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

Digital transmission systems – Digital networks – Management of transport network

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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.

NOTE

In this Recommendation the term *recognized operating agency (ROA)* includes any individual, company, corporation or governmental organization that operates a public correspondence service. The terms *Administration, ROA* and *public correspondence* are defined in the *Constitution of the ITU (Geneva, 1992)*.

INTELLECTUAL PROPERTY RIGHTS

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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.

CONTENTS

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

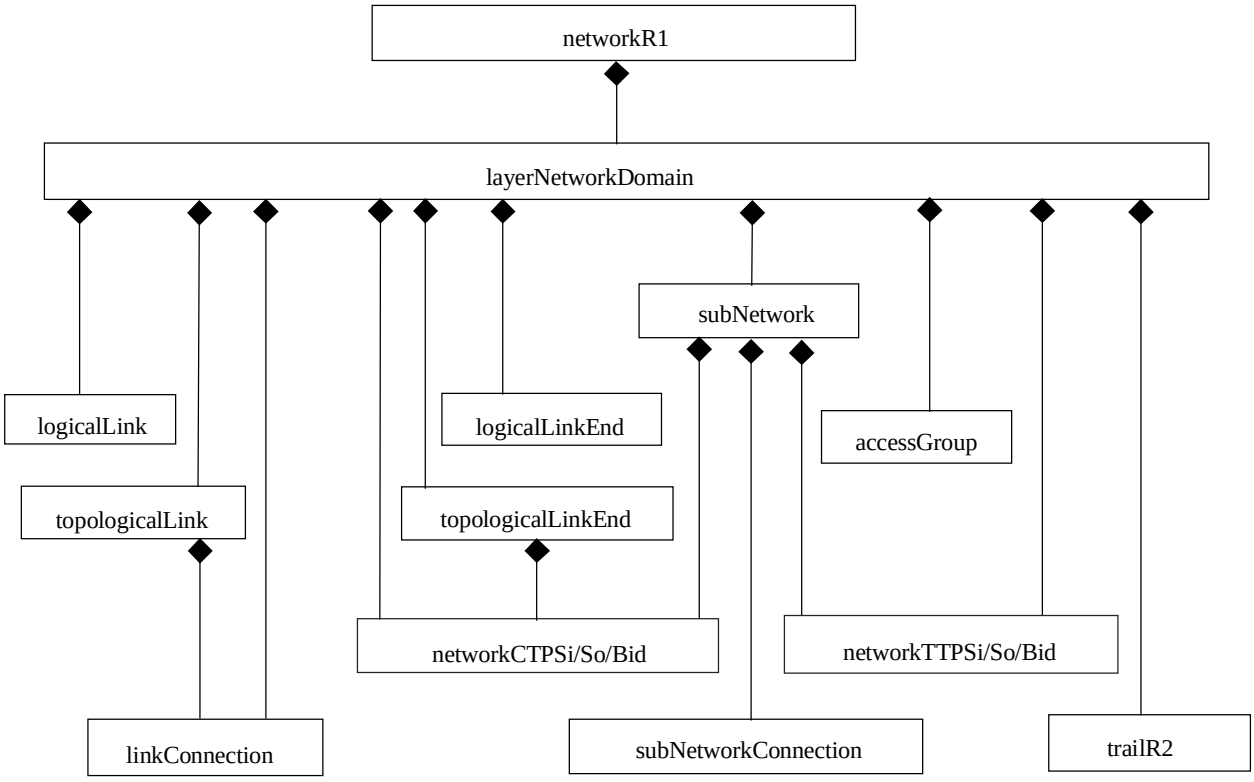
5 Managed objects

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*.



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.

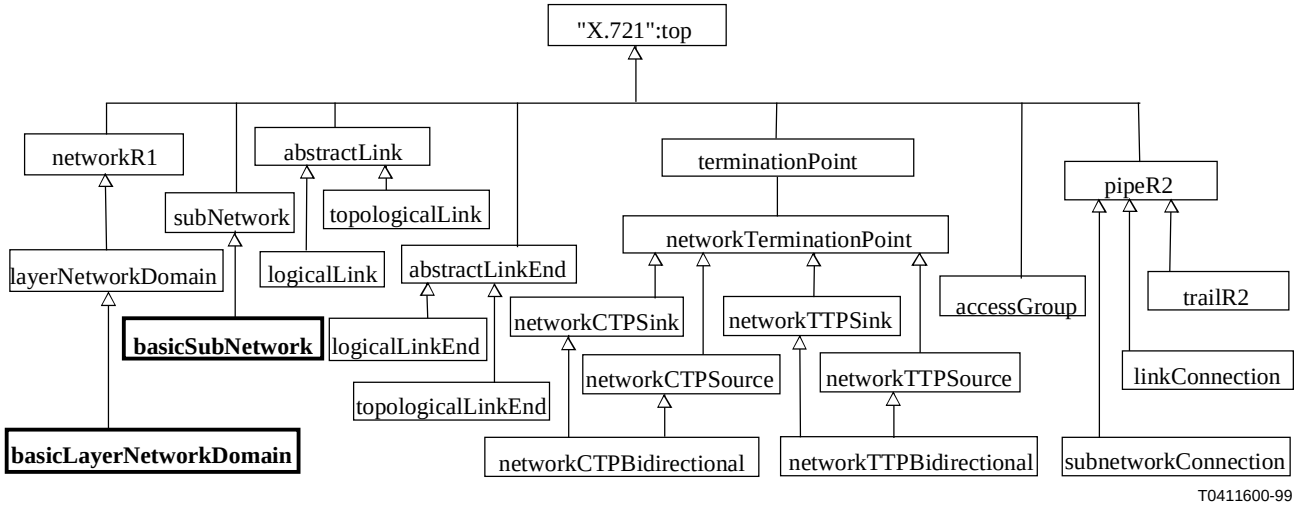


Figure 2/G.855.1 – Inheritance hierarchy

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

```
aEndNetworkTPConnected   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.TPList;
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, CTPList, LinkConnectionList, LinkEnd, None, UserIdentifier,
    LinkDirectionality, ConnectivityEndPoint, TPList, 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,
        …
        }

DisassociateNWTTPFromTopLinkEndInformation::= 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 {
        traillId                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.

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