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SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Digital transmission systems – Digital networks –
Management of transport network

**GDMO engineering viewpoint for the generic
network level model**

ITU-T Recommendation G.855.1

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION G.855.1

GDMO ENGINEERING VIEWPOINT FOR THE GENERIC NETWORK LEVEL MODEL

Summary

This Recommendation contains a specification for a generic network level management information model expressed in GDMO notation. This model was developed from existing Recommendation M.3100 managed object classes, and based on the following Recommendations:

- ITU-T Recommendation G.852.1 (1996), *Enterprise viewpoint for simple subnetwork connection management.*
- ITU-T Recommendation G.852.2 (1999), *Enterprise viewpoint description of transport network resource model.*
- ITU-T Recommendation G.852.3 (1999), *Enterprise viewpoint for topology management.*
- ITU-T Recommendation G.852.6 (1999), *Enterprise viewpoint for trail management.*
- ITU-T Recommendation G.852.8 (1999), *Enterprise viewpoint for pre-provisioned adaptation management.*
- ITU-T Recommendation G.852.10 (1999), *Enterprise viewpoint for pre-provisioned link connection management.*
- ITU-T Recommendation G.852.12 (1999), *Enterprise viewpoint for pre-provisioned link management.*
- ITU-T Recommendation G.853.2 (1996), *Subnetwork connection management information viewpoint.*
- ITU-T Recommendation G.853.3 (1999), *Information viewpoint for topology management.*
- ITU-T Recommendation G.853.6 (1999), *Information viewpoint for trail management.*
- ITU-T Recommendation G.853.8 (1999), *Information viewpoint for pre-provisioned adaptation management.*
- ITU-T Recommendation G.853.10 (1999), *Information viewpoint for pre-provisioned link connection management.*
- ITU-T Recommendation G.853.12 (1999), *Information viewpoint for pre-provisioned link management.*
- ITU-T Recommendation G.854.3 (1999), *Computational viewpoint for topology management.*
- ITU-T Recommendation G.854.6 (1999), *Computational viewpoint for trail management.*
- ITU-T Recommendation G.854.8 (1999), *Computational viewpoint for pre-provisioned adaptation management.*
- ITU-T Recommendation G.854.10 (1999), *Computational viewpoint for pre-provisioned link connection management.*
- ITU-T Recommendation G.854.12 (1999), *Computational viewpoint for pre-provisioned link management.*

Source

ITU-T Recommendation G.855.1 was prepared by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 26th of March 1999.

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 their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 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.

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Recommendation G.855.1

GDMO ENGINEERING VIEWPOINT FOR THE GENERIC NETWORK LEVEL MODEL

(Geneva, 1999)

1 Scope, purpose, and field of application

1.1 Scope

This Recommendation provides a generic information model for the network level view of transmission networks. It identifies TMN object classes that are common to managed telecommunications networks; or are of a generic type that can be used to manage a network at a technology-independent level; or are super-classes of technology-specific managed objects in a telecommunications network; or are management support objects that are required for the management of the telecommunications network.

This Recommendation addresses generically the abstractions of those aspects of telecommunication resources required to manage the network with a network level view. Recommendation G.805 on the architecture of the transport network is used as the basis in developing the transport aspects of this model.

This Recommendation does not address abstractions relevant to technology-specific areas or implementation-specific details.

1.2 Purpose

1.2.1 Interoperability

There will be a variety of TMN conformant management systems and managed systems concerning many technology-specific areas. One purpose of this Recommendation is to provide a vehicle for management interoperability between such systems.

1.2.2 Technology-independent management

By introducing the concept of technology-independent management, it is possible to perform management of diverse networks using common communications interfaces. In this manner, an "abstract" view over a set of networks can be achieved.

1.2.3 Facilitating information model development

This Recommendation also provides a framework from which technology-specific information models may be developed using the modelling principles defined in Recommendation X.720 (1992), *Information technology – Open Systems Interconnection – Structure of Management Information: Management Information Model*.

1.3 Field of application

This Recommendation captures the generally applicable requirements of the technology-independent and technology-specific information models related to the network level view of transmission networks.

Through specialization, this Recommendation is applicable to technology-specific TMN information models. The mechanism for specialization is inheritance.

Even though technology-specific models may be derived from this Recommendation, some of the generic managed object classes in this Recommendation are instantiable in order to provide interoperability between equipment supporting information models derived from this Recommendation and equipment that only supports the information model in this Recommendation.

1.4 Structure of this Recommendation

The definition of management information in clauses 5 to 10, describing information model is documented using the notational mechanisms defined in Recommendation X.722 (1992), *Information technology – Open Systems Interconnection – Structure of Management Information: Guidelines for the definition of managed objects*. The relationships between the managed object classes for the different fragments of the model in clause 5 are depicted using entity relationship diagrams. Clause 10 contains the syntax definitions of the information carried in the protocol. The notation used is Abstract Syntax Notation One (ASN.1) defined in Recommendation X.680 (1997), *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*.

When referencing the definitions for the templates in this Recommendation by other documents, the prefix "Recommendation G.855.1" should be used to identify the source for the definitions.

The Management Conformance Summary is documented in Annex A using the conformance summary tables specified in Recommendation X.724.

The Managed Object Conformance Statements are documented in Annex B using the conformance tables specified in Recommendation X.724.

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.

- [1] ITU-T Recommendation G.805 (1995), *Generic functional architecture of transport networks*.
- [2] ITU-T Recommendation G.851.1 (1996), *Management of the transport network – Application of the RM-ODP framework*.
- [3] ITU-T Recommendation G.851.2, *Methodology for GDMO Engineering Viewpoint*.
- [4] ITU-T Recommendation G.852.1 (1996), *Enterprise viewpoint for simple subnetwork connection management*.
- [5] ITU-T Recommendation G.852.2 (1999), *Enterprise viewpoint description of transport network resource model*.
- [6] ITU-T Recommendation G.852.3 (1999), *Enterprise viewpoint for topology management*.
- [7] ITU-T Recommendation G.852.6 (1999), *Enterprise viewpoint for trail management*.
- [8] ITU-T Recommendation G.852.8 (1999), *Enterprise viewpoint for pre-provisioned adaptation management*.
- [9] ITU-T Recommendation G.852.10 (1999), *Enterprise viewpoint for pre-provisioned link connection management*.

- [10] ITU-T Recommendation G.852.12 (1999), *Enterprise viewpoint for pre-provisioned link management.*
- [11] ITU-T Recommendation G.853.1 (1999), *Common information viewpoint.*
- [12] ITU-T Recommendation G.853.2 (1996), *Subnetwork connection management information viewpoint.*
- [13] ITU-T Recommendation G.853.3 (1999), *Information viewpoint for topology management.*
- [14] ITU-T Recommendation G.853.6 (1999), *Information viewpoint for trail management.*
- [15] ITU-T Recommendation G.853.8 (1999), *Information viewpoint for pre-provisioned adaptation management.*
- [16] ITU-T Recommendation G.853.10 (1999), *Information viewpoint for pre-provisioned link connection management.*
- [17] ITU-T Recommendation G.853.12 (1999), *Information viewpoint for pre-provisioned link management.*
- [18] ITU-T Recommendation G.854.1 (1996), *Computational interfaces for basic transport network model.*
- [19] ITU-T Recommendation G.854.3 (1999), *Computational viewpoint for topology management.*
- [20] ITU-T Recommendation G.854.6 (1999), *Computational viewpoint for trail management.*
- [21] ITU-T Recommendation G.854.8 (1999), *Computational viewpoint for pre-provisioned adaptation management.*
- [22] ITU-T Recommendation G.854.10 (1999), *Computational viewpoint for pre-provisioned link connection management.*
- [23] ITU-T Recommendation G.854.12 (1999), *Computational viewpoint for pre-provisioned link management.*
- [24] ITU-T Recommendation M.3100 (1995), *Generic network information model.*
- [25] ITU-T Recommendation X.501 (1997) | ISO/IEC 9594-2:1999, *Information technology – Open Systems Interconnection – The Directory: Models.*
- [26] ITU-T Recommendation X.680 (1997), *Information technology – Abstract Syntax Notation One (ASN.1): Specification of Basic Notation.*
- [27] ITU-T Recommendation X.711 (1997) | ISO/IEC 9596-1:1998, *Information technology – Open Systems Interconnection – Common management information protocol: Specification.*
- [28] CCITT Recommendation X.720 (1992) | ISO/IEC 10165-1:1993, *Information technology – Open Systems Interconnection – Structure of management information: Management information model.*
- [29] CCITT Recommendation X.721 (1992) | ISO/IEC 10165-2:1992, *Information technology – Structure of management information: Definition of management information.*
- [30] CCITT Recommendation X.722 (1992) | ISO/IEC 10165-4:1992, *Information technology – Open Systems Interconnection – Structure of management information: Guidelines for the definition of managed objects.*

- [31] ITU-T Recommendation X.724 (1996) | ISO/IEC 10165-6:1997, *Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management.*

3 Definitions

None.

4 Abbreviations

This Recommendation uses the following abbreviations:

CTP Connection Termination Point

TTP Trail Termination Point

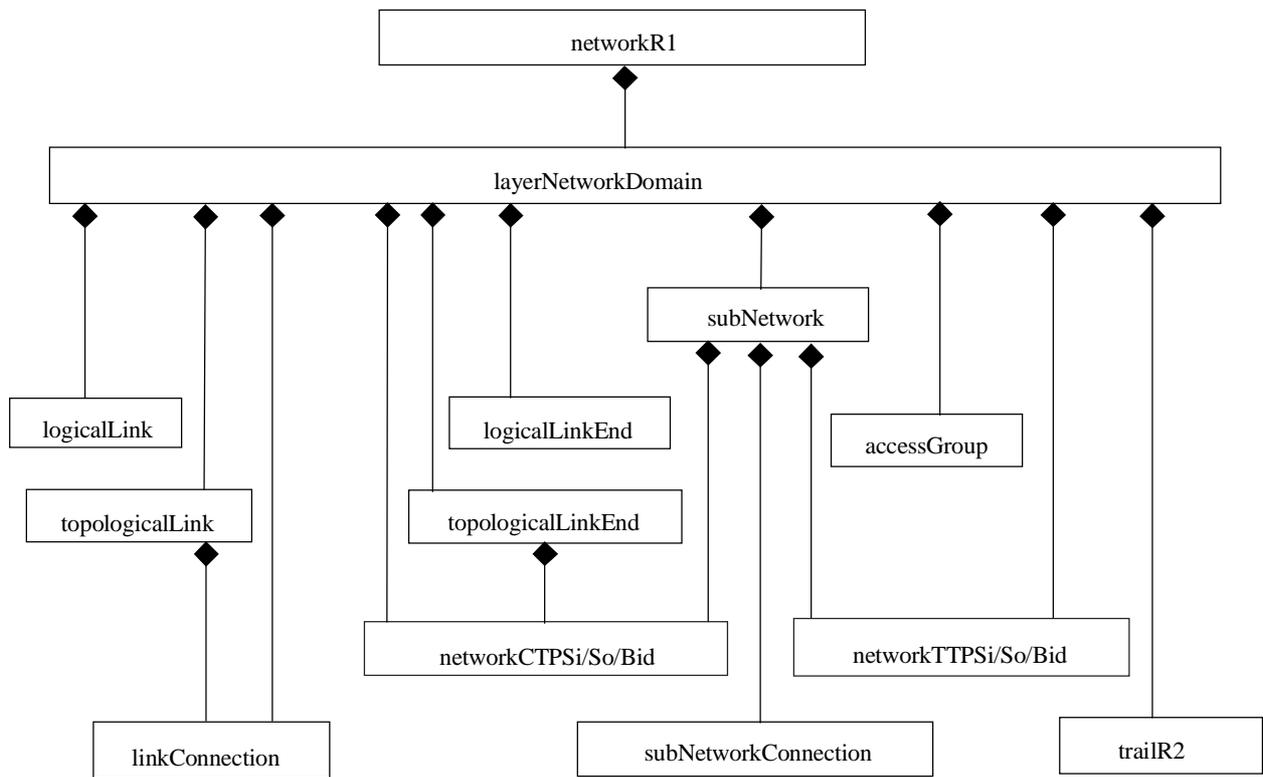
5 Managed objects

This clause contains the definitions of the object classes that taken together can be used to develop a network information model related to the management of transmission networks. Table 1 is a summary of the managed object classes that, taken together, define the management information model for generic transmission management from the network view.

Table 1/G.855.1 – Managed objects summary

Managed objects summary
"Recommendation M.3100:1995":accessGroup
basicLayerNetworkDomain
basicSubNetwork
"Recommendation M.3100:1995":abstractLink
"Recommendation M.3100:1995":linkConnection
"Recommendation M.3100:1995":linkEnd
"Recommendation M.3100:1995":networkCTPBidirectional
"Recommendation M.3100:1995":networkCTPSink
"Recommendation M.3100:1995":networkCTPSource
"Recommendation M.3100:1995":networkTTPBidirectional
"Recommendation M.3100:1995":networkTTPSink
"Recommendation M.3100:1995":networkTTPSource
"Recommendation M.3100:1995":node
"Recommendation M.3100:1995":subNetworkConnection
"Recommendation M.3100:1995":topologicalLink
"Recommendation M.3100:1995":topologicalLinkEnd
"Recommendation M.3100:1995":trailR2

Figure 1 shows the naming hierarchy of managed objects. The managed objects and the name bindings illustrated in this figure are all specified in Recommendation M.3100 (1995), *Generic network information model*.

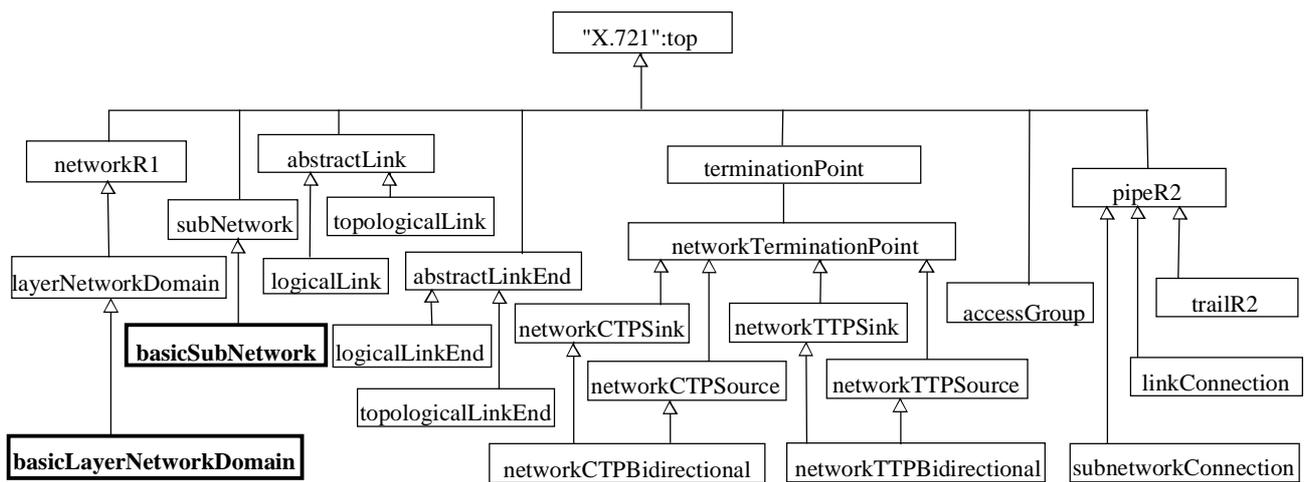


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NOTE – All object classes are defined in Recommendation M.3100.

Figure 1/G.855.1 – Naming hierarchy

The inheritance hierarchy of the managed objects that represented the network level management information model for generic transport networks is illustrated in Figure 2. The two object classes defined in this Recommendation are indicated by the thick borders.



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Figure 2/G.855.1 – Inheritance hierarchy

5.1 Basic Layer Network Domain

basicLayerNetworkDomain MANAGED OBJECT CLASS

DERIVED FROM "Recommendation M.3100:1995":layerNetworkDomain;

CHARACTERIZED BY

basicTrailHandlerPackage,

basicLayerNetworkDomainPackage PACKAGE

BEHAVIOUR

basicLayerNetworkDomainBehaviour **BEHAVIOUR**

DEFINED AS "

The basicLayerNetworkDomain object class is a class of managed objects that manages the immediate set-up and release of trails.

It provides the following functionality:

1) Immediate trail set-up;

<G.854.6,OPERATION:setupPointToPointTrail>

2) Trail release.

<G.854.6,OPERATION:releaseTrail> ";;;;

CONDITIONAL PACKAGES

topologicalLinkHandlerPackage **PRESENT IF**

"management of topological links is supported",

topologicalLinkEndHandlerPackage **PRESENT IF**

"management of topological link ends is supported",

logicalLinkEndHandlerPackage **PRESENT IF**

"management of link ends is supported",

logicalLinkHandlerPackage **PRESENT IF**

"management of links is supported";

REGISTERED AS {g85501MObjectClass 1};

5.2 Basic SubNetwork

basicSubNetwork MANAGED OBJECT CLASS

DERIVED FROM "Recommendation M.3100:1995":subNetwork;

CHARACTERIZED BY

basicConnectionPerformerPackage,

basicSubNetworkPackage PACKAGE

BEHAVIOUR

basicSubNetworkBehaviour **BEHAVIOUR**

DEFINED AS "

The basicSubNetwork object class is a class of managed objects that manages the set-up and release of Subnetwork Connections, under the control of a manager.

<G.853.1,RELATIONSHIP:subnetworkHasSubnetworkConnections>

";;;;

REGISTERED AS {g85501MObjectClass 2};

6 Packages

6.1 Basic Connection Performer Package

basicConnectionPerformerPackage PACKAGE

BEHAVIOUR

basicConnectionPerformerBehaviour **BEHAVIOUR**

DEFINED AS "

The Basic Connection Performer object class provides basic connection set-up functionality.

The action SetupSubNetworkConnection sets up a Subnetwork Connection, and releaseSubNetworkConnection removes the Subnetwork connection.

";;

ACTIONS

**setupSnc,
releaseSnc;**

REGISTERED AS {g85501Package 1};

6.2 Basic Trail Handler Package

basicTrailHandlerPackage PACKAGE

BEHAVIOUR

basicTrailHandlerBehaviour BEHAVIOUR

DEFINED AS "

Immediate trail set-up. When it receives the setupTrail request, the agent has the responsibility to:

- 1) find a route for the trail;
- 2) set up any required subnetwork connections;
- 3) ensure that the trail object instance has been created with the correct initial values.
- 4) inform the service user of the result of its request.

Trail release:

When it receives the releaseTrail request, the agent has the responsibility to:

- 1) release any used subnetwork connections; Update network resource usage (configuration) information;
 - 2) inform the service user of the result of its request.
- "";**

ACTIONS

**setupTrail,
releaseTrail;**

REGISTERED AS {g85501Package 2};

6.3 Logical Link End Handler Package

logicalLinkEndHandlerPackage PACKAGE

BEHAVIOUR

logicalLinkEndHandlerPackageBehaviour BEHAVIOUR

DEFINED AS "

This package provides the support for the orderly creation and deletion of a logical link end.

"";

ACTIONS

**establishLogicalLinkAndEnds,
removeLogicalLinkAndEnds;**

REGISTERED AS {g85501Package 3};

6.4 Logical Link Handler Package

logicalLinkHandlerPackage PACKAGE

BEHAVIOUR

logicalLinkHandlerPackageBehaviour BEHAVIOUR

DEFINED AS "

This package provides the support for the orderly creation and deletion of a logical link.

"";

ACTIONS

**establishLogicalLink,
removeLogicalLink;**

REGISTERED AS {g85501Package 4};

6.5 Topological Link End Handler Package

topologicalLinkEndHandlerPackage PACKAGE

BEHAVIOUR

topologicalLinkEndHandlerPackageBehaviour BEHAVIOUR

DEFINED AS "

This package provides the support for the orderly creation and deletion of a topological link end. It also provides actions to enable an unassigned topological link end to be assigned to a server network TTP and an assigned topological link end to be de-assigned.

";;

ACTIONS

**associateNetworkTTPWithTopologicalLinkEnd,
disassociateNetworkTTPFromTopologicalLinkEnd,
establishTopologicalLinkAndEnds,
removeTopologicalLinkAndEnds;**

REGISTERED AS {g85501Package 5};

6.6 Topological Link Handler Package

topologicalLinkHandlerPackage PACKAGE

BEHAVIOUR

topologicalLinkHandlerPackageBehaviour BEHAVIOUR

DEFINED AS "

This package provides the support for the orderly creation and deletion of a topological link. It also provides actions to enable an unassigned topological link to be assigned to a server trail and an assigned topological link to be de-assigned.

";;

ACTIONS

**associateTrailWithTopologicalLink,
disassociateTrailFromTopologicalLink,
establishTopologicalLink,
removeTopologicalLink;**

REGISTERED AS {g85501Package 6};

7 Actions

NOTE – For all actions below:

The use of local name for object instance may not be appropriate when the names are exchanged between different Administrations and in the context for which the local root is not defined.

7.1 Associate a Network TTP with a Topological Link End

associateNetworkTTPWithTopologicalLinkEnd ACTION

BEHAVIOUR

associateNetworkTTPWithTopologicalLinkEndBehaviour BEHAVIOUR

DEFINED AS "

This action associates a networkTTP in the server layer with a topological link end in the client layer. There may be one and only one networkTTP associated with one topological link end.

The result of action returns the potential capacity of the link and a list of the available network CTPs. <G.854.8,OPERATION:associateNetworkTTPWithTopologicalLinkEnd>

"";

MODE CONFIRMED;

PARAMETERS

"Recommendation M.3100:1995":noSuchLinkEnd,
noSuchNetworkTTP,
linkEndAndNetworkTTPsNotCompatible,
initialCapacitiesFailure,
networkTTPAlreadyAssociated,
finalCapacitiesFailure,
consistencyFailure,
failureToAssociate;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.AssociateNetworkTTPWithTopologicalLinkEndInformation;

WITH REPLY SYNTAX

G85501-ASN1TypeModule.AssociateNetworkTTPWithTopologicalLinkEndResult;

REGISTERED AS {g85501Action 1};

7.2 Associate Trail with Topological Link

associateTrailWithTopologicalLink ACTION

BEHAVIOUR

associateTrailWithTopologicalLinkBehaviour BEHAVIOUR

DEFINED AS "

This action associates a trail in the server layer with a topological link in the client layer.
There may be one and only one server trail associated with one topological link.

<G.854.8,OPERATION:associateTrailWithTopologicalLink>

"";

MODE CONFIRMED;

PARAMETERS

"Recommendation M.3100:1995":noSuchLink,
noSuchTrail,
linkAndTrailsNotCompatible,
initialCapacitiesFailure,
trailAlreadyAssociated,
finalCapacitiesFailure,
consistencyFailure,
failureToAssociate;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.AssociateTrailWithTopologicalLinkInformation;

WITH REPLY SYNTAX

G85501-ASN1TypeModule.AssociateTrailWithTopologicalLinkResult;

REGISTERED AS {g85501Action 2};

7.3 Disassociate NetworkTTP from Topological Link End

disassociateNetworkTTPFromTopologicalLinkEnd ACTION

BEHAVIOUR

disassociateNetworkTTPFromTopologicalLinkEndBehaviour BEHAVIOUR

DEFINED AS "

This action disassociates the server layer network TTP from the topological link end in the client layer.

<G.854.8,OPERATION:disassociateNetworkTTPFromTopologicalLinkEnd>

"";

MODE CONFIRMED;

PARAMETERS

"Recommendation M.3100:1995":noSuchLinkEnd,
noSuchNetworkTTP,
networkTTPNotAssociated,

capacityProvisionned,
 finalCapacitiesFailure;
WITH INFORMATION SYNTAX
 G85501-ASN1TypeModule.DisassociateNWTTPFromTopLinkEndInformation;
REGISTERED AS {g85501Action 3};

7.4 Disassociate Trail from Topological Link

disassociateTrailFromTopologicalLink ACTION

BEHAVIOUR

disassociateTrailFromTopologicalLinkBehaviour BEHAVIOUR

DEFINED AS "

This action disassociates a server layer trail from the topological link in the client layer that it supports.

<G.854.8,OPERATION:disassociateTrailFromTopologicalLink>

";;

MODE CONFIRMED;

PARAMETERS

"Recommendation M.3100:1995":noSuchLink,

noSuchTrail,

trailNotAssociated,

capacityProvisionned,

finalCapacitiesFailure,

failureToDisassociate;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.DisassociateTrailFromTopLinkInformation;

REGISTERED AS {g85501Action 4};

7.5 Establish Logical Link

establishLogicalLink ACTION

BEHAVIOUR

establishLogicalLinkBehaviour BEHAVIOUR

DEFINED AS "

This action creates a logical link between either:

- two subnetworks; or
- two access groups; or
- a subnetwork and an access group; or
- an access group and a subnetwork.

The two end-points are specified in the information in the action request.

The linkPointerList attribute of the associated subnetwork managed objects will be modified to reflect the creation of the logical link.

A logical link managed object is created as a result of this action. The name of the logical link is returned in the action result.

<G.854.3,OPERATION:createLink>

";;

MODE CONFIRMED;

PARAMETERS

incorrectLinkEnds,

userIdentifierNotUnique,

"Recommendation M.3100:1995":failureToSetUserIdentifier,

"Recommendation M.3100:1995":failureToCreateLink,

"Recommendation M.3100:1995":failureToBindLink,

failureToSetDirectionality;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.EstablishLogicalLinkInformation;

WITH REPLY SYNTAX
G85501-ASN1TypeModule.EstablishLogicalLinkResult;
REGISTERED AS {g85501Action 5};

7.6 Establish Logical Link and Logical Link Ends

establishLogicalLinkAndEnds ACTION
BEHAVIOUR

establishLogicalLinkAndEndsBehaviour BEHAVIOUR
DEFINED AS "

This action creates a logical link between and the logical link ends were the logical link connects:

- two subnetworks; or
- two access groups; or
- a subnetwork and an access group; or
- an access group and a subnetwork.

A logical link and two logical link end managed objects are created as result of this action. The name of the logical link and the names of the logical link ends are returned in the action result.

<G.854.3,OPERATION:createLink>
<G.854.3,OPERATION:createLinkEnd>

"";

MODE CONFIRMED;

PARAMETERS

userIdentifierNotUnique,
incorrectSubnetwork,
"Recommendation M.3100:1995":failureToCreateLinkEnd,
"Recommendation M.3100:1995":failureToBindLinkEnd,
"Recommendation M.3100:1995":failureToSetUserIdentifier,
failureToSetDirectionality;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.EstablishLogicalLinkInformation;

WITH REPLY SYNTAX

G85501-ASN1TypeModule.EstablishLogicalLinkAndEndsResult;

REGISTERED AS {g85501Action 6};

7.7 Establish Topological Link

establishTopologicalLink ACTION
BEHAVIOUR

establishTopologicalLinkBehaviour BEHAVIOUR
DEFINED AS "

This action creates a topological link between which connects:

- two subnetworks; or
- two access groups; or
- a subnetwork and an access group; or
- an access group and a subnetwork.

A topological link managed object is created as result of this action. The name of the topological link is returned in the action result.

<G.854.3,OPERATION:createTopologicalLink>

"";

MODE CONFIRMED;

PARAMETERS

incorrectLinkEnds,
userIdentifierNotUnique,
"Recommendation M.3100:1995":failureToSetUserIdentifier,
failureToCreateTopologicalLink,

**"Recommendation M.3100:1995":failureToBindTopologicalLink,
 failureToSetDirectionality;
 WITH INFORMATION SYNTAX
 G85501-ASN1TypeModule.EstablishTopologicalLinkInformation;
 WITH REPLY SYNTAX
 G85501-ASN1TypeModule.EstablishTopologicalLinkResult;
 REGISTERED AS {g85501Action 7};**

7.8 Establish Topological Link and Link Ends

**establishTopologicalLinkAndEnds ACTION
 BEHAVIOUR**

**establishTopologicalLinkAndEndsBehaviour BEHAVIOUR
 DEFINED AS "**

This action creates a topological link between and the topological link ends were the topological link connects:

- two subnetworks; or
- two access groups; or
- a subnetwork and an access group; or
- an access group and a subnetwork.

A topological link and two topological link end managed objects are created as result of this action. The name of the topological link and the names of the topological link ends are returned in the action result.

<G.854.3,OPERATION:createTopologicalLink>
 <G.854.3,OPERATION:createTopologicalLinkEnd>
 ";;

MODE CONFIRMED;

PARAMETERS

**incorrectLinkEnds,
 userIdentifierNotUnique,
 incorrectSubnetwork,
 "Recommendation M.3100:1995":failureToCreateLinkEnd,
 "Recommendation M.3100:1995":failureToBindLinkEnd,
 "Recommendation M.3100:1995":failureToSetUserIdentifier,
 failureToSetDirectionality;**

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.EstablishTopologicalLinkInformation;

WITH REPLY SYNTAX

G85501-ASN1TypeModule.EstablishTopologicalLinkAndEndsResult;

REGISTERED AS {g85501Action 8};

7.9 Release Subnetwork Connection

**releaseSnc ACTION
 BEHAVIOUR**

**releaseSncBehaviour BEHAVIOUR
 DEFINED AS "**

This action is used to release Subnetwork Connection(s). The Subnetwork Connection pointed to by the compositePointer attribute will also be cleared down by this action. If a Link End is involved in the Subnetwork Connection, its attributes idleNWCTPCount, and connectedNWCTPCount will be updated as a result of this action. If implicit TP creation is used, the associated TPs will be deleted when the subnetwork connection is released.

<G.852.1,sscc2:Release Point to Point SNC>
 ";;

MODE CONFIRMED;
PARAMETERS
noSuchSnc,
sncConnected,
failureToRelease;
WITH INFORMATION SYNTAX
G85501-ASN1TypeModule.ReleaseSncInformation;
REGISTERED AS {g85501Action 9};

7.10 Release Trail

releaseTrail ACTION
BEHAVIOUR
releaseTrailBehaviour BEHAVIOUR
DEFINED AS "
This action is used to release a Trail. The link connections pointed to by the clientConnectionList and the subnetwork connections pointed to by the layer connection list package will also be released by this action.

If successful, the connectivityPointer in the disconnected network trail termination points will be set to NULL as a result of this action.
<G.854.6,OPERATION:releaseTrail>
";;
MODE CONFIRMED;
PARAMETERS
unknownTrail,
trailConnected;
WITH INFORMATION SYNTAX
G85501-ASN1TypeModule.ReleaseTrailInformation;
REGISTERED AS {g85501Action 10};

7.11 Remove Logical Link

removeLogicalLink ACTION
BEHAVIOUR
removeLinkBehaviour BEHAVIOUR
DEFINED AS "
This action deletes a logical link.

The linkPointerList attribute of the associated subnetworks will be modified to reflect the deletion of the logical link.
<G.854.3,OPERATION:deleteLink>
";;
MODE CONFIRMED;
PARAMETERS
incorrectLink,
linkConnectionsExisting,
failureToDeleteLink;
WITH INFORMATION SYNTAX
G85501-ASN1TypeModule.RemoveLogicalLinkInformation;
REGISTERED AS {g85501Action 11};

7.12 Remove Logical Link and Logical Link Ends

removeLogicalLinkAndEnds ACTION
BEHAVIOUR
removeLogicalLinkAndEndsBehaviour BEHAVIOUR
DEFINED AS "
This action removes the logical link and logical link end managed objects that represent a link.

The linkPointerList attribute of the associated subnetworks will be modified to reflect the deletion of the link.

<G.854.3,OPERATION:deleteLink>
<G.854.3,OPERATION:deleteLinkEnd>

"";

MODE CONFIRMED;

PARAMETERS

incorrectLink,
incorrectLinkEnds,
networkCTPsExisting,
linkConnectionsExisting,
failureToDeleteLink;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.RemoveLogicalLinkInformation;

REGISTERED AS {g85501Action 12};

7.13 Remove Topological Link

removeTopologicalLink ACTION

BEHAVIOUR

removeTopologicalLinkBehaviour BEHAVIOUR

DEFINED AS "

This action deletes a topological link.

The linkPointerList attribute of the associated subnetworks will be modified to reflect the deletion of the topological link.

<G.854.3,OPERATION:deleteTopologicalLink>

"";

MODE CONFIRMED;

PARAMETERS

"Recommendation M.3100:1995":noSuchLink,
linkConnectionsExisting,
failureToDeleteLink;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.RemoveTopologicalLinkInformation;

REGISTERED AS {g85501Action 13};

7.14 Remove Topological Link and Link Ends

removeTopologicalLinkAndEnds ACTION

BEHAVIOUR

removeTopologicalLinkAndEndsBehaviour BEHAVIOUR

DEFINED AS "

This action deletes a topological link and the topological link end managed objects that represent a topological link.

<G.854.3,OPERATION:deleteTopologicalLinkAndEnds>

"";

MODE CONFIRMED;

PARAMETERS

"Recommendation M.3100:1995":noSuchLinkEnd,
networkCTPsExisting,
failureToDeleteTopologicalLinkEnd;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.RemoveTopLinkAndEndsInformation;

REGISTERED AS {g85501Action 14};

7.15 Set up Subnetwork Connection

setupSnc ACTION

BEHAVIOUR

setupSncBehaviour BEHAVIOUR

DEFINED AS "

This action is used to set up a Subnetwork Connection between network termination points.

If a Link End is involved in the Subnetwork Connection, its attributes idleNWCTPCount, and connectedNWCTPCount will be updated as a result of this action.

<G.854.01,sscc1:'Setup Point to Point SNC'>

"";

MODE CONFIRMED;

PARAMETERS

invalidTransportServiceCharacteristics,

incorrectSubnetworkTerminationPoints,

aEndNetworkTPConnected,

zEndNetworkTPConnected,

wrongAEndDirectionality,

wrongZEndDirectionality,

failureToConnect,

"Recommendation M.3100:1995":failureToSetUserIdentifier;

WITH INFORMATION SYNTAX

G85501-ASN1TypeModule.SetupSncInformation;

WITH REPLY SYNTAX

G85501-ASN1TypeModule.SetupSncResult;

REGISTERED AS {g85501Action 15};

7.16 Set up Trail

setupTrail ACTION

BEHAVIOUR

setupTrailBehaviour BEHAVIOUR

DEFINED AS "

This action is used to set up a Trail between network trail termination points. The trail termination points to be connected can be specified in one of two ways: by explicitly identifying the network trail termination points, or by specifying one or more Access Groups from which any idle network trail termination point may be used. The result, if successful, always returns an explicit list of network TTPs.

This action will fail if any of the network termination points specified is already involved in a Trail. The Trail will have a directionality (unidirectional or bidirectional) as specified in the action parameter directionality. The identifier of the client will be passed to the server and will be logged by the server against the identifier of the created Trail.

<G.854.6,OPERATION:setup point-to-point Trail>

"";

MODE CONFIRMED;

PARAMETERS

networkTTPsNotPartOfLayerND,

aEndNetworkTPConnected,

networkTTPsInAEndAccessGroupConnected,

zEndNetworkTPConnected,

networkTTPsInZEndAccessGroupConnected,

userIdentifierNotUnique,

"Recommendation M.3100:1995":failureToSetUserIdentifier,

"Recommendation M.3100:1995":invalidTPType,

invalidTrail,

wrongAEndDirectionality,

wrongZEndDirectionality,

invalidTransportServiceCharacteristics,
invalidTrafficDescriptor;
WITH INFORMATION SYNTAX
G85501-ASN1TypeModule.SetupTrailInformation;
WITH REPLY SYNTAX
G85501-ASN1TypeModule.SetupTrailResult;
REGISTERED AS {g85501Action 16};

8 Notifications

None.

9 Parameters

aEndNetworkTPCConnected PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.TPList;
REGISTERED AS {g85501SpecificError 1};

capacityProvisionned PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.Capacities;
REGISTERED AS {g85501SpecificError 2};

consistencyFailure PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 3};

failureToAssociate PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 4};

failureToConnect PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.Failed;
REGISTERED AS {g85501SpecificError 5};

failureToCreateTopologicalLink PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 6};

failureToDeleteLink PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 7};

failureToDeleteTopologicalLinkEnd PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 8};

failureToDisassociate PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 9};

failureToRelease PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.Failed;
REGISTERED AS {g85501SpecificError 10};

failureToSetDirectionality PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 11};

finalCapacitiesFailure PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.Capacities;
REGISTERED AS {g85501SpecificError 13};

incorrectLink PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
REGISTERED AS {g85501SpecificError 14};

incorrectLinkEnds PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
REGISTERED AS {g85501SpecificError 15};

incorrectSubnetwork PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
REGISTERED AS {g85501SpecificError 16};

incorrectSubnetworkTerminationPoints PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.TPLList;
REGISTERED AS {g85501SpecificError 17};

initialCapacitiesFailure PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.Capacities;
REGISTERED AS {g85501SpecificError 18};

invalidTrafficDescriptor PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 19};

invalidTrail PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 20};

invalidTransportServiceCharacteristics PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX G85501-ASN1TypeModule.None;
REGISTERED AS {g85501SpecificError 21};

linkAndTrailsNotCompatible PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.None;
 REGISTERED AS {g85501SpecificError 23};

linkEndAndNetworkTTPsNotCompatible PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.None;
 REGISTERED AS {g85501SpecificError 24};

linkConnectionsExisting PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.ObjectList;
 REGISTERED AS {g85501SpecificError 25};

networkCTPsExisting PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.TPList;
 REGISTERED AS {g85501SpecificError 26};

networkTTPAlreadyAssociated PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.None;
 REGISTERED AS {g85501SpecificError 27};

networkTTPNotAssociated PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.None;
 REGISTERED AS {g85501SpecificError 28};

networkTTPsInAEndAccessGroupConnected PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
 REGISTERED AS {g85501SpecificError 29};

networkTTPsInZEndAccessGroupConnected PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
 REGISTERED AS {g85501SpecificError 30};

networkTTPsNotPartOfLayerND PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.TPList;
 REGISTERED AS {g85501SpecificError 31};

noSuchNetworkTTP PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
 REGISTERED AS {g85501SpecificError 32};

noSuchSnc PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
 REGISTERED AS {g85501SpecificError 33};

noSuchTrail PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
 REGISTERED AS {g85501SpecificError 34};

trailAlreadyAssociated PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.None;
 REGISTERED AS {g85501SpecificError 35};

sncConnected PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.TPList;
 REGISTERED AS {g85501SpecificError 36};

trailConnected PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.ObjectInstance;
 REGISTERED AS {g85501SpecificError 37};

trailNotAssociated PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.None;
 REGISTERED AS {g85501SpecificError 38};

unknownSnc PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.Count;
 REGISTERED AS {g85501SpecificError 39};

unknownTrail PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.None;
 REGISTERED AS {g85501SpecificError 40};

userIdentifierNotUnique PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.UserIdentifier;
 REGISTERED AS {g85501SpecificError 41};

wrongAEndDirectionality PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.Directionality;
 REGISTERED AS {g85501SpecificError 42};

wrongZEndDirectionality PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.Directionality;
 REGISTERED AS {g85501SpecificError 43};

zEndNetworkTPConnected PARAMETER
 CONTEXT SPECIFIC-ERROR;
 WITH SYNTAX G85501-ASN1TypeModule.TPList;
 REGISTERED AS {g85501SpecificError 44};

10 Abstract syntax

10.1 Rules of extensibility

The following types will be indicated as being extensible:

- ENUMERATED;
- named INTEGER;
- named BIT STRING;

- tagged SET;
- tagged SEQUENCE;
- tagged CHOICE.

Under the rules of extensibility, new enumerations (for ENUMERATED types), new bit name assignments (for named BIT STRING types), new named numbers (for named INTEGER types), and new tagged elements (for tagged SET, SEQUENCE, and CHOICE types) may be added in future versions of this Recommendation.

When processing information in a System Management Application Protocol (SMAP) PDU, the accepting SMAP-machine shall ignore:

- enumerations not recognized;
- unrecognized named numbers;
- unrecognized named bits;
- unrecognized tagged elements of sets, sequences, and choices.

10.2 ASN.1 Module

G85501-ASN1TypeModule {itu-t recommendation g gntm(85501) informationModel(0) asn1Modules(2) asn1TypeModule(0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- EXPORTS everything

IMPORTS

AdditionalInformation, AdministrativeState, AvailabilityStatus, OperationalState, PerceivedSeverity, ProbableCause
FROM Attribute-ASN1Module{joint-iso-ccitt ms(9) smi (3) part2 (2) asn1Module(2) 1}

Directionality, Failed, ObjectList, ProblemCause, UserLabel
FROM ASN1DefinedTypesModule
 {ccitt recommendation m(13) gnm(3100) informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)}

Capacity, Capacities, Count, CTPLList, LinkConnectionList, LinkEnd, None, UserIdentifier, LinkDirectionality, ConnectivityEndPoint, TPLList, SignalId **FROM M3100ASN1TypeModule2** {itu-t recommendation m gnm(3100) informationModel(0) asn1Modules(2) asn1Module2(1)}

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

DistinguishedName
FROM InformationFramework {joint-iso-ccitt ds(5) modules(1) informationFramework(1)} ;
-- NOTE – This Recommendation imports DistinguishedName from CCITT Rec. X.501 (1988). The
-- specification for this syntax can now be found in an informative annex of
-- Rec. X.711 (1997) | ISO/IEC 9596-1:1998.

g85501ClassLibrary OBJECT IDENTIFIER ::= {itu-t recommendation g gntm(85501) informationModel(0)}

g85501MObjectClass OBJECT IDENTIFIER ::= {g85501ClassLibrary managedObjectClass(3)}

g85501Attribute OBJECT IDENTIFIER ::= {g85501ClassLibrary attribute(7)}

g85501NameBinding OBJECT IDENTIFIER ::= {g85501ClassLibrary nameBinding(6)}

g85501Package OBJECT IDENTIFIER ::= {g85501ClassLibrary package(4)}

g85501Action OBJECT IDENTIFIER ::= {g85501ClassLibrary action(9)}

g85501Notification OBJECT IDENTIFIER ::= {g85501ClassLibrary notification(10)}

g85501SpecificError OBJECT IDENTIFIER ::= {g85501ClassLibrary specificError(12)}

AssociateNetworkTTPWithTopologicalLinkEndInformation ::= SEQUENCE {
 linkEnd ObjectInstance,
 networkTTP ObjectInstance,
 ...
 }

AssociateNetworkTTPWithTopologicalLinkEndResult ::= SEQUENCE {
 potentialCapacity Capacity,
 networkCTPs CTPList,
 ...
 }

AssociateTrailWithTopologicalLinkInformation ::= SEQUENCE {
 link ObjectInstance,
 trail ObjectInstance,
 ...
 }

AssociateTrailWithTopologicalLinkResult ::= SEQUENCE {
 potentialCapacity Capacity,
 resultingLinkConnections LinkConnectionList,
 ...
 }

DisassociateNWTTTPFromTopLinkEndInformation ::= SEQUENCE {
 linkEnd [1] ObjectInstance,
 networkTTP [2] ObjectInstance OPTIONAL,
 ...
 }

DisassociateTrailFromTopLinkInformation ::= SEQUENCE {
 link [1] ObjectInstance,
 trail [2] ObjectInstance OPTIONAL,
 ...
 }

EstablishLogicalLinkAndEndsResult ::= SEQUENCE {
 link ObjectInstance,
 aEnd ObjectInstance,
 zEnd ObjectInstance,
 ...
 }

EstablishLogicalLinkInformation ::= SEQUENCE {
 layerNetworkDomain ObjectInstance,
 aEnd LinkEnd,
 zEnd LinkEnd,
 suppliedUserIdentifier [1] UserIdentifier OPTIONAL,
 }

suppliedUserLabel [2] **GraphicString** **OPTIONAL**,
suppliedDirection [3] **LinkDirectionality** **OPTIONAL**,
...
}

EstablishLogicalLinkResult ::= SEQUENCE {
link **ObjectInstance**,
...
}

EstablishTopologicalLinkAndEndsResult ::= SEQUENCE {
link **ObjectInstance**,
aEnd **ObjectInstance**,
zEnd **ObjectInstance**,
...
}

EstablishTopologicalLinkInformation ::= SEQUENCE {
layerNetworkDomain **ObjectInstance**,
aEnd **LinkEnd**,
zEnd **LinkEnd**,
suppliedUserIdentifier [1] **UserIdentifier** **OPTIONAL**,
suppliedUserLabel [2] **GraphicString** **OPTIONAL**,
suppliedDirection [3] **Directionality** **OPTIONAL**,
...
}

EstablishTopologicalLinkResult ::= SEQUENCE {
link **ObjectInstance**,
...
}

Implicit ::= BOOLEAN (TRUE)

QofConnectivityService ::= ObjectInstance

ReleaseSncInformation ::= SEQUENCE {
snc **ObjectInstance**,
userId **UserIdentifier** **OPTIONAL**,
...
}

ReleaseTrailInformation ::= SEQUENCE {
trailId **ObjectInstance**,
userId **UserIdentifier** **OPTIONAL**,
...
}

RemoveLogicalLinkInformation ::= SEQUENCE {
link **ObjectInstance**,
...
}

RemoveTopologicalLinkInformation ::= SEQUENCE {
link **ObjectInstance**,
...
}

RemoveTopLinkAndEndsInformation ::= SEQUENCE {
link **ObjectInstance**,
...
}

```

SetupSncInformation ::= SEQUENCE {
    aEnd                SET OF ConnectivityEndPoint,
    zEnd                SET OF ConnectivityEndPoint,
    directionality      Directionality,
    signalid            [1] SignalId OPTIONAL,
    qofConnectivityService [2] QofConnectivityService OPTIONAL,
    implicitTPCreation  [8] Implicit OPTIONAL,
    ...
}

SetupSncResult ::= SEQUENCE {
    connection          ObjectInstance,
    aEnd                ObjectInstance,
    zEnd                ObjectInstance,
    userId              UserIdentifier OPTIONAL,
    ...
}

SetupTrailInformation ::= SEQUENCE {
    aEnd                SET OF ConnectivityEndPoint,
    zEnd                SET OF ConnectivityEndPoint,
    directionality      Directionality,
    additionalInformation [2] AdditionalInformation OPTIONAL,
    qofConnectivityService [3] QofConnectivityService OPTIONAL,
    userId              [0] UserIdentifier OPTIONAL,
    userLabel           [1] UserLabel OPTIONAL,
    ...
}

SetupTrailResult ::= SEQUENCE {
    trailId             ObjectInstance,
    aEnds               SET OF ObjectInstance,
    zEnds               SET OF ObjectInstance,
    ...
}

```

END

11 Conformance

Implementations claiming to conform to this Recommendation shall comply with the conformance requirements as defined in the following subclauses.

11.1 Static conformance

The implementation shall conform to the requirements of this Recommendation in one or more of these roles:

- manager role;
- agent role.

If a claim of conformance is made for support in the manager role, the implementation shall support at least one management operation or notification of at least one of the managed objects specified by this Recommendation.

If a claim of conformance is made for support in the agent role, the implementation shall support one or more instances of the managed object classes specified by this Recommendation.

The implementation shall support the transfer syntax derived from the encoding rules specified in Recommendation X.680 {joint-iso-ccitt(2) asn1(1) basicEncoding (1)} for the abstract data types referenced by the definitions for which support is claimed.

11.2 Dynamic conformance

Implementations claiming to conform to this Recommendation shall support the elements of procedure and definitions of semantics corresponding to the definitions for which support is claimed.

ITU-T RECOMMENDATIONS SERIES

- Series A Organization of the work of the ITU-T
- Series B Means of expression: definitions, symbols, classification
- Series C General telecommunication statistics
- Series D General tariff principles
- Series E Overall network operation, telephone service, service operation and human factors
- Series F Non-telephone telecommunication services
- Series G Transmission systems and media, digital systems and networks**
- Series H Audiovisual and multimedia systems
- Series I Integrated services digital network
- Series J Transmission of television, sound programme and other multimedia signals
- Series K Protection against interference
- Series L Construction, installation and protection of cables and other elements of outside plant
- Series M TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
- Series N Maintenance: international sound programme and television transmission circuits
- Series O Specifications of measuring equipment
- Series P Telephone transmission quality, telephone installations, local line networks
- Series Q Switching and signalling
- Series R Telegraph transmission
- Series S Telegraph services terminal equipment
- Series T Terminals for telematic services
- Series U Telegraph switching
- Series V Data communication over the telephone network
- Series X Data networks and open system communications
- Series Y Global information infrastructure and Internet protocol aspects
- Series Z Languages and general software aspects for telecommunication systems