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AND LEASED CIRCUITS

Telecommunications management network

TMN management services for dedicated and reconfigurable circuits network: Information model for connection management of preprovisioned service link connections to form a reconfigurable leased service

ITU-T Recommendation M.3108.2

(Formerly CCITT Recommendation)

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ITU-T Recommendation M.3108.2

TMN management services for dedicated and reconfigurable circuits network: Information model for connection management of preprovisioned service link connections to form a reconfigurable leased service

Summary

This ITU-T Recommendation is one of the series of M.3100-M.3200 TMN management service Recommendations. Specifically, it provides a GDMO-based information model to support the real time management of preprovisioned leased circuit services as specified in ITU-T Recommendation M.3208.2. The model enables service customers to request, via a service layer X interface, the interconnect of preprovisioned service link connections to form a leased circuit service.

Also included in this ITU-T Recommendation are Unified Modelling Language diagrams describing selected aspects of the model and selected management functions and processes.

Source

ITU-T Recommendation M.3108.2 was prepared by ITU-T Study Group 4 (1997-2000) and approved under the WTSC Resolution 1 procedure on 4 February 2000.

Keywords

Connection management, dedicated and reconfigurable circuits network, information model, leased circuit services, leased circuits, telecommunications management network (TMN), TMN management service.

FOREWORD

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NOTE

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Introduction

ITU-T Recommendation M.3208.1 specifies functions that support customer management of leased circuit services. ITU-T Recommendation M.3208.2 applies these management functions to the case in which service customers manage preprovisioned resources. In this application, the service creation process from the submission of the customer request to create a service until the service is available for use only involves connecting existing, preprovisioned resources. The connection of the preprovisioned resources is normally completed within a very short time interval, i.e. nearly instantaneously.

ITU-T Recommendation M.3108.1 provides a GDMO-based information model to support the management of the leased circuit service as outlined in ITU-T M.3208.1. This ITU-T Recommendation provides a GDMO-based information model that supports the services specified in ITU-T M.3208.2. The information model is for use across a service layer X interface, among service customers, service providers, and network providers for the purposes of managing the leased circuit services specified in ITU-T Recommendation M.3208.2. It may optionally be used at the service layer within an administration.

ITU-T Recommendation M.3108.2

TMN management services for dedicated and reconfigurable circuits network: Information model for connection management of preprovisioned service link connections to form a reconfigurable leased service

1 Scope

This ITU-T Recommendation provides a GDMO-based information model to support connection management (CM) of leased circuit services (LCS) using preprovisioned service link connections (SLC) as outlined in ITU-T Recommendation M.3208.2.

Informative Appendix I provides a mapping of the attributes contained in this ITU-T Recommendation to the recommendations that are the immediate source of the attributes. Informative Appendix II provides Unified Modelling Language (UML) diagrams of selected aspects of the information model and selected aspects of the service management functions supported herein.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- ITU-T Recommendation G.805 (1995), *Generic functional architecture of transport networks*.
- CCITT Recommendation M.125 (1988), *Digital loopback mechanisms*.
- ITU-T Recommendation M.3010 (2000), *Principles for a telecommunications management network*.
- ITU-T Recommendation M.3020 (2000), *TMN interface specification methodology*.
- ITU-T Recommendation M.3100 (1995), *Generic network information model*.
- ITU-T Recommendation M.3108.1 (1999), *TMN management services for dedicated and reconfigurable circuits network: Information model for management of leased circuit and reconfigurable services*.
- ITU-T Recommendation M.3200 (1997), *TMN management services and telecommunications managed areas: Overview*.
- ITU-T Recommendation M.3208.1 (1997), *TMN management services for dedicated and reconfigurable circuits network: Leased circuit services*.
- ITU-T Recommendation M.3208.2 (1999), *TMN management services for dedicated and reconfigurable circuits network: Connection management of preprovisioned service link connections to form a link connection service*.
- ITU-T Recommendation M.3320 (1997), *Management requirements framework for the TMN X interface*.
- ITU-T Recommendation M.3400 (2000), *TMN management functions*.

- ITU-T Recommendation Q.812 (1997), *Upper layer protocol profiles for the Q3 and X interfaces.*
- ITU-T Recommendation Q.813 (1998), *Security transformations application service element for remote operations service element (STASE-ROSE).*
- ITU-T Recommendation Q.821 (1993), *Stage 2 and stage 3 description for the Q3 interface – alarm surveillance.*
- ITU-T Recommendation X.690 (1997) | ISO/IEC 8825-1:1998, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*
- ITU-T Recommendation X.701 (1997) | ISO/IEC 10040:1998, *Information technology – Open Systems Interconnection – Systems Management overview.*
- CCITT Recommendation X.721 (1992) | ISO/IEC 10165-2:1992, *Information technology – Open Systems Interconnection – Structure of management information: Definition of management information.*
- CCITT Recommendation X.731 (1992) | ISO/IEC 10164-2:1993, *Information technology – Open Systems Interconnection – Systems Management: State management function.*
- CCITT Recommendation X.734 (1992) | ISO/IEC 10164-5:1993, *Information technology – Open Systems Interconnection – Systems Management: Event Report Management Function.*
- CCITT Recommendation X.735 (1992) | ISO/IEC 10164-6:1993, *Information technology – Open Systems Interconnection – Systems Management: Log control function.*
- ITU-T Recommendation X.746 (1995) | ISO/IEC 10164-15:1995, *Information technology – Open Systems Interconnection – Systems Management: Scheduling function.*
- ITU-T Recommendation X.790 (1995), *Trouble management function for ITU-T applications.*

3 Definitions

This ITU-T Recommendation makes use of the following terms defined and/or specialized in ITU-T Recommendation M.3208.1:

- connection point;
- dedicated leased circuit service;
- diversity;
- layer network;
- leased circuit service;
- link connection;
- network connection;
- reconfigurable leased circuit service;
- service access group;
- service access point;
- service characteristic;
- service customer;
- service node;
- service provider;
- subnetwork;

- subnetwork connection;
- termination connection point.

This ITU-T Recommendation makes use of the following terms defined and/or specialized in ITU-T Recommendation M.3208.2:

- CM schedule;
- dedicated service link connection;
- end link connection;
- route;
- service link connection;
- shared service link connection.

This ITU-T Recommendation makes use of the following terms defined in ITU-T Recommendation G.805:

- access group;
- access point;
- trail.

4 Abbreviations

This ITU-T Recommendations uses the following abbreviations:

AP	Access Point
ATM	Asynchronous Transfer Mode
CM	Connection Management
CMIP	Common Management Information Protocol
CMISE	Common Management Information Service Element
CP	Connection Point
CPE	Customer Premises Equipment
DSn	Digital Signal Level n
GDMO	Guidelines for the Definition of Managed Objects
GDMS	Guidelines for the Definition of TMN Management Services
ISP	International Standardized Profile
LC	Link Connection
LCS	Leased Circuit Service
MAPDU	Management Application Protocol Data Unit
MOC	Managed Object Class
MOI	Managed Object Instance
MS	Management Services
NE	Network Element
NML	Network Management Layer
OSI	Open Systems Interconnection
PDH	Plesiochronous Digital Hierarchy

PDU	Protocol Data Unit
RDN	Relative Distinguished Name
ROSE	Remote Operations Service Element
SAP	Service Access Point
SC	Service Customer
SDH	Synchronous Digital Hierarchy
SLA	Service Level Agreement
SLC	Service Link Connection
SML	Service Management Layer
SN	Service Node
SNC	Sub-Network Connection
SP	Service Provider
STASE	Security Transformations Application Service Element
TCP	Termination Connection Point
TMN	Telecommunications Management Network
UML	Unified Modelling Language

5 Conventions

The entry, "See Recommendations M.3208.1/M.3208.2," in the Notes Column of an Attribute To Information Element Mapping Table means that the note for the associated information element is identical in ITU-T Recommendations M.3208.1 and M.3208.2. Consequently, the corresponding note from either Recommendation applies to this ITU-T Recommendation. The entry, "See Recommendation M.3208.2" means that the corresponding note in M.3208.2 is an extension or specialization of the equivalent one in M.3208.1. In this case only the note in M.3208.2 applies to this ITU-T Recommendation. A note entry that does not reference other ITU-T Recommendations means that the entry is an elaboration of the equivalent note in M.3208.2, or the note refers to an attribute that is not directly mapped to an M.3208.2 Information Element.

6 Overview of the CM Information Model

6.1 CM Managed Object Classes

The following two managed object classes (MOC) are defined in this ITU-T Recommendation to meet the functional requirements specified in ITU-T Recommendation M.3208.2.

6.1.1 The preProvisionedSLC MOC

The preProvisionedSLC MOC models a preprovisioned, service level, link connection. A service link connection (SLC) provides service between two connection points (CP) or between a CP and a service access point (SAP). The preProvisionedSLC MOC represents only those aspects of a SLC that are relevant for connection management (CM) of preprovisioned service link connections to form a link connection service. The preProvisionedSLC MOC is a subclass of the M.3108.1: transportService MOC.

The following are three examples of SLCs. In the first example, the SLC models the service resources between a SAP at a service customer (SC) controlled facility and a subnetwork CP, e.g. a

multiplexer port located in the SP's network. In the next example, the SLC represents the service resources between two subnetwork CPs, e.g. two broadband digital cross-connects in the service provider's (SP) network. Lastly, a SLC can model the service resources between a subnetwork CP, such as a cross-connect in the SP's local exchange and a SAP located in SC's end user's premises.

When properly combined with other preProvisionedSLC managed object instances (MOI), a specific preProvisionedSLC MOI is a component of a leased circuit service (LCS) represented by a cmLeasedCircuitService MOI.

6.1.2 The cmLeasedCircuitService MOC

The cmLeasedCircuitService MOC is a subclass of the M.3108.1: transportService MOC. A cmLeasedCircuitService MOI represents an LCS as an ordered list of SLCs. This list must contain two or more SLCs. Exactly two of the SLCs in the list must be end link connections¹. A cmLeasedCircuitService MOI may be created by specifying the complete list of its constituent preProvisionedSLC MOIs or by specifying the SAPs at the ends of the LCS.

The on duty and the off duty intervals of a cmLeasedCircuitService MOI are scheduled via the scheduling packages defined in ITU-T Recommendations X.734 and X.735.

6.2 Inheritance Hierarchy

Figure 1 contains the inheritance hierarchy for the MOCs defined in this ITU-T Recommendation.

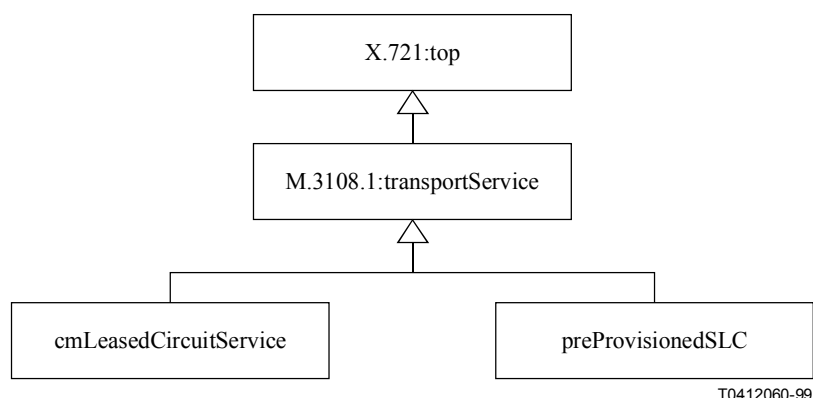


Figure 1/M.3108.2 – Inheritance hierarchy

6.3 Referential Relationships

Figure 2 displays the referential relationship that exists among the CM MOIs. Referential relationships represent logical dependencies between MOIs. As the relationship between an LCS and its constituent SLCs is very dynamic, existing only from the LCS creation time to its termination time, a pointer based approach is used in this ITU-T Recommendation to model this relationship.

For performance reasons, the model specified in this ITU-T Recommendation also defines an attribute in the preProvisionedSLC MOC that identifies all of LCSs it supports. At any time, a preProvisionedSLC MOI may point to more than one cmLeasedCircuitService MOI as long as these cmLeasedCircuitService MOIs have compatible schedules.

¹ M.3208.2 only applies to point-to-point circuits.

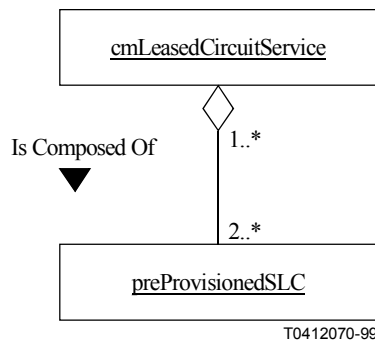


Figure 2/M.3108.2 – Managed object class relationships

6.4 Attributes

This subclause describes the attributes used in CM. The attributes of each of the MOCs defined in this ITU-T Recommendation are arranged in alphabetical order in the following subclauses. Major portions of these subclauses are reused as behaviour descriptions in the GDMO templates contained in clause Formal Model Specifications For Connection Management.

The following subclauses also indicate if an attribute is defined in this ITU-T Recommendation, if it is inherited from the transportService MOC defined in ITU-T Recommendation M.3108.1, or if it is imported. The table in Appendix I (see Table I.1) summarizes this information for all the attributes in the preProvisionedSLC and the cmLeasedCircuitService MOCs.

6.4.1 The preProvisionedSLC Attributes

This ITU-T Recommendation requires that the transportService conditional package, "Rec. X.721": availabilityStatusPackage², shall not be instantiated in the preProvisionedSLC MOIs. Consequently, the availabilityStatus attribute does not appear in the preProvisionedSLC MOC.

6.4.1.1 administrativeState

The administrativeState attribute is inherited from the M.3108.1: transportService MOC. For CM, the value of this attribute must be set to unlocked by the SP when the resource is made available to the SC. The SC may change this attribute to locked for dedicated SLCs only. The administrativeState of shared SLCs cannot be changed to locked by the SC. One possible implementation of this latter requirement is through the use of an access control process.

6.4.1.2 bandwidth

The bandwidth attribute is inherited from the M.3108.1: transportService MOC. See ITU-T Recommendations M.3208.1 and M.3108.1 for the functions supported by and for this attribute.

6.4.1.3 dedicatedOrShared

The dedicatedOrShared attribute identifies whether a SLC is dedicated to the SC or is in a shared resource pool. The value of this attribute cannot be changed by the SC.

When a SC specifies an LCS via its SAPs, one of the possible LCS restrictions that may be specified is the value of the dedicatedOrShared attribute for the SLCs used to support the LCS. See the description of the restrictionsOnSLC attribute in subclause restrictionsOnSLC and the description of the create CM LCS function in subclause Create CM, LCS for additional information.

² See Corrigendum 1 to ITU-T Recommendation M.3108.1.

6.4.1.4 leasedCircuitServicePtrList

For a given SLC, this attribute is a list of all cmLeasedCircuitService MOIs that employ it. That is, for a specific preProvisionedSLC MOI, this attribute contains a list of all the LCSs that contain the SLC. See subclause listOfSLCsUsedfor the specification of the means by which an LCS maintains a description of its constituent SLCs.

When a request is made by the SC to create a new LCS that will use this SLC, the leasedCircuitServicePtrList attribute is used to determine if a conflict exists between the requested schedule for the new LCS and the schedules of any existing LCSs that use this SLC.

6.4.1.5 loopbackControl

The loopbackControl attribute identifies whether or not an SLC is looped back. In general there are two possibilities for creating a loopback. Consequently for those SLCs that are looped back, this attribute also specifies which end of the SLC is looped back.

Note that establishing a loopback is considered to be an instantaneous service, i.e. the loopback is established by the SP on receipt of the loopback request. Only SLCs that are in unlocked LCSs with a status of on duty can be looped back.

This attribute is also used to set the loopback termination time. A loopback will be removed when the LCS which contains the looped back SLC transitions from an availability status of on duty to the off duty status or when the loopback termination time is reached.

See the slcEnds attribute in subclause slcEndsand the Initiate Loopback Of End-of-link Connection function in subclause Initiate Loopback Of End-of-link Connection for additional information on loopback.

6.4.1.6 operationalState

The operationalState attribute is inherited from the M.3108.1: transportService MOC. In order for an SLC to support an LCS, its operationalState must have a value of enabled. The operationalState may not be changed by the SC.

6.4.1.7 protected

The protected attribute is imported from ITU-T Recommendation M.3100. It identifies whether or not the SLC is protected, e.g. the service uses facilities that are on a survivable ring or are in an Automatic Protection System protection group. A value of true for this attribute indicates that the SLC is protected.

When a SC specifies an LCS via its SAPs, one of the possible LCS restrictions that may be specified is the value of the protected attribute of the SLCs used to support the LCS.

6.4.1.8 serviceCustomerContact

The serviceCustomerContact attribute is inherited from the M.3108.1: transportService MOC. See ITU-T Recommendations M.3208.1 and M.3108.1 for the functions supported by and for this attribute.

6.4.1.9 serviceID

The serviceID attribute is inherited from the M.3108.1: transportService MOC. The serviceID attribute is used to construct the Relative Distinguished Name (RDN) of the preProvisionedSLC MOIs. It uniquely identifies the preProvisionedSLC MOIs within a particular naming context. Note that the information element associated with this attribute is different from the information element associated with the serviceID attribute in the cmLeasedCircuitService MOC. For the preProvisionedSLC MOC, the serviceID attribute maps to the link connection identifier while in the cmLeasedCircuitService MOC, the serviceID attributes maps to the circuit number.