



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

M.3208.3

(02/2000)

SERIES M: TMN AND NETWORK MAINTENANCE:
INTERNATIONAL TRANSMISSION SYSTEMS,
TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE
AND LEASED CIRCUITS

Telecommunications management network

**TMN management services for dedicated and
reconfigurable circuits network: Virtual private
network service**

ITU-T Recommendation M.3208.3

(Formerly CCITT Recommendation)

TMN AND NETWORK MAINTENANCE: INTERNATIONAL TRANSMISSION SYSTEMS, TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE AND LEASED CIRCUITS

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**TMN management services for dedicated and reconfigurable circuits network:
Virtual private network service**

Summary

This ITU-T Recommendation is one of the series of M.3200 TMN management service Recommendations that provides descriptions of management services, goals and context for the Dedicated and Reconfigurable Circuits Network. Its main focus is on the Virtual Private Network (VPN) service management. This ITU-T Recommendation is based on ITU-T Recommendation M.3208.1 and adds new function sets to support the VPN services.

Source

ITU-T Recommendation M.3208.3 was prepared by ITU-T Study Group 4 (1997-2000) and approved under the WTSC Resolution 1 procedure on 4 February 2000.

Keywords

Dedicated and reconfigurable circuits network, leased circuit services, leased circuits, Telecommunications Management Network (TMN), TMN management service, Virtual Private Network (VPN), VPN service

FOREWORD

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The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSC Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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ITU-T Recommendation M.3208.3

TMN management services for dedicated and reconfigurable circuits network: Virtual private network service

1 Scope

This ITU-T Recommendation describes a subset of TMN management services for Dedicated and Reconfigurable Circuits network identified in ITU-T Recommendation M.3200 as a TMN managed area. Its main focus is on the VPN service management. These management services may also be applicable for interactions between management systems of different service providers or within a service provider.

TMN management services in this ITU-T Recommendation specify interface requirements between operation systems (OS) to perform customer network management of VPN service. The interfaces addressed by the TMN management services in this ITU-T Recommendation are applicable to both the X interface and the Q3 interface. Support for the services described in this ITU-T Recommendation are at the discretion of the Service Provider.

The TMN management services in this ITU-T Recommendation are described using the GDMS template contained in ITU-T Recommendation M.3020 and build on the management services defined in ITU-T Recommendations M.3208.1 and M.3208.2.

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 M.3010 (2000), *Principles for a Telecommunications Management Network*.
- ITU-T Recommendation M.3020 (2000), *TMN Interface Specification Methodology*.
- 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 pre-provisioned service link connections to form a leased circuit 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 G.805 (2000), *Generic functional architecture of transport networks*.

3 Definitions

3.1 Service related definitions

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

- layer network;
- leased circuit service;
- network operator;
- reconfigurable leased circuit service;
- service access group;
- service access point;
- service characteristic;
- service customer;
- service provider;
- contract.

3.2 This ITU-T Recommendation defines the following terms:

3.2.1 virtual private network: A Virtual Private Network is a collection of service access groups that form a private network for reconfigurable leased circuit services. Any service access point can be connected to any other service access point in the Virtual Private Network.

NOTE – For the purpose of this ITU-T Recommendation, loopback within a service access group is undefined.

3.2.2 VPN service: A VPN service is a telecommunications service that provides for the transmission of information between two or more service access points in a layer network. These service access points are connected by the VPN leased circuits and included in the service access groups that compose the VPN.

3.3 Role related definitions

This ITU-T Recommendation makes use of the following roles defined in ITU-T Recommendation M.3208.1:

- service customer;
- service provider.

4 Abbreviations

This ITU-T Recommendation uses the following abbreviations:

ATM	Asynchronous Transfer Mode
GDMS	Guidelines for the Definition of TMN Management Services
LCS	Leased Circuit Services
NE	Network Element
NML	Network Management Layer
SAD	Service Access Domain
SAG	Service Access Group
SAP	Service Access Point

SC	Service Customer
SML	Service Management Layer
SP	Service Provider
TMN	Telecommunications Management Network
VPN	Virtual Private Network

5 Conventions used in this ITU-T Recommendation

Legend for the tables:

- m Mandatory.
- m(=) The SP must provide the same value in the response as provided in the request by the SC.
- o Optional, subject to definition according to the Service Level Agreement or Contract between the SC and SP, i.e. a parameter listed as optional may be made mandatory by the Contract.
- o(=) Return of the value by the SP is optional; however, if the SP elects to return the value, it must be the same value supplied by the SC in the request. SP is not allowed to alter this field.
- c Conditional parameter, definition of the condition will be specified in the notes column. A numeric suffix is used to enable reuse of the conditional statements.
- c(=) If the value is provided in the request by the SC, the SP must provide the same value in the response.
- A dash implies that the parameter is not applicable.

6 VPN service security

The VPN service is defined between a single SC and SP. Several security services¹ are needed to assure the proper functioning of VPN management:

- a) Peer entity authentication and data origin authentication are needed to prevent attacks and uniquely identify the SC.
- b) Integrity is needed to prevent unauthorized modification of data in transit.
- c) Access control is needed to assure that one Service Customer does not gain access, maliciously or accidentally, to other customers' data. The SP may use the authenticated identity of the SC to provide access control.

The following requirements are optional:

- d) Confidentiality may be needed if private information is being exchanged. This security service may not be needed for all VPN management messages.
- e) Non-repudiation of origin may be needed, e.g. when a SC requests a service that may cause the service provider to invest labour and/or materials. This security service may not be needed for all VPN management messages.
- f) Non-repudiation of delivery may be needed, e.g. when a SC reports a problem. This security service may not be needed for all VPN management messages.

¹ Note that a "service" in this context is not a management service. The term "security service" is used as in ITU-T Recommendation X.800.

In addition, security management functions, as per ITU-T Recommendation M.3400, are needed to manage the security-related information needed to support the security services described above. The exact nature of the security management functions depends on the selection of security mechanisms used to provide the security services. Security management is outside the scope of this ITU-T Recommendation.

7 Customer network management service

7.1 Management service description

This management service addresses the management interface between the SP domain and the SC domain. It is based on an abstract view of the resources underlying a particular service, a view that shields the service user from knowledge of the specific technical implementation that supports the service.

Management capabilities described by these management service enables customers to configure and to reconfigure their VPN services.

Possible interactions between TMN management roles are given in Figures 1/M.3208.1 and 2/M.3208.1.

7.2 Management Goals

The goal of this management service is to provide the SC with the capability to request, modify, or delete a VPN service. In addition, the SP is given a mechanism to keep the SC informed on the status of his/her VPN services.

7.2.1 High level service customer requirements for VPN service management

- 1) A TMN Service Management Layer X interface is required so that SCs can create VPN LCSs without a detailed knowledge of the SP's network elements and network topology.
- 2) The secure use of VPN service requires that unauthorized users cannot affect the management of VPN services.

7.2.2 Relationship with ITU-T Recommendations M.3208.1 and M.3208.2

The relationship with ITU-T Recommendations M.3208.1 and M.3208.2 includes the following concepts:

- 1) The service access domain configuration function set in ITU-T Recommendation M.3208.1 is modified for VPN configuration.
- 2) The VPN service configuration function set involves modifying VPN service (new function introduced in this ITU-T Recommendation).
- 3) Creating a VPN LCS is an instantaneous service. Consequently, there is no need for the concept of a service request, the associated state model and the status administration function set, nor the link connection status administration function set.
- 4) Every instance of a VPN LCS is an instance of a dedicated LCS for the period during which it is up.
- 5) As in ITU-T Recommendation M.3208.1, any access point may be connected to any other access point in the SCs VPN to form a VPN LCS. The loop back function is out scope of this ITU-T Recommendation.

7.3 Management context description

7.3.1 Roles

The following roles defined in ITU-T Recommendation M.3208.1 apply.

- service customer;
- service provider.

7.3.2 Telecommunications services and resources

The VPN management service is concerned with the management of VPN.

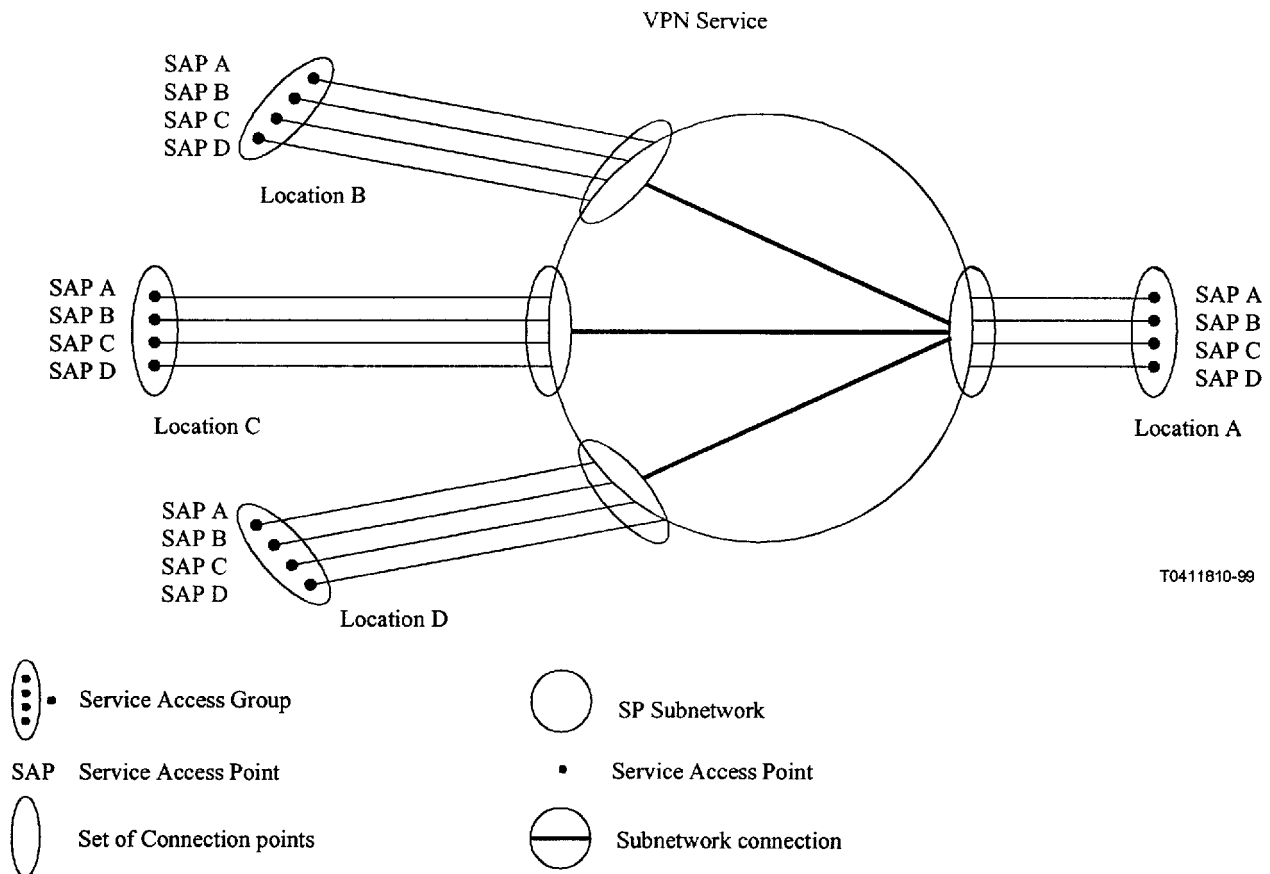


Figure 1/M.3208.3 – Example topology of the VPN service

Figure 1 illustrates an example topology of the VPN Service based on Figure 6/M.3208.1. A VPN service customer has 4 locations, A, B, C and D. The service access groups, shown as ellipses, at these four locations form a customer's VPN. The figure shows a VPN service consisting of the 4 Service Access Groups, each of which supports 4 individual service access points. The circle in the centre represents a sub-network. SAP A from Customer Location A is connected to SAP A at Customer Location B through a VPN leased circuit. SAP B from Customer Location A is connected to SAP B at Customer Location C through a VPN leased circuit and SAP C from Customer Location A is also connected to SAP D at Customer Location D through a VPN leased circuit.