INTERIM
EUROPEAN
TELECOMMUNICATION
STANDARD

Transmission and Multiplexing (TM);
Synchronous Digital Hierarchy (SDH)
network information model;
Basic trail and Sub-Network Connection (SNC)
configuration management ensemble

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Contents

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Foreword

This draft Interim European Telecommunication Standard (I-ETS) has been produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Public Enquiry phase of the ETSI standards approval procedure.

An ETSI standard may be given I-ETS status either because it is regarded as a provisional solution ahead of a more advanced standard, or because it is immature and requires a "trial period". The life of an I-ETS is limited to three years after which it can be converted into an ETS, have it's life extended for a further two years, be replaced by a new version, or be withdrawn.

Introduction

Ensembles provide a top down view of a particular solution to a management problem. In order to focus on the solution to this management problem, specific restrictions are placed upon particular referenced definitions. The concepts and format of ensembles are described in the "NM Forum Ensemble Concepts and Format"[5] specification document.

Each ensemble contains general text in each subclause that is common to all ensembles. By convention this common text is portrayed in bold italic characters.

The ensemble defined in this ETS, wherever possible, references documents which define the components of the ensemble.

The management problem is identified as a set of requirements and constraints. In defining the solution to this management problem, the resources to be managed, the functions to be applied, and the scenarios describing the interactions are all identified. The ensemble defined in this ETS makes reference to base standards and International Standardized Profiles (ISPs). It also references libraries containing definitions expressed by GDMO templates (where GDMO is Guidelines for the Definition of Managed Objects - see ISO/IEC DISP 12060-1 [9]).

The purpose of this ETS is to collect management information definitions and profiles, and show how they can be applied to manage the resources identified in this ensemble.

This ETS is organized as follows:

Introduction: provides a high level overview describing the ensemble and the structure of the document;

Clause 4:   "Management context", identifies the managed resources and management capabilities of the ensemble;

Clause 5:   "Management Information model", specifies all management information components of this ensemble;

Clause 6:   "Ensemble conformance requirements", provides or references statements of conformance for this ensemble. The Managed Object Conformance Statements (MOCS) proformas, specific to the ensemble are provided in annex A.

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1   Scope

Ensembles represent specific solutions to particular problems. Thus, an ensemble is the complete description of the problem and the solution to that problem.

An ensemble includes the definition of the information model that represents the solution to a problem. These definitions comprise references to one or more management information libraries which contain definitions of managed object classes expressed in GDMO templates, packages, attributes, name bindings, etc.. Also, included in the ensemble definition are statements of conformance and suitable proformas.

The purpose of the ensemble defined in this ETS is to describe a management interface at the network level for the provision of Synchronous Digital Hierarchy (SDH) configuration management capabilities with basic features. The services considered in this ensemble are:

- **the setting-up of trails:**

    a manager will have the ability to request that a trail be set up between two access points, or groups of access points.

- **the release of trails:**

    a manager will be able to request the release of a previously set-up trail.

- **the setting-up of Sub-Network Connections (SNCs):**

    a manager will have the ability to request that a SNC be set up between two connection points, or groups of connection points, in the same sub-network.

- **the release of SNCs:**

    a manager will be able to request the release of a previously set-up SNC.

The ensemble defined in this ETS considers that part of the VC-12 or VC-4 SDH layer network bounded by a ring containing an arbitrary number of SDH Network Elements (NEs), see figure 1.
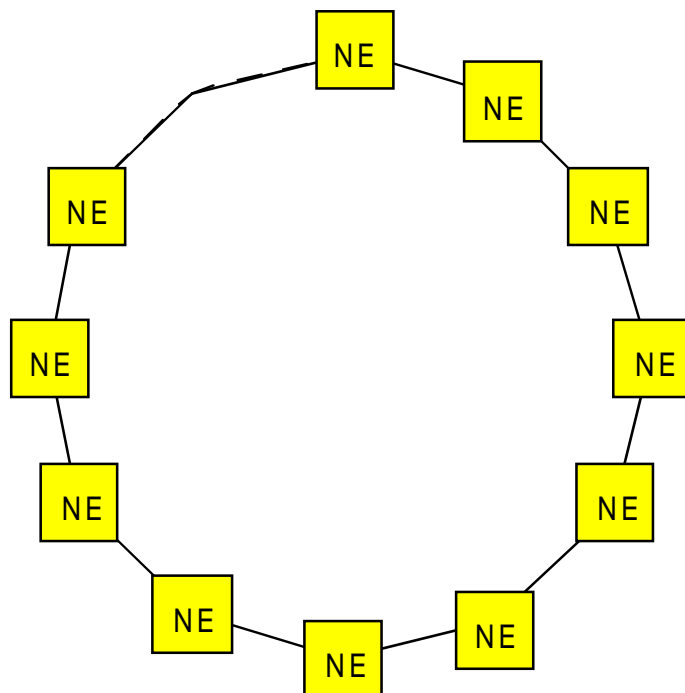
Figure 1: An SDH single ring

1.1 Unique identity

The unique identity (a registered object identifier used to identify the ensemble defined in this ETS) is:

"I-ETS300810"

1.2 General description of ensemble

This ensemble specifies the managed objects and the functions that define the management interfaces between a service user and a service provider.

In this ensemble the services under consideration are the basic configuration of trails and SNCs within an SDH network.

In this ensemble the user plays the OSI manager role and the service provider plays the OSI agent role (see figure 2).
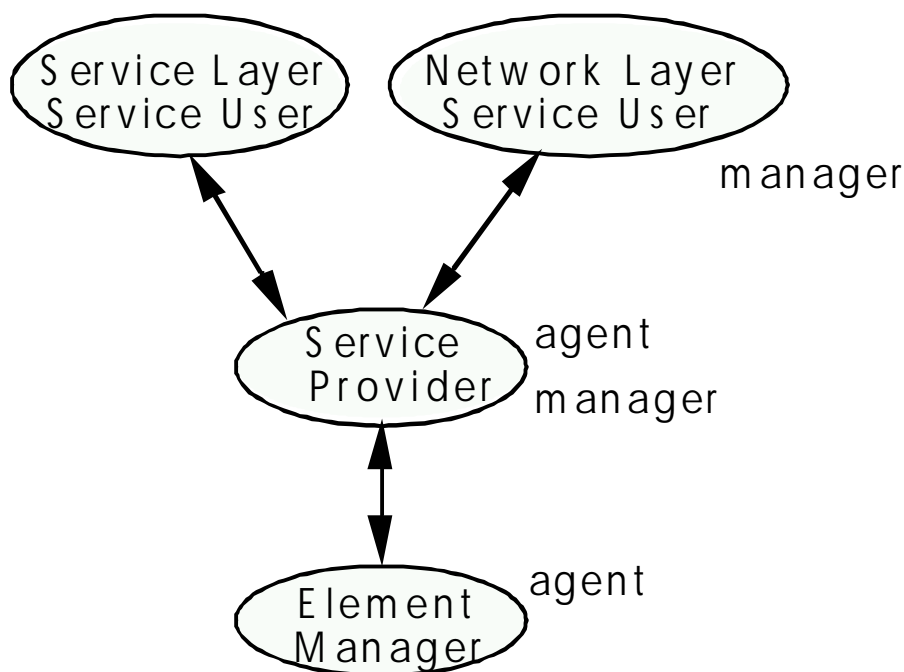
Figure 2: The OSI (manager - agent) view

1.3 Relationship with other ensembles

This is the first of what are expected to be a related series of ensembles for SDH network management, which deal with similar resources and management contexts. It is expected that ensembles from this series will often be used together in similar implementations.

2   References

This I-ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]   ITU-T Recommendation G.803 (1993): "Architectures of transport networks based on the synchronous digital hierarchy (SDH)".

[2]   I-ETS 300 653 (1996): "Telecommunications Management Network (TMN); Generic managed object class library for the network level view".

[3]   ITU-T Recommendation M.3100: "Generic network information model".

[4]   ITU-T Recommendation M.3010: "Principles for a telecommunications management network".

[5]   ETR 037 (1992): "Network Aspects (NA); Telecommunications Management Network (TMN); Objectives, principles, concepts and reference configurations".

[6]   ITU-T Recommendation X.721: "Information technology – Open Systems Interconnection – Structure of management information: Definition of management information". (Shares common text with ISO/IEC 10165-2.)

[7]   Network Management Forum: "The 'Ensemble' Concept and Format" Issue 1.0 (1992), Forum 025.

[8]   Network Management Forum: "OMNI*Point* 1 Conformance Requirements", Issue 1.0 (August 1992) Forum 020.

[9]   ISO/IEC pDISP 12060-1 (1992): "Information Technology - International Standardized Profiles AOM2n OSI Management - Management Functions - Part 1: AOM211 - General Management Capabilities".

[10]   ISO/IEC pDISP 12060-2 (1992): "Information Technology - International Standardized Profiles AOM2n OSI Management - Management Functions - Part 2: AOM212 - Alarm Reporting and State Management Capabilities".

[11]   ISO/IEC pDISP 12060-3 (1992): "Information Technology - International Standardized Profiles AOM2n OSI Management - Management Functions - Part 3: AOM213 - Alarm Reporting Capabilities".

[12]   ISO/IEC pDISP 12060-4 (1992): "Information Technology - International Standardized Profiles AOM2n OSI Management - Management Functions - Part 4: AOM221 - General Event Report Management".

[13]   ISO/IEC pDISP 12060-5 (1992): "Information Technology - International Standardized Profiles AOM2n OSI Management - Management Functions - Part 4: AOM231 - General Log Control".

3 Abbreviations

For the purposes of this I-ETS, the following abbreviations apply:

AP	Access Point
CMISE	Common Management Information Service Element
CP	Connection Point
CTP	Connection Termination Point
DCN	Data Communications Network
f	f type reference point
ISO	International Organisation for Standardisation
MAF	Management Application Function
MOC	Managed Object Class
NE	Network Element
NEF	Network Element Function
NWCTP	NetWork CTP
OS	Operations System (physical implementation)
OSF	Operations System Function block
OSFB	Business management layer OSF
OSFS	Service management layer OSF
OSFN	Network management layer OSF
OSFE	Element management layer OSF
OSF_E	Element manager OSF
OSF_{SP}	Service Provider OSF
OSF_{User}	User OSF
OSI	Open Systems Interconnection
PON	Passive Optical Network
q	q type reference point
SDH	Synchronous Digital Hierarchy
SNC	Sub-Network Connection
TMN	Telecommunications Management Network
TP	Termination Point
TTP	Trail Termination Point
VC	Virtual Container
x	x type reference point

4 Management context

The "management context" describes why the ensemble is required. The description of the "management context" includes the definition of the resources to be managed, the management functions to be performed, the scope of the problem to be solved, and the management view or level of abstraction from which the problem is to be approached. The influence of the management context on the ensemble is shown below in Figure 3.

MANAGEMENT TOOLS

(STANDARDS: GDMO, OBJECTS
SYSTEM MANAGEMENT FUNCTIONS
PROFILES...)

MANAGEMENT CONTEXT

VIEWPOINT

(USER, PROVIDER, ELEMENT, NETWORK,...)

RESOURCES

(EQUIPMENT, SOFTWARE, APPLICATIONS,...)

FUNCTIONS

(FAULT, CONFIGURATION, PERFORMANCE,...)

ENSEMBLE

-REQUIREMENTS

-SCENARIOS

-RESOURCES

-INFORMATION MODELS

-ENTITY RELATIONSHIP DIAGRAMS

-OBJECT SPECIFICATIONS

-MANAGED OBJECT CONFORMANCE STATEMENTS

-ENSEMBLE CONFORMANCE

Figure 3: Management context overview

4.1 General introduction

The management context for this ensemble is the interface between a SDH service user and an SDH service provider. The management capability described by this ensemble enables the configuration of trails and SNCs in a basic manner.

4.2 Management view and level of abstraction

This subclause indicates the management view of the ensemble which includes information on the level of abstraction. For example, in an hierarchically organised system this subclause would indicate if the ensemble deals with the management of equipment, the management of networks or the management of services. It may also indicate management perspectives and roles.

This ensemble addresses the management view for the interface between the service user and the service provider.

This view is afforded at the interface between the user domain and the service provider domain.

Note that in this ensemble the term 'service' is normally used to describe a feature offered by one entity to another entity within a relationship (either client/server or peer-to-peer). Where 'service' is used to refer to the service management layer as described in ITU-T Recommendation M.3010 [4], annex B, the full term, 'service management layer', will be used.

In this ensemble the service under consideration, "the management of the configuration of trails and SNCs in a basic manner " lies with the ITU-T Recommendation M.3010 [4] network management (see figure 4).
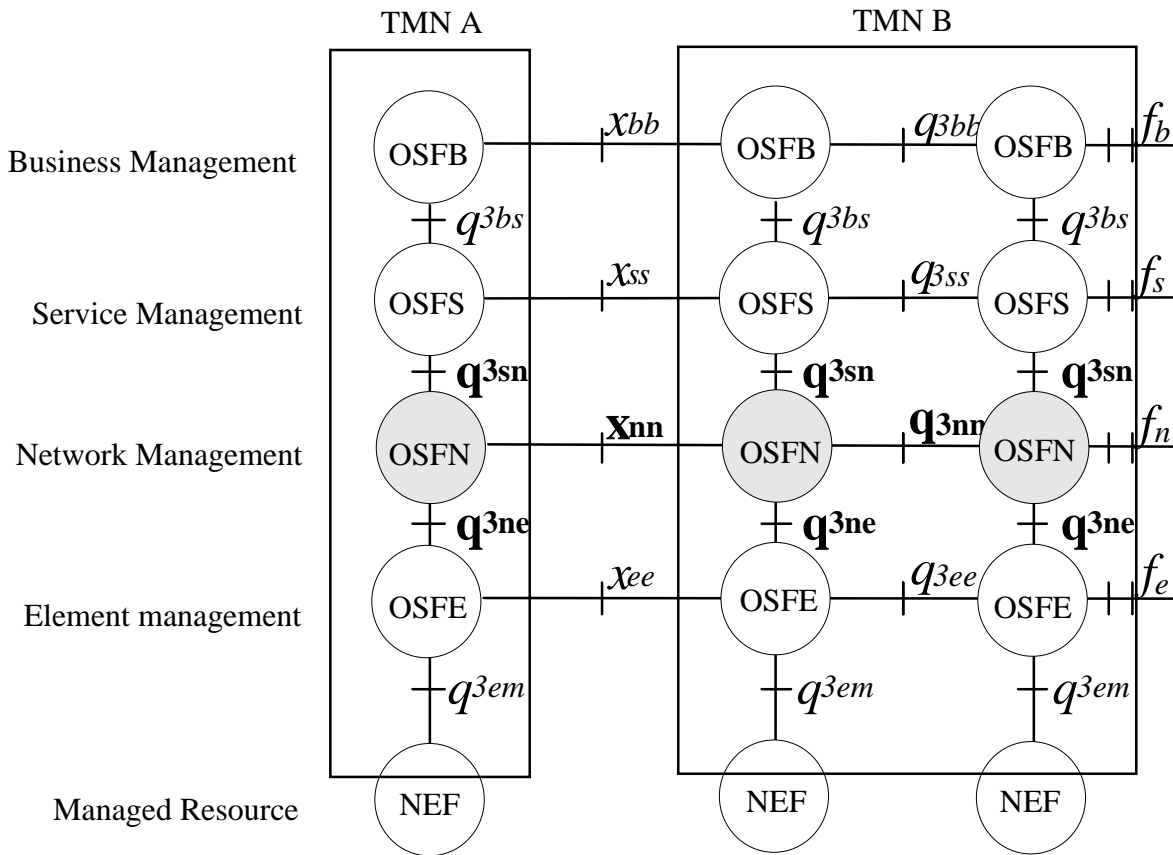
Figure 4: The TMN reference architecture (based on clause B.3 of ETR 037 [5])

The ensemble is applicable to the following functional architecture (see figure 5):

1)   the service provider is represented by the OSF, $OSFN_{SP}$, within the network management layer;

2)   the service user is represented by one of two OSFs; $OSFS_{User}$, when the OSF is within the service management layer and $OSFN_{User}$, when the OSF is within the network management layer;

3)   in order to provide a service either for the service or network user, the service provider OSF communicates with one or more element manager OSFs (the OSFEs), (within the element management layer) which are responsible for the network elements.
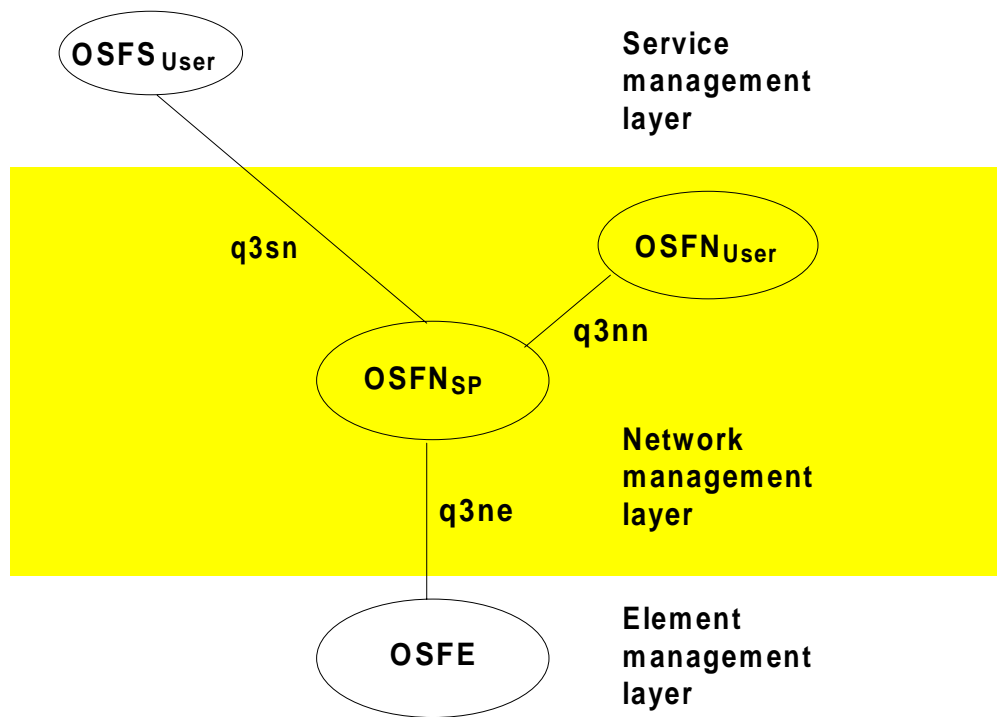
Figure 5: The TMN (management layer) view

The element managers (OSFEs) simultaneously control a number of different NEs, NE-1..NE-n. However, each NE is controlled independently.

The (service management layer or network management layer) user OSF has the responsibility for a 'larger' part of the network, which it undertakes by coordinating the activities of a number of service provider OSFs each of which has responsibility for a smaller part of the network.

The (service management layer or network management layer) user OSF requests the service provider OSF to provide a service within the VC-12 layer or VC-4 layer of the SDH network and the service provider OSF performs the service inter-working, where necessary, with the element manager OSFs.

The service provider OSF is then responsible for the performance of the service (including, where appropriate, the maintenance of the service).

The functional architecture depicted in figure 5 above may be implemented by the physical architecture shown in figure 6 below. This consists of a number of Operations Systems (OSs) communicating across Q_3 intefaces (see ITU-T Recommendation M.3010 [4]).
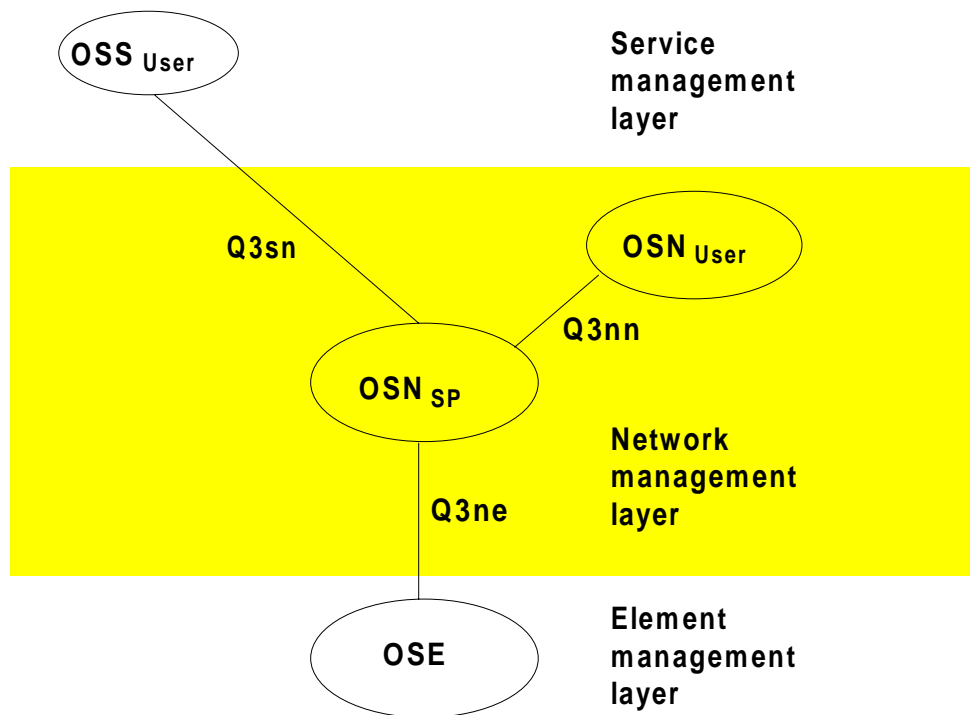
Figure 6: The Physical Architecture

This ensemble is relevant for the Q3$_{nn}$ interface.

4.3 Resources

This subclause defines all the resources or components of resources that are to be the subject of the ensemble. The definition of the resources contains all the resources and only those resources that are relevant to the ensemble. The resources are defined by textual descriptions or by reference to other documents containing descriptions of the resources. When other documents are referenced statements are provided to indicate any restrictions and constraints on those source definitions.

The resources to be managed are described below. These resources are based on entities and concepts defined within ITU-T Recommendation G.803 [1]. However ITU-T Recommendation G.803 [1] is highly complex and in places inconsistent. Therefore a sub-set of ITU-T Recommendation G.803 [1] has been taken and used to describe the resources. The definitions of the resources below shall be used within the modelling process.

Taken together these resources make up a part of a layer network, a complete layer network or a number of layer networks. A layer network is itself a resource composed of several distinct types of resource along with certain functions associated with these resources. Therefore the resources to be managed are:

- access groups;
- access points;
- adaptation functions;
- characteristic information;
- connection points;
- layer networks;
- links;
- link connections;
- matrices;
- sub-networks;
- Sub-Network Connections (SNCs);
- tandem connections;
- termination connection points;
- trails;
- Trail Termination Functions (TTFs).

NOTE: Links, link connections, and tandem connections are strictly not relevant to the ensemble, but are included here for completeness of the resource descriptions.

Figure 7 shows a single network element ring represented with the above resources:
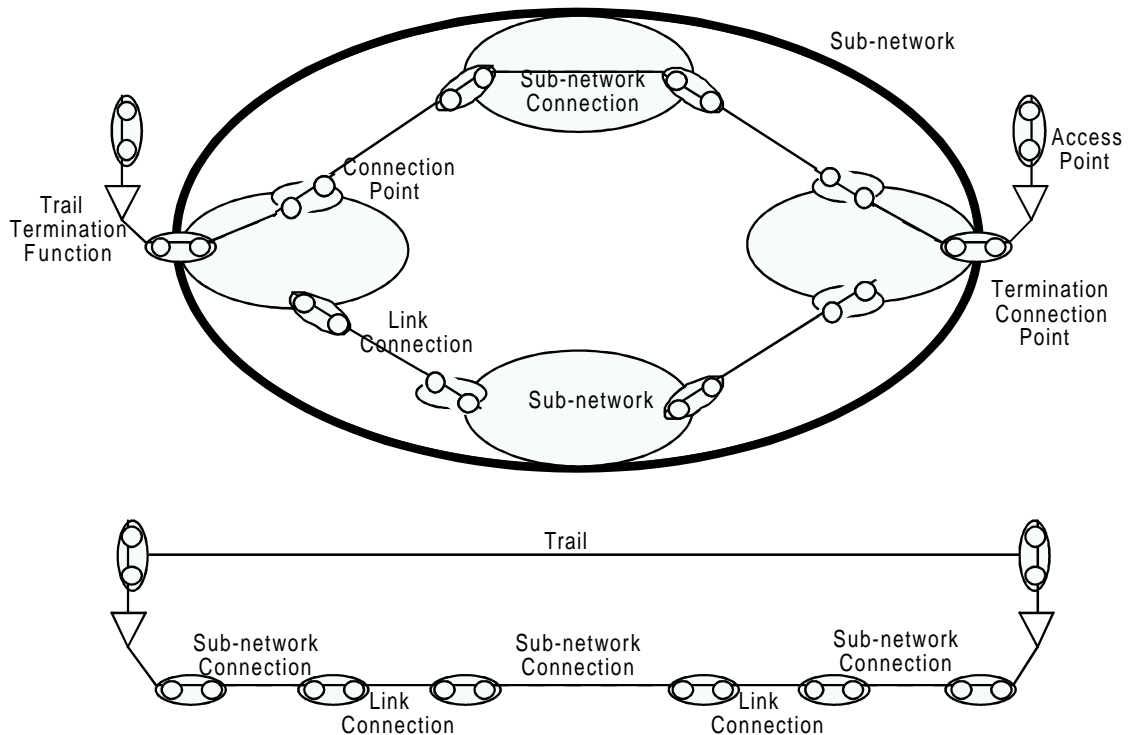
**Figure 7: Single network element ring described in terms of
ITU-T Recommendation G.803 [1] resources**

The following describes the layer network and the resources that make it up in a technology independent way (terms in *italics* refer to ITU-T Recommendation G.803 [1] entities described in other subclauses within subclause 4.3).

4.3.1 Access group

An access group is a group of co-located access points together with their associated trail termination functions. (Trail termination generates the characteristic information of a layer network and ensures integrity of transport of that characteristic information.).

NOTE: An access point does not have to belong to an access group.

The *access points* within an access group may be within a single NE or within a limited geographical region (e.g. a building).

4.3.2 Access point

An access *point* is where the adapted characteristic information from a client *layer network* enters the server *layer network*. It is the point where the adapted *characteristic information* is bound to a trail termination function, and thus the point where the adapted *characteristic information* enters the *trail*. (Trail termination generates the *characteristic information* of a *layer network* and ensures integrity of transport of that *characteristic information*.)

4.3.3 Adaptation function

The adaptation function is a 'transport processing function' which adapts a server layer to the needs of a client layer. The adaptation function defines the server/client association between the *connection point* and *access point* and these points therefore delimit the adaptation function. Adaptation functions have been defined for many client/server interactions.

4.3.4 Characteristic information

Characteristic information is a signal of characteristic rate and format which is transferred within and between *sub-networks* and presented via an adaptation function to an *access point* for transport by a server *layer network*. (The adaptation function adapts the signal so that it may be transported by the server *layer network,* e.g. by multiplexing several client layer signals together.)

4.3.5 Connection point

A connection point is where:

1) A link connection may be bound to another link connection;
2) A link connection may be bound to a SNC;
3) A link connection may be bound to a trail termination function (associated with an access point) forming the end of a trail;
4) A SNC may be bound to a trail termination function (associated with an access point) forming the end of a trail.

4.3.6 Layer network

A layer network is defined by the complete set of like *access points* which may be associated for the purpose of transferring information. The information transferred is characteristic of the layer and is termed *characteristic information. Access point* associations may be made and broken by a layer management process thus changing its connectivity (i.e. the establishment or clearing down of *trails*). A separate, logically distinct layer network exists for each *access point* type. A layer network is made up of *sub-networks* and *links* between them. A layer network may serve a client layer network by transporting the *characteristic information* of the client layer within a signal of *characteristic information* of its own layer.

4.3.7 Link

A link describes the fixed relationship between a *sub-network* and another *sub-network* or *access group*. It is defined by the sub-set of *connection points* on one *sub-network* which are associated with a sub-set of *connection points* or *access points* on another *sub-network* or *access group* for the purpose of transferring *characteristic information*. The set of *connection point* associations which define the link are represented by *link connections*. The link represents the topological relationship between a pair of *sub-networks* or a *sub-network* and an *access group*.

4.3.8 Link connection

A link connection is supported by a *trail* in the server *layer network*. It is capable of transferring information transparently across a *link* between two *sub-networks,* or across a *link* between an *access group* and a *sub-network*. It is delimited by *connection points* at the boundary of the *link* and the *sub-networks* and represents the association between a pair of *connection points* in the case of a *link* between two *sub-networks*, and is delimited by an *access point* and a *connection point* in the case of a *link* between an *access group* and a s*ub-network.* Link connections are configured by the *trail* management process of the server *layer network* (i.e. the establishment of a *trail* in a server *layer network* results in the establishment of *link connections* in one or more client *layer networks*).

4.3.9 Matrix

A matrix is a special case of a *sub-network* and represents the limit to the recursive partitioning of *a sub-network*.

4.3.10 Sub-network

A sub-network describes the potential for *sub-network connections* across the sub-network. It can be partitioned into interconnected sub-networks and *links*. Each sub-network in turn can be partitioned into smaller sub-networks and links and so on. It is defined by the complete set of like *connection points* which may be associated for the purpose of transferring *characteristic information*. The *connection point* associations in a sub-network may be made and broken by a layer management process thus changing its connectivity (i.e. the establishment or clearing down of *sub-network connections*).

4.3.11   Sub-Network Connection (SNC)

A SNC is capable of transferring *characteristic information* across a *sub-network* transparently. It is delimited by *connection points* at the boundary of the *sub-network* and represents the association between *connection points* within the same *sub-network*. SNCs are in general made up of a series of adjacent lower level SNCs and *link connections* and can be viewed as an abstraction of this more detailed view.

> NOTE: SNCs, trails, link connections and tandem connections may take the form of point to multipoint connectivity entities. This is not explicitly covered by ITU-T Recommendation G.803 [1] but is provided for here to allow the description of such connectivity configurations.

4.3.12   Tandem connection

A tandem connection is an arbitrary series of adjacent *link connections* and *sub-network connections*.

4.3.13   Termination Connection point

A termination connection point is a special case of a *connection point* where a *trail termination function* is bound to an *adaptation function* or a *matrix*.

4.3.14   Trail

A trail in a server *layer network* is responsible for the integrity of transfer of *characteristic information* from one or more client *layer networks* between the server layer *access points*, utilising the *characteristic information* of its own layer. It defines the association between *access points* in the same *layer network*. Trail termination functions at either end of the trail monitor the integrity of transfer by adding incremental information to the adapted *characteristic information* from the client *layer networks.* These trail termination functions are thought of as being part of the *trail*.

4.3.15   Trail Termination Function (TTF)

TheTTF is a transport processing function which generates *the characteristic information* of a *layer network* and ensures integrity of that *characteristic information*. The trail termination function defines the association between the *access point* and *termination connection point* and these points therefore delimit the trail termination function.

The trail termination source is a transport processing function which accepts adapted client layer network *characteristic information*, adds *trail* overhead and assigns it to an associated network connection in the same transport network layer.

The trail termination sink is a transport processing function which terminates a *trail*, extracts the *trail* overhead information, checks validity and passes the adapted client layer network *characteristic information* to the *adaptation function*.

4.3.16   Configuration examples

The following presents a number of configuration examples. These examples are not intended to be exhaustive, but are intended to give an appreciation of the range of complexity that is covered.

In figures 8 - 11 the following symbols are used:

access point

access group

trail

sub-network

link connection

SNC

connection point

link
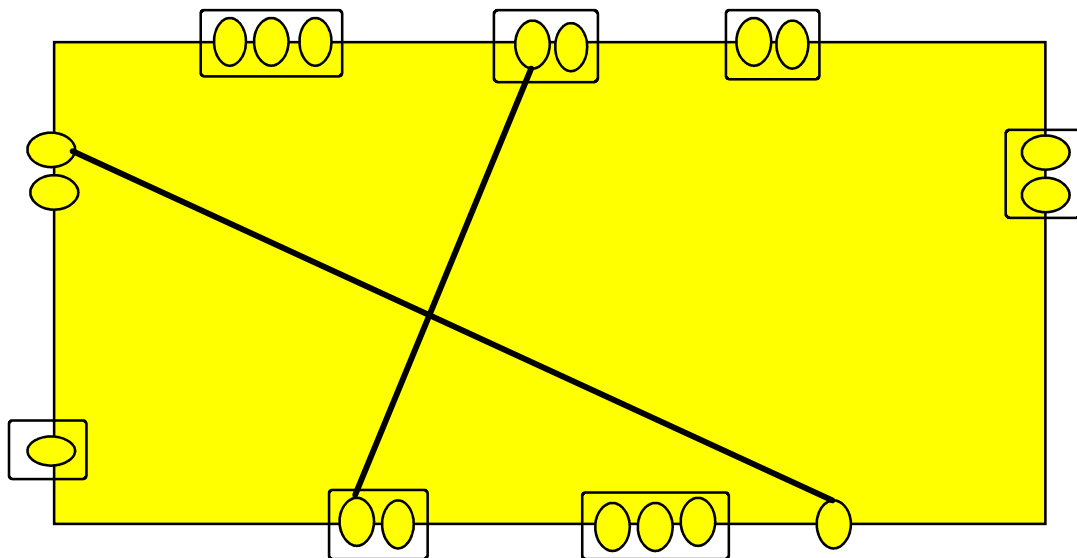
Figure 8: Trails

Figure 8 shows two point to point trails across a layer network. They are supporting link connections outside the domain of the agent.
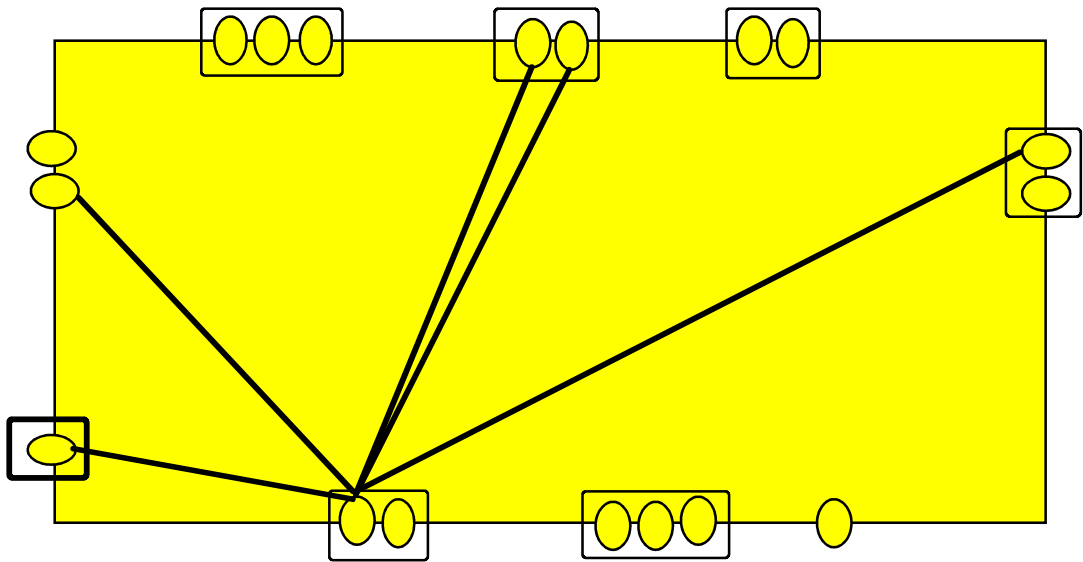
Figure 9: Point to multi-point trail

Figure 9 shows a point to multi-point trail. This trail will support one or more point to multi-point link connections in its client layer.
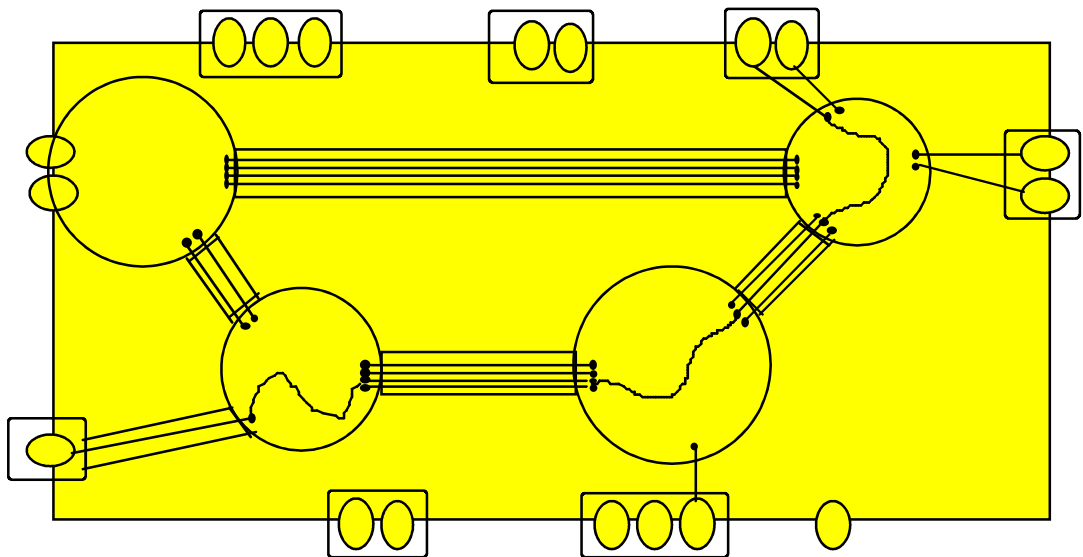
Figure 10: SNCs

Figure 10 illustrates SNCs configured within sub-networks.
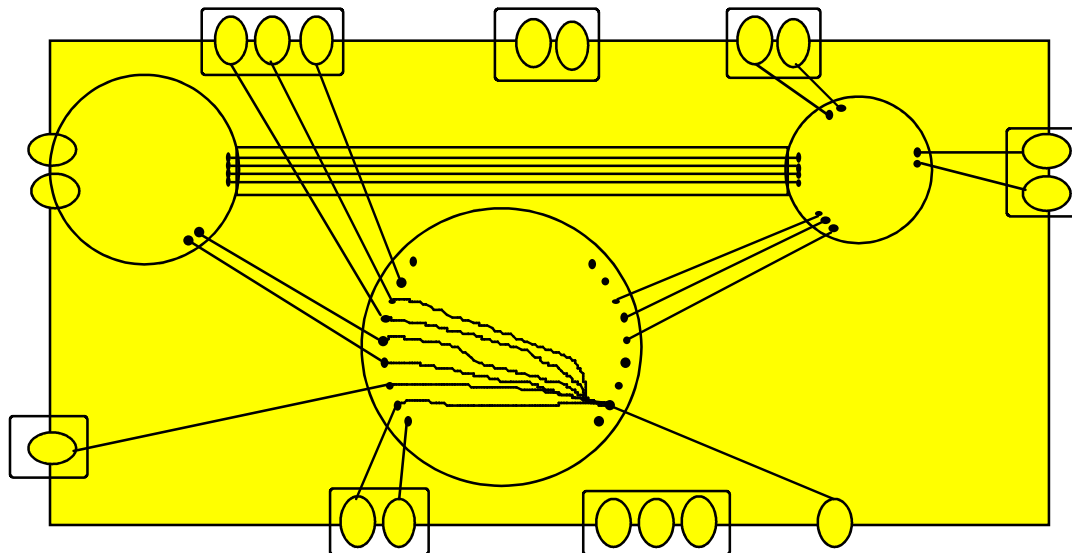
Figure 11: Point to multi-point SNC

Figure 11 illustrates a point to multi-point SNC, which could be used as the basis of creating a point to multi-point trail.

4.4   Functions

This subclause defines the management functions that can be performed on the resources described in subclause 4.3. These functions may be primitive functions defined for OSI systems management (e.g. event management), higher level functions for general network management (e.g. alarm surveillance), or other functions unique to the problem the ensemble addresses.

This subclause focuses on what can be performed, rather than how it is performed. Subclause 5.3 describes how these functions can be performed using the managed objects referenced in subclause 5.4. The following template is used to describe the management capabilities:

Table 1: Template of management capabilities

Template entry	Entry description
Management capability description	A management capability description describes the purpose and/or scope of the management capabilities as seen by a service user.
Functional requirements	This is a numbered list of functional requirements supported by the management capability.
The input data	This is the data which a service user shall supply to a service provider in order for the service provider to provide the service. Some of the data may be optional.
The output data	This is the data which a service provider returns to the service user after having completed the management capability. An important output datum is the 'result code' which indicates the success or failure of a request, and, in the case of failure, the reason for the failure. Although result codes shall be identified for each service, table 4 identifies a number of general result codes.
Pre-conditions	Pre-conditions express constraints placed on the state of the system for a service to be performed in terms of the resources being managed. Typically, a pre-condition will be checked by a service provider before attempting to perform a service. If one of the pre-conditions associated with the service is not met, then the service can not be performed. As it may not be possible for a service user to know all of the pre-conditions, these are described from the service provider's perspective.
Post conditions	Post conditions express the state of the system following successful completion of a management capability in terms of the resources being managed. If a post condition cannot be fulfilled by the service provider, then the service has failed. A statement shall be made as to whether a service is atomic, i.e. will leave the system in its previous state if it fails. Some services, for example, a viewing service, may not change the state of the system, that is, pre- and post conditions are the same. As it may not be possible for a service user to know all of the post conditions, these are described from the service provider's perspective.

4.4.1   Basic trail configuration

Basic trail configuration covers:

- The setting-up a non-scheduled trail;
- The release of a non-scheduled trail;
- The aborting of a set-up request;
- The aborting of a release request.

4.4.1.1 Set-up a non-scheduled trail

This management capability allows a service user to request the immediate setting-up of a trail between two specified end-points and is described by the following:

**Table 2: Service user request for the immediate setting-up of a trail between
two specified end-points**

Management capability description	A service user may request the immediate setting-up of a trail between two specified end-points	
Functional requirements	1	A service user will have the ability to request the immediate setting-up of a trail between existing identifiable end points.
The input data	**M/C**	**Description**
The A-end trail end point identifier	M	The A-end trail end point identifier identifies the A-end end point of the trail, depending upon the mode of the trail, the A-end trail end point identifier may represent: 1 one or a set of access points; 2 one or a set of access groups; 3 one or a set of sub-networks. The possible entities that the A-end trail end point identifier may represent for each combination of directionality and mode are listed in table 4, the nature of the A-end and Z-end trail end point identifier parameters A-end trail end point identifiers are unique to the domain shared by the service provider and service user.
The Z-end rail end point identifier	M	The Z-end trail end point identifier identifies the Z-end end point of the trail, depending upon the mode of the trail, the Z-end trail end point identifier may represent: 1 one or a set of access points; 2 one or a set of access groups; 3 one or a set of sub-networks. The possible entities that the Z-end trail end point identifier may represent for each combination of directionality and mode are listed in table 4 The nature of the A-end and Z-end trail end point identifier parameters Z-end trail end point identifiers are unique to the domain shared by the service provider and service user.
Directionality	M	The directionality of a trail indicates whether transmission is uni-directional or bi-directional.
Mode	M	The mode of a trail indicates the type of transmission, that is, point to point, point to multi-point, multi-cast, broadcast or conference (see table 3).
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service users.
Transaction identifier	C	The transaction identifier is used to associate together a number of operations. The transaction identifier shall be supplied if the user may wish to use the 'abort set-up trail' service. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
The output data	**M/C**	**Description**
Result code	M	The result code indicates the result of a request. In the case of failure the code indicates the cause. The result codes to be supported are defined below (see table 5, trail set-up result codes)

(continued)

Table 2 (concluded): Service user request for the immediate setting-up of a trail between two specified end-points

Management capability description	A service user may request the immediate setting-up of a trail between two specified end-points	
Trail identifier	C	A trail identifier is returned when a trail has been successfully set-up and may be used by a service user to identify a particular trail. The trail identifier is not returned when the trail has not been successfully set-up or reserved. Trail identifiers are unique to the domain shared by the service provider and service user.
Access point identifiers	C	Access point identifier are sent with the trail identifier in the case of a successful set-up. Access point identifiers are unique to the domain shared by the service provider and service user.
Payload configuration	M	The payload configuration defines the payload configuration of the trail.
Pre-conditions	1 2 3 4	The layer network which contains the end-point identifiers exist The end-point identifiers exist and can support the requested mode and directionality A route (a free path) exists between the end-point identifiers The end point identifiers identify free access points (either directly or indirectly)
Post conditions	1	A trail has been physically established with the connectivity state set to In-service

Table 3: Connectivity modes

Mode	Description
Point-to-point	One A end and one Z end.
Point-to-multi-point	One A end and multiple Z ends. There is no traffic flow between Z ends.
Multi-cast	Multiple A ends and multiple Z ends. There is no traffic flow between A ends or between Z ends.
Conference	Multiple A ends send traffic to, and receive traffic from, all other A ends. There are no Z ends.
Broadcast	One A end and multiple, undefined Z ends.

Table 4: The nature of the A-end and Z-end trail end point identifier parameters

Mode	Uni-directional		Bi-directional	
Directionality	A-end trail end point identifier	Z-end trail end point identifier	A-end trail end point identifier	Z-end trail end point identifier
point to point	1 one access point 2 one access group 3 one sub-network	1 one access point 2 one access group 3 one sub-network	1 one access point 2 one access group 3 one sub-network	1 one access point 2 one access group 3 one sub-network
point to multi-point	1 one access point 2 one access group 3 one sub-network	1 a set of access points 2 a set of access groups 3 a set of sub-networks	1 one access point 2 one access group 3 one sub-network	1 a set of access points 2 a set of access groups 3 a set of sub-networks
multicast	1 a set of access points 2 a set of access groups 3 a set of sub-networks	1 a set of access points 2 a set of access groups 3 a set of sub-networks	1 a set of access points 2 a set of access groups 3 a set of sub-networks	1 a set of access points 2 a set of access groups 3 a set of sub-networks
conference	Not valid		1 a set of access points 2 a set of access groups 3 a set of sub-networks	There are no Z-end trail end point identifiers
broadcast	1 one access point 2 one access group 3 one sub-network	There are no known Z-end trail end point identifier	Not valid	Not valid

Table 5: Trail set-up result codes

Trail set-up result codes	Description
Parameter value error	
End point identifiers	End point identifiers Parameter value error - requested end point identifiers not recognized
Directionality	Directionality Parameter value error - requested directionality not supported
Mode	Mode Parameter value error - requested mode not supported
User identifier	User identifier Parameter value error - requested User identifier not recognized
Transaction identifier	Transaction identifier Parameter value error - requested Transaction identifier not recognized
Pre-conditions not met	
1 The layer network which contains the end-point identifiers exist	Covered by 'End point identifiers Parameter value error'. No explicit check is performed on the existence of the layer network as the layer network can only be identified by the access point which it contains. The existence of a layer network can be assumed if no error is found in the end-point identifiers. if an error is found in the end-point identifiers then it is not possible to process the request.
2 The end-point identifiers exist	Covered by 'End point identifiers Parameter value error'
3 A route exists between the end-point identifiers	No route between the specified end-point identifiers can be found.
4 The end point identifiers identify free access points (either directly or indirectly)	Some of the access points identified directly were not free, or there were insufficient free access points identified indirectly
Service could not be provided	Post-conditions can not be met
Access restriction	The service user does not have the authority for the service
Insufficient management resources	Insufficient management resources

4.4.1.2   Release a non-scheduled trail

This management capability allows a service user to request the immediate release of a trail and is described by the following:

Table 6: User request for the immediate release of a trail

Management capability description		A service user may request the immediate release of a trail
Functional requirements	1	A service user will have the ability to request the release of a trail.
The input data	**M/C**	**Description**
Trail identifier	M	The trail identifier is used by a service user to identify a particular trail. Trail identifiers are unique to the domain shared by the service provider and service user.
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service users.
Transaction identifier	C	The transaction identifier is used to associate together a number of operations. The transaction identifier shall be supplied if the user may wish to use the 'abort release trail' service. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
The output data	**M/C**	**Description**
Result code	M	The result code indicates the result of a request. In the case of failure the code indicates the cause. The result codes to be supported are defined below: - The trail has been released; - Access restriction - the service user does not have the authority to request release of the identified trail; - Insufficient management resources; - Service could not be provided; - Trail identifier parameter value error; - User identifier parameter value error; - Transaction identifier parameter value error. (N.B. failure to meet the pre-conditions is covered by the parameter value errors above)
Pre-conditions	1	The identified trail exists
Post conditions	1	The identified trail has been released (no longer exists)

4.4.1.3   Abort set-up a non-scheduled trail

This management capability allows a service user to request the aborting of a set-up trail request prior to having received the result of the request and is described by the following:

**Table 7: User request for the immediate aborting of a set-up trail request
prior to having received the result of the request**

Management capability description	A service user may request the immediate aborting of a set-up trail request prior to having received the result of the request	
Functional requirements	1	A service user will have the ability to request the aborting of a trail set-up request prior to having received the result of the request from the service provider.
The input data	**M/C**	**Description**
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service user. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
Transaction identifier	M	The transaction identifier is used to identify the request to be aborted. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
The output data	**M/C**	**Description**
Result code	M	The result code indicates the success or failure of a request. In the case of failure the code indicates the reason for the failure. The result codes to be supported are defined below: - The set-up request has been aborted (prior to the trail having been set-up); - The trail had already been set-up but has now been released; - Access restriction - the service user does not have the authority to request that the set-up be aborted; - Insufficient management resources; - Service could not be provided (the set-up request is still being processed); - Service could not be provided(the trail has been set-up); - User identifier parameter value error; - Transaction identifier parameter value error. (N.B. failure to meet the pre-conditions is covered by the parameter value errors above)
Pre-conditions	1	The service provider is processing a trail set-up request which has the same combination of user identifier and transaction identifier as the abort request.
Post conditions	1	The set-up trail request has been aborted.

4.4.1.4 Abort release a non-scheduled trail

This management capability allows a service user to request the aborting of a release trail request prior to having received the result of the request and is described by the following:

**Table 8: User request for the immediate aborting of a release trail request
prior to having received the result of the request**

Management capability description	A service user may request the immediate aborting of a release trail request prior to having received the result of the request		
Functional requirements	1	A service user will have the ability to request the aborting of a release trail request prior to the having received a result of the request from the service provider.	
The input data	M/C	Description	
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service user. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.	
Transaction identifier	M	The transaction identifier is used to identify the request to be aborted. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.	
The output data	M/C	Description	
Result code	M	The result code indicates the success or failure of a request. In the case of failure the code indicates the reason for the failure. The result codes to be supported are defined below: - The release request has been aborted (prior to the trail being released); - Access restriction - the service user does not have the authority to request that the release be aborted; - Insufficient management resources; - Service could not be provided (the release request is still being processed); - Service could not be provided (the trail has been released); - User identifier parameter value error; - Transaction identifier parameter value error. (N.B. failure to meet the pre-conditions is covered by the parameter value errors above)	
Pre-conditions	1	The service provider is processing a release trail request which has the same combination of user identifier and transaction identifier as the abort request.	
Post conditions	1	The release trail request has been aborted.	

4.4.2 Basic SNC configuration

Basic SNC configuration covers:

- The setting-up a non-scheduled SNC;
- The release of a non-scheduled SNC;
- The aborting of a set-up request;
- The aborting of a release request.

4.4.2.1 Set-up a non-scheduled SNC

This management capability allows a service user to request the immediate setting-up of a SNC between two specified end-points and is described by the following:

Table 9: User request for the immediate setting-up of a SNC between two specified end-points

Management capability description	A service user may request the immediate setting-up of a SNC between two specified end-points	
Functional requirements	1	A service user will have the ability to request the immediate setting-up of a SNC between existing identifiable end points.
The input data	**M/C**	**Description**
The A-end SNC end point identifier	M	The A-end SNC end point identifier identifies the A-end end point of the SNC, depending upon the mode of the SNC, the A-end SNC end point identifier may represent: 1 one or a set of connection points or termination connection points; 2 one or a set of groups of connection points or termination connection points; 3 one or a set of sub-networks. The possible entities that the A-end SNC end point identifier may represent for each combination of directionality and mode are listed in table 10. A-end SNC end point identifiers are unique to the domain shared by the service provider and service user.
The Z-end SNC end point identifier	M	The Z-end SNC end point identifier identifies the Z-end end point of the SNC, depending upon the mode of the SNC, the Z-end SNC end point identifier may represent: 1 one or a set of connection points or termination connection points; 2 one or a set of groups of connection points or termination connection points; 3 one or a set of sub-networks. The possible entities that the Z-end SNC end point identifier may represent for each combination of directionality and mode are listed in table 10. Z-end SNC end point identifiers are unique to the domain shared by the service provider and service user.
Directionality	M	The directionality of a SNC indicates whether transmission is uni-directional or bi-directional.
Mode	M	The mode of a SNC indicates the type of transmission, that is, point to point, point to multi-point, multi-cast, broadcast or conference (see table 3).
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service users.
Transaction identifier	C	The transaction identifier is used to associate together a number of operations. The transaction identifier shall be supplied if the user may wish to use the 'abort set-up SNC' service. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.

(continued)

Table 9 (concluded): User request for the immediate setting-up of a SNC between two specified end-points

Management capability description	A service user may request the immediate setting-up of a SNC between two specified end-points	
The output data	**M/C**	**Description**
Result code	M	The result code indicates the result of a request. In the case of failure the code indicates the cause. The result codes to be supported are defined below: - Access restriction; - Insufficient management resources; - Service could not be provided; - End point identifiers Parameter value error; - Directionality Parameter value error; - Mode Parameter value error; - User identifier Parameter value error; - Transaction identifier Parameter value error; - No route between the specified end-point identifiers can be found; - Some of the connection points identified directly were not free, or there were insufficient free connection points identified indirectly.
SNC identifier	C	A SNC identifier is returned when a SNC has been successfully set-up and may be used by a service user to identify a particular SNC. The SNC identifier is not returned when the SNC has not been successfully set-up or reserved. SNC identifiers are unique to the domain shared by the service provider and service user.
Connection point identifiers	C	Connection point identifiers are sent with the SNC identifier in the case of a successful set-up. Connection point identifiers are unique to the domain shared by the service provider and service user.
Pre-conditions	1 2 3 4	The sub-network which contains the end-point identifiers exists. The end-point identifiers exist and can support the requested mode and directionality. A route (a free path) exists between the end-point identifiers The end point identifiers identify free connection points (either directly or indirectly).
Post conditions	1	A SNC has been physically established with the connectivity state set to In-service.

Table 10: The nature of the A-end and Z-end SNC end point identifier parameters

Mode	Uni-directional		Bi-directional	
Directionality	A-end SNC end point identifier	Z-end SNC end point identifier	A-end SNC end point identifier	Z-end SNC end point identifier
point to point	1 one connection point or termination connection point 2 one group of connection points or termination connection points 3 one sub-network	1 one connection point or termination connection point 2 one group of connection points or termination connection points 3 one sub-network	1 one connection point or termination connection point 2 one group of connection points or termination connection points 3 one sub-network	1 one connection point or termination connection point 2 one group of connection points or termination connection points 3 one sub-network
point to multi-point	1 one connection point or termination connection point 2 one group of connection points or termination connection points 3 one sub-network	1 a set of connection points or termination connection points 2 a set of groups of connection points or termination connection points 3 a set of sub-networks	1 one connection point or termination connection point 2 one group of connection points or termination connection points 3 one sub-network	1 a set of connection points or termination connection points 2 a set of groups of connection points or termination connection points 3 a set of sub-networks
multicast	1 a set of connection points or termination connection points 2 a set of groups of connection points or termination connection points 3 a set of sub-networks	1 a set of connection points or termination connection points 2 a set of groups of connection points or termination connection points 3 a set of sub-networks	1 a set of connection points or termination connection points 2 a set of groups of connection points or termination connection points 3 a set of sub-networks	1 a set of connection points or termination connection points 2 a set of groups of connection points or termination connection points 3 a set of sub-networks
conference	Not valid		1 a set of connection points or termination connection points 2 a set of groups of connection points or termination connection points 3 a set of sub-networks	There are no Z-end SNC end point identifiers
broadcast	1 one connection point or termination connection point 2 one group of connection points or termination connection points 3 one sub-network	There are no known Z-end SNC end point identifiers	Not valid	Not valid

4.4.2.2 Release a non-scheduled SNC

This management capability allows a service user to request the immediate release of a SNC and is described by the following:

Table 11: User request for the immediate release of a SNC

Management capability description	A service user may request the immediate release of a SNC	
Functional requirements	**1**	**A service user will have the ability to request the release of a SNC.**
The input data	**M/C**	**Description**
SNC identifier	M	The SNC identifier is used by a service user to identify a particular SNC. SNC identifiers are unique to the domain shared by the service provider and service user.
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service users.
Transaction identifier	C	The transaction identifier is used to associate together a number of operations. The transaction identifier shall be supplied if the user may wish to use the 'abort release SNC' service. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
The output data	**M/C**	**Description**
Result code	M	The result code indicates the result of a request. In the case of failure the code indicates the cause. The result codes to be supported are defined below: - The SNC has been released; - Access restriction - the service user does not have the authority to request release of the identified SNC; - Insufficient management resources; - Service could not be provided; - SNC identifier parameter value error; - User identifier parameter value error; - Transaction identifier parameter value error. (N.B. failure to meet the pre-conditions is covered by the parameter value errors above)
Pre-conditions	1	The identified SNC exists
Post conditions	1	The identified SNC has been released (no longer exists)

4.4.2.3 Abort set-up a non-scheduled SNC

This management capability allows a service user to request the aborting of a set-up SNC request prior to having received the result of the request and is described by the following:

Table 12: User request for the immediate aborting of a set-up SNC request prior to having received the result of the request

Management capability description	A service user may request the immediate aborting of a set-up SNC request prior to having received the result of the request	
Functional requirements	1	A service user will have the ability to request the aborting of a SNC set-up request prior to having received the result of the request from the service provider.
The input data	**M/C**	**Description**
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service user. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
Transaction identifier	M	The transaction identifier is used to identify the request to be aborted. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
The output data	**M/C**	**Description**
Result code	M	The result code indicates the success or failure of a request. In the case of failure the code indicates the reason for the failure. The result codes to be supported are defined below: - The set-up request has been aborted (prior to the SNC having been set-up); - The SNC had already been set-up but has now been released; - Access restriction - the service user does not have the authority to request that the set-up be aborted; - Insufficient management resources; - Service could not be provided (the set-up request is still being processed); - Service could not be provided(the SNC has been set-up); - User identifier parameter value error; - Transaction identifier parameter value error. (N.B. failure to meet the pre-conditions is covered by the parameter value errors above)
Pre-conditions	1	The service provider is processing a SNC set-up request which has the same combination of user identifier and transaction identifier as the abort request.
Post conditions	1	The set-up SNC request has been aborted.

4.4.2.4 Abort release a non-scheduled SNC

This management capability allows a service user to request the aborting of a release SNC request prior to having received the result of the request and is described by the following:

Table 13: User request for the immediate aborting of a release SNC request prior to having received the result of the request

Management capability description	A service user may request the immediate aborting of a release SNC request prior to having received the result of the request	
Functional requirements	1	A service user will have the ability to request the aborting of a release SNC request prior to the having received a result of the request from the service provider.
The input data	**M/C**	**Description**
User identifier	M	A user identifier uniquely defines the service user / source of a request. User identifiers are unique to the domain shared by the service provider and service user. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
Transaction identifier	M	The transaction identifier is used to identify the request to be aborted. The combination of user identifier and transaction identifier is unique to the domain shared by the service provider and service user.
The output data	**M/C**	**Description**
Result code	M	The result code indicates the success or failure of a request. In the case of failure the code indicates the reason for the failure. The result codes to be supported are defined below: - The release request has been aborted (prior to the SNC being released); - Access restriction - the service user does not have the authority to request that the release be aborted; - Insufficient management resources; - Service could not be provided (the release request is still being processed); - Service could not be provided (the SNC has been released); - User identifier parameter value error; - Transaction identifier parameter value error. (N.B. failure to meet the pre-conditions is covered by the parameter value errors above)
Pre-conditions	1	The service provider is processing a release SNC request which has the same combination of user identifier and transaction identifier as the abort request.
Post conditions	1	The release SNC request has been aborted.

5 Management information model

The information model focuses on the real world under study. It contains information about both the elements of the model and their interrelationships. The elements of management information are defined using GDMO templates and their interrelationships are graphically illustrated.

5.1 General introduction

The aspects of the real world addressed by this ensemble are described in subclause 4.3. These resources will be represented where possible using I-ETS 300 653 [2]. Additional managed object definitions are given in annex B. The specific resources and the object classes used to represent them are summarized in table 14 below:

Table 14: Resource to managed object class mapping

Resource	Object class
access group	Access Group
access point	NWTTP
adaptation function	NWTTP, NWCTP
characteristic information	Signal Id (attribute)
connection point	NWCTP
group of connection points	Topological Point
layer network	Layer Network Domain
matrix	Sub-network
sub-network	Sub-network
Sub-Network Connection (SNC)	Sub-Network Connection
termination connection point	NWTTP
trail	Trail
Trail Termination Function (TTF)	NWTTP

In addition to object classes that represent resources, this ensemble makes use of object classes used only to name the resource objects, to perform certain actions and certain system support object classes:

- classes used only for naming:

  - system.

- classes used to perform actions:

  - instantiableBasicSDHTrailHandler;
  - instantiableBasicSDHConnectionPerformer.

- management support classes:

  - none in scope.

5.2 Relationships

This subclause defines the relationships between the components of the model. These may be expressed in Entity Relationship (ER) diagrams or other similar graphical representations.

Three types of diagrams are used:

- one for the relationships inherent in the underlying resources;

- one for the relationships among the classes representing these resources;

- and one for the naming schema.

5.2.1 Entity relationship diagrams

The following ER diagram represents the relationships among the resources described in subclause 4.3 and summarized in table 14.
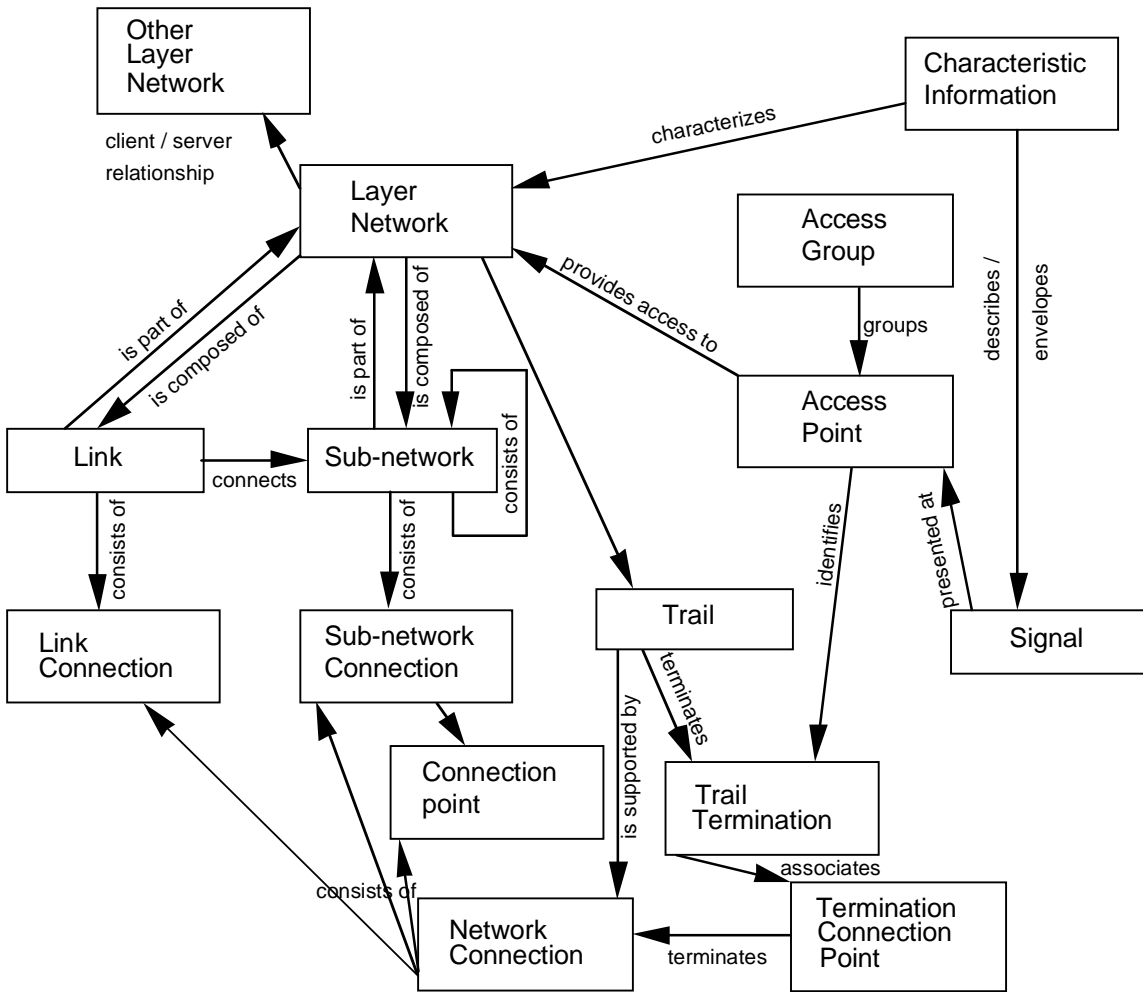
Figure 12: Managed resources ER diagram

The resources and their relationships shown in figure 12 are represented by the managed objects and the relationships among them shown in figure 13. This diagram shows all the possible relationships. Not all of these relationships are used by this ensemble. See the GOM model in I-ETS 300 653 [2] for a comprehensive description of the mapping of resources to the managed objects and of the representation of relationships in the model.
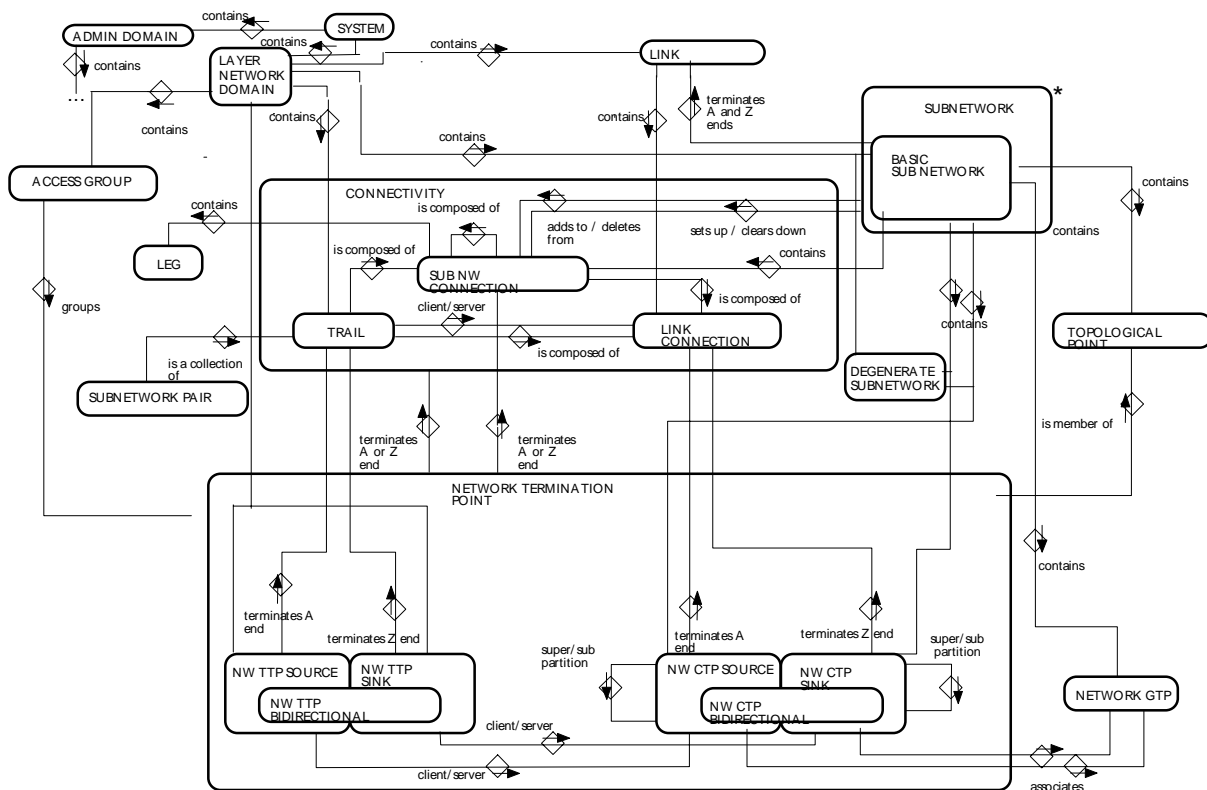
Relationships Diagram
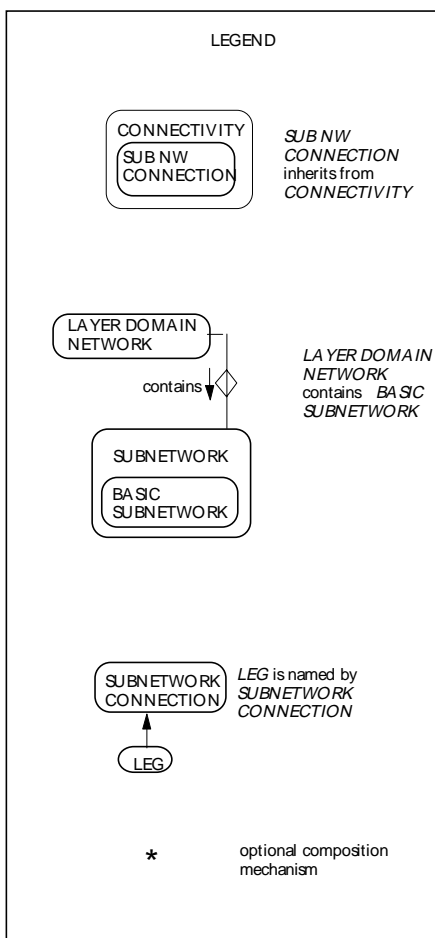
Figure 13: Managed object entity relationships

5.2.2 Object naming

The naming schema shown in figure 14 shows the name bindings used in this ensemble. This is based on 'example schema 1' from the GOM model in I-ETS 300 653 [2].
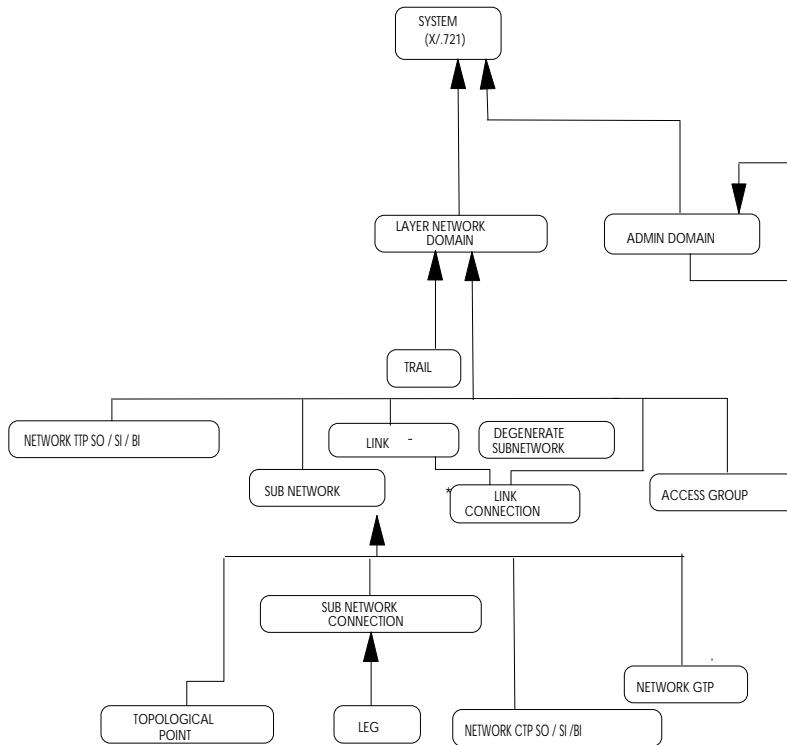
Figure 14: Naming diagram

NOTE 1: In the NE view, the naming relationship is used to define the client-server relationship between two ITU-T Recommendation G.803 [1] layers. This method is most suited to describing a tightly coupled multiplexing hierarchy, but does not allow an OS to manage a layer network independently of other layer networks. In the latter case it is better to describe the client-server interaction using a relationship, (i.e. using a pointer or a relationship object).

NOTE 2: The ITU-T Recommendation X.721 [6] 'System' class is used at the top of the naming tree which represents the MIB for a Service Provider OSF. Event Forwarding Discriminators, Logs, etc. may be named from system as in the ITU X.700 series of Recommendations.

5.3 Scenarios

In this subclause, the management capabilities described in subclause 4.4 are mapped to the information model.

Mapping is performed at the service level. The components of each management capability template are mapped to the information model:

−   the resources concerned are mapped to the Managed Object (MO) classes (including any required new classes) in the ensemble, in terms of the pre- and post- conditions;

−   the input/output data is mapped to MO attributes, action information syntax and the Common Management Information Service Element (CMISE) error parameter (i.e. to CMISE service parameters);

−   the functional requirements are mapped to CMISE services.

Table 15 describes the form of the mapping. For each management capability template, several mappings to the information model may be required, e.g. if there are several functional requirements relating to one management capability.

Table 15: Service level mappings

Management capability template component	Requirement (service) description	Implementation (information fragment) description
Functional requirements	Messages	Normally described in terms of a single CMISE service and the resulting actions performed by the agent
Input data	Message parameters	CMISE service parameters
Output data	Message parameters	CMISE service parameters
Output data - Potential fault cases	Informal description according the management capability template output data result codes	Specific value of a CMISE service parameter or the CMISE error parameter

Pre-conditions	The status of ITU-T Recommendation G.803 [1] entities as perceived by the agent prior to the invocation of the service	The status of the information fragment prior to the first CMISE Service Request (Req) being sent by the manager is described in terms of:
		- Pre-existing object instances;
		- Object instances' attribute values, in particular:
		  - state attribute values;
		  - pointer attribute values;

Post-conditions	The status of ITU-T Recommendation G.803 [1] entities as perceived by the agent at the completion of the service	The status of the information fragment after the final CMISE Service Response (Rsp) has been received by the manager is described in terms of: - Object status (which instances exist); - Attribute values (in particular state attribute and pointer values) within object instances.
NOTE: The term 'action' (lower-case) is used in its normal sense (feat or deed). Whether input and output data items are mandatory or conditional is stated in subclause 4.4.		

5.3.1 Basic trail configuration

5.3.1.1 Set-up a non-scheduled trail

Table 16: User request for the immediate setting-up of a trail between two specified end-points

Management capability description	A service user may request the immediate setting-up of a trail between two specified end-points	
	Requirement (service) description	**Implementation (information fragment) description**
Functional requirements	1 A service user will have the ability to request the immediate setting-up of a trail between existing identifiable end points.	M-ACTION setupTrail on the instantiableBasicSDHTrailHandler, named by the layerNetworkDomain with the required signal id
The input data	The A-end trail end point identifier	trailEndPoints parameter within the SetupTrailInformation
	The Z-end rail end point identifier	trailEndPoints parameter within the SetupTrailInformation
	Directionality	trailEndPoints parameter within the SetupTrailInformation
	Mode	trailEndPoints parameter within the SetupTrailInformation
	User identifier	userId parameter within the SetupTrailInformation
	Transaction identifier	transactionId parameter within the SetupTrailInformation
The output data	Result code	setupTrailResultCode within the SetupTrailResult
	Trail identifier	trailId within the SetupTrailResult
	Access point identifiers	aends and zends within the SetupTrailResult
	Payload configuration	payloadConfig within the SetupTrailResult

(continued)

Table 16 (concluded): User request for the immediate setting-up of a trail between two specified end-points

Management capability description	A service user may request the immediate setting-up of a trail between two specified end-points		
The output data - Potential fault cases	-	Access restriction;	Access restriction
	-	Insufficient management resources;	Insufficient management resources
	-	Service could not be provided;	
	-	End point identifiers Parameter value error;	Action could not be performed
			End point identifiers Parameter value error
	-	Directionality Parameter value error;	
	-	Mode Parameter value error;	Directionality Parameter value error
	-	User identifier Parameter value error;	
			Mode Parameter value error
	-	Transaction identifier Parameter value error;	User identifier Parameter value error
	-	No route between the specified end-point identifiers can be found;	Transaction identifier Parameter value error
	-	Some of the access points identified directly were not free, or there were insufficient free access points identified indirectly.	Free route not found
			Termination points not free
Pre-conditions	1	The layer network which contains the end-point identifiers exist	A layerNetworkDomain object instance with the required value of signal id exists.
	2	The end-point identifiers exist and can support the requested mode and directionality	There are NW TTPs or NW GTPs, identified by the SetupTrailInformation, which are named by the layerNetworkDomain object instance, which can support the requested mode and directionality The subNetworkConnectionPointer attribute of the NW TTPs or NW GTPs points to a subNetwork or is NULL. The connectivityPointer attribute of the NW TTPs is null.
	3	A route (a free path) exists between the end-point identifiers	-
	4	The end point identifiers identify free access points (either directly or indirectly)	The status condition of the NW TTPs is 'In service, not allocated'
Post-conditions	1	A trail has been physically established with the connectivity state set to In-service	A new trail object instance has been created with the status condition 'In service with no spare capacity', named by the layer network domain object. The Trail object points to the NWTTPs or NWGTPs involved in the Trail. The connectivityPointer in the NWTTPs points to the Trail object. The status condition of the NWTTPs will also be 'In service with no spare capacity'. Note that in this application the 'with no spare capacity' part of the status condition reflects the fact that the object (the trail) to which the status condition applies is in use, not that any link connections which it supports are in use. Whether these are in use or not is reflected by their own status conditions.

5.3.1.2 Release a non-scheduled trail

Table 17: User request for the immediate release of a trail

Management capability description	A service user may request the immediate release of a trail	
	Requirement (service) description	**Implementation (information fragment) description**
Functional requirements	1 A service user will have the ability to request the release of a trail.	M-ACTION releaseTrail on the instantiableBasicSDHTrailHandler, named by the layerNetworkDomain which names the trail to be released
The input data	Trail identifier	trailId parameter within the ReleaseTrailInformation
	User identifier	userId parameter within the ReleaseTrailInformation
	Transaction identifier	transactionId parameter within the ReleaseTrailInformation
The output data	Result code	ReleaseTrailResult
The output data - Potential fault cases	- Access restriction; - Insufficient management resources; - Service could not be provided; - Trail identifier parameter value error; - User identifier parameter value error; - Transaction identifier parameter value error.	Access restriction Insufficient management resources Action could not be performed Trail identifier parameter value error User identifier Parameter value error Transaction identifier Parameter value error
Pre-conditions	1 The identified trail exists	A trail with the trail id given in the ReleaseTrailInformation exists, named by the layerNetworkDomain which names the instantiableBasicSDHTrailHandler
Post-conditions	1 The identified trail has been released (no longer exists)	The trail object has been deleted. . Any link connections pointed to by the clientConnectionList and any SNCs pointed to by the layer connection list package will also be released by this action. The connectivityPointer in the disconnected network trail termination points will be set to NULL as a result of this action. The status conditions of the termination points of the deleted objects are set appropriately, e.g. to 'In service, not allocated'

5.3.1.3 Abort set-up a non-scheduled trail

Table 18: User request for the immediate aborting of a set-up trail request prior to having received the result of the request

Management capability description	A service user may request the immediate aborting of a set-up trail request prior to having received the result of the request	
	Requirement (service) description	**Implementation (information fragment) description**
Functional requirements	1 A service user will have the ability to request the aborting of a trail set-up request prior to having received the result of the request from the service provider.	M-ACTION abortSetupTrail on the instantiableBasicSDHTrailHandler, to which the setupTrail action was sent
The input data	User identifier	userId parameter within the AbortSetupTrailInformation
	Transaction identifier	transactionId parameter within the AbortSetupTrailInformation
The output data	Result code	AbortSetupTrailResult
The output data - Potential fault cases	- The trail had already been set-up but has now been released; - Access restriction; - Insufficient management resources; - Service could not be provided (the set-up request is still being processed); - Service could not be provided (the trail has been set-up); - User identifier parameter value error; - Transaction identifier parameter value error.	The trail had already been set-up but has now been released Access restriction Insufficient management resources Action could not be performed (the set-up request is still being processed) Action could not be performed (the trail has been set-up) User identifier Parameter value error Transaction identifier Parameter value error
Pre-conditions	1 The service provider is processing a trail set-up request which has the same combination of user identifier and transaction identifier as the abort request.	-
Post-conditions	1 The set-up trail request has been aborted.	The effect of the original setupTrail action has been negated

5.3.1.4   Abort release a non-scheduled trail

Table 19: User request for the immediate aborting of a release trail request prior to having received the result of the request

Management capability description	A service user may request the immediate aborting of a release trail request prior to having received the result of the request	
	Requirement (service) description	Implementation (information fragment) description
Functional requirements	1 A service user will have the ability to request the aborting of a release trail request prior to the having received a result of the request from the service provider.	M-ACTION abortReleaseTrail on the instantiableBasicSDHTrailHandler, to which the releaseTrail action was sent
The input data	User identifier	userId parameter within the AbortReleaseTrailInformation
	Transaction identifier	transactionId parameter within the AbortReleaseTrailInformation
The output data	Result code	AbortReleaseTrailResult
The output data - Potential fault cases	- Access restriction; - Insufficient management resources; - Service could not be provided (the release request is still being processed); - Service could not be provided (the trail has been released); - User identifier parameter value error; - Transaction identifier parameter value error.	Access restriction Insufficient management resources Action could not be performed (the release request is still being processed) Action could not be performed (the trail has been released) User identifier Parameter value error Transaction identifier Parameter value error
Pre-conditions	1 The service provider is processing a release trail request which has the same combination of user identifier and transaction identifier as the abort request.	-
Post-conditions	1 The release trail request has been aborted.	The potential effects of the original releaseTrail action have been negated

5.3.2 Basic SNC configuration

5.3.2.1 Set-up a non-scheduled SNC

Table 20: User request for the immediate setting-up of a SNC between two specified end-points

Management capability description	A service user may request the immediate setting-up of a SNC between two specified end-points	
	Requirement (service) description	**Implementation (information fragment) description**
Functional requirements	1 A service user will have the ability to request the immediate setting-up of a SNC between existing identifiable end points.	M-ACTION setupSubNetworkConnection on the instantiableBasicSDHConnectionPerformer, named by the subNetwork with the required signal id
The input data	The A-end SNC end point identifier	sncEndPoints parameter within the SetupSubNetworkConnectionInformation
	The Z-end SNC end point identifier	sncEndPoints parameter within the SetupSubNetworkConnectionInformation
	Directionality	sncEndPoints parameter within the SetupSubNetworkConnectionInformation
	Mode	sncEndPoints parameter within the SetupSubNetworkConnectionInformation
	User identifier	userId parameter within the SetupSubNetworkConnectionInformation
	Transaction identifier	transactionId parameter within the SetupSubNetworkConnectionInformation
The output data	Result code	setupSubNetworkConnectionResultCode parameter within the SetupSubNetworkConnectionResult
	SNC identifier	subNetworkConnectionId parameter within the SetupSubNetworkConnectionResult
	Connection point identifiers	aends and zends parameter within the SetupSubNetworkConnectionResult

(continued)

Table 20 (concluded): User request for the immediate setting-up of a SNC between two specified end-points

Management capability description	A service user may request the immediate setting-up of a SNC between two specified end-points	
The output data - Potential fault cases	- Access restriction; - Insufficient management resources; - Service could not be provided; - End point identifiers Parameter value error; - Directionality Parameter value error; - Mode Parameter value error; - User identifier Parameter value error; - Transaction identifier Parameter value error; - No route between the specified end-point identifiers can be found; - Some of the connection points identified directly were not free, or there were insufficient free connection points identified indirectly.	Access restriction Insufficient management resources Action could not be performed End point identifiers Parameter value error Directionality Parameter value error Mode Parameter value error User identifier Parameter value error Transaction identifier Parameter value error Free route not found Termination points not free
Pre-conditions	1 The sub-network which contains the end-point identifiers exists	A subNetwork object instance with the required value of signal id exists.
	2 The end-point identifiers exist and can support the requested mode and directionality	There are NW TPs or NW GTPs, identified by the SetupSubNetworkConnectionInformation, which are pointed at by the subNetwork object instance (using the containedNWCTPList and containedNWTTPList), which can support the requested mode and directionality The subNetworkConnectionPointer attribute of the NW TTPs, NW GTPs, or NWCTPs points to a subNetwork or is NULL. The connectivityPointer attribute of the NW TTPs is null.
	3 A route (a free path) exists between the end-point identifiers	-
	4 The end point identifiers identify free connection points (either directly or indirectly)	The status condition of the NWTTPs or NWCTPs is 'In service, not allocated'
Post-conditions	1 A SNC has been physically established with the connectivity state set to In-service	A new subNetworkConnection object instance has been created with the status condition 'In service with no spare capacity', named by the subNetwork object. The subNetworkConnection object points to the NWTTPs, NWCTPs or NWGTPs involved in the subNetworkConnection. The connectivityPointer in the NWTTPs points to the Trail object. The status condition of the NWTPs will also be 'In service with no spare capacity'.

5.3.2.2 Release a non-scheduled SNC

Table 21: User request for the immediate release of a SNC

Management capability description	A service user may request the immediate release of a SNC	
	Requirement (service) description	**Implementation (information fragment) description**
Functional requirements	1 A service user will have the ability to request the release of a SNC.	M-ACTION releaseSubNetworkConnection on the instantiableBasicSDHConnectionPerformer, named by the subNetwork which names the subNetworkConnection to be released
The input data	SNC identifier	subNetworkConnectionId parameter within the ReleaseSubNetworkConnectionInformation
	User identifier	userId parameter within the ReleaseSubNetworkConnectionInformation
	Transaction identifier	transactionId parameter within the ReleaseSubNetworkConnectionInformation
The output data	Result code	ReleaseSubNetworkConnectionResult
The output data - Potential fault cases	- Access restriction - the service user does not have the authority to request release of the identified SNC; - Insufficient management resources; - Service could not be provided; - SNC identifier parameter value error; - User identifier parameter value error; - Transaction identifier parameter value error.	Access restriction Insufficient management resources Action could not be performed SNC identifier parameter value error User identifier Parameter value error Transaction identifier Parameter value error
Pre-conditions	1 The identified SNC exists	A subNetworkConeection with the SNC id given in the ReleaseSubNetworkConnectionInformation exists, named by the subNetwork which names the instantiableBasicSDHConnectionPerformer
Post-conditions	1 The identified SNC has been released (no longer exists)	The subNetworkConnection object has been deleted. Any SNCs pointed to by the component connection list package will also be released by this action. The sncPointer in the disconnected network termination points will be set to NULL as a result of this action. The status conditions of the termination points of the deleted objects are set appropriately, e.g. to 'In service, not allocated'

5.3.2.3 Abort set-up a non-scheduled SNC

Table 22: User request for the immediate aborting of a set-up SNC request prior to having received the result of the request

Management capability description	A service user may request the immediate aborting of a set-up SNC request prior to having received the result of the request	
	Requirement (service) description	**Implementation (information fragment) description**
Functional requirements	1 A service user will have the ability to request the aborting of a SNC set-up request prior to having received the result of the request from the service provider.	M-ACTION abortSetupSubNetworkConnection on the instantiableBasicSDHConnectionPerformer, to which the setupSubNetworkConnection action was sent
The input data	User identifier	userId parameter within the AbortSetupSubNetworkConnectionInformation
	Transaction identifier	transactionId parameter within the AbortSetupSubNetworkConnectionInformation
The output data	Result code	AbortSetupSubNetworkConnectionResult
The output data - Potential fault cases	- The SNC had already been set-up but has now been released;	The SNC had already been set-up but has now been released
	- Access restriction - the service user does not have the authority to request that the set-up be aborted;	Access restriction
	- Insufficient management resources;	Insufficient management resources
	- Service could not be provided (the set-up request is still being processed);	Action could not be performed (the set-up request is still being processed)
	- Service could not be provided(the SNC has been set-up);	Action could not be performed (the SNC has been set-up)
	- User identifier parameter value error;	User identifier Parameter value error
	- Transaction identifier parameter value error.	Transaction identifier Parameter value error
Pre-conditions	1 The service provider is processing a SNC set-up request which has the same combination of user identifier and transaction identifier as the abort request.	-
Post-conditions	1 The set-up SNC request has been aborted.	The effect of the original setupSubNetworkConnection action has been negated

5.3.2.4 Abort release a non-scheduled SNC

Table 23: User request for the immediate aborting of a release SNC request prior to having received the result of the request

Management capability description	A service user may request the immediate aborting of a release SNC request prior to having received the result of the request	
	Requirement (service) description	Implementation (information fragment) description
Functional requirements	1 A service user will have the ability to request the aborting of a release SNC request prior to the having received a result of the request from the service provider.	M-ACTION abortReleaseSubNetworkConnection on the instantiableBasicSDHConnectionPerformer, to which the releaseSubNetworkConnection action was sent
The input data	User identifier	userId parameter within the AbortReleaseSubNetworkConnectionInformation
	Transaction identifier	transactionId parameter within the AbortReleaseSubNetworkConnectionInformation
The output data	Result code	AbortReleaseSubNetworkConnectionResult
The output data - Potential fault cases	- Access restriction - the service user does not have the authority to request that the release be aborted; - Insufficient management resources; - Service could not be provided (the release request is still being processed); - Service could not be provided (the SNC has been released); - User identifier parameter value error; - Transaction identifier parameter value error.	Access restriction Insufficient management resources Action could not be performed (the release request is still being processed) Action could not be performed (the trail has been released) User identifier Parameter value error Transaction identifier Parameter value error
Pre-conditions	1 The service provider is processing a release SNC request which has the same combination of user identifier and transaction identifier as the abort request.	-
Post-conditions	1 The release SNC request has been aborted.	The potential effects of the original releaseSubNetworkConnection action have been negated

5.4 Management information references

This subclause references all the definitions of management information relevant to the ensemble.

This subclause contains only references to definitions that are relevant to the ensemble. Thus, this subclause also contains statements about any additional restrictions or constraints to those definitions.

Object classes from the following information models, are included in this ensemble:

- ITU-T Recommendation X.721 [6]: Definition of Management Information;

- I-ETS 300 653 [2]: Managed Object Class Definitions for the Network Level Viewpoint:

    - "I-ETS300653":accessGroup;
    - "I-ETS300653":layerNetworkDomain;
    - "I-ETS300653":networkCTPBidirectional;
    - "I-ETS300653":networkCTPSink;
    - "I-ETS300653":networkCTPSource;
    - "I-ETS300653":networkGTP;
    - "I-ETS300653":networkTTPBidirectional;
    - "I-ETS300653":networkTTPSink;
    - "I-ETS300653":networkTTPSource;
    - "I-ETS300653":subNetwork;
    - "I-ETS300653":subNetworkConnection;
    - "I-ETS300653":topologicalPoint;
    - "I-ETS300653":trail;

- Managed Object Class definitions given in annex B of this ETS;

    - "I-ETS300810":instantiableBasicSDHTrailHandler;
    - "I-ETS300810":instantiableBasicSDHConnectionPerformer.

6 Ensemble conformance requirements

6.1 General conformance requirements

The general conformance requirements for OMNIPoint 1 are specified in the "OMNI*Point* 1 Conformance Requirements" [8] document. All the conformance requirements identified in this part of the document are based on the "OMNI*Point* 1 Conformance Requirements" [8] and the "The 'Ensemble' Concept and Format" [7] specifications.

Clause 6 references a set of existing AOM2n OSI Management Function ISPs, or specifies ensemble conformance requirements for management functions in a tabular format similar to the one used in these profiles.

It may also include other Implementation Conformance Statements (ICS) proformas for components of the ensemble other than system management functions. These ICS proformas will also be specified in a tabular format. The supplier of an implementation that claims conformance to this ensemble shall complete these tables, indicating which options and capabilities have been implemented.

It is the proformas that identify which role (manager or agent) the implementation supporting this ensemble adopts.

The capabilities of the underlying object classes, ISP functions and communications protocols that are not explicitly required for this ensemble definition are left "beyond the scope" of conformance to this ensemble.

6.2 Specific conformance requirements

This subclause presents specific conformance requirements for this ensemble. The relationship of ensemble conformance to OSI management function ISP conformance is discussed, and ensemble function support requirements are presented. The detailed managed object conformance statements are provided in annex A.

6.2.1 OSI management functions profiles conformance

This ensemble defers to ISPs for AOM211 and AOM221; see ISO/IES DISP 12060-1 [9] for general management capabilities (AOM211), and ISO/IEC DISP 12060-4 [12] for general event report management capabilities (AOM221). Although these ISPs specify functions over and above those strictly required to support the management capabilities provided by this ensemble, it is felt that requiring their support will enhance the general intra-operability of management systems. As a result, AOM211 and AOM221 are required. However, the topic of ensemble conformance is new, further study of the topic is proceeding, and it is likely that over time ensemble specific profiles will be developed.

Table 24 list all the current ISPs and identifies which profiles are required to be supported when the implementation adopts a manager or an agent role.

The following notation convention has been used:

m   defines a mandatory requirement;
i   stands for out of scope.

Table 24: basic trail and SNC configuration ensemble functional ISP conformance requirements

ISPs supported	Manager role	Agent role
AOM211 [9], General Management Capabilities	m	m
AOM212 [10], Alarm Reporting & State Management Capabilities	i	i
AOM213 [11], Alarm Reporting Capabilities	i	i
AOM221 [12], General Event Report Management	m	m
AOM231 [13], General Log Control Profile	i	i

6.2.2 Ensemble management capabilities conformance

Table 25 lists all the ensemble management capabilities, and identifies which are mandatory, optional or conditional in the manager or agent roles.

The following notation convention has been used:

m   defines a mandatory requirement;
o   defines an optional requirement;
c   defines a conditional requirement.

Table 25: basic trail and SNC configuration management ensemble management capability requirements

Management capability	Manager	Agent
Set-up a non-scheduled trail	m	m
Release a non-scheduled trail	m	m
Abort set-up a non-scheduled trail	o	m
Abort release a non-scheduled trail	o	m
Set-up a non-scheduled SNC	m	m
Release a non-scheduled SNC	m	m
Abort set-up a non-scheduled SNC	o	m
Abort release a non-scheduled SNC	o	m

Annex A (normative): Managed Object Conformance Statement (MOCS) proformas for I-ETS 300 810

The Managed Object Conformance Statement (MOCS) proformas that follow should be used by an implementation to identify which features and properties of each managed object class are supported. These tables have been prepared without regard to the manager or agent role, so they can be used in either situation. An implementation that supports both roles could either use one set of tables if all support details are the same, or a different set of tables for each role.

Tables are numbered consistently for all classes. To preserve this numbering scheme, table numbers are allocated even if a particular class does not contain any of the corresponding properties.

The 'implementation support' columns are to be filled in by an implementor.

Key:

c   conditional function or feature or parameter.

c1   defines that support for at least one of the items in the group is required.

i   out of scope for this ensemble.

                          This means for the corresponding element: implementations may use it outside the scope of this ensemble, conformance tests shall not be provided for it, implementations may conform to other ensembles where it is required, no requirements are placed on either transmitter or receiver to support it and receiver actions are unspecified when present.

m   mandatory function or feature or parameter.

n   the implementation does not support the feature.

nb1   if the class is used in the ensemble implementation, at least one of the name bindings designated nb1 shall be supported.

o   optional function or feature or parameter.

x   prohibited function or feature or parameter.

y   the implementation supports the feature.

-                         (dash) for not applicable function or feature or parameter.

A.0   Overview of all object classes

Table A.0 provides an overview of all the object classes in this ensemble.

Table A.0: Ensemble managed object conformance requirements

Item	Object class label	Base status		Profile status		Implementation support		Additional information
		Manager role	Agent role	Manager role	Agent role	Manager role	Agent role	
1	"ITU-T Recommendation X.721 | ISO/IEC 10165-2 : 1992": system	NA	NA	m	m			
2	"I-ETS300653": accessGroup	NA	NA	m	m			
3	"I-ETS300653": layerNetworkDomain	NA	NA	m	m			
4	"I-ETS300653": networkGTP	NA	NA	o	o			
5	"I-ETS300653": networkTTPBidirectional	NA	NA	m	m			
6	"I-ETS300653": networkTTPSink	NA	NA	m	m			
7	"I-ETS300653": networkTTPSource	NA	NA	m	m			
8	"I-ETS300653": subNetwork	NA	NA	m	m			
9	"I-ETS300653": trail	NA	NA	m	m			
10	"I-ETS300810": instantiableBasicSDHTrailHandler	NA	NA	m	m			
11	"I-ETS300653": networkCTPBidirectional	NA	NA	m	m			
12	"I-ETS300653": networkCTPSink	NA	NA	m	m			
13	"I-ETS300653": networkCTPSource	NA	NA	m	m			
14	"I-ETS300653": subNetworkConnection	NA	NA	m	m			
15	"I-ETS300653": topologicalPoint	NA	NA	m	m			
16	"I-ETS300810": instantiableBasicSDHConnectionPerformer	NA	NA	m	m			

A.1 ITU-T Recommendation X.721 system

Table A.1.1: System packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	administrativeStatePackage	an instance supports it	c	i		
2	supportedFeaturesPackage	an instance supports it	c	i		

Table A.1.2: System name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	-										

Table A.1.3: System attributes

Item	Attribute Label	Profile Status	Implementation support	Additional Information
1	systemId	m		
2	systemTitle	m		
3	operationalState	m		
4	usageState	m		

Table A.1.4: Actions

No actions are defined in system.

A.2 I-ETS 300 653 access group

Table A.2.1: accessGroup packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	linkPointerListPackage	topology is modelled using links	c	i		
2	topologicalGroupPointerPackage	topology is modelled using topological points	c	i		

Table A.2.2: accessGroup name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	accessGroup-adminDomain	adminDomain	m		m	m	m	m			

Table A.2.3: accessGroup attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	accessPointList	m		
2	accessGroupId	m		
3	signalid	m		

Table A.2.4: accessGroup actions

No actions are defined in access group.

A.3 I-ETS 300 653 layer network domain

Table A.3.1: layerNetworkDomain packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	signalidPackage	an instance supports it	c	m		
2	adminDomainIdPackage	an instance supports it	c	m		
3	systemTitlePackage	an instance supports it	c	i		
4	"Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		

Table A.3.2: layerNetworkDomain name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status		Profile status		Implementation support		Additional information
					Create	Delete	Create	Delete	Create	Delete	
1	adminDomain-system	"ITU-T Recommendation X.721 | ISO/IEC 10165-2 : 1992":system	m		m	m	m	m			

Table A.3.3: layerNetworkDomain attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	Non defined			

Table A.3.4: layerNetworkDomain actions

No actions are defined in layer network domain.

A.4   I-ETS 300 653 network GTP

Table A.4.1: networkGTP packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":objectManagementNotificationsPackage	-	m	m		
2	sncPointerPackage	-	m	m		
3	"Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		

Table A.4.2: networkGTP name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status		Profile status		Implementation support		Additional information
					Create	Delete	Create	Delete	Create	Delete	
1	networkGTP-subNetwork	subNetwork	m		-	-	-	-			The provisioning of NWGTPs is outside of the scope of this ensemble

Table A.4.3: networkGTP attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":gtpId	m		
2	signalid	m		
3	"Recommendation M.3100 : 1992":tpsInGtpList	m		

Table A.4.4: networkGTP actions

No actions are defined in network GTP.

A.5 I-ETS 300 653 network TTP bidirectional

Table A.5.1: networkTTPBidirectional packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":supportableClientListPackage	an instance supports it	c	i		
2	"Recommendation M.3100 : 1992":ttpInstancePackage	an instance supports it	c	m		
3	clientCTPListPackage	an instance supports it	c	i		
4	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	-	m	m		
5	connectivityPointerPackage	an instance supports it	c	m		
6	neAssignmentPackage	an instance supports it	c	i		
7	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
8	sncPointerPackage	a NWTP may be flexibly connected to another NWTP	c	c1 (on per instance basis)		
9	networkTPPointerPackage	when there is no flexibility between NWTPs	c	c1 (on per instance basis)		
10	Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	an instance supports it	c	i		
11	Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		
12	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
13	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
14	"Recommendation X.721 | ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		

(continued)

Table A.5.1 (concluded): networkTTPBidirectional packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
15	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
16	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed objectclass is composed using this state, as defined in Annex A	c	m		
17	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	an instance supports it	c	i		
18	supportedByPackage	an instance supports it	c	i		

Table A.5.2: networkTTPBidirectional name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	networkTTPSink-adminDomain	adminDomain	c1		m	m	m	m			
2	networkTTPSink-subNetwork	subNetwork	x		m	m	-	-			
3	networkTTPSource-adminDomain	adminDomain	c1		m	m	m	m			
4	networkTTPSource-subNetwork	subNetwork	x		m	m	-	-			

Table A.5.3: networkTTPBidirectional attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	mode	m		
2	signalid	m		

Table A.5.4: networkTTPBidirectional actions

No actions are defined in network TTP bidirectional.

A.6 I-ETS 300 653 network TTP sink

Table A.6.1: networkTTPSink packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":supportableClientListPackage	an instance supports it	c	i		
2	"Recommendation M.3100 : 1992":ttpInstancePackage	an instance supports it	c	m		
3	clientCTPListPackage	an instance supports it	c	i		
4	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	-	m	m		
5	connectivityPointerPackage	an instance supports it	c	m		
6	neAssignmentPackage	an instance supports it	c	i		
7	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
8	sncPointerPackage	a NWTP may be flexibly connected to another NWTP	c	c1 (on per instance basis)		
9	networkTPPointerPackage	when there is no flexibility between NWTPs	c	c1 (on per instance basis)		
10	Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	an instance supports it	c	i		
11	Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		
12	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
13	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
14	"Recommendation X.721	ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		

(continued)

Table A.6.1 (concluded): networkTTPSink packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
15	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
16	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed objectclass is composed using this state, as defined in Annex A	c	m		
17	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	an instance supports it	c	i		
18	supportedByPackage	an instance supports it	c	i		

Table A.6.2: networkTTPSink name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	networkTTPSink-adminDomain	adminDomain	m		m	m	m	m			
2	networkTTPSink-subNetwork	subNetwork	x		m	m	-	-			

Table A.6.3: networkTTPSink attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	mode	m		
2	signalid	m		

Table A.6.4: networkTTPSink actions

No actions are defined in network TTP sink.

A.7 I-ETS 300 653 network TTP source

Table A.7.1: networkTTPSource packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":supportableClientListPackage	an instance supports it	c	i		
2	"Recommendation M.3100 : 1992":ttpInstancePackage	an instance supports it	c	m		
3	clientCTPListPackage	an instance supports it	c	i		
4	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	-	m	m		
5	connectivityPointerPackage	an instance supports it	c	m		
6	neAssignmentPackage	an instance supports it	c	i		
7	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
8	sncPointerPackage	a NWTP may be flexibly connected to another NWTP	c	c1 (on per instance basis)		
9	networkTPPointerPackage	when there is no flexibility between NWTPs	c	c1 (on per instance basis)		
10	Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	an instance supports it	c	i		
11	Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		
12	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
13	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
14	"Recommendation X.721 | ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		

(continued)

Table A.7.1 (concluded): networkTTPSource packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
15	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
16	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed objectclass is composed using this state, as defined in Annex A	c	m		
17	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	an instance supports it	c	i		
18	supportedByPackage	an instance supports it	c	i		

Table A.7.2: networkTTPSource name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	networkTTPSource-adminDomain	adminDomain	m		m	m	m	m			
2	networkTTPSource-subNetwork	subNetwork	x		m	m	-	-			

Table A.7.3: networkTTPSource attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	mode	m		
2	signalid	m		

Table A.7.4: networkTTPSource actions

No actions are defined in network TTP source.

A.8   I-ETS 300 653 sub-network

Table A.8.1: subNetwork packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage,	-	m	m		
2	"Recommendation M.3100 : 1992": stateChangeNotificationPackage	an instance supports it	c	i		
3	"Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	an instance supports it	c	i		
4	signalidPackage	an instance supports it	c	i		
5	"Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		
6	subNetworkIdPackage	an instance supports it	c	m		
7	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
8	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
9	"Recommendation X.721 | ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
10	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
11	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
12	supportedByPackage	an instance supports it	c	i		
13	containedNWCTPListPackage	an instance supports it	c	m		
14	containedNWTTPListPackage	an instance supports it	c	m		
15	containedLinkListPackage	an instance supports it	c	i		

(continued)

Table A.8.1 (concluded): subNetwork packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
16	containedSubNetworkListPackage	an instance supports it	c	i		
17	linkPointerListPackage	a topological view using links, sub-networks, and access groups issupported	c	i		

Table A.8.2: subNetwork name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status		Profile status		Implementation support		Additional information
					Create	Delete	Create	Delete	Create	Delete	
1	subNetwork-adminDomain	adminDomain	m		m	m	m	m			

Table A.8.3: subNetwork attributes

No attributes are defined in subNetwork.

Table A.8.4: subNetwork actions

No attributes are defined in subNetwork.

A.9   I-ETS 300 653 trail

Table A.9.1: trail packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	layerConnectionListPackage	there is a requirement to view the sequence of subnetwork connections and link connections which make up the trail in the same layer	c	i		
2	clientConnectionListPackage	there is a requirement to view the link connection(s) in a higher layer which are supported by this trail	c	i		
3	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	the objectCreation and objectDeletion notifications defined in ITU-T Recommendation X.721 [6] are supported by an instance of this managed object class	c	i		
4	"Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	the attributeValueChange notification defined in ITU-T Recommendation X.721 [6] is supported by an instance of this managed object class	c	i		
5	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	the stateChange notification defined in ITU-T Recommendation X.721 [6] is supported by an instance of this managed object class	c	i		
6	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
7	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
8	"Recommendation X.721	ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
9	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		

(continued)

Table A.9.1 (concluded): trail packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
10	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
11	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
12	"Recommendation M.3100 : 1992":alarmSeverityAssignmentPointerPackage	the communicationsAlarmInformationPkg package is present AND the managed object supports configuration of alarm severities	c	i		
13	supportedByPackage	an instance supports it	c	i		
14	"Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	m		
15	qualityOfConnectivityServicePackage	an instance supports it	c	i		
16	zEndNWTPListPackage	an instance supports it	c	m		

Table A.9.2: trail name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	trail-adminDomain	adminDomain	m		-	-	-	-			

Table A.9.3: trail attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":trailId	m		
2	signalid	m		
3	mode	m		
4	aEndNWTPList	m		
5	"Recommendation M.3100 : 1992": directionality	m		

Table A.9.4: trail actions

No actions are defined in trail.

A.10   I-ETS 300 810 instantiable basic SDH trail handler

Table A.10.1: InstantiableBasicSDHTrailHandler packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	basicSDHTrailHandlerPackage	-	m	m		

Table A.10.2: instantiableBasicSDHTrailHandler name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status		Profile status		Implementation support		Additional information
					Create	Delete	Create	Delete	Create	Delete	
1	instantiableBasicSDHTrailHandler-layerNetworkDomain	layerNetworkDomain	m		m	m	m	m			

Table A.10.3: instantiableBasicSDHTrailHandler attributes

Item	Attribute label	Object identifier	Profile status	Implementation support	Additional information
1	basicSDHTrailHandlerId		m		

Table A.10.4: instantiableBasicSDHTrailHandler actions

No actions are defined directly (they are defined in the package definition).

A.11 I-ETS 300 653 network CTP bidirectional

Table A.11.1: networkCTPBidirectional packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":channelNumberPackage	an instance supports it	c	i		
2	"Recommendation M.3100 : 1992":ctpInstancePackage	an instance supports it	c	m		
3	networkCTPPackage	an instance supports it	c	x		
4	serverTTPPackage	an instance supports it	c	i		
5	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	-	m	m		
6	connectivityPointerPackage	an instance supports it	c	m		
7	neAssignmentPackage	an instance supports it	c	i		
8	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
9	sncPointerPackage	a NWTP may be flexibly connected to another NWTP	c	c1 (on per instance basis)		
10	networkTPPointerPackage	when there is no flexibility between NWTPs	c	c1 (on per instance basis)		
11	Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	an instance supports it	c	i		
12	Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		
13	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
14	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
15	"Recommendation X.721 | ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		

(continued)

Table A.11.1 (concluded): networkCTPBidirectional packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
16	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
17	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed objectclass is composed using this state, as defined in Annex A	c	m		
18	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	an instance supports it	c	i		
19	supportedByPackage	an instance supports it	c	i		

Table A.11.2: networkCTPBidirectional name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status		Profile status		Implementation support		Additional information
					Create	Delete	Create	Delete	Create	Delete	
1	networkCTPSink-adminDomain	adminDomain	x		m	m	-	-			
2	networkCTTPSink-subNetwork	subNetwork	c1		m	m	m	m			
3	networkCTPSink-networkTTPSink	networkTTPSink	x		m	m	-	-			
4	networkCTPSource-adminDomain	adminDomain	x		m	m	-	-			
5	networkCTPSource-subNetwork	subNetwork	c1		m	m	m	m			
6	networkCTPSource-networkTTPSource	networkTTPSource	x		m	m	-	-			

Table A.11.3: networkCTPBidirectional attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	mode	m		
2	signalid	m		

Table A.11.4: networkCTPBidirectional actions

No actions are defined in network CTP bidirectional.

A.12 I-ETS 300 653 network CTP sink

Table A.12.1: networkCTPSink packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":channelNumberPackage	an instance supports it	c	i		
2	"Recommendation M.3100 : 1992":ctpInstancePackage	an instance supports it	c	m		
3	networkCTPPackage	an instance supports it	c	x		
4	serverTTPPackage	an instance supports it	c	i		
5	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	-	m	m		
6	connectivityPointerPackage	an instance supports it	c	m		
7	neAssignmentPackage	an instance supports it	c	i		
8	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
9	sncPointerPackage	a NWTP may be flexibly connected to another NWTP	c	c1 (on per instance basis)		
10	networkTPPointerPackage	when there is no flexibility between NWTPs	c	c1 (on per instance basis)		
11	Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	an instance supports it	c	i		
12	Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		
13	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
14	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
15	"Recommendation X.721	ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		

(continued)

Table A.12.1 (concluded): networkCTPSink packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
16	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
17	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
18	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	an instance supports it	c	i		
19	supportedByPackage	an instance supports it	c	i		

Table A.12.2: networkCTPSink name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	networkCTPSink-adminDomain	adminDomain	x		m	m	-	-			
2	networkCTTPSink-subNetwork	subNetwork	c1		m	m	m	m			
3	networkCTPSink-networkTTPSink	networkTTPSink	x								

Table A.12.3: networkCTPSink attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	mode	m		
2	signalid	m		

Table A.12.4: networkCTPSink actions

No actions are defined in network TTP sink.

A.13 I-ETS 300 653 network CTP source

Table A.13.1: networkCTPSource packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":channelNumberPackage	an instance supports it	c	l		
2	"Recommendation M.3100 : 1992":ctpInstancePackage	an instance supports it	c	m		
3	networkCTPPackage	an instance supports it	c	x		
4	serverTTPPackage	an instance supports it	c	i		
5	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	-	m	m		
6	connectivityPointerPackage	an instance supports it	c	m		
7	neAssignmentPackage	an instance supports it	c	i		
8	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
9	sncPointerPackage	a NWTP may be flexibly connected to another NWTP	c	c1 (on per instance basis)		
10	networkTPPointerPackage	when there is no flexibility between NWTPs	c	c1 (on per instance basis)		
11	Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	an instance supports it	c	i		
12	Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		
13	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
14	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
15	"Recommendation X.721 | ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		

(continued)

Table A.13.1 (concluded): networkCTPSource packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
16	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
17	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed objectclass is composed using this state, as defined in Annex A	c	m		
18	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	an instance supports it	c	i		
19	supportedByPackage	an instance supports it	c	i		

Table A.13.2: networkCTPSource name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status		Profile status		Implementation support		Additional information
					Create	Delete	Create	Delete	Create	Delete	
1	networkCTPSource-adminDomain	adminDomain	x		m	m	-	-			
2	networkCTPSource-subNetwork	subNetwork	c1		m	m	m	m			
3	networkCTPSource-networkTTPSource	networkTTPSource	x		m	m	-	-			

Table A.13.3: networkCTPSource attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	mode	m		
2	signalid	m		

Table A.13.4: networkCTPSource actions

No actions are defined in network CTP source.

A.14   I-ETS 300 653 SNC

Table A.14.1: subNetworkConnection packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	compositePointerPackage	an instance supports it.	c	i		
2	componentPointerPackage	PRESENT IF "an instance supports it	c	i		
3	durationSchedulingPackage	The sub network connection is to be immediately set up	c	i		
4	dailyBasisSchedulingPackage	The sub network connection is to be scheduled on a daily basis	c	i		
5	weeklyBasisSchedulingPackage	The sub network connection is to be scheduled on a weekly basis	c	i		
6	monthlyBasisSchedulingPackage	The sub network connection is to be scheduled on a monthly basis	c	i		
7	occasionalSchedulingPackage	The sub network connection is to be occasionally scheduled	c	i		
8	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	the objectCreation and objectDeletion notifications defined in ITU-T Recommendation X.721 [6] are supported by an instance of this managed object class	c	i		
9	"Recommendation M.3100 : 1992":attributeValueChangeNotificationPackage	the attributeValueChange notification defined in ITU-T Recommendation X.721 [6] is supported by an instance of this managed object class	c	i		
10	"Recommendation M.3100 : 1992":stateChangeNotificationPackage	the stateChange notification defined in ITU-T Recommendation X.721 [6] is supported by an instance of this managed object class	c	i		
11	administrativeStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
12	assignmentStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		

(continued)

Table A.14.1 (concluded): subNetworkConnection packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
13	"Recommendation X.721 | ISO/IEC 10165-2 : 1992":availabilityStatusPackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
14	lifecycleStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	i		
15	"Recommendation M.3100 : 1992":operationalStatePackage	The Status Condition described in the behaviour of this managed object class is composed using this state, as defined in Annex A	c	m		
16	"Recommendation M.3100 : 1992":tmnCommunicationsAlarmInformationPackage	the communicationsAlarm notification (as defined in ITU-T Recommendation X.721 [6]) is supported by this managed object	c	i		
17	"Recommendation M.3100 : 1992":alarmSeverityAssignmentPointerPackage	the communicationsAlarmInformationPkg package is present AND the managed object supports configuration of alarm severities	c	i		
18	supportedByPackage	an instance supports it	c	i		
19	"Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	m		
20	qualityOfConnectivityServicePackage	an instance supports it	c	i		
21	zEndNWTPListPackage	an instance supports it	c	m		

Table A.14.2: subNetworkConnection name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status		Profile status		Implementation support		Additional information
					Create	Delete	Create	Delete	Create	Delete	
1	subNetworkConnection-subNetwork	subNetwork	m		-	-	-	-			

Table A.14.3: subNetworkConnection attributes

Item	Attribute Label	Profile Status	Implementation support	Additional Information
1	subNetworkConnectionId	m		
2	signalid	m		
3	mode	m		
4	aEndNWTPList	m		
5	"Recommendation M.3100 : 1992": directionality	m		

Table A.14.4: subNetworkConnection actions

No actions are defined in sub-network connection.

A.15   I-ETS 300 653 topological point

Table A.15.1: topologicalPoint packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	"Recommendation M.3100 : 1992":createDeleteNotificationsPackage	-	m	m		
2	topologicalGroupPointerPackage,	-	m	m		
3	"Recommendation M.3100 : 1992":userLabelPackage	an instance supports it	c	i		

Table A.15.2: topologicalPoint name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	topologicalPoint-subNetwork	subNetwork	m		-	-	-	-			

Table A.15.3: topologicalPoint attributes

Item	Attribute label	Profile status	Implementation support	Additional information
1	signalid	m		
2	nWCTPsInTopologicalPointList	m		
3	totalNWCTPCount	m		
4	connectedNWCTPCount	m		
5	idleNWCTPCount	m		
6	idleNWCTPCount	m		

Table A.15.4: topologicalPoint actions

No actions are defined in topological point.

A.16 I-ETS 300 810 instantiable basic SDH connection performer

Table A.16.1: instantiableBasicSDHConnectionPerformer packages

Item	Package label	Condition	Base status	Profile status	Implementation support	Additional information
1	basicSDHConnectionPerformerPackage	-	m	m		

Table A.16.2: instantiableBasicSDHConnectionPerformer name bindings

Item	Name binding label	Superior class	Profile status	Implementation support	Base status Create	Base status Delete	Profile status Create	Profile status Delete	Implementation support Create	Implementation support Delete	Additional information
1	instantiableBasicSDHConnectionPerformer-subNetwork	subNetwork	m		m	m	m	m			

Table A.16.3: instantiableBasicSDHConnectionPerformer attributes

Item	Attribute Label	Object Identifier	Profile Status	Implementation support	Additional Information
1	basicSDHConnectionPerformerId		m		

Table A.16.4: instantiableBasicSDHConnectionPerformer actions

No actions are defined directly (they are defined in the package definition).

Annex B (normative): Additional managed object definitions

B.1 Managed object class definitions

B.1.1 Instantiable Basic SDH Trail Handler

```
instantiableBasicSDHTrailHandler MANAGED OBJECT CLASS
    DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY basicSDHTrailHandlerPackage,
        instantiableBasicSDHTrailHandlerPackage PACKAGE
            BEHAVIOUR
        instantiableBasicSDHTrailHandlerBehaviour BEHAVIOUR
            DEFINED AS "This object is used in the composition of the management capabilities
of an SDH layer network domain";;
        ATTRIBUTES
            basicSDHTrailHandlerId                                GET;;;
REGISTERED AS {iets300810MObjectClass X};
```

B.1.2 Instantiable Basic SDH Connection Performer

```
instantiableBasicSDHConnectionPerformer MANAGED OBJECT CLASS
    DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY basicSDHConnectionPerformerPackage,
        instantiableBasicSDHConnectionPerformerPackage PACKAGE
            BEHAVIOUR
        instantiableBasicSDHConnectionPerformerBehaviour BEHAVIOUR
            DEFINED AS "This object is used in the composition of the management capabilities
of an SDH sub-network";;
        ATTRIBUTES
            basicSDHConnectionPerformerId                         GET;;;
REGISTERED AS {iets300810MObjectClass X};
```

B.2 Package definitions

B.2.1 Basic SDH Trail Handler Package

> NOTE: Where the trail is setup between accessGroups, the directionality is specified from the ConnectivityDirectionality defined in the setupTrailInformation of the set up trail request.

```
basicSDHTrailHandlerPackage PACKAGE
            BEHAVIOUR
        basicSDHTrailHandlerBehaviour 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 sub-network 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 sub-network connections;
                2)  Update network resource usage (configuration) information;
                3)  Inform the service user of the result of its request. request.
                Abort trail setup:
                    When it receives the abortSetupTrail request the agent has the responsibility
to:
                1)  Cancel the trail set-up;
                2)  Release any network resources which may have been consumed during the
progress of the set-up and update network resource usage (configuration) information if
appropriate;
                3)  Inform the service user of the result of its request.
                Abort trail release:
                    When it receives the abortReleaseTrail request the agent has the
responsibility to:
                1)  Cancel the trail release;
                2)  Inform the service user of the result of its request.";;
    ACTIONS
        setupTrail,
        releaseTrail,
        abortSetupTrail,
        abortReleaseTrail;
REGISTERED AS {iets300810Package X};
```

B.2.2 Basic SDH Connection Performer Package

> NOTE: Where the SNC is setup between topologicalPoints, the directionality is specified from the ConnectivityDirectionality defined in the setupSubNetworkConnectionInformation of the set up SNC request.

```
basicSDHConnectionPerformerPackage PACKAGE
            BEHAVIOUR
        basicSDHConnectionPerformerBehaviour BEHAVIOUR
                DEFINED AS "Immediate sub-network-connection set-up. When it receives the
setupSubNetworkConnection request the agent has the responsibility to:
                1)  find a route for the sub-network-connection;
                2)  set-up any required lower level sub-network connections;
                3)  ensure that the sub-network-connection object instance has been created with
the correct initial values.
                4)  Inform the service user of the result of its request.
                Sub-network connection release:
                    When it receives the releaseSubNetworkConnection request the agent has the
responsibility to:
                1)  Release any used lower level sub-network connections;
                2)  Update network resource usage (configuration) information;
                3)  Inform the service user of the result of its request.
                Abort sub-network connection setup:
                    When it receives the abortSetupSub-network-connection request the agent has
the responsibility to:
                1)  Cancel the sub-network connection set-up;
                2)  Release any network resources which may have been consumed during the
progress of the set-up and update network resource usage (configuration) information if
appropriate;
                3)  Inform the service user of the result of its request.
                Abort sub-network connection release:
                    When it receives the abortReleaseSubNetworkConnection request the agent has
the responsibility to:
                1)  Cancel the sub-network connection release;
                2)  Inform the service user of the result of its request.";;
    ACTIONS
        setupSubNetworkConnection,
        releaseSubNetworkConnection,
        abortSetupSubNetworkConnection,
        abortReleaseSubNetworkConnection;
REGISTERED AS {iets300810Package X};
```

B.3 Attribute definitions

B.3.1 Basic SDH Trail Handler Id

```
basicSDHTrailHandlerId ATTRIBUTE
WITH ATTRIBUTE SYNTAX   I-ETS300810.NameType;
MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
REGISTERED AS {iets300810Attribute X};
```

B.3.2 Basic SDH Connection Performer Id

```
basicSDHConnectionPerformerId ATTRIBUTE
WITH ATTRIBUTE SYNTAX   I-ETS300810.NameType;
MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
REGISTERED AS {iets300810Attribute X};
```

B.4 Name bindings

B.4.1 Instantiable Basic SDH Trail Handler

```
instantiableBasicSDHTrailHandler-layerNetworkDomain NAME BINDING
    SUBORDINATE OBJECT CLASS    instantiableBasicSDHTrailHandler AND SUBCLASSES;
    NAMED BY
        SUPERIOR OBJECT CLASS    layerNetworkDomain AND SUBCLASSES;
    WITH ATTRIBUTE   basicSDHTrailHandlerId;
    CREATE
        WITH-REFERENCE-OBJECT;
    DELETE
        ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {iets300810NameBinding X};
```

B.4.2 Instantiable Basic SDH Connection Performer

```
instantiableBasicSDHConnectionPerformer-subNetwork NAME BINDING
    SUBORDINATE OBJECT CLASS    instantiableBasicSDHConnectionPerformer AND SUBCLASSES;
```

```
       NAMED BY
           SUPERIOR OBJECT CLASS    subNetwork AND SUBCLASSES;
       WITH ATTRIBUTE   basicSDHConnectionPerformerId;
       CREATE
           WITH-REFERENCE-OBJECT;
       DELETE
           ONLY-IF-NO-CONTAINED-OBJECTS;
   REGISTERED AS {iets300810NameBinding X};
```

B.5   Actions

B.5.1   Setup Trail

```
setupTrail ACTION
    BEHAVIOUR
        setupTrailBehaviour BEHAVIOUR
            DEFINED AS "This action is used to set up a trail between existing identifiable
network trail termination points or network GTPs.
The A-end trail end point identifier identifies the A-end end point of the trail, depending upon
the mode of the trail, the A-end trail end point identifier may represent:
1   one or a set of network trail termination points or network GTPs
2   one or a set of access groups from which any idle network trail termination point or NWGTP
may be used
3   one or a set of sub-networks from which any idle network trail termination point or NWGTP may
be used
The Z-end trail end point identifier identifies the Z-end end point of the trail, depending upon
the mode of the trail, the Z-end trail end point identifier may represent:
1   one or a set of network trail termination points or network GTPs
2   one or a set of access groups from which any idle network trail termination point or NWGTP
may be used
3   one or a set of sub-networks from which any idle network trail termination point or NWGTP may
be used
The directionality of a trail indicates whether transmission is uni-directional or bi-
directional.
The mode of a trail indicates the type of transmission, that is, point to point, point to multi-
point, multi-cast, broadcast or conference.
The A-end trail end point identifier, Z-end trail end point identifier, directionality and mode
are indicated by the trailEndPoints parameter within the SetupTrailInformation.
The user identifier uniquely defines the client of a request.
The user label may be used to assign an identifier to the trail that is meaningful to the client.
The transaction identifier is used to associate together a number of actions. It must be supplied
if the client wishes to use the 'abortSetupTrail' action.
The result is indicated by a result code.
The result, if successful, always returns:
A trail identifier which may be used by a service user to identify a particular trail
An explicit list of NWTTPs or NWGTPs which are at the A-end and Z-end of the trail
The payload configuration of the trail.
If successful, the trail is set up with the service state - In Service with no spare capacity. A
single Trail object will be created if any ofptoPUnidirectional, ptoPBidirectional,
ptoMultipointUni or ptoMultipointBidir modes are selected in this action with one A End and one
or more Z Ends. The Trail object points to the NWTPs or NWGTPs involved in the Trail. The
connectivityPointer in the NWTTPs points to the Trail object. The Trail will have a
directionality (unidirectional or bi-directional) 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.
If unsuccessful, the result code indicates the reason for failure. This action will fail if:
1   The end-points do not exist or can not support the requested mode and directionality
2   A free route does not exist between the end-points
3   The end point identifiers do not identify free termination points (either directly or
indirectly) e.g. if any of the network termination points specified is already involved in a
Trail or if a NWTTP which is part of an existing NWGTP is specified.
This action may also fail if there is a parameter value error (value not supported, out of range
or not recognised) in the trailSetupInformation, if there is an access restriction on the client
(identified by the user id), if there are insufficient management resources (e.g. a problem with
the agent's onward communications) or if the action could not be performed for some other
reason.";;
    MODE    CONFIRMED;
    WITH INFORMATION SYNTAX     I-ETS300810.SetupTrailInformation;
    WITH REPLY SYNTAX           I-ETS300810.SetupTrailResult;
REGISTERED AS {iets300810Action X};
```

B.5.2   Release Trail

```
releaseTrail ACTION
    BEHAVIOUR
        releaseTrailBehaviour BEHAVIOUR
            DEFINED AS " This action is used to release a Trail.
The trail identifier identifies the trail to be released.
The user identifier uniquely defines the client of a request.
The transaction identifier is used to associate together a number of actions. It must be supplied
if the client wishes to use the 'abortReleaseTrail' action.
The result is indicated by a result code.
If successful, the trail is released. The link connections pointed to by the clientConnectionList
and the sub-network connections pointed to by the layer connection list package will also be
released by this action. The connectivityPointer in the disconnected network trail termination
points will be set to NULL as a result of this action.
If unsuccessful, the result code indicates the reason for failure. This action will fail if:
there is a parameter value error (value not supported, out of range or not recognised) in the
ReleaseTrailInformation, if there is an access restriction on the client (identified by the user
id), if there are insufficient management resources (e.g. a problem with the agent's onward
communications) or if the action could not be performed for some other reason.";;
    MODE    CONFIRMED;
    WITH INFORMATION SYNTAX    I-ETS300653.ReleaseTrailInformation;
    WITH REPLY SYNTAX          I-ETS300653.ReleaseTrailResult;
REGISTERED AS {iets300810Action X};
```

B.5.3   Abort Setup Trail

```
abortSetupTrail ACTION
    BEHAVIOUR
        abortSetupTrailBehaviour BEHAVIOUR
            DEFINED AS " This action is used to abort the set-up of a Trail prior to the
client having received the result of the set-up request from the server.
The user identifier uniquely defines the client of a request.
The transaction identifier is used to identify the setupTrail action to be aborted.
The result is indicated by a result code.
If successful, the setupTrail action is aborted.
If unsuccessful, the result code indicates the reason for failure. This action will fail (and
therefore the trail set up will proceed) if: there is a parameter value error (value not
supported, out of range or not recognised) in the AbortSetupTrailInformation, if there is an
access restriction on the client (identified by the user id), if there are insufficient
management resources (e.g. a problem with the agent's onward communications) or if the action
could not be performed for some other reason.";;
    MODE    CONFIRMED;
    WITH INFORMATION SYNTAX    I-ETS300653.AbortSetupTrailInformation;
    WITH REPLY SYNTAX          I-ETS300653.AbortSetupTrailResult;
REGISTERED AS {iets300810Action X};
```

B.5.4   Abort Release Trail

```
abortReleaseTrail ACTION
    BEHAVIOUR
        abortReleaseTrailBehaviour BEHAVIOUR
            DEFINED AS " This action is used to abort the release of a Trail prior to the
client having received the result of the release request from the server.
The user identifier uniquely defines the client of a request.
The transaction identifier is used to identify the releaseTrail action to be aborted.
The result is indicated by a result code.
If successful, the releaseTrail action is aborted.
If unsuccessful, the result code indicates the reason for failure. This action will fail (and
therefore the trail release will proceed) if: there is a parameter value error (value not
supported, out of range or not recognised) in the AbortReleaseTrailInformation, if there is an
access restriction on the client (identified by the user id), if there are insufficient
management resources (e.g. a problem with the agent's onward communications) or if the action
could not be performed for some other reason.";;
    MODE    CONFIRMED;
    WITH INFORMATION SYNTAX    I-ETS300653.AbortReleaseTrailInformation;
    WITH REPLY SYNTAX          I-ETS300653.AbortReleaseTrailResult;
REGISTERED AS {iets300810Action X};
```

B.5.5   Setup SNC

```
setupSubNetworkConnection ACTION
    BEHAVIOUR
        setupSubNetworkConnectionBehaviour BEHAVIOUR
            DEFINED AS "This action is used to set up a sub-network connection between
existing identifiable network sub-network connection termination points or network GTPs.
The A-end sub-network connection end point identifier identifies the A-end end point of the sub-
network connection, depending upon the mode of the sub-network connection, the A-end sub-network
connection end point identifier may represent:
1   one or a set of network termination points or network GTPs
2   one or a set of access groups or topological points from which any idle network termination
point or NWGTP may be used
```

3   one or a set of sub-networks from which any idle network termination point or NWGTP may be
used
The Z-end sub-network connection end point identifier identifies the Z-end end point of the sub-
network connection, depending upon the mode of the sub-network connection, the Z-end sub-network
connection end point identifier may represent:
1   one or a set of network termination points or network GTPs
2   one or a set of access groups or topological points from which any idle network termination
point or NWGTP may be used
3   one or a set of sub-networks from which any idle network termination point or NWGTP may be
used
The directionality of a sub-network connection indicates whether transmission is uni-directional
or bi-directional.
The mode of a sub-network connection indicates the type of transmission, that is, point to point,
point to multi-point, multi-cast, broadcast or conference.
The A-end sub-network connection end point identifier, Z-end sub-network connection end point
identifier, directionality and mode are indicated by the subNetworkConnectionEndPoints parameter
within the SetupSubNetworkConnectionInformation.
The user identifier uniquely defines the client of a request.
The user label may be used to assign an identifier to the sub-network connection that is
meaningful to the client.
The transaction identifier is used to associate together a number of actions. It must be supplied
if the client wishes to use the 'abortSetupSubNetworkConnection' action.
The result is indicated by a result code.
The result, if successful, always returns:
A sub-network connection identifier which may be used by a service user to identify a particular
sub-network connection
An explicit list of NWTPs or NWGTPs which are at the A-end and Z-end of the sub-network
connection
If successful, the sub-network connection is set up with the service state - In Service with no
spare capacity. A single Sub-network connection object will be created if any
ofptoPUnidirectional, ptoPBidirectional, ptoMultipointUni or ptoMultipointBidir modes are
selected in this action with one A End and one or more Z Ends. The Sub-network connection object
points to the NWTPs or NWGTPs involved in the Sub-network connection. The sncPointer in the NWTPs
points to the Sub-network connection object. The Sub-network connection will have a
directionality (unidirectional or bi-directional) 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 Sub-network connection.
If unsuccessful, the result code indicates the reason for failure. This action will fail if:
1   The end-points do not exist or can not support the requested mode and directionality
2   A free route does not exist between the end-points
3   The end point identifiers do not identify free termination points (either directly or
indirectly) e.g. if any of the network termination points specified is already involved in a sub-
network connection or if a NWTTP which is part of an existing NWGTP is specified.
This action may also fail if there is a parameter value error (value not supported, out of range
or not recognised) in the subNetworkConnectionSetupInformation, if there is an access restriction
on the client (identified by the user id), if there are insufficient management resources (e.g. a
problem with the agent's onward communications) or if the action could not be performed for some
other reason.";;
    MODE   CONFIRMED;
    WITH INFORMATION SYNTAX   I-ETS300810.SetupSubNetworkConnectionInformation;
    WITH REPLY SYNTAX   I-ETS300810.SetupSubNetworkConnectionResult;
REGISTERED AS {iets300810Action X};

B.5.6   Release SNC

releaseSubNetworkConnection ACTION
    BEHAVIOUR
        releaseSubNetworkConnectionBehaviour BEHAVIOUR
            DEFINED AS " This action is used to release a Sub-network connection.
The sub-network connection identifier identifies the sub-network connection to be released.
The user identifier uniquely defines the client of a request.
The transaction identifier is used to associate together a number of actions. It must be supplied
if the client wishes to use the 'abortReleaseSubNetworkConnection' action.
The result is indicated by a result code.
If successful, the sub-network connection is released. The the sub-network connections pointed to
by the composite pointer package will also be released by this action. The sncPointer in the
disconnected network sub-network connection termination points will be set to NULL as a result of
this action.
If unsuccessful, the result code indicates the reason for failure. This action will fail if:
there is a parameter value error (value not supported, out of range or not recognised) in the
ReleaseSubNetworkConnectionInformation, if there is an access restriction on the client
(identified by the user id), if there are insufficient management resources (e.g. a problem with
the agent's onward communications) or if the action could not be performed for some other
reason.";;
    MODE   CONFIRMED;
    WITH INFORMATION SYNTAX   I-ETS300653.ReleaseSubNetworkConnectionInformation;
    WITH REPLY SYNTAX   I-ETS300653.ReleaseSubNetworkConnectionResult;
REGISTERED AS {iets300810Action X};

B.5.7   Abort Setup SNC

abortSetupSubNetworkConnection ACTION

```
BEHAVIOUR
     abortSetupSubNetworkConnectionBehaviour BEHAVIOUR
           DEFINED AS " This action is used to abort the set-up of a Sub-network connection
prior to the client having received the result of the set-up request from the server.
The user identifier uniquely defines the client of a request.
The transaction identifier is used to identify the setupSubNetworkConnection action to be
aborted.
The result is indicated by a result code.
If successful, the setupSubNetworkConnection action is aborted.
If unsuccessful, the result code indicates the reason for failure. This action will fail (and
therefore the sub-network connection set up will proceed) if: there is a parameter value error
(value not supported, out of range or not recognised) in the
AbortSetupSubNetworkConnectionInformation, if there is an access restriction on the client
(identified by the user id), if there are insufficient management resources (e.g. a problem with
the agent's onward communications) or if the action could not be performed for some other
reason.";;
     MODE    CONFIRMED;
     WITH INFORMATION SYNTAX    I-ETS300653.AbortSetupSubNetworkConnectionInformation;
     WITH REPLY SYNTAX          I-ETS300653.AbortSetupSubNetworkConnectionResult;
REGISTERED AS {iets300810Action X};
```

B.5.8   Abort Release SNC

```
abortReleaseSubNetworkConnection ACTION
     BEHAVIOUR
        abortReleaseSubNetworkConnectionBehaviour BEHAVIOUR
           DEFINED AS " This action is used to abort the release of a Sub-network connection
prior to the client having received the result of the release request from the server.
The user identifier uniquely defines the client of a request.
The transaction identifier is used to identify the releaseSubNetworkConnection action to be
aborted.
The result is indicated by a result code.
If successful, the releaseSubNetworkConnection action is aborted.
If unsuccessful, the result code indicates the reason for failure. This action will fail (and
therefore the sub-network connection release will proceed) if: there is a parameter value error
(value not supported, out of range or not recognised) in the
AbortReleaseSubNetworkConnectionInformation, if there is an access restriction on the client
(identified by the user id), if there are insufficient management resources (e.g. a problem with
the agent's onward communications) or if the action could not be performed for some other
reason.";;
     MODE    CONFIRMED;
     WITH INFORMATION SYNTAX    I-ETS300653.AbortReleaseSubNetworkConnectionInformation;
     WITH REPLY SYNTAX          I-ETS300653.AbortReleaseSubNetworkConnectionResult;
REGISTERED AS {iets300810Action X};
```

B.6   ASN.1 syntax

```
I-ETS300810 {ccitt(0) identified-organization(4) etsi(0) ets(810) informationModel(0)
asn1Module(2) I-ETS300810(0)}
DEFINITIONS IMPLICIT TAGS ::= BEGIN
--EXPORTS everything

IMPORTS
AdditionalInformation, AdministrativeState, AvailabilityStatus, OperationalState FROM Attribute-
ASN1Module{joint-iso-ccitt ms(9) smi (3) part2 (2) asn1Module(2) 1}
Bundle, CharacteristicInformation, Directionality, NameType, UserLabel, LogicalProblem,
ResourceProblem, ProblemCause, ObjectList, RelatedObjectInstance FROM ASN1DefinedTypesModule
{ccitt(0) recommendation(0)
m(13) gnm(3100) informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)}
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)}
StopTime, Time24 FROM Attribute-ASN1Module {joint-iso-ccitt ms (9) smi (3) part2 (2)
    asn1Module (2) 1}
TrafficDescriptor FROM ASN1TypeModule {ccitt (0) administration (2) etsi (0) ets (469)
informationModel (0) asn1Module (2) asn1TypesModule (0)}
TransactionId FROM I-ETS300653 {ccitt(0) identified-organization(4) etsi(0) ets(653)
informationModel(0) asn1Module(2) i-ets300653(0)}
;
gomNLVClassLibrary OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0) ets(653)
informationModel(0)}
iets300653MObjectClass OBJECT IDENTIFIER ::= {gomNLVClassLibrary managedObjectClass(3)}
iets300653Attribute OBJECT IDENTIFIER ::= {gomNLVClassLibrary attribute(7)}
iets300653NameBinding OBJECT IDENTIFIER ::= {gomNLVClassLibrary nameBinding(6)}
iets300653Package OBJECT IDENTIFIER ::= {gomNLVClassLibrary package(4)}
iets300653Action OBJECT IDENTIFIER ::= {gomNLVClassLibrary action(9)}
iets300653Notification OBJECT IDENTIFIER ::= {gomNLVClassLibrary notification(10)}
SetupTrailInformation ::= SEQUENCE {
    trailEndPoints         ConnectivityDirectionality,
    userId             [0] UserId,
    userLabel          [1] UserLabel       OPTIONAL,
    transactionId      [2] TransactionId     OPTIONAL
}
```

```
SetupTrailResult ::= SEQUENCE {
    setupTrailResultCode     SetupTrailResultCode,
    trailId             ObjectInstance,
    aEnds               SET OF ObjectInstance,
    zEnds               SET OF ObjectInstance,
    payloadConfig       PayloadConfig
}
SetupTrailResultCode ::= CHOICE {
    unknown         NULL ,
    integerValue    INTEGER
}
-- The following values are used for integerValue of SetupTrailResultCode :
-- Trail setup successful                          0
-- Access restriction                              1
-- Insufficient management resources               2
-- Action could not be performed                   3
-- End point identifiers Parameter value error     4
-- Directionality Parameter value error            5
-- Mode Parameter value error                      6
-- User identifier Parameter value error           7
-- Transaction identifier Parameter value error    8
-- Free route not found                            9
-- Termination points not free                     10

ReleaseTrailInformation ::= SEQUENCE {
    trailId         ObjectInstance,
    userId          UserId,
    transactionId   TransactionId   OPTIONAL
}

ReleaseTrailResult ::= CHOICE {
    unknown         NULL,
    integerValue        INTEGER
}
-- The following values are used for integerValue of releaseTrailResult:
-- The trail has been released                     0
-- Access restriction                              1
-- Insufficient management resources               2
-- Action could not be performed                   3
-- Trail identifier parameter value error          4
-- User identifier Parameter value error           5
-- Transaction identifier Parameter value error    6

AbortSetupTrailInformation ::= SEQUENCE {
    userId          UserId,
    transactionId       TransactionId
}

AbortSetupTrailResult ::= CHOICE {
    unknown         NULL,
    integerValue    INTEGER
}
-- The following values are used for integerValue of AbortSetupTrailResult:
-- The set-up request has been aborted                                     0
-- The trail had already been set-up but has now been released             1
-- Access restriction                                                      2
-- Insufficient management resources                                       3
-- Action could not be performed (the set-up request is still being processed)  4
-- Action could not be performed (the trail has been set-up)               5
-- User identifier Parameter value error                                   6
-- Transaction identifier Parameter value error                            7

AbortReleaseTrailInformation ::= SEQUENCE {
    userId          UserId,
    transactionId       TransactionId
}

AbortReleaseTrailResult ::= CHOICE {
    unknown         NULL,
    integerValue    INTEGER
}
-- The following values are used for integerValue of AbortSetupTrailResult:
-- The release request has been aborted                                    0
-- Access restriction                                                      1
-- Insufficient management resources                                       2
-- Action could not be performed (the release request is still being processed)  3
-- Action could not be performed (the trail has been released)             4
-- User identifier Parameter value error                                   5
-- Transaction identifier Parameter value error                            6

SetupSubNetworkConnectionInformation ::= SEQUENCE {
    sncEndPoints            ConnectivityDirectionality,
    userId              [0] UserId,
    userLabel           [1] UserLabel        OPTIONAL,
    transactionId       [2] TransactionId       OPTIONAL
```

```
}
SetupSubNetworkConnectionResult ::= SEQUENCE {
    setupSubNetworkConnectionResultCode    SetupSubNetworkConnectionResultCode,
    SubNetworkConnectionId         ObjectInstance,
    aEnds            SET OF ObjectInstance,
    zEnds            SET OF ObjectInstance
}
SetupSubNetworkConnectionResultCode ::= CHOICE {
    unknown         NULL ,
    integerValue        INTEGER
}
-- The following values are used for integerValue of SetupSubNetworkConnectionResultCode :
-- SubNetworkConnection setup successful       0
-- Access restriction                          1
-- Insufficient management resources           2
-- Action could not be performed               3
-- End point identifiers Parameter value error 4
-- Directionality Parameter value error        5
-- Mode Parameter value error                  6
-- User identifier Parameter value error       7
-- Transaction identifier Parameter value error 8
-- Free route not found                        9
-- Termination points not free                 10

ReleaseSubNetworkConnectionInformation ::= SEQUENCE {
    SubNetworkConnectionId         ObjectInstance,
    userId          UserId,
    transactionId    TransactionId   OPTIONAL
}

ReleaseSubNetworkConnectionResult ::= CHOICE {
    unknown         NULL,
    integerValue            INTEGER
}
-- The following values are used for integerValue of releaseSubNetworkConnectionResult:
-- The SubNetworkConnection has been released       0
-- Access restriction                               1
-- Insufficient management resources                2
-- Action could not be performed                    3
-- SubNetworkConnection identifier parameter value error  4
-- User identifier Parameter value error            5
-- Transaction identifier Parameter value error     6

AbortSetupSubNetworkConnectionInformation ::= SEQUENCE {
    userId          UserId,
    transactionId       TransactionId
}

AbortSetupSubNetworkConnectionResult ::= CHOICE {
    unknown         NULL,
    integerValue        INTEGER
}
-- The following values are used for integerValue of AbortSetupSubNetworkConnectionResult:
-- The set-up request has been aborted                              0
-- The SubNetworkConnection had already been set-up but has now been released   1
-- Access restriction                                              2
-- Insufficient management resources                               3
-- Action could not be performed (the set-up request is still being processed)  4
-- Action could not be performed (the SubNetworkConnection has been set-up)     5
-- User identifier Parameter value error                           6
-- Transaction identifier Parameter value error                    7

AbortReleaseSubNetworkConnectionInformation ::= SEQUENCE {
    userId          UserId,
    transactionId       TransactionId
}

AbortReleaseSubNetworkConnectionResult ::= CHOICE {
    unknown         NULL,
    integerValue        INTEGER
}
-- The following values are used for integerValue of AbortSetupSubNetworkConnectionResult:
-- The release request has been aborted                             0
-- Access restriction                                              1
-- Insufficient management resources                               2
-- Action could not be performed (the release request is still being processed) 3
-- Action could not be performed (the SubNetworkConnection has been released)   4
-- User identifier Parameter value error                           5
-- Transaction identifier Parameter value error                    6

ConnectivityDirectionality ::= CHOICE {
    ptoPUnidirectional         [0] PtoPoint,
    ptoPBidirectional          [1] PtoPoint,
    ptoMultipointUni           [2] PtoMultipoint,
    ptoMultipointBidir         [3] PtoMultipoint,
```

```
    multicastUni              [4] Multicast,
    multicastBidir            [5] Multicast,
    broadcastUni              [6] Broadcast,
    broadcastBi               [7] Broadcast,
    conference                [8] Conference
}

UserId ::= GraphicString20

PayloadConfig ::= PrintableString
--values to be defined by implementor

PtoPoint ::= SEQUENCE {
    aEnd            ConnectivityEndPoint,
    zEnd            ConnectivityEndPoint
}
-- single A and Z ends

PtoMultipoint ::= SEQUENCE {
    aEnd            ConnectivityEndPoint,
    zEnds       SET OF ConnectivityEndPoint
}
-- single A end, multiple Z ends

Multicast ::= SEQUENCE {
    aEnds       SET OF ConnectivityEndPoint,
    zEnds       SET OF ConnectivityEndPoint
}
-- multiple A ends, multiple Z ends

Broadcast ::= ConnectivityEndPoint
-- single A end, no Z ends known

Conference ::= SET OF ConnectivityEndPoint
-- all A ends, no Z ends

ConnectivityEndPoint ::= CHOICE {
    none                      [0] NULL,
    sncTp                     [1] ObjectInstance,
    topologicalPoint          [2] ObjectInstance,
    accessGroup               [3] ObjectInstance,
    subNetwork                [4] ObjectInstance
}
-- This allows a network termination point or GTP to be chosen explicitly (using the sncTPchoice)
--or a Topological Point, Access Group or Sub-network may be selected, and hence any idle NWTP
within them.
```

Annex C (informative): Bibliography

- ITU-T Recommendation X.700: "Management framework for Open Systems Interconnection (OSI) for CCITT applications".

- ITU-T Recommendation X.701: "Information technology – Open Systems Interconnection – Systems management overview".

- ITU-T Recommendation X.710: "Common management information service definition for CCITT applications".

- ITU-T Recommendation X.711: "Common management information protocol specification for CCITT applications".

- ITU-T Recommendation X.712: "Information technology – Open Systems Interconnection – Common management information protocol: Protocol Implementation Conformance Statement (PICS) proforma".

- ITU-T Recommendation X.720: "Information technology – Open Systems Interconnection – Structure of management information: Management information model".

- ITU-T Recommendation X.722: "Information technology – Open Systems Interconnection – Structure of Management Information: Guidelines for the definition of managed objects".

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- ITU-T Recommendation X.724: "Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management".

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- ITU-T Recommendation X.733: "Information technology – Open Systems Interconnection – Systems Management: Alarm reporting function".

- ITU-T Recommendation X.734: "Information technology – Open Systems Interconnection – Systems Management: Event report management function".

- ITU-T Recommendation X.735: "Information technology – Open Systems Interconnection – Systems Management: Log control function".

- ITU-T Recommendation X.736: "Information technology – Open Systems Interconnection – Systems Management: Security alarm reporting function".

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History

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