPassedCells
                    GET;;;
        CONDITIONAL PACKAGES
            discardedCLP0CellsHistoryDataPkg
                PRESENT IF "attribute value is supplied by upcNpcCurrentData",
            successfullyPassedCLP0CellsHistoryDataPkg
                PRESENT IF "attribute value is supplied by upcNpcCurrentData",
            taggedCLP0CellsHistoryDataPkg
                PRESENT IF "attribute value is supplied by upcNpcCurrentData";
REGISTERED AS {atmfM4ObjectClass 23};

upcNpcHistoryDataBeh BEHAVIOUR
DEFINED AS
        " Instances of the upcNpcHistoryData object class are used to store the observed events of an
        upcNpcCurrentData object at the end of the 15-minute granularity period. A minimum of two
        instances of this managed object are needed to maintain the most recent past 30 minutes of history
        data.";
```

2.1.24. vcCTPBidirectional

```
vcCTPBidirectional MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": connectionTerminationPointBidirectional;
    CHARACTERIZED BY
        "ITU-T M.3100": attributeValueChangeNotificationPackage,
        "ITU-T M.3100": createDeleteNotificationsPackage,
        "ITU-T M.3100": crossConnectionPointerPackage,
        vcCTPBidirectionalPkg PACKAGE
            BEHAVIOUR vcCTPBidirectionalBeh;
            ATTRIBUTES
                vcCTPId
```

```
                GET,
            segmentEndPoint
                DEFAULT VALUE AtmMIBMod.booleanFalseDefault
                GET-REPLACE;;;
        CONDITIONAL PACKAGES
            egressTrafficDescriptorPkg
                PRESENT IF      "supplied by the managing system. This package must be
                    present at points where egress UPC/NPC functions are performed.",
            ingressTrafficDescriptorPkg
                PRESENT IF      "supplied by the managing system. This package must be
                    present at points where ingress UPC/NPC functions are performed.",
            oamCellLoopbackPkg
                PRESENT IF      "the termination point supports OAM cell Loopbacks",
            qosClassesPkg
                PRESENT IF      "QOS Class information is supplied by the managing
    system";
REGISTERED AS {atmfM4ObjectClass 24};

vcCTPBidirectionalBeh BEHAVIOUR
    DEFINED AS
        " The vcCTPBidirectional object class is a class of managed objects that delimit Virtual Channel
        (VC) links. From a configuration management perspective, instances of this object class represent
        VC link terminations that are either cross-connected to other VC link terminations or are
        available for such cross-connection.

        Instances of this object class include attributes that describe the VCI value, traffic descriptor, and,
        optionally, the Quality of Service (QOS) class assigned to the VCL termination being
        represented. Note that the vcCTPId attribute value identifies the VCI value for the VCL being
        terminated and is also used as the RDN for naming instances of this object class. The vcCTPId
        attribute value may be provided by the managing system upon creation of this managed object
        instance or it may be absent in the M-CREATE message and thus selected by the managed
        system. When selected by the managed system, the value chosen shall be reported to the
        managing system as a parameter in the response to the successfully performed M-CREATE
        request.

        From a performance and fault management perspective, instances of this object class represent
        logical points along VCCs at which various maintenance and network traffic management
        functions may be performed.

        The conditional package oamCellLoopbackPkg provides the M-ACTION used to request the
        termination point to insert an OAM cell for downstream loopbacking and report whether or not the
        cell was returned within the required time.

        When a VC-AIS or VC-RDI failure is detected, the vcCTPBidirectional object shall generate a
        communicationsAlarm notification (if the tmnCommunicationsAlarmInformationPackage is present) with
        the probableCause parameter value set equal to aIS or farEndReceiverFailure, respectively.

        Instances of this object class may be explicitly created and deleted by the managing system using
        the CMIS M-CREATE and M-DELETE services, respectively. Instances of this managed object
        class may also be automatically created by the managed system in response to actions performed
        on instances of the atmFabric or atmMpFabric object class. ";
```

2.1.25. vcTTPBidirectional

```
vcTTPBidirectional MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": trailTerminationPointBidirectional;
    CHARACTERIZED BY
        "Rec. X.721 | ISO/IEC 10165-2": administrativeStatePackage,
        "ITU-T M.3100": attributeValueChangeNotificationPackage,
        "ITU-T M.3100": createDeleteNotificationsPackage,
        vcTTPBidirectionalPkg PACKAGE
            BEHAVIOUR vcTTPBidirectionalBeh;
            ATTRIBUTES
                vcTTPId
                    GET;;;
        CONDITIONAL PACKAGES
            oamCellLoopbackPkg
                PRESENT IF      "the termination point supports OAM cell Loopbacks";
REGISTERED AS {atmfM4ObjectClass 25};

vcTTPBidirectionalBeh BEHAVIOUR
    DEFINED AS
        " The vcTTPBidirectional object class is a class of managed objects that delimit Virtual Channel
        Connections (VCCs).

        An instance of this object class represents the logical point in the managed system where the
        end-to-end F5 flow (i.e., OAM cells with PT=5) terminates.

        The conditional package oamCellLoopbackPkg provides the M-ACTION used to request the
        termination point to insert an OAM cell for downstream loopbacking and report whether or not the
        cell was returned within the required time.

        An instance of this object class shall always point (via the upstreamConnectivityPointer and
        downstreamConnectivityPointer attributes) to a vcCTPBidirectional managed object.

        Instances of this object class are explicitly created and deleted by the managing system using the
        CMIS M-CREATE and M-DELETE services, respectively. ";
```

2.1.26. vpCTPBidirectional

```
vpCTPBidirectional MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": connectionTerminationPointBidirectional;
    CHARACTERIZED BY
        "ITU-T M.3100": attributeValueChangeNotificationPackage,
        "ITU-T M.3100": createDeleteNotificationsPackage,
        "ITU-T M.3100": crossConnectionPointerPackage,
        vpCTPBidirectionalPkg PACKAGE
            BEHAVIOUR vpCTPBidirectionalBeh;
            ATTRIBUTES
                vpCTPId
                    GET,
                segmentEndPoint
                    DEFAULT VALUE AtmMIBMod.booleanFalseDefault
                    GET-REPLACE;;;
```

```
        CONDITIONAL PACKAGES
            egressTrafficDescriptorPkg
                PRESENT IF      "supplied by the managing system. This package must be
                    present at points where egress UPC/NPC functions are performed.",
            ingressTrafficDescriptorPkg
                PRESENT IF      "supplied by the managing system. This package must be
                    present at points where ingress UPC/NPC functions are performed.",
            oamCellLoopbackPkg
                PRESENT IF      "the termination point supports OAM cell Loopbacks",
            qosClassesPkg
                PRESENT IF      "QOS Class information is supplied by the managing
                    system";
REGISTERED AS {atmfM4ObjectClass 26};

vpCTPBidirectionalBeh BEHAVIOUR
    DEFINED AS
        " The vpCTPBidirectional object class is a class of managed objects that delimit Virtual Path
        (VP) links. From a configuration management perspective, instances of this object class represent
        VP link terminations that are either cross-connected to other VP link terminations or are
        available for such cross-connection.

        Instances of this object class include attributes that describe the VPI value, traffic descriptor, and,
        optionally, the Quality of Service (QOS) class assigned to the VPL termination being represented.
        Note that the vpCTPId attribute value identifies the VPI value of the VPL termination being
        represented and is also used as the RDN for naming instances of this object class. Note that the
        vpCTPId attribute may be provided by the managing system upon creation of this managed
        object instance or it may be absent in the M-CREATE message and thus selected by the
        managed system. When selected by the managed system, the value chosen shall be reported to
        the managing system as a parameter in the response to the successfully performed M-CREATE
        request.

        From a performance and fault management perspective, instances of this object class represent
        logical points along VPCs at which various maintenance and network traffic management
        functions may be performed.

        The conditional package oamCellLoopbackPkg provides the M-ACTION used to request the
        termination point to insert an OAM cell for downstream loopbacking and report whether or not the
        cell was returned within the required time.

        When a VP-AIS or VP-RDI failure is detected, the vpCTPBidirectional object shall generate a
        communicationsAlarm notification (if the tmnCommunicationsAlarmInformationPackage is present) with
        the probableCause parameter value set equal to aIS or farEndReceiverFailure, respectively.

        Instances of this object class may be explicitly created and deleted by the managing system using
        the CMIS M-CREATE and M-DELETE services, respectively. Instances of this managed object
        class may also be automatically created by the managed system in response to actions performed
        on instances of the atmFabric or atmMpFabric object class. ";
```

2.1.27. vpTTPBidirectional

```
vpTTPBidirectional MANAGED OBJECT CLASS
    DERIVED FROM "ITU-T M.3100": trailTerminationPointBidirectional;
```

```
    CHARACTERIZED BY
        "Rec. X.721 | ISO/IEC 10165-2": administrativeStatePackage,
        "ITU-T M.3100": attributeValueChangeNotificationPackage,
        "ITU-T M.3100": createDeleteNotificationsPackage,
        vpTTPBidirectionalPkg PACKAGE
            BEHAVIOUR vpTTPBidirectionalBeh;
            ATTRIBUTES
                vpTTPId
                GET;;;
        CONDITIONAL PACKAGES
            oamCellLoopbackPkg
                PRESENT IF      "the termination point supports OAM cell Loopbacks";
REGISTERED AS {atmfM4ObjectClass 27};

vpTTPBidirectionalBeh BEHAVIOUR
    DEFINED AS
        " The vpTTPBidirectional object class is a class of managed objects that delimit Virtual Path
        Connections (VPCs).

        An instances of this object class represents the logical point in the managed system where the
        end-to-end F4 flow (i.e., OAM cells with VCI=4) terminates.

        The oamCellLoopbackPkg package provides the M-ACTION used to request the termination point
        to insert an OAM cell for downstream loopbacking and report whether or not the cell was returned
        within the required time.

        An instance of this object class shall always point (via the upstreamConnectivityPointer and
        downstreamConnectivityPointer attributes) to a vpCTPBidirectional managed object.

        Instances of this object class are explicitly created and deleted by the managing system using the
        CMIS M-CREATE and M-DELETE services, respectively. Instances of this object class may also be
        automatically created by the managed system in response to actions performed on instances of the atmFabric
        or atmMpFabric object class.";
```

2.2. Conditional Packages

2.2.1. atmSubscriberAddressPkg

```
atmSubscriberAddressPkg PACKAGE
  ATTRIBUTES
    atmSubscriberAddress
        GET-REPLACE
        ADD-REMOVE;
REGISTERED AS {atmfM4Package 1};
```

2.2.2. cellScramblingEnabledPkg

```
cellScramblingEnabledPkg PACKAGE
  ATTRIBUTES
    cellScramblingEnabled
       DEFAULT VALUE AtmMIBMod.booleanTrueDefault
        GET-REPLACE;
REGISTERED AS {atmfM4Package 2};
```

2.2.3. discardedCLP0CellsHistoryDataPkg

```
discardedCLP0CellsHistoryDataPkg PACKAGE
  ATTRIBUTES
    discardedCLP0Cells
        GET;
REGISTERED AS {atmfM4Package 3};
```

2.2.4. discardedCLP0CellsPkg

```
discardedCLP0CellsPkg PACKAGE
  ATTRIBUTES
    discardedCLP0Cells
       REPLACE-WITH-DEFAULT
        GET;
REGISTERED AS {atmfM4Package 4};
```

2.2.5. egressTrafficDescriptorPkg

```
egressTrafficDescriptorPkg PACKAGE
  ATTRIBUTES
    egressPeakCellRate
        GET-REPLACE,
    egressCDVTolerance
        GET-REPLACE,
    egressSustainableCellRate
        GET-REPLACE,
    egressMaxBurstSize
        GET-REPLACE;
REGISTERED AS {atmfM4Package 5};
```

2.2.6. farEndCarrierNetworkPkg

```
farEndCarrierNetworkPkg PACKAGE
  ATTRIBUTES
    farEndCarrierNetwork
        GET-REPLACE;
REGISTERED AS {atmfM4Package 6};
```

2.2.7. ilmiPkg

```
ilmiPkg PACKAGE
  ATTRIBUTES
    ilmiChannelIdentifier
        GET-REPLACE;
REGISTERED AS {atmfM4Package 7};
```

2.2.8. ingressTrafficDescriptorPkg

```
ingressTrafficDescriptorPkg PACKAGE
  ATTRIBUTES
    ingressPeakCellRate
        GET-REPLACE,
    ingressCDVTolerance
        GET-REPLACE,
    ingressSustainableCellRate
        GET-REPLACE,
    ingressMaxBurstSize
        GET-REPLACE;
REGISTERED AS {atmfM4Package 8};
```

2.2.9. loopbackLocationIdentifierPkg

```
loopbackLocationIdentifierPkg PACKAGE
  ATTRIBUTES
    loopbackLocationIdentifier
        GET-REPLACE;
REGISTERED AS {atmfM4Package 9};
```

2.2.10. oamCellLoopbackPkg

```
oamCellLoopbackPkg PACKAGE
  ACTIONS
    loopbackOAMCell;
REGISTERED AS {atmfM4Package 10};
```

2.2.11. preferredCarrierPkg

```
preferredCarrierPkg PACKAGE
  ATTRIBUTES
    preferredCarrier
        GET-REPLACE
        ADD-REMOVE;
REGISTERED AS {atmfM4Package 11};
```

2.2.12. qosClassesPkg

```
qosClassesPkg PACKAGE
  ATTRIBUTES
    ingressQOSClass
        GET-REPLACE,
    egressQOSClass
        GET-REPLACE;
REGISTERED AS {atmfM4Package 12};
```

2.2.13. successfullyPassedCLP0CellsHistoryDataPkg

```
successfullyPassedCLP0CellsHistoryDataPkg PACKAGE
  ATTRIBUTES
    successfullyPassedCLP0Cells
        GET;
REGISTERED AS {atmfM4Package 13};
```

2.2.14. successfullyPassedCLP0CellsPkg

```
successfullyPassedCLP0CellsPkg PACKAGE
  ATTRIBUTES
    successfullyPassedCLP0Cells
        REPLACE-WITH-DEFAULT
        GET;
REGISTERED AS {atmfM4Package 14};
```

2.2.15. taggedCLP0CellsHistoryDataPkg

```
taggedCLP0CellsHistoryDataPkg PACKAGE
  ATTRIBUTES
    taggedCLP0Cells
        GET;
REGISTERED AS {atmfM4Package 15};
```

2.2.16. taggedCLP0CellsPkg

```
taggedCLP0CellsPkg PACKAGE
  ATTRIBUTES
    taggedCLP0Cells
        REPLACE-WITH-DEFAULT
        GET;
REGISTERED AS {atmfM4Package 16};
```

2.2.17. vcLevelProfilePackage

```
vcLevelProfilePackage PACKAGE
  ATTRIBUTES
    maxNumVCIBitsSupported
        GET-REPLACE,
    maxNumActiveVCCsAllowed
        GET-REPLACE;
REGISTERED AS {atmfM4Package 17};
```

2.2.18. vpLevelProfilePackage

```
vpLevelProfilePackage PACKAGE
```

```
  ATTRIBUTES
    maxNumVPIBitsSupported
        GET-REPLACE,
    maxNumActiveVPCsAllowed
        GET-REPLACE,
    maxEgressBandwidth
        GET-REPLACE,
    maxIngressBandwidth
        GET-REPLACE;
REGISTERED AS {atmfM4Package 18};
```

2.3. Attributes

2.3.1. atmAccessProfileId

```
atmAccessProfileId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
   MATCHES FOR EQUALITY;
  BEHAVIOUR atmAccessProfileIdBeh;
REGISTERED AS {atmfM4Attribute 1};

atmAccessProfileIdBeh BEHAVIOUR
  DEFINED AS
" This attribute is used to name instances of the atmAccessProfile managed object class.";
```

2.3.2. atmFabricId

```
atmFabricId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
   MATCHES FOR EQUALITY;
  BEHAVIOUR atmFabricIdBeh;
REGISTERED AS {atmfM4Attribute 2};

atmFabricIdBeh BEHAVIOUR
  DEFINED AS
" This attribute is used to name instances of the atmFabric managed object class.";
```

2.3.3. atmSubscriberAddress

```
atmSubscriberAddress ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.AtmSubscriberAddress;
   MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR atmSubscriberAddressBeh;
REGISTERED AS {atmfM4Attribute 3};

atmSubscriberAddressBeh BEHAVIOUR
  DEFINED AS
"  This attribute identifies the ATM Subscriber address(es) associated with a particular UNI. The first address listed in
this attribute is considered to be the primary address. ";
```

2.3.4. cellHeaderAbnormalityType

```
cellHeaderAbnormalityType ATTRIBUTE
```

```
  WITH ATTRIBUTE SYNTAX AtmMIBMod.CellHeaderAbnormalityType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR cellHeaderAbnormalityTypeBeh;
REGISTERED AS {atmfM4Attribute 4};

cellHeaderAbnormalityTypeBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the abnormality associated with the log record. Valid values for this attribute are:
Unassigned VPI/VCI Value and Out-Of-Range VPI/VCI Value. This attribute type will be used as part of the
keyAttributeList in the containing latestOccurrenceLog object.";
```

2.3.5. cellScramblingEnabled

```
cellScramblingEnabled ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.Boolean;
  MATCHES FOR EQUALITY;
  BEHAVIOUR cellScramblingEnabledBeh;
REGISTERED AS {atmfM4Attribute 5};

cellScramblingEnabledBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies whether or not ATM cell scrambling is being performed over the ATM interface.  A value
of TRUE (default) is used to indicate that cell scrambling is being performed. ";
```

2.3.6. commonCTPs

```
commonCTPs ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.CommonCTPs;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR commonCTPsBeh;
REGISTERED AS {atmfM4Attribute 6};

commonCTPsBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies all legs of the multipoint connection except the leg identified via the primaryCTP
attribute. This attribute provides a pointer to one or more instances of the vpCTPBidirectional object class
or vcCTPBidirectional object class. For full multipoint cross-connections, all the legs of the multipoint cross-
connection shall be identfied by this attribute. ";
```

2.3.7. discardedCells

```
discardedCells ATTRIBUTE
 DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR discardedCellsBeh;
REGISTERED AS {atmfM4Attribute 7};
```

discardedCellsBeh BEHAVIOUR
  DEFINED AS
" This attribute provides a count of the number of ATM cells that were discarded due to UPC/NPC policing of the combined high and low cell loss priority traffic.";

2.3.8. discardedCellsHECViolation

discardedCellsHECViolation ATTRIBUTE
 DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
   BEHAVIOUR discardedCellsHECViolationBeh;
REGISTERED AS {atmfM4Attribute 8};

discardedCellsHECViolationBeh BEHAVIOUR
  DEFINED AS
" This attribute provides a count of the number of cells discarded due to uncorrectable header bit errors. ";

2.3.9. discardedCLP0Cells

discardedCLP0Cells ATTRIBUTE
 DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
   BEHAVIOUR discardedCLP0CellsBeh;
REGISTERED AS {atmfM4Attribute 9};

discardedCLP0CellsBeh BEHAVIOUR
  DEFINED AS
" This attribute provides a count of the number of cells with CLP=0 that were discarded due to UPC/NPC policing of high priority (CLP=0) only traffic. ";

2.3.10. discardedCellsInvalidHeader

discardedCellsInvalidHeader ATTRIBUTE
 DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
   BEHAVIOUR discardedCellsInvalidHeaderBeh;
REGISTERED AS {atmfM4Attribute 10};

discardedCellsInvalidHeaderBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the number of ATM cells discarded due to header content errors. ";

2.3.11. ds3PLCPPathCTPId

```
ds3PLCPPathCTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR ds3PLCPPathCTPIdBeh;
REGISTERED AS {atmfM4Attribute 11};

ds3PLCPPathCTPIdBeh BEHAVIOUR
 DEFINED AS
" This attribute is used to name instances of the ds3PLCPPathCTPBidirectional managed object class.";
```

2.3.12. egressCDVTolerance

```
egressCDVTolerance ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.CDVTolerance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR egressCDVToleranceBeh;
REGISTERED AS {atmfM4Attribute 12};

egressCDVToleranceBeh BEHAVIOUR
 DEFINED AS
" This attribute represents the egress (with respect to the managed system) CDV Tolerance assigned to the VPL or
VCL being terminated.  ";
```

2.3.13. egressMaxBurstSize

```
egressMaxBurstSize ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.MaxBurstSize;
  MATCHES FOR EQUALITY;
  BEHAVIOUR egressMaxBurstSizeBeh;
REGISTERED AS {atmfM4Attribute 13};

egressMaxBurstSizeBeh BEHAVIOUR
 DEFINED AS
" This attribute represents the egress maximum burst size (in cells) that has been assigned to the VP or VC link
being terminated. ";
```

2.3.14. egressPeakCellRate

```
egressPeakCellRate ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.PeakCellRate;
  MATCHES FOR EQUALITY;
  BEHAVIOUR egressPeakCellRateBeh;
REGISTERED AS {atmfM4Attribute 14};
```

```
egressPeakCellRateBeh BEHAVIOUR
  DEFINED AS
" This attribute is used to indicate the peak cell rate assigned or reserved in the egress (with respect to the managed system) direction of transmission across the VP or VC link being terminated. ";
```

2.3.15. egressQOSClass

```
egressQOSClass ATTRIBUTE
   WITH ATTRIBUTE SYNTAX AtmMIBMod.QosClass;
   MATCHES FOR EQUALITY;
   BEHAVIOUR egressQOSClassBeh;
REGISTERED AS {atmfM4Attribute 15};

egressQOSClassBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the Quality Of Service (QOS) class assigned to the VPL or VCL in the egress (with respect to the managed system) direction of cell transmission. Valid values for this attribute are: Class 0, Class 1, Class 2, Class 3, and Class 4. ";
```

2.3.16. egressSustainableCellRate

```
egressSustainableCellRate ATTRIBUTE
   WITH ATTRIBUTE SYNTAX AtmMIBMod.SustainableCellRate;
   MATCHES FOR EQUALITY;
   BEHAVIOUR egressSustainableCellRateBeh;
REGISTERED AS {atmfM4Attribute 16};

egressSustainableCellRateBeh BEHAVIOUR
  DEFINED AS
" This traffic descriptor represents the egress (with respect to the managed system) sustainable cell rate (in cells/second) assigned to the link being terminated ";
```

2.3.17. erroredCellsHECViolation

```
erroredCellsHECViolation ATTRIBUTE
 DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
   BEHAVIOUR erroredCellsHECViolationBeh;
REGISTERED AS {atmfM4Attribute 17};

erroredCellsHECViolationBeh BEHAVIOUR
  DEFINED AS
" This attribute provides a count of the number of cells detected with an HEC error.";
```

2.3.18. farEndCarrierNetwork

```
farEndCarrierNetwork ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.FarEndCarrierNetwork;
  MATCHES FOR EQUALITY;
  BEHAVIOUR farEndCarrierNetworkBeh;
REGISTERED AS {atmfM4Attribute 18};

farEndCarrierNetworkBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the adjacent (far-end) carrier to which the Inter-NNI is connected. ";
```

2.3.19. ilmiChannelIdentifier

```
ilmiChannelIdentifier ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.IlmiChannelIdentifier;
  MATCHES FOR EQUALITY;
  BEHAVIOUR ilmiChannelIdentifierBeh;
REGISTERED AS {atmfM4Attribute 19};

ilmiChannelIdentifierBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the VPI/VCI pair that is used to provide the user connectivity to the Interim Local
Management Interface (ILMI) Server in the managed system. The default value for this attribute is VPI=0 and
VCI=16. ";
```

2.3.20. ingressCDVTolerance

```
ingressCDVTolerance ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.CDVTolerance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR ingressCDVToleranceBeh;
REGISTERED AS {atmfM4Attribute 20};

ingressCDVToleranceBeh BEHAVIOUR
  DEFINED AS
" This attribute represents the ingress (with respect to the managed system) CDV Tolerance assigned to the VPL or
VCL being terminated.";
```

2.3.21. ingressMaxBurstSize

```
ingressMaxBurstSize ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.MaxBurstSize;
```

```
   MATCHES FOR EQUALITY;
  BEHAVIOUR ingressMaxBurstSizeBeh;
REGISTERED AS {atmfM4Attribute 21};

ingressMaxBurstSizeBeh BEHAVIOUR
  DEFINED AS
" This attribute represents the ingress (with respect to the managed system) maximum burst size (in cells) that has
been assigned to the VP or VC link being terminated. ";
```

2.3.22. ingressPeakCellRate

```
ingressPeakCellRate ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.PeakCellRate;
   MATCHES FOR EQUALITY;
  BEHAVIOUR ingressPeakCellRateBeh;
REGISTERED AS {atmfM4Attribute 22};

ingressPeakCellRateBeh BEHAVIOUR
  DEFINED AS
" This attribute is used to indicate the peak cell rate assigned or reserved in the ingress (with respect to the managed
system) direction of transmission across the VP or VC link being terminated. ";
```

2.3.23. ingressQOSClass

```
ingressQOSClass ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.QosClass;
   MATCHES FOR EQUALITY;
  BEHAVIOUR ingressQOSClassBeh;
REGISTERED AS {atmfM4Attribute 23};

ingressQOSClassBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the Quality Of Service (QOS) class assigned to the VPL or VCL in the ingress (with
respect to the managed system) direction of cell transmission. Valid values for this attribute are: Class 0, Class 1,
Class 2, Class 3, and Class 4. ";
```

2.3.24. ingressSustainableCellRate

```
ingressSustainableCellRate ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.SustainableCellRate;
   MATCHES FOR EQUALITY;
  BEHAVIOUR ingressSustainableCellRateBeh;
REGISTERED AS {atmfM4Attribute 24};

ingressSustainableCellRateBeh BEHAVIOUR
```

DEFINED AS
" This traffic descriptor represents the ingress (with respect to the managed system) sustainable cell rate (in cells/second) assigned to the link being terminated. ";

2.3.25. interfacePointer

interfacePointer ATTRIBUTE
WITH ATTRIBUTE SYNTAX AtmMIBMod.InterfacePointer;
MATCHES FOR EQUALITY;
BEHAVIOUR interfacePointerBeh;
REGISTERED AS {atmfM4Attribute 25};

interfacePointerBeh BEHAVIOUR
DEFINED AS
" This attribute identifies the object instance Id of the uni, interNNI, or intraNNI object with which the cell header abnormality is associated. This attribute type will be used as part of the keyAttributeList in the containing latestOccurrenceLog object.";

2.3.26. interNNIId

interNNIId ATTRIBUTE
WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR interNNIIdBeh;
REGISTERED AS {atmfM4Attribute 26};

interNNIIdBeh BEHAVIOUR
DEFINED AS
" This attribute is used to name instances of the interNNI managed object class. ";

2.3.27. intraNNIId

intraNNIId ATTRIBUTE
WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR intraNNIIdBeh;
REGISTERED AS {atmfM4Attribute 27};

intraNNIIdBeh BEHAVIOUR
DEFINED AS
" This attribute is used to name instances of the intraNNI managed object class. ";

2.3.28. keyAttributeList

keyAttributeList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.AttributeList;
  MATCHES FOR EQUALITY;
  BEHAVIOUR keyAttributeListBeh;
REGISTERED AS {atmfM4Attribute 28};

keyAttributeListBeh BEHAVIOUR
 DEFINED AS
" This attribute indicates the list of attribute types to be used as keys to uniquely identify the entries in a latestOccurrenceLog.";

2.3.29. loopbackLocationIdentifier

loopbackLocationIdentifier ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.OctetString;
  MATCHES FOR EQUALITY;
  BEHAVIOUR loopbackLocationIdentifierBeh;
REGISTERED AS {atmfM4Attribute 29};

loopbackLocationIdentifierBeh BEHAVIOUR
 DEFINED AS
" This attribute provides a read/write code used for OAM cell loopback purposes. Incoming OAM Loopback cells with a Loopback Location field value that matches the value of the loopbackLocationIdentifier attribute shall be looped-back over the ATM interface.";

2.3.30. maxEgressBandwidth

maxEgressBandwidth ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR maxEgressBandwidthBeh;
REGISTERED AS {atmfM4Attribute 30};

maxEgressBandwidthBeh BEHAVIOUR
 DEFINED AS
"This attribute identifies the maximum egress bandwidth for the ATM Interface that is managed exclusively by the NE. *Further behaviour for this attribute is the subject of further study.*";

2.3.31. maxIngressBandwidth

maxIngressBandwidth ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR maxIngressBandwidthBeh;
REGISTERED AS {atmfM4Attribute 31};

maxIngressBandwidthBeh BEHAVIOUR

DEFINED AS
"This attribute identifies the maximum ingress bandwidth for the ATM Interface that is managed exclusively by the NE. *Further behaviour for this attribute is the subject of further study.*";

2.3.32. maxNumActiveVCCsAllowed

maxNumActiveVCCsAllowed ATTRIBUTE
WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR maxNumActiveVCCsAllowedBeh;
REGISTERED AS {atmfM4Attribute 32};

maxNumActiveVCCsAllowedBeh BEHAVIOUR
DEFINED AS
" This attribute identifies the maximum number of concurrently active Virtual Channel Connections (VCCs) that the interface has been configured to support. ";

2.3.33. maxNumActiveVPCsAllowed

maxNumActiveVPCsAllowed ATTRIBUTE
WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR maxNumActiveVPCsAllowedBeh;
REGISTERED AS {atmfM4Attribute 33};

maxNumActiveVPCsAllowedBeh BEHAVIOUR
DEFINED AS
" This attribute identifies the maximum number of concurrently active Virtual Path Connections (VPCs) that the interface has been configured to support. ";

2.3.34. maxNumVCIBitsSupported

maxNumVCIBitsSupported ATTRIBUTE
WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR maxNumVCIBitsSupportedBeh;
REGISTERED AS {atmfM4Attribute 34};

maxNumVCIBitsSupportedBeh BEHAVIOUR
DEFINED AS
" This attribute identifies the maximum number of contiguous VCI bits, starting from the least significant bit, that may be used over the UNI, Inter-NNI, or Intra-NNI. The value of this parameter represents the lower supported value of the equipment on each end of the UNI, Inter-NNI, or Intra-NNI. Note that a value of N for this attribute implies that VCI values in the range of 0 to (2^N)-1 are possible.";

2.3.35. maxNumVPIBitsSupported

```
maxNumVPIBitsSupported ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR maxNumVPIBitsSupportedBeh;
REGISTERED AS {atmfM4Attribute 35};

maxNumVPIBitsSupportedBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the maximum number of contiguous VPI bits, starting from the least significant bit, that
may be used over the UNI, Inter-NNI, or Intra-NNI. The value of this parameter represents the lower supported value
of the equipment on each end of the UNI, Inter-NNI, or Intra-NNI. Note that a value of N for this attribute implies
that VPI values in the range of 0 to (2^N)-1 are possible.";
```

2.3.36. multipointBridgeId

```
multipointBridgeId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR multipointBridgeIdBeh;
REGISTERED AS {atmfM4Attribute 36};

multipointBridgeIdBeh BEHAVIOUR
  DEFINED AS
" This attribute is used to name instances of the multipointBridge managed object class. ";
```

2.3.37. multipointConnectionType

```
multipointConnectionType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.MultipointConnectionType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR multipointConnectionTypeBeh;
REGISTERED AS {atmfM4Attribute 37};

multipointConnectionTypeBeh BEHAVIOUR
  DEFINED AS
" This attribute represents the type of cross-connection established by the multipoint bridge. Valid values are
broadcast, merge, composite, and full multipoint. ";
```

2.3.38. numReceivedOAMCells

```
numReceivedOAMCells ATTRIBUTE
 DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
   BEHAVIOUR numReceivedOAMCellsBeh;
REGISTERED AS {atmfM4Attribute 38};

numReceivedOAMCellsBeh BEHAVIOUR
  DEFINED AS
" This attribute provides a count of the number of OAM cells received by the ATM Layer for the supporting UNI,
Inter-NNI, or Intra-NNI. ";
```

2.3.39. preferredCarrier

```
preferredCarrier ATTRIBUTE
   WITH ATTRIBUTE SYNTAX AtmMIBMod.PreferredCarrier;
   MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
   BEHAVIOUR preferredCarrierBeh;
REGISTERED AS {atmfM4Attribute 39};

preferredCarrierBeh BEHAVIOUR
  DEFINED AS
" This attribute identifies the default carrier to use when one is not explicitly identified in the call setup message
received and processed by the managed system. ";
```

2.3.40. primaryCTP

```
primaryCTP ATTRIBUTE
   WITH ATTRIBUTE SYNTAX AtmMIBMod.PointerOrNull;
   MATCHES FOR EQUALITY;
   BEHAVIOUR primaryCTPBeh;
REGISTERED AS {atmfM4Attribute 40};

primaryCTPBeh BEHAVIOUR
  DEFINED AS
"The primaryCTP attribute identifies the vpCTPBidirectional or vcCTPBidirectional object that generates traffic
to broadcast and/or receives merged traffic for broadcast, merge, or composite multipoint cross-connection types.
For full multipoint connections (i.e., all legs communicate with all other legs), the value of this
attribute shall be set to NULL. The primaryCTP attribute value shall remain fixed during the life of the associated
multipoint cross-connection. ";
```

2.3.41. recoveryType

```
recoveryType ATTRIBUTE
   WITH ATTRIBUTE SYNTAX AtmMIBMod.RecoveryType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR recoveryTypeBeh;
```

REGISTERED AS {atmfM4Attribute 41};

recoveryTypeBeh BEHAVIOUR
DEFINED AS
"The recoveryType attribute identifies whether the ATM cross-connection is recoverable (default) or non-recoverable. Recoverable cross-connections remain intact regardless of the operational state of the cross-connection. Non-recoverable ATM cross-connections are cross-connections that are automatically released by the managed system upon detection of a service affecting failure.";

2.3.42. segmentEndPoint

segmentEndPoint ATTRIBUTE
WITH ATTRIBUTE SYNTAX AtmMIBMod.Boolean;
MATCHES FOR EQUALITY;
BEHAVIOUR segmentEndPointBeh;
REGISTERED AS {atmfM4Attribute 42};

segmentEndPointBeh BEHAVIOUR
DEFINED AS
" This boolean attribute indicates whether the vpCTPBidirectional object instance or vcCTPBidirectional object instance has been configured to represent an end-point of a VPC or VCC Segment, respectively. ";

2.3.43. successfullyPassedCells

successfullyPassedCells ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
BEHAVIOUR successfullyPassedCellsBeh;
REGISTERED AS {atmfM4Attribute 43};

successfullyPassedCellsBeh BEHAVIOUR
DEFINED AS
" This attribute represents the number of ATM cells that where received and successfully passed (i.e., not discarded) by the UPC/NPC function after performing policing functions on the combined high and low cell loss priority traffic. ";

2.3.44. successfullyPassedCLP0Cells

successfullyPassedCLP0Cells ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
BEHAVIOUR successfullyPassedCLP0CellsBeh;
REGISTERED AS {atmfM4Attribute 44};

successfullyPassedCLP0CellsBeh BEHAVIOUR
DEFINED AS

" This attribute represents the number of ATM cells that where received and successfully passed (i.e., not discarded) by the UPC/NPC function after performing policing functions on the high priority (CLP=0) traffic. ";

2.3.45. taggedCLP0Cells

```
taggedCLP0Cells ATTRIBUTE
 DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
   BEHAVIOUR taggedCLP0CellsBeh;
REGISTERED AS {atmfM4Attribute 45};

taggedCLP0CellsBeh BEHAVIOUR
  DEFINED AS
" This attribute provides a count of the number of cells with CLP=0 that were tagged (i.e., CLP reset to 1) by the
UPC or NPC function. ";
```

2.3.46. tcTTPId

```
tcTTPId ATTRIBUTE
   WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR tcTTPIdBeh;
REGISTERED AS {atmfM4Attribute 46};

tcTTPIdBeh BEHAVIOUR
  DEFINED AS
" This attribute is used for naming instances of the tcAdaptorTTPBidirectional managed object class. ";
```

2.3.47. underlyingTTPPointer

```
underlyingTTPPointer ATTRIBUTE
   WITH ATTRIBUTE SYNTAX AtmMIBMod.PointerOrNull;
   MATCHES FOR EQUALITY;
   BEHAVIOUR underlyingTTPPointerBeh;
REGISTERED AS {atmfM4Attribute 47};

underlyingTTPPointerBeh BEHAVIOUR
  DEFINED AS
" This attribute provides a pointer relationship to the tcAdaptorTTPBidirectional object that provides the
underlying ATM transport for the interface.";
```

2.3.48. uniId

```
uniId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR uniIdBeh;
REGISTERED AS {atmfM4Attribute 48};

uniIdBeh BEHAVIOUR
  DEFINED AS
" This attribute is used for naming instances of the uni managed object class. ";
```

2.3.49. vcCTPId

```
vcCTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.SimpleNameType;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR vcCTPIdBeh;
REGISTERED AS {atmfM4Attribute 49};

vcCTPIdBeh BEHAVIOUR
  DEFINED AS
" This attribute is used for naming instances of the vcCTPBidirectional managed object class. The value of this
attribute shall be set equal to the VCI value of the Virtual Channel Link (VCL) being terminated. ";
```

2.3.50. vciValue

```
vciValue ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR vciValueBeh;
REGISTERED AS {atmfM4Attribute 50};

vciValueBeh BEHAVIOUR
  DEFINED AS
" This attribute represents the VCI Value in the header of the discarded ATM cell. ";
```

2.3.51. vcTTPId

```
vcTTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR vcTTPIdBeh;
REGISTERED AS {atmfM4Attribute 51};

vcTTPIdBeh BEHAVIOUR
  DEFINED AS
```

" This attribute is used for naming instances of the vcTTPBidirectional managed object class. ";

2.3.52. vpCTPId

```
vpCTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.SimpleNameType;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR vpCTPIdBeh;
REGISTERED AS {atmfM4Attribute 52};

vpCTPIdBeh BEHAVIOUR
 DEFINED AS
```
" This attribute is used for naming instances of the vpCTPBidirectional managed object class. This attribute shall be set equal to the VPI value of the Virtual Path Link (VPL) being terminated. ";

2.3.53. vpiValue

```
vpiValue ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR vpiValueBeh;
REGISTERED AS {atmfM4Attribute 53};

vpiValueBeh BEHAVIOUR
 DEFINED AS
```
" This attribute represents the VPI value in the header of the discarded ATM cell. ";

2.3.54. vpTTPId

```
vpTTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AtmMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR vpTTPIdBeh;
REGISTERED AS {atmfM4Attribute 54};

vpTTPIdBeh BEHAVIOUR
 DEFINED AS
```
" This attribute is used for naming instances of the vpTTPBidirectional managed object class. ";

2.4. Name-Bindings

2.4.1. atmAccessProfile-tcAdaptorTTPBidirectional

```
atmAccessProfile-tcAdaptorTTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS atmAccessProfile AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS tcAdaptorTTPBidirectional AND
   SUBCLASSES;
  WITH ATTRIBUTE atmAccessProfileId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 1};
```

2.4.2. atmCrossConnection-atmFabric

```
atmCrossConnection-atmFabric NAME BINDING
  SUBORDINATE OBJECT CLASS atmCrossConnection AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS atmFabric AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T M.3100":crossConnectionId;
  DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 2};
```

2.4.3. atmFabric-managedElementR1

```
atmFabric-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS atmFabric AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE atmFabricId;
REGISTERED AS {atmfM4NameBinding 3};
```

2.4.4. cellHeaderAbnormalityLogRecord-latestOccurrenceLog

```
cellHeaderAbnormalityLogRecord-latestOccurrenceLog NAME BINDING
  SUBORDINATE OBJECT CLASS cellHeaderAbnormalityLogRecord AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS latestOccurrenceLog AND SUBCLASSES;
  WITH ATTRIBUTE "Rec. X.721 | ISO/IEC 10165-2":logRecordId;
  DELETE
```

```
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 4};
```

2.4.5. cellLevelProtocolCurrentData-interNNI

```
cellLevelProtocolCurrentData-interNNI NAME BINDING
  SUBORDINATE OBJECT CLASS cellLevelProtocolCurrentData AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS interNNI AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T X.739":scannerId;
  CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 5};
```

2.4.6. cellLevelProtocolCurrentData-intraNNI

```
cellLevelProtocolCurrentData-intraNNI NAME BINDING
  SUBORDINATE OBJECT CLASS cellLevelProtocolCurrentData AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS intraNNI AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T X.739":scannerId;
  CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 6};
```

2.4.7. cellLevelProtocolCurrentData-uni

```
cellLevelProtocolCurrentData-uni NAME BINDING
  SUBORDINATE OBJECT CLASS cellLevelProtocolCurrentData AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS uni AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T X.739":scannerId;
  CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 7};
```

2.4.8. ds3PLCPPathCTPBidirectional-ds3PathTTPBidirectional

```
ds3PLCPPathCTPBidirectional-ds3PathTTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS ds3PLCPPathCTPBidirectional AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "Bellcore GR-
  836":ds3PathTTPBidirectional AND
   SUBCLASSES;
  WITH ATTRIBUTE ds3PLCPPathCTPId;
REGISTERED AS {atmfM4NameBinding 8};
```

2.4.9. ds3PLCPPathTTPBidirectional-managedElementR1

```
ds3PLCPPathTTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS ds3PLCPPathTTPBidirectional AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE "Bellcore GR-836":ds3PathTTPId;
   CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 9};
```

2.4.10. electricalSPITTPBidirectional-managedElementR1

```
electricalSPITTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS "ITU-T G.774":electricalSPITTPBidirectional
   AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T G.774":electricalSPITTPId;
   CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 10};
```

2.4.11. equipmentHolder-equipmentR1

```
equipmentHolder-equipmentR1 NAME BINDING
  SUBORDINATE OBJECT CLASS "ITU-T M.3100":equipmentHolder
   AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": equipmentR1 AND
   SUBCLASSES;
  WITH ATTRIBUTE "ITU-T M.3100": equipmentId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 11};
```

2.4.12. interNNI-managedElementR1

```
interNNI-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS interNNI AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE interNNIId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 12};
```

2.4.13. intraNNI-managedElementR1

```
intraNNI-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS intraNNI AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE intraNNIId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 13};
```

2.4.14. latestOccurrenceLog-managedElementR1

```
latestOccurrenceLog-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS latestOccurrenceLog AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
```

```
  WITH ATTRIBUTE "Rec. X.721 | ISO/IEC 10165-2":logId;
 CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 14};
```

2.4.15. msTTPBidirectional-managedElementR1

```
msTTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS "ITU-T G.774":msTTPBidirectional AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T G.774":msTTPId;
   CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 15};
```

2.4.16. multipointBridge-managedElementR1

```
multipointBridge-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS multipointBridge AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE multipointBridgeId;
   CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 16};
```

2.4.17. opticalSPITTPBidirectional-managedElementR1

```
opticalSPITTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS "ITU-T G.774":opticalSPITTPBidirectional AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T G.774":opticalSPITTPId;
   CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
```

```
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 17};
```

2.4.18. rsTTPBidirectional-managedElementR1

```
rsTTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS "ITU-T G.774":rsTTPBidirectional AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T G.774":rsTTPId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 18};
```

2.4.19. tcAdaptorCurrentData-tcAdaptorTTPBidirectional

```
tcAdaptorCurrentData-tcAdaptorTTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS tcAdaptorCurrentData AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS tcAdaptorTTPBidirectional AND
   SUBCLASSES;
  WITH ATTRIBUTE "ITU-T X.739":scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 19};
```

2.4.20. tcAdaptorTTPBidirectional-managedElementR1

```
tcAdaptorTTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS tcAdaptorTTPBidirectional AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100": managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE tcTTPId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
```

```
REGISTERED AS {atmfM4NameBinding 20};
```

2.4.21. uni-managedElementR1

```
uni-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS uni AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE uniId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 21};
```

2.4.22. upcNpcCurrentData-vcCTPBidirectional

```
upcNpcCurrentData-vcCTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS upcNpcCurrentData AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS vcCTPBidirectional AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T X.739":scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 22};
```

2.4.23. upcNpcCurrentData-vpCTPBidirectional

```
upcNpcCurrentData-vpCTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS upcNpcCurrentData AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS vpCTPBidirectional AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T X.739":scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 23};
```

2.4.24. vc4TTPBidirectional-managedElementR1

```
vc4TTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS "ITU-T G.774":vc4TTPBidirectional AND
   SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T G.774":vc4TTPId;
  CREATE
     WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 24};
```

2.4.25. vcCTPBidirectional-vpTTPBidirectional

```
vcCTPBidirectional-vpTTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS vcCTPBidirectional AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS vpTTPBidirectional AND SUBCLASSES;
  WITH ATTRIBUTE vcCTPId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 25};
```

2.4.26. vcTTPBidirectional-managedElementR1

```
vcTTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS vcTTPBidirectional AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE vcTTPId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 26};
```

2.4.27. vpCTPBidirectional-tcAdaptorTTPBidirectional

```
vpCTPBidirectional-tcAdaptorTTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS vpCTPBidirectional AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS tcAdaptorTTPBidirectional AND
```

```
   SUBCLASSES;
  WITH ATTRIBUTE vpCTPId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 27};
```

2.4.28. vpTTPBidirectional-managedElementR1

```
vpTTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS vpTTPBidirectional AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
   AND SUBCLASSES;
  WITH ATTRIBUTE vpTTPId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {atmfM4NameBinding 28};
```

2.5. Actions

2.5.1. addTpsToMultipointBridge

```
addTpsToMultipointBridge ACTION
      BEHAVIOUR addTpsToMultipointBridgeBeh;
      MODE CONFIRMED;
      WITH INFORMATION SYNTAX AtmMIBMod.AddTpsToMultipointBridgeInfo;
      WITH REPLY SYNTAX AtmMIBMod.AddTpsToMultipointBridgeReply;
REGISTERED AS {atmfM4Action 1};

addTpsToMultipointBridgeBeh BEHAVIOUR
      DEFINED AS
"This action is used to add one or more vpCTPBidirectional objects or vcCTPBidirectional objects to the identified
multipoint connection.

Supplied with this action is the following information:

New CTPs - This parameter identifies the additional CTPs (i.e., the vpCTPBidirectional or vcCTPBidirectional
object instances) to add to the existing multipoint connection.

MultipointBridge - This parameter  identifies the instance of the multipointBridge object class to which the
additional legs need to be connected.

If the request is granted, the commonCTPs attribute, in the multipointBridge object, shall be reset to reflect the new
legs added to the multipoint connection. ";
```

2.5.2. connect

connect ACTION
BEHAVIOUR connectBeh;
MODE CONFIRMED;
WITH INFORMATION SYNTAX AtmMIBMod.ConnectInformation;
WITH REPLY SYNTAX AtmMIBMod.ConnectReply;
REGISTERED AS {atmfM4Action 2};

connectBeh BEHAVIOUR
DEFINED AS
"This action is used to establish a point-to-point ATM connection two between termination points. The termination points to be connected can be identified explicitly by specifying the associated vcCTPBidirectional object or vpCTPBidirectional object, or by specifying the charcteristics of each termination point. Multiple point-to-point connections may be requested with a single connect ACTION.

If a valid end point descriptor is provided and the connect request can be successfully carried out, the NE would reserve the necessary resources such as the VPI and/or VCI value, and automatically create the necessary VP/VC termination points (e.g., the VP CTPs, VP TTPs, and VC CTPs) for the cross-connection.

The result, if successful, always returns an explicit list of termination points.

Successful execution of this action would result in the creation of an instance of the atmCrossConnection object. This cross-connection object has the fromTermination and toTermination attributes pointing to the two termination points. The administrativeState and recoveryType attributes in the cross-connection object are initialized according to the values provided in the action request information. If the administrativeState parameter is omitted, the administrative state will be set to 'unlocked'. If the recoveryType parameter is omitted, the recovery type will be set to recoverable.

If the administrativeState in the atmCrossConnection object is unlocked, the upstreamConnectivityPointer and downstreamConnectivityPointer in the two termination points are set to the local distinguished name of the (peer) termination point to which it is connected. Also, the crossConnectionObjectPointer in the termination points shall point to the atmCrossConnection object.

This action will fail if any of the termination points specified are already involved in a cross-connection, any of the termination point descriptors specified cannot be satisfied, or the two termination points do not have compatible termination point descriptors.";

2.5.3. connectMultipointBridge

connectMultipointBridge ACTION
BEHAVIOUR connectMultipointBridgeBeh;
MODE CONFIRMED;
WITH INFORMATION SYNTAX AtmMIBMod.ConnectMultipointBridgeInfo;
WITH REPLY SYNTAX AtmMIBMod.ConnectMultipointBridgeReply;
REGISTERED AS {atmfM4Action 3};

connectMultipointBridgeBeh BEHAVIOUR

DEFINED AS
"This action is used to establish a multipoint connection between vpCTPBidirectional or vcCTPBidirectional objects. Four types of multipoint connections can be established using this action: broadcast, merge, broadcast/merge (composite), and full multipoint. The multipointConnectionType attribute of this action is used to identify the desired connection type. Note that this action will result in the cross-connection of CTP objects to an instance of the multipointBridge object.

Also supplied with this action is the following information:

Primary CTP - This parameter identifies a termination point (vpCTPBidirectional or vcCTPBidirectional object) or termination point descriptor for the termination point that generates traffic to broadcast and/or receives merged traffic for broadcast, merge, or composite multipoint connection types. For full multipoint connections (i.e., all legs communicate with all other legs), the value of this attribute shall be set to NULL. The termination point identified by this parameter shall serve as the basis for the primaryCTP attribute of the multipointBridge object.

Common CTPs - This identifies termination point descriptor or CTP object instances (vpCTPBidirectional object class or vcCTPBidirectional object class) of all legs of the multipoint connection except the leg identified via the primaryCTP attribute. For full multipoint cross-connections, all the legs of the multipoint cross-connection shall be identfied by this attribute. The termination points derived from this parameter shall serve as the basis for the commonCTPs attribute of the multipointBridge.

Recovery Type - This parameter indicates if the multipoint session should be recovered in case of service interruption. This parameter serves as the initial values for the recoveryType attribute in all the associated cross-connection objects.

Administrative State - This parameter will be used as the initial value for the administrativeState attribute in multipointBridge and its associated cross-connection objects.

The action will fail if the primaryCTP is specified but cannot be connected or none of the commonCTPs can be connected. If the action is accepted, the result would return the primaryCTP termination point, the connected common CTPs, and a problem cause for each of the non-connected common CTPs.";

2.5.4. disconnect

```
disconnect ACTION
    BEHAVIOUR disconnectBeh;
    MODE    CONFIRMED;
    WITH INFORMATION SYNTAX       ASN1DefinedTypesModule.DisconnectInformation;
    WITH REPLY SYNTAX ASN1DefinedTypesModule.DisconnectResult;
REGISTERED AS {atmfM4Action 4};

disconnectBeh BEHAVIOUR
    DEFINED AS
```

"This action is used to take down a point-to-point cross-connection. The connection to be taken down is specified by identifying a termination point of the connection. The other termination point of the point-to-point connection is implicitly disconnected as well and the cross-connection object is deleted. The connectivity pointers in the disconnected termination points will be set to NULL as a result of this action. Disconnection of multiple point-to-point connections can be requested by providing multiple CTP

object instances in the DisconnectInformation. Each component in the DisconnectResult sequence provides the disconnection result for the corresponding components of the DisconnectInformation sequence.

This action shall not result in the deletion any of the termination point objects to disconnect.";

2.5.5. disconnectMultipointBridge

```
disconnectMultipointBridge ACTION
    BEHAVIOUR disconnectMultipointBridgeBeh;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX AtmMIBMod.DisconnectMultipointBridgeInfo;
    WITH REPLY SYNTAX AtmMIBMod.DisconnectMultipointBridgeReply;
REGISTERED AS {atmfM4Action 5};

disconnectMultipointBridgeBeh BEHAVIOUR
    DEFINED AS
```

"This action is used to release a multipoint cross-connection. Supplied with this action is the instance of the multipointBridge object supporting the multipoint cross-connection.

If any of the commonCTPs cannot be disconnected, the primaryCTP, if any, should not be disconnected. If the multipointBridge is not completely disconnected, the action result would indicate which commonCTPs have been disconnected and which commonCTPs are not disconnected and why.";

2.5.6. loopbackOAMCell

```
loopbackOAMCell ACTION
  BEHAVIOUR loopbackOAMCellBeh;
  MODE CONFIRMED;
  WITH INFORMATION SYNTAX AtmMIBMod.LoopbackOAMCellInfo;
  WITH REPLY SYNTAX AtmMIBMod.LoopbackOAMCellReply;
REGISTERED AS {atmfM4Action 6};

loopbackOAMCellBeh BEHAVIOUR
  DEFINED AS
```

" This action is used to request a vpCTPBidirectional, vcCTPBidirectional, vpTTPBidirectional, or vcTTPBidirectional object to insert (in the outgoing direction) a loopback OAM cell into the ATM cell stream and verify its return.

Supplied along with this action is the loopbackLocation parameter. This parameter identifies the downstream vpCTPBidirectional, vcCTPBidirectional, vpTTPBidirectional, or vcTTPBidirectional object instance responsible for looping back the OAM cell. The value of TRUE-NULL (default) can be used to request the end-point of the ATM connection or connection segment to loopback the OAM cell. Also supplied with this parameter is an indication as to whether or not the OAM Loopback Cell to be inserted shall be of the segment type or end-to-end type.";

2.5.7. removeTpsFromMultipointBridge

removeTpsFromMultipointBridge ACTION
BEHAVIOUR removeTpsFromMultipointBridgeBeh ;
MODE CONFIRMED;
WITH INFORMATION SYNTAX AtmMIBMod.RemoveTpsFromMultipointBridgeInfo;
WITH REPLY SYNTAX AtmMIBMod.RemoveTpsFromMultipointBridgeReply;
REGISTERED AS {atmfM4Action 7};

removeTpsFromMultipointBridgeBeh BEHAVIOUR
DEFINED AS
"This action is used to remove one or more legs (leaf CTPs) from the identified multipoint connection.

Supplied with this action is the following information:

Existing CTPs - This parameter identifies the existing CTPs to remove from the multipoint connection.

MultipointBridge - This parameter identifies the instance of the multipointBridge object class from which the identified legs should be removed (disconnected).

If the request is granted, the commonCTPs attribute, in the multipointBridge object, shall be reset to reflect the remaining legs of the multipoint connection. ";

2.6. Supporting Productions

```
AtmMIBMod -- {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1) atmfCmipNEView(1)
informationModel(0) asn1Module(2) atmMIBMod(0)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN

  -- exports everything
  IMPORTS
  Boolean,
  DisconnectInformation,
  DisconnectResult,
  Failed,
  NameType,
  PointerOrNull,
  ProblemCause
  FROM
  ASN1DefinedTypesModule {ccitt recommendation m(13) gnm(3100)
    informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)}

  DistinguishedName,
  RelativeDistinguishedName
  FROM
  InformationFramework {joint-iso-ccitt ds(5) modules(1) informationFramework(1)}

  EventTypeId,
  ObjectInstance
  FROM
  CMIP-1 {joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3)}

  AdministrativeState,
  AttributeList,
  ProbableCause,
  SimpleNameType
  FROM
  Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module(2) 1};

  atmfM4ObjectClass OBJECT IDENTIFIER ::= {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1)
atmfCmipNEView(1) informationModel(0) managedObjectClass(3)}

  atmfM4Package OBJECT IDENTIFIER ::= {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1)
atmfCmipNEView(1) informationModel(0) package(4)}

  atmfM4Attribute OBJECT IDENTIFIER ::= {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1)
atmfCmipNEView(1) informationModel(0) attribute(7)}

  atmfM4NameBinding OBJECT IDENTIFIER ::= {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1)
atmfCmipNEView(1) informationModel(0) nameBinding(6)}

  atmfM4Action OBJECT IDENTIFIER ::= {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1)
atmfCmipNEView(1) informationModel(0) action(9)}
```

```
  -- default value definitions

  booleanFalseDefault Boolean ::= FALSE

  booleanTrueDefault Boolean ::= TRUE

  integerZero INTEGER ::= 0

  -- additional value definitions to probableCause production

  atmProbableCause OBJECT IDENTIFIER ::= {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1)
atmfCmipNEView(1) atmMIB(99) standardSpecificExtension(0) atmProbableCause(0)}

  lossOfCellDelineation ProbableCause ::= globalValue : {atmProbableCause 1}

  congestion ProbableCause ::= globalValue : {atmProbableCause 2}

  unspecified ProbableCause ::= globalValue : {atmProbableCause 3}

  -- additional eventTypes

  atmEventType OBJECT IDENTIFIER ::= {1 3 6 1 4 1 353 atmForumNetworkManagement(5) atmfM4(1)
atmfCmipNEView(1) atmMIB(99) standardSpecificExtension(0) atmEventType(1)}

  cellHeaderAbnormalityEvent EventTypeId ::= globalForm : {atmEventType 1}

  -- supporting productions

  AddTpsToMultipointBridgeInfo ::= SEQUENCE {
        newCTPs NewCTPs,
        multipointBridgeInstance ObjectInstance}

  AddTpsToMultipointBridgeReply ::= SEQUENCE OF SEQUENCE{
        legAddedObjectInstance,
        legNotAdded      ProblemCause OPTIONAL}

  AtmSubscriberAddress ::= SEQUENCE OF PrintableString

  CDVTolerance ::= SEQUENCE {
    cellDealyVariationToleranceCLP0plus1 [1] INTEGER OPTIONAL,
    cellDelayVariationToleranceCLP0 [2] INTEGER OPTIONAL}

  CellHeaderAbnormalityType ::= ENUMERATED {
    unassignedVpiVciValue (0),
    outOfRangeVpiVciValue (1)}

  CommonCTPs ::= SEQUENCE OF CtpOrDescriptor

  ConnectCtpStatus ::= CHOICE {
        ctpConnected     [0]  ObjectInstance,
        ctpFailed        [1]  ProblemCause}

  Connected ::= SEQUENCE {
        fromTp  ObjectInstance,
```

```
        toTp      ObjectInstance,
        xCon      ObjectInstance}

ConnectInformation ::= SEQUENCE OF SEQUENCE {
        fromTermination  [0] CtpOrDescriptor,
        toTermination    [1] CtpOrDescriptor,
        recoveryType     [2] RecoveryType OPTIONAL,
        administrativeState          [3] AdministrativeState     OPTIONAL}

ConnectMultipointBridgeInfo ::= SEQUENCE {
        primaryCTP       [0] PrimaryCTP,
        commonCTPs       [1] CommonCTPs          OPTIONAL,
        multipointBridgeInstance   [2] ObjectInstance,
        multipointConnectionType          [3] MultipointConnectionType,
        recoveryType     [4] RecoveryType OPTIONAL,
        -- the recoveryType value is shared by all legs
        administrativeState          [5] AdministrativeState     OPTIONAL}
        -- the administrativeState value is shared by all legs

ConnectMultipointBridgeReply ::= CHOICE {
        mpConnected      MpConnected,
        mpFailed         MpFailed}

ConnectReply ::= SEQUENCE OF CHOICE {
        connected        [0]  Connected,
        failed     [1]  Failed} -- import from M.3100

CtpOrDescriptor ::= CHOICE {
        ctp        [0] ObjectInstance,
        descriptor       [1] Descriptor}

CtpStatus ::= CHOICE {
        disconnected     [0]  NULL,
        failed     [1]  ProblemCause}

Descriptor ::= SEQUENCE {
        interfaceId [0] ObjectInstance, -- a uni, intraNNI, or interNNI
        vpi [1] INTEGER OPTIONAL, -- assigned by NE if absent
        vci [2] INTEGER OPTIONAL, -- set to 0 for VP cross connect
        egressCDVTolerance [3] CDVTolerance OPTIONAL,
        ingressCDVTolerance [4] CDVTolerance OPTIONAL,
        egressMaxBurstSize [5] MaxBurstSize OPTIONAL,
        ingressMaxBurstSize [6] MaxBurstSize OPTIONAL,
        egressPeakCellRate [7] PeakCellRate OPTIONAL,
        ingressPeakCellRate [8] PeakCellRate OPTIONAL,
        egressSustainableCellRate [9] SustainableCellRate OPTIONAL,
        ingressSustainableCellRate [10] SustainableCellRate OPTIONAL,
        egressQosClass [11] QosClass OPTIONAL,
        ingressQosClass [12] QosClass OPTIONAL}

DisconnectMultipointBridgeInfo ::= ObjectInstance  -- multipointBridge

DisconnectMultipointBridgeReply ::= CHOICE {
        disconnected     NULL,
```

```
        notDisconnected   SEQUENCE OF DisconnectCtpStatus}

  DisconnectCtpStatus ::= SEQUENCE OF SEQUENCE {
        ctpInstance       ObjectInstance,
        ctpStatus         CtpStatus}

  ExistingCTPs ::= SEQUENCE OF ObjectInstance

  FarEndCarrierNetwork ::= GraphicString

  GraphicStringOrNull ::= CHOICE {
    graphicString GraphicString,
    null NULL}

  IlmiChannelIdentifier ::= SEQUENCE {
    vpiValue INTEGER,
    vciValue INTEGER}

  Integer ::= INTEGER

  InterfacePointer ::= ObjectInstance  -- uni, interNNI, or intraNNI

  LoopbackLocation ::= SEQUENCE {
    endPoint BOOLEAN, -- default is TRUE
    loopbackLocationCode OctetStringOrNull -- default is NULL
  }

  LoopbackOAMCellInfo ::= SEQUENCE {
    loopbackLocation LoopbackLocation,
    oamCellType  OamCellType}

  LoopbackOAMCellReply ::= SEQUENCE {
    loopbackSuccessful BOOLEAN,
    problemCause ProblemCause OPTIONAL}

  MaxBurstSize ::= SEQUENCE {
    maxBurstSizeCLP0plus1 [1] INTEGER OPTIONAL,
    maxBurstSizeCLP0 [2] INTEGER OPTIONAL}

  MpConnected ::= SEQUENCE {
     primary        [0]  ObjectInstance,
     commonCTPs           [1]  SEQUENCE OF ConnectCtpStatus}
-- in the same sequence as the ConnectMultipointBridgeInfo

  MpFailed ::= ProblemCause

  MultipointConnectionType ::= CHOICE {
    typeNotAssigned NULL,
    multipointType ENUMERATED {
      broadcast (0), -- point-to-multipoint
      merge (1), -- multipoint-to-point
      composite (2), -- root-to-leaves & leaves-to-root
      multipoint (3) -- multipoint-to-multipoint
  }}
```

```
  NewCTPs ::= SEQUENCE OF CtpOrDescriptor

  Null ::= NULL

  OctetString ::= OCTET STRING

  OctetStringOrNull ::= CHOICE {
     octetString OctetString,
     null NULL}

  PeakCellRate ::= SEQUENCE {
    peakCellRateCLP0plus1 [1] INTEGER OPTIONAL,
    peakCellRateCLP0 [2] INTEGER OPTIONAL}

  PreferredCarrier ::= SEQUENCE OF GraphicString

  PrimaryCTP ::= CHOICE {
          null       NULL,
          ctp        ObjectInstance,
          descriptor           Descriptor}

  OamCellType ::= ENUMERATED {
     segment (0),
    endToEnd (1)}

  OctetString ::= OCTET STRING

  QosClass ::= ENUMERATED {
     class0 (0),
     class1 (1),
     class2 (2),
     class3 (3),
     class4 (4)}

  RecoveryType ::= ENUMERATED {
    recoverable (0),
    nonrecoverable (1)}

  RemoveTpsFromMultipointBridgeInfo ::= SEQUENCE {
          existingCTPs                    ExistingCTPs,
          multipointBridgeInstance   ObjectInstance}

  RemoveTpsFromMultipointBridgeReply ::= SEQUENCE OF SEQUENCE {
          ctpInstance                ObjectInstance,
          legRemovalProblem          ProblemCause OPTIONAL
          -- absent if ctpInstance is disconnected
          }

  SustainableCellRate ::= SEQUENCE {
     sustainableCellRateCLP0plus1 [1] INTEGER OPTIONAL,
     sustainableCellRateCLP0 [2] INTEGER OPTIONAL}

END
```

References

[1] ATM Forum af-nm-0020.000, *M4 Interface Requirements and Logical MIB: ATM Network Element View*, October 1994.

[2] ITU-T Recommendation G.774, *Synchronous Digital Hierarchy (SDH) Management Information Model*, November 1991; and ITU-T Recommendation G.774-01, *Synchronous Digital Hierarchy (SDH) Performance Monitoring for the Network Element View*, January 1994.

[3] ITU-T Recommendation M.3100, *Generic Network Information Model*, Version 2, March 1995.

[4] ITU-T Recommendation Q.822, *Stage 1, State 2, and Stage 3 Description for the Q3 Interface. Performance Management*, April 1994.

[5] ITU-T Recommendation X.721, *Information Technology - Open Systems Interconnection - Structure of Management Information - Part 2: Definition of Management Information*, February 1992, plus Technical Corrigendum 1.

[6] ITU-T Recommendation X.739, *Information Technology - Open Systems Interconnection - Systems Management -- Part 11: Workload Monitoring Function*, November 1993.

[7] Bellcore GR-836-IMD, *Generic Operations Interfaces Using OSI Tools - Information Model Details: Transport Configuration and Surveillance for Network Elements*, Issue 1, August 1994, plus Revision October 1994.

[8] ANSI T1.247, *Operations, Administration, Maintenance, and Provisioning (OAM&P) - Performance Management Functional Area Services and Information Model for Interfaces between Operations Systems and Network Elements*, 1995.

[9] ETSI NA5-2210, *B-ISDN Management Architecture and Management Information Model for the ATM Crossconnect*, Version 2, February 1994.

[10] Bellcore TA-NWT-001114, *Generic Requirements for Operations Interfaces Using OSI Tools: ATM/Broadband Network Management*, Issue 2, October 1993.

[11] ITU-T Recommendation I.321, *B-ISDN Protocol Reference Model and its Application*, February 1990.

Annex A : Communications Support for the CMIP M4 Interface

In order to promote interoperability, this Annex describes recommended communications stacks to support the CMIP M4 Interface. These recommendations are depicted in Figure A-1 below.

A.1. Protocol Profiles for OSI Stacks

ITU-T Recommendations Q.812 and Q.811 define the protocol profiles for the Q3 interface as defined in Recommendation M.3010.

Implementations of the CMIP M4 Interface that use OSI protocol stacks, should implement the Q3 interface as defined in Recommendation Q.812 for transaction type services (CMISE), and implement supporting lower layer services as defined in Recommendation Q.811.

Note that Recommendations Q.811 and Q.812 are currently being revised with the intention to base the next editions on International Standard Profiles (ISPs) including those of the AOM1x series.

A.2. Protocol Profiles for TCP/IP Stacks

A.2.1. Upper Layer Profiles for TCP/IP Stacks, Layers 5-7

Implementations of the CMIP M4 Interface that use TCP/IP protocol stacks, should implement the OSI upper layers (5-7) as defined in Recommendation Q.812 for transaction type services (CMISE).

A.2.2. Lower Layer Profiles for TCP/IP Stacks, Layers 3-4

Implementations of the CMIP M4 Interface that use the TCP/IP protocol stack, should implement the ISO TP0 protocol on top of TCP/IP as defined in RFC1006.

A.2.3. Lower Layer Profiles for TCP/IP Stacks, ATM Layer

Implementations of the CMIP M4 Interface that use the TCP/IP protocol stack over ATM, should implement IP over AAL5/ATM as defined in RFC1577 using the LLC/SNAP Encapsulation method defined in RFC1483.

A.3. Interim Protocol Profile using CMOT

In order to support early deployment of the CMIP M4 Interface, some implementations may temporarily use the CMOT protocol stack. Implementations of the CMIP M4 Interface that use the TCP/IP protocol stack, may optionally implement the CMOT profile defined in RFC1095[1].

[1] Note: RFC1095 has been declared obsolete by the IETF having been replaced by RFC1189, which itself has been classified as a “Historic” RFC with “Not Recommended” status. The option to use a CMOT profile will be removed in the next edition of this specification.

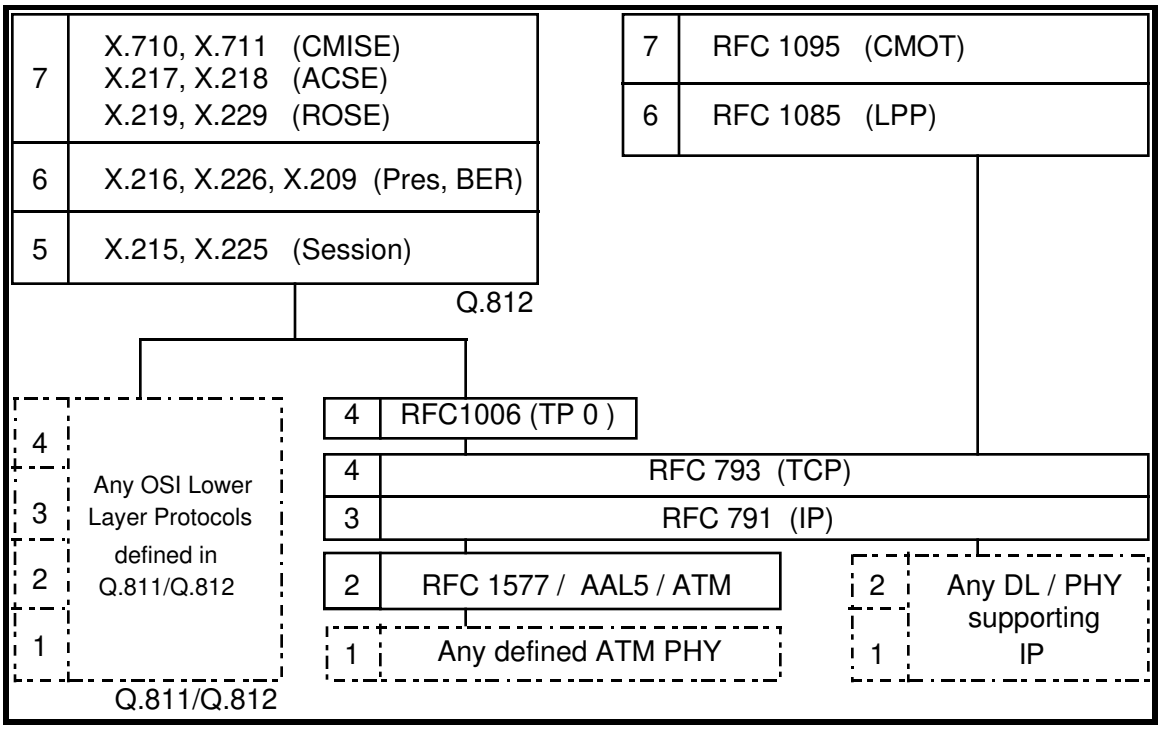


Figure A-1: Communications Stacks for the CMIP M4 Interface

A.4. References

ITU-T Recommendation Q.811, *Q3 - Lower Layer Protocols*, 1990

ITU-T Recommendation Q.812, *Q3 - Higher Layer Protocols*, 1990

RFC1006, D. Cass, M. Rose, *ISO transport services on top of the TCP: Version: 3*, 05/01/1987.

RFC1095, U. Warrier, L. Besaw, *Common Management Information Services and Protocol over TCP/IP (CMOT)*, 04/01/1989.

RFC1189, L. Besaw, B. Handspicker, L. LaBarre, U. Warrier, *The Common Management Information Services and Protocols for the Internet*, 10/26/1990.

RFC1483, J. Heinanen, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*, 07/20/1993.

RFC1577, M. Laubach, *Classical IP and ARP over ATM*, 01/20/1994.