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Telecommunications Management Network (TMN); Information model for a VC transport system using a 34 Mbit/s PDH transmission system in accordance with ITU-T Recommendation G.832

Reference
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Keywords
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Contents

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Foreword

This European Standard (ES) has been produced by ETSI Technical Committee Telecommunications Management Network (TMN), and is now submitted for the ETSI standards Membership Approval Procedure.

The present document describes the information model that represents a Virtual Circuit (VC 12) Transport System that uses a PDH (34 Mbits/sec) Transmission System in accordance with ITU-T Recommendation G.832 [15], ETS 300 337 [17] and EN 300 417-5-1 [18].

Introduction

Network Operators wish to deploy SDH transmission systems in the final customer reach. This will maintain the benefits of a fully managed network to SDH standards on an end to end network basis. However the capacity is smaller than the full STM 1 bearer capacity. Thus economic provision must be made to transport small quantities of SDH VC payloads. Advantage can also be taken of an existing PDH infrastructure particularly the standardized 34 Mbits/sec bearers that are already deployed. ITU-T Recommendation G.832 [15] and ETS 337 [17] define a range of ways (EN 300 417-5-1 [18]) in which PDH may be used to convey SDH payloads. Specifically it defines the multiplexing structures that carry up to 14 VC 12's within the 34 Mbits/sec bearer. A Management Information Model should be developed to represent this function and enable it to be part of a managed network as required.

When considering the information model for the "VC" Transmission System several ITU-T Recommendations and ETSI Standards were considered. The SDH managed object employed in this information model are derived from or are taken directly from ETS 300 304 [1] and ITU-T Recommendation G.774 [3]. ETS 300 371 [2] defines European TTPs for transport of SDH VC's and ATM cells. These managed objects are appropriate for the VC Transmission System information model. The e3IntTTP is directly adapted from the pPPITTPBidirectional managed object as there cannot be any cross connectivity (e3IntTTBidirectional managed object represents the termination point of a 34 Mbit/s trail transporting SDH elements, see managed object ETS 300 371 [2] for details).

The TUG31s managed objects can be used to represent the adaptation of the TU12's to the G.832 structure used by the VC Transmission System.

1 Scope

The present document defines the information model to be used at the interface between the Network Elements (NE's) and the Element Manager (EM) for the management of a Virtual (SDH) Circuit (VC 12) Transport System on a PDH (34 Mbits/sec) Bearer.

The present document defines a model that is applicable for management of any virtual circuit transport system resources that utilizes a 34 Mbits/sec PDH bearer to carry up to 14 VC 12's. It may also form the basis of models applicable for the management of other structures defined by ITU-T Recommendation G.832 [15], ETS 300 377 and functionally EN 300 417-5-1 [18].

Considering that:

- ETS 300 304 [1] and ITU-T Recommendation G.774 [3] define the SDH NE specific information model.

- ETS 300 371 [2] defines the PDH NE specific information model.

- ETS 300 337 [17] defines the frame, multiplexing structure and associated notifications for Virtual Circuit Transport Systems on PDH bearers.

- ITU-T Recommendation G.832 [15] defines the frame, multiplexing structure and associated notifications for Virtual Circuit Transport Systems on PDH bearers.

- EN 300 417-5-1 [18] defines the functional model.

The present document specifies the management information model for VCTS at the $Q3_{NE}$ interface. It specifies the managed object classes, packages, attributes, and name bindings that define the VCTS information model at the $Q3_{NE}$ interface providing a network element view between operations systems. The managed objects, packages, attributes, and name bindings are defined using GDMO and ASN.1.

It does not define:

- The protocol stack to be used for message communication.

- Network or Element Level (NCL/EML) management processes.

- The NCL or EML or TMN application contexts.

- The Information Models for generic SDH or PDH NE's.

- The Conformance Requirements that must be met by an implementation of this information model.

The information model defined herein (and the corresponding CMIP message set) is concerned with the management of network elements, the equipment used to implement them and the functions supported by them. It applies to the equipment domain that is visible at the element manager to network element interface and is restricted to the resources within that domain. Information specific to the Network Management Layer is not included in this model.

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1]   ETS 300 304 (1997): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); SDH information model for the Network Element (NE) view".

[2]   ETS 300 371 (1996): "Transmission and Multiplexing (TM); Plesiochronous Digital Hierarchy (PDH) information model for the Network Element (NE) view".

[3]   ITU-T Recommendation G.774 (1992): "Synchronous digital hierarchy (SDH) management information model for the network element view".

[4]   ITU-T Recommendation G.774.03 (1994): "Synchronous digital hierarchy (SDH) management of multiplex-section protection for the network element view".

[5]   ITU-T Recommendation M.3100 (1995): "Generic network information model".

[6]   ITU-T Recommendation X.701 (1992): "Information technology - Open Systems Interconnection - Systems management overview".

[7]   ITU-T Recommendation X.710 (1997): "Information technology - Open Systems Interconnection - Common Management Information Service".

[8]   ITU-T Recommendation X.711 (1997): "Information technology - Open Systems Interconnection - Common Management Information Protocol: Specification".

[6]   ITU-T Recommendation X.720 (1992): "Information technology - Open Systems Interconnection - Structure of management information: Management information model".

[7]   ITU-T Recommendation X.721 (1992): "Information technology - Open Systems Interconnection - Structure of management information: Definition of management information".

[8]   ITU-T Recommendation X.722 (1992): "Information technology - Open Systems Interconnection - Structure of Management Information: Guidelines for the definition of managed objects".

[9]   ITU-T Recommendation X.730 (1992): "Information technology - Open Systems Interconnection - Systems Management: Object management function".

[10]   ITU-T Recommendation X.731 (1992): "Information technology - Open Systems Interconnection - Systems Management: State management function".

[11]   ITU-T Recommendation X.733 (1992): "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".

[12]   ITU-T Recommendation X.734 (1992): "Information technology - Open Systems Interconnection - Systems Management: Event report management function".

[13]   ITU-T Recommendation X.735 (1992): "Information technology - Open Systems Interconnection - Systems Management: Log control function".

[14]   ITU-T Recommendation G.805 (1995): "Generic functional architecture of transport networks".

[15]   ITU-T Recommendation G.832 (1995): "Transport of SDH elements on PDH networks - Frame and multiplexing structures".

[16]   ITU-T Recommendation M.3010 (1996): "Principles for a Telecommunications management network".

[17]   ETS 300 337: "Transmission and Multiplexing (TM); Generic frame structures for the transport of various signals (including Asynchronous Transfer Mode (ATM) cells and Synchronous Digital Hierarchy (SDH) elements) at the ITU-T Recommendation G.702 hierarchical rates of 2 048 kbit/s, 34 368 kbit/s and 139 264 kbit/s".

[18]   EN 300 417-5-1: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 5-1: Plesiochronous Digital Hierarchy (PDH) path layer functions".

3   Definitions, symbols and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply:

agent: the system component that only responds to commands or issues spontaneous notifications.

EM (Element Manager): a member of the EML.

EML (Element Manager Layer): the Management Layer that contains all the element management functionality.

manager: the system component that always issues commands and set up a control sequence and gathers notifications.

NCL (Network Control Layer): the Management Layer that contains all the network level management.

TMN (Telecommunications Management Network): this comprises the Network Elements in the Transmission Network in the Network Element layer, EM's in the Element Manager Layer and Network Level Controllers in the Network Control Layer of the ITU-T Recommendation M.3010 [16] Architecture.

3.2   Symbols

For the purposes of the present document, the following symbol applies:

$Q3_{NE}$ The interface referred to meets the requirements of the Q3 definition and is referenced at the Network Element Level. That is the resources that are represented are those visible within a Network Element; the functional resources that are supported and the equipment that supported those functions.

3.3   Abbreviations

For the purposes of the present document, the following abbreviations apply:

ASN.1	Abstract Syntax Notation One
CMIP	Common Management Information Protocol
EM	Element Manager
EML	Element Management Layer
EN	European Norm
ETS	European Telecommunication Standard
ETSI	European Telecommunications Standards Institute
ITU-T	International Telecommunications Union Transmission
NCL	Network Control Layer
NE	Network Element
NE's	Network Elements
PDH	Plesiochronous Digital Hierarchy
SDH	Synchronous Digital Hierarchy
TMN	Telecommunications Management Network
VC 12	Virtual Circuit 12
VCT	Virtual Container Transport
P31s	34 364 kbits/sec with 125 microsecond Frame Structure according to ETS 300 337 [17]
TUG 31s	VC 12/11 Aggregation to Server Layer P31s
VCTS	Virtual Circuit Transport System

4   Information Model Specification

4.1   Overview of the VCTS Model

The inheritance diagram for the P31s components of the model is shown in figure 1. Only the inheritance hierarchy for the P31s managed objects is shown as all other managed objects are shown in the relevant Recommendations and Standards.

The P31s DCC Connection Termination Point managed objects are derived from the Connection Termination Point managed objects. The TUG 31s managed object classes are derived from the Indirect Adapter managed object classes defined in the ITU-T Recommendation G.774 [3].

There is one type of Connection Termination Point managed object defined in the VCTS information model:

- P31s DCC Connection Termination Point

Figure 1: Inheritance Tree for VC-TS managed objects
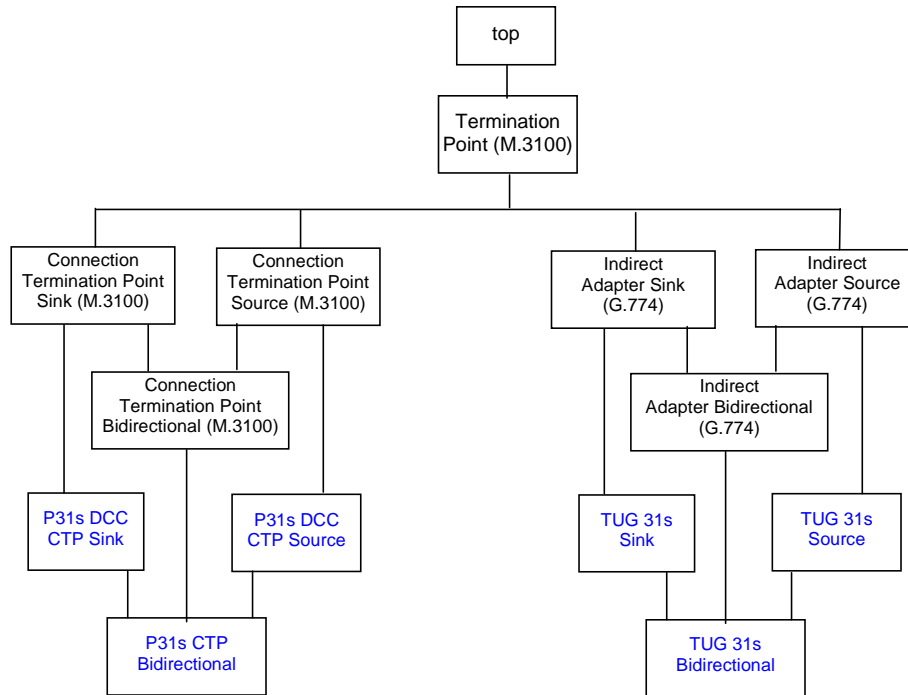
The naming tree illustrating the use of the name bindings for the VCTS management information model is shown in figure 2.
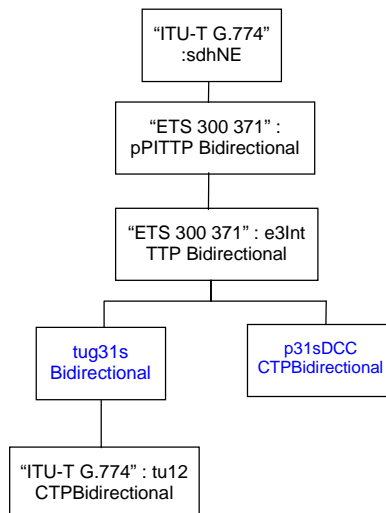

Figure 2: Naming Tree for VC-TS

Figure 2 illustrates the naming tree for the VC-TS. Only the Bi-directional cases are shown. There is direct adaptation of the e3intTTPBidirectional managed object to the tug31sTTPBidirectional managed object.

4.2 Void

4.3 Void

4.4 Managed Object Class Definitions

4.4.1 P31s DCC Connection Termination Point Bi-directional

```
p31sDCCCTPBidirectional  MANAGED OBJECT CLASS
    DERIVED FROM     "Recommendation M.3100":connectionTerminationPointBidirectional,
            p31sDCCCTPSink,
            p31sDCCCTPSource;
REGISTERED AS { vctsObjectClass 1 };
```

4.4.2 P31s DCC Connection Termination Point Sink

```
p31sDCCCTPSink  MANAGED OBJECT CLASS
    DERIVED FROM     "Recommendation M.3100":connectionTerminationPointSink;
    CHARACTERIZED BY
        "Recommendation M.3100":createDeleteNotificationsPackage,
        p31sDCCCTPSinkPackage PACKAGE
            BEHAVIOUR    p31sDCCCTPSinkBehaviour;
                ATTRIBUTES
                    p31sDCCCTPId                    GET;;;
REGISTERED AS { vctsObjectClass 2 };
```

```
p31sDCCCTPSinkBehaviour  BEHAVIOUR
    DEFINED AS "
        This object class represents the termination of the GC byte.
    ";
```

4.4.3 P31s DCC Connection Termination Point Source

```
p31sDCCCTPSource        MANAGED OBJECT CLASS
    DERIVED FROM     "Recommendation M.3100":connectionTerminationPointSource;
    CHARACTERIZED BY
        "Recommendation M.3100":createDeleteNotificationsPackage,
        p31sDCCCTPSourcePackage PACKAGE
            BEHAVIOUR    p31sDCCCTPSourceBehaviour;
            ATTRIBUTES
                p31sDCCCTPId                    GET;;;
REGISTERED AS { vctsObjectClass 3 };
```

```
p31sDCCCTPSourceBehaviour  BEHAVIOUR
    DEFINED AS "
        This object class represents the origin of the GC byte.
    ";
```

4.4.4 TUG 31s Bi-directional

```
tug31sBidirectional MANAGED OBJECT CLASS
    DERIVED FROM     "Recommendation G.774":indirectAdaptorBidirectional,
                tug31sSink,
                tug31sSource;
REGISTERED AS { vctsObjectClass 4 };
```

4.4.5   TUG 31s Sink

```
tug31sSink MANAGED OBJECT CLASS
    DERIVED FROM        "Recommendation G.774":indirectAdaptorSink;
    CHARACTERIZED BY
        tug31sSinkPkg PACKAGE
            BEHAVIOUR  tug31sSinkBehaviourPkg;
            ATTRIBUTES
                tug31sId                                GET,
                "Recommendation M.3100":supportableClientList      GET;;;
REGISTERED AS { vctsObjectClass 5 };

tug31sSinkBehaviourPkg BEHAVIOUR
    DEFINED AS "
        This object class adapts between a P31s trail termination point and the client layer connection termination
        points that it supports.
        A TUG-31s may consists of an assembly of fourteen TU-11s or TU-12s, or ATM cells or P0 connection
        termination points.
    ";
```

4.4.6   TUG 31s Source

```
tug31sSource MANAGED OBJECT CLASS
    DERIVED FROM        "Recommendation G.774":indirectAdaptorSource;
    CHARACTERIZED BY
        tug31sSourcePkg PACKAGE
            BEHAVIOUR   tug31sSourceBehaviourPkg;
            ATTRIBUTES
                tug31sId                                GET,
                "Recommendation M.3100":supportableClientList      GET;;;
REGISTERED AS { vctsObjectClass 6 };

tug31sSourceBehaviourPkg BEHAVIOUR
    DEFINED AS "
        This object class adapts between a P31s trail termination point and the client layer connection termination
        points that it supports.
        A TUG-31s may consists of an assembly of fourteen TU-11s or TU-12s, or ATM cells or P0 connection
        termination points.
    ";
```

4.5   Packages

None.

4.6   Attributes

4.6.1   P31s DCC Connection Termination Point Bi-directional Identifier

```
p31sDCCCTPId  ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  P31S-ASN1Module.NameType;
    MATCHES FOR EQUALITY;
REGISTERED AS { vctsAttribute 1 };
```

4.6.2   TUG 31s Identifier

tug31sId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX P31S-ASN1Module.NameType;
    MATCHES FOR EQUALITY;
REGISTERED AS { vctsAttribute 2 };

4.7   Action Definitions

None.

4.8   Parameter Definitions

None.

4.9   Name Bindings

4.9.1   P31s DCC Connection Termination Point Sink to e3Int Trail Termination Point Sink

p31sDCCCTPSink-e3IntTTPSink NAME BINDING
    SUBORDINATE OBJECT CLASS p31sDCCCTPSink AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS "ETS 300 371": e3IntTTPSink AND SUBCLASSES;
    WITH ATTRIBUTE p31sDCCCTPId;
        BEHAVIOUR p31sDCCCTPSink-e3IntTTPSinkBehaviour;
REGISTERED AS { vctsNameBinding 1 };

p31sDCCCTPSink-e3IntTTPSinkBehaviour BEHAVIOUR
    DEFINED AS "
        This name binding is used to name p31sDCCCTPSink contained in an e3IntTTPSink.
    ";

4.9.2   P31s DCC Connection Termination Point Source to e3Int Trail Termination Point Source

p31sDCCCTPSource-e3IntTTPSource NAME BINDING
    SUBORDINATE OBJECT CLASS p31sDCCCTPSource AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS "ETS 300 371": e3IntTTPSource AND SUBCLASSES;
    WITH ATTRIBUTE p31sDCCCTPId;
        BEHAVIOUR p31sDCCCTPSource-e3IntTTPSourceBehaviour;
REGISTERED AS { vctsNameBinding 2 };

p31sDCCCTPSource-e3IntTTPSourceBehaviour BEHAVIOUR
    DEFINED AS "
        This name binding is used to name p31sDCCCTPSource contained in a e3IntTTPSource.
    ";
    ";

4.9.3   TU12 Connection Termination Point Sink to TUG 31s Sink

tu12CTPSink-tug31sSink NAME BINDING
    SUBORDINATE OBJECT CLASS "Recommendation G.774":tu12CTPSink AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS tug31sSink AND SUBCLASSES;
    WITH ATTRIBUTE "Recommendation G.774":tu12CTPId;
        BEHAVIOUR tu12CTPSink-tug31sSinkBehaviour;
REGISTERED AS { vctsNameBinding 3 };

tu12CTPSink-tug31sSinkBehaviour BEHAVIOUR
    DEFINED AS "
        This name binding is used to name tu12CTPSink contained in a tug31sSink.
    ";

4.9.4   TU12 Connection Termination Point Source to TUG 31s Source

tu12CTPSource-tug31sSource NAME BINDING
    SUBORDINATE OBJECT CLASS "Recommendation G.774":tu12CTPSource AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS tug31sSource AND SUBCLASSES;
    WITH ATTRIBUTE "Recommendation G.774":tu12CTPId;
        BEHAVIOUR tu12CTPSource-tug31sSourceBehaviour;
REGISTERED AS { vctsNameBinding 4 };

tu12CTPSource-tug31sSourceBehaviour BEHAVIOUR
    DEFINED AS "
        This name binding is used to name tu12CTPSource contained in a tug31sSource.
    ";

4.9.5   TUG 31s Sink to e3Int Trail Termination Point Sink

tug31sSink-e3IntTTPSink NAME BINDING
    SUBORDINATE OBJECT CLASS tug31sSink AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS "ETS 300371": e3IntTTPSink AND SUBCLASSES;
    WITH ATTRIBUTE tug31sId;
        BEHAVIOUR tug31sSink-e3IntTTPSinkBehaviour;
REGISTERED AS { vctsNameBinding 5 };

tug31sSink-e3IntTTPSinkBehaviour BEHAVIOUR
    DEFINED AS "
        This name binding is used to name tug31sSink contained in an e3IntTTPSink.
    ";

4.9.6   TUG 31s Source to e3Int Trail Termination Point Source

tug31sSource-e3IntTTPSource NAME BINDING
    SUBORDINATE OBJECT CLASS tug31sSource AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS "ETS 300 371":e3IntTTPSource AND SUBCLASSES;
    WITH ATTRIBUTE tug31sId;
        BEHAVIOUR tug31sSource-e3IntTTPSourceBehaviour;
REGISTERED AS { vctsNameBinding 6 };

tug31sSource-e3IntTTPSourceBehaviour BEHAVIOUR
    DEFINED AS "
        This name binding is used to name tug31sSource contained in an e3IntTTPSource.
    ";

4.10 VC Transmission System ASN.1 Module

PrETNdentmn00038 {itu-t(0) identified-organization(4) etsi(0) enzzz(999) informationModel(0) asnModule(2) dentmn00038(0)}

-- enzzz(999) is a placeholder for an assignment by the secretariat. This dummy compiles.

DEFINITIONS IMPLICIT TAGS ::= BEGIN

-- EXPORT   Everything

vcts OBJECT IDENTIFIER ::= {itu-t(0) identified-organization(4) etsi(0) enzzz(999) informationModel(0)}

vctsObjectClass	OBJECT IDENTIFIER	::=	{vcts managedObjectClass(3)}
vctsPackage	OBJECT IDENTIFIER	::=	{vcts package (4)}
vctsParameter	OBJECT IDENTIFIER	::=	{vcts parameter(5)}
vctsNameBindingOBJECT IDENTIFIER		::=	{vcts nameBinding(6)}
vctsAttribute	OBJECT IDENTIFIER	::=	{vcts attribute(7)}
vctsAttributeGroup	OBJECT IDENTIFIER	::=	{vcts attributeGroup(8)}
vctsAction	OBJECT IDENTIFIER	::=	{vcts action(9)}
vctsNotification	OBJECT IDENTIFIER	::=	{vcts notification(10)}

END

P31S-ASN1Module {itu-t(0) identified-organization(4) etsi(0) enzzz(999) informationModel(0) asnModule(2)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN
IMPORTS
NameType FROM ASN1DefinedTypesModule {ccitt(0) recommendation(0) m(13) gnm(3100) informationModel(0)
                                        asn1Modules(2) asn1DefinedTypesModule(0)};

END

Annex A (normative):
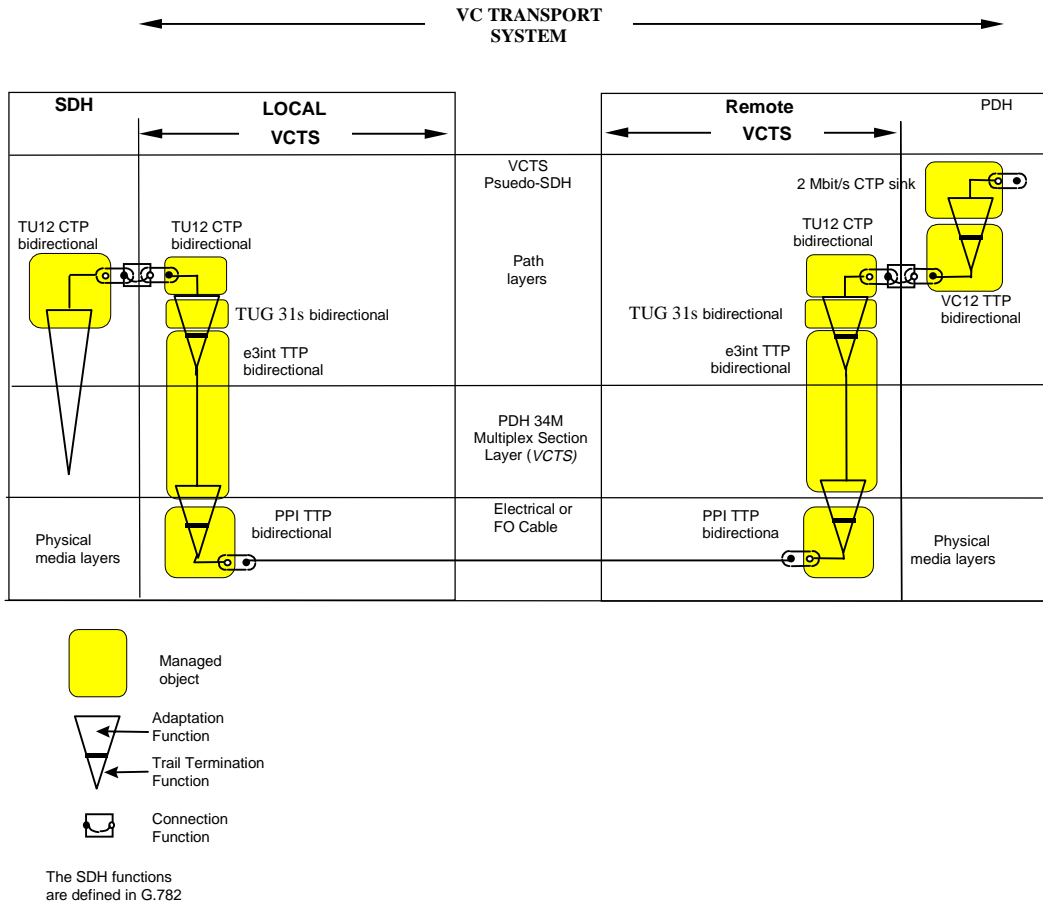# G.805 Style Network Layered Diagram

Unprotected System

Figure A.1

History

Document history		
V1.1.1	February 1999	Membership Approval Procedure MV 9914: 1999-02-02 to 1999-04-02