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SERIES M: TELECOMMUNICATION MANAGEMENT, INCLUDING TMN AND NETWORK MAINTENANCE

Telecommunications management network

Generic, protocol-neutral management information model

Recommendation ITU-T M.3160

ITU-T M-SERIES RECOMMENDATIONS

TELECOMMUNICATION MANAGEMENT, INCLUDING TMN AND NETWORK MAINTENANCE

For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T M.3160

Generic, protocol-neutral management information model

Summary

Recommendation ITU-T M.3160 provides a generic network information model. The model describes information object classes (IOCs) and their properties that are generic and useful to describe information exchanged across all interfaces defined in Recommendation ITU-T M.3010 TMN architecture. These generic managed object classes are intended to be applicable across different technologies, architecture and services. The managed object classes in this Recommendation may be specialized to support the management of various telecommunications networks.

This Recommendation follows Recommendation ITU-T M.3020, management interface specification methodology on the analysis phase. The information models provided in this Recommendation are in a protocol-neutral manner, and can be mapped to multiple protocol-specific information models (design phase).

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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

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

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

NOTE

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

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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Generic, protocol-neutral management information model

1   Scope

This Recommendation provides a generic network information model. It identifies TMN object classes that are common to managed telecommunication networks, or are of a generic type that can be used to manage a network at a technology-independent level, or are super-classes of technology-specific managed objects in a telecommunication network, or management support objects that are required for the management of the telecommunication network. These objects are relevant to information exchanged across standardized interfaces defined in the [b-ITU-T M.3010] TMN architecture.

This Recommendation addresses generically the abstractions of those aspects of telecommunication resources (e.g., equipments, telecommunication services) required to manage the network. It also includes the abstractions related to the management services. [b-ITU-T G.805], on the generic functional architecture of the connection-oriented transport network, and [b-ITU-T G.809], on the functional architecture of connectionless layer networks, are used as the basis in developing the transport aspects of this model.

The generic information model provided in this Recommendation follows the [ITU-T M.3020] interface methodology on the analysis phase, and they are developed in a protocol-neutral manner, which can be mapped to multiple protocol-specific information models.

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

1.1   Purpose

1.1.1   Interoperability

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

1.1.2   Technology-independent management

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

1.1.3   Facilitating information model development

This Recommendation also provides a framework from which technology-specific information models may be developed.

1.2   Field of application

This Recommendation captures the generally applicable requirements of the technology-independent and technology-specific information models, as well as information relating to TMN management services.

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

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

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T E.410]   Recommendation ITU-T E.410 (1998), *International network management – General information*.

[ITU-T M.1400]   Recommendation ITU-T M.1400 (2006), *Designations for interconnections among operators' networks*.

[ITU-T M.1401]   Recommendation ITU-T M.1401 (2006), *Formalization of interconnection designations among operators' telecommunication networks*.

[ITU-T M.3020]   Recommendation ITU-T M.3020 (2008), *Management interface specification methodology*.

[ITU-T X.731]   Recommendation ITU-T X.731 (1992) | ISO/IEC 10164-2:1993, *Information technology – Open Systems Interconnection – Systems management: State management function*.

[ITU-T X.734]   Recommendation ITU-T X.734 (1992) | ISO/IEC 10164-5:1993, *Information technology – Open Systems Interconnection – Systems Management: Event report management function*.

[ISO 3166-1]   ISO 3166-1:2006, *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes*.

Additional non-normative references can be found in the Bibliography.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 aggregate audible/visual indicators [b-ITU-T M.3100]: An audible/visual alarm indicator that reflects information about a set of managed resources.

3.1.2 alarm reporting [b-ITU-T M.3100]: Process of alerting, for the purposes of management, external systems and users regarding alarms.

3.1.3 ALarM reporting (ALM) [b-ITU-T M.3100]: Alarm Reporting is turned on.

3.1.4 alarm reporting control [b-ITU-T M.3100]: Involves the turning off of alarm reporting which includes inhibiting new autonomous alarm indication notification, and inhibiting the use of managed resource-specific/unit alarm information for the determination of aggregate audible/visual indicators. Autonomous alarm clear notification for previously reported alarms will not be suppressed. Alarm reporting "on" is supported by the "ALM" state. Alarm reporting "off" is supported by the "NALM-QI", "NALM-TI", and "NALM" states.

3.1.5 **ARC interval** [b-ITU-T M.3100]: Generic term that applies to both the persistence and timed intervals.

3.1.6 **inhibited** [b-ITU-T M.3100]: This term is used throughout this feature description to identify that reporting is off (or in other words, is not allowed).

3.1.7 **managed entity** [b-ITU-T M.3100]: A managed entity may be a managed system, a managed application, or a managed resource. This definition is dependent upon the context in which it is used.

3.1.8 **managed resource** [b-ITU-T M.3100]: A specific component of a managed system/managed application (e.g., a specific circuit pack, termination point).

3.1.9 **managed resource-specific/unit audible/visual indicator** [b-ITU-T M.3100]: An audible/visual alarm indicator that is specific to a single managed resource.

3.1.10 **management interface** [b-ITU-T M.3100]: Any managed entity interface that is defined for the purpose of management (e.g., OS interface, craft interface, LED indicator).

3.1.11 **No ALarM reporting (NALM)** [b-ITU-T M.3100]: Alarm Reporting is turned off.

3.1.12 **No ALarM reporting, CountDown (NALM-CD)** [b-ITU-T M.3100]: This is a substate of NALM-QI and performs the persistence timing countdown function when the managed entity is qualified problem-free.

3.1.13 **No ALarM reporting, NotReady (NALM-NR)** [b-ITU-T M.3100]: This is a substate of NALM-QI and performs a wait function until the managed entity is qualified problem-free.

3.1.14 **No ALarM reporting, Qualified Inhibit (NALM-QI)** [b-ITU-T M.3100]: Alarm Reporting is turned off until the managed entity is qualified problem-free for a specified persistence interval.

3.1.15 **No ALarM reporting, Timed Inhibit (NALM-TI)** [b-ITU-T M.3100]: Alarm Reporting is turned off for a specified timed interval.

3.1.16 **persistence interval** [b-ITU-T M.3100]: A period of time for which a managed entity must be free of qualified problems.

3.1.17 **qualified problem** [b-ITU-T M.3100]: A problem that affects the operability of the managed entity and used to qualify transitions between the "NALM-NR" and "NALM-CD" states. Additional detail for this definition is managed resource specific and is to be defined by the managed resource.

3.1.18 **timed interval** [b-ITU-T M.3100]: A period of time.

3.2 Terms defined in this Recommendation

This Recommendation has no new definitions.

4 Abbreviations

This Recommendation uses the following abbreviations and acronyms:

AP   Access Point

ARC   Alarm Reporting Control

ASAP   Alarm Severity Assignment Profile

AVC   Attribute Value Change Notification

DN   Distinguished Name

FD   Flow Domain

FDFr	Flow Domain Fragment
FP	Flow Point
FPP	Flow Point Pool
FPPLink	Flow Point Pool Link
FTP	Flow Termination Point
ICC	ITU Carrier Code
IOC	Information Object Class
ME	Managed Element
MO	Managed Object
MOC	Managed Object Class
NE	Network Element
NEF	Network Element Function
NWCTP	Network Connection Termination Point
NWTTP	Network Trail Termination Point
OS	Operations System
RDN	Relative Distinguished Name
PBX	Private Branch eXchange
RDN	Relative Distinguished Name
SC	Service Customer
SCN	State Change Notification
SDH	Synchronous Digital Hierarchy
SLA	Service Level Agreement
SP	Service Provider
TMN	Telecommunication Management Network
UML	Unified Modelling Language

5 Conventions

This Recommendation follows the conventions defined by the Methodology in [ITU-T M.3020].

6 Concepts and background

A generic network information model is essential to the generation of uniform fault, configuration, performance, security, and accounting management standards. A common network model, identifying the generic resources that exist in a network and their associated attribute types, events, actions, and behaviours, provides a foundation for understanding the interrelationships between these resources and attributes, and may, in turn, promote uniformity in dealing with the various aspects of managing these resources and attributes.

Network resources may be customer or provider owned; the latter includes portions that may be assigned for exclusive use by specific customers. Resources may be physical or logical in nature. Physical resources include customer (e.g., PBXs) or provider (e.g., digital cross-connect systems) systems, their associated subsystems (e.g., a line card within a PBX) and also the links that

interconnect these systems. Such systems are generally known as network elements (NEs). Logical resources include communication protocols, application programs, logs, and network services.

There may also exist (separate or integrated) resources involved in operating a telecommunications network. These resources include the operations systems (OSs) closely associated with managing specific NEs, and OSs that have network-wide responsibilities.

Resources have attributes that allow the user to control and/or observe the behaviour of the resource. Attributes may also allow the user to control and/or observe the relationships between resources.

There is a need to represent the way resources, or entities can be combined and interrelated (relationships). In this version, UML class diagram techniques have been used to represent inter-object relationships.

These UML diagrams result in a high-level view (schema) of the model. This view can be used to derive information related to naming, to verifying consistency, and to ensuring completeness. For example, it ensures that sufficient information (i.e., relationships) is provided from a physical resource to identify the services that are dependent on that resource.

Resources are modelled as objects, and the management view of a resource is called a managed object. Additional objects, called support managed objects, are defined to support the functions of managing a telecommunications network.

Objects with similar attributes and behaviours may be grouped into object classes. An object is characterized by its object class and object instance, and may possess multiple attribute types and associated values. Similarly, the terms managed object class and managed object instance apply specifically to objects that are being managed. This Recommendation specifies the properties of the resource (i.e., managed object) visible for management.

An object class may be a subclass of another object class. A subclass inherits attribute types and behaviours of its super-class, in addition to possessing its own specific attributes and properties.

Object classes and attribute types are defined only for the purpose of communicating network management messages between systems, and need not be related to the structuring of data within these systems. Some object classes defined in these issues (and future issues) of the model apply to many management functional areas, while others support specific functional areas.

7 Information object classes

7.1 Imported information entities and local labels

None.

7.2 Class diagram

There are several different viewpoints of management information which may be defined for management purposes, with the network element level viewpoint, the network level viewpoint and the service level viewpoint defined below. These viewpoints are not restrictive but define the levels of abstraction of particular types of interfaces. That is, object class definitions are not forced into this categorization but are constructed to meet the needs of exchanging management information across management interfaces. Objects defined for a given viewpoint may be used in others, and any object may be used by any interface which requires it. The definition of viewpoint is a means of generating requirements, hence there is no implicit definition of interfaces or storage requirements. This information is defined for the purpose of management via an open interface.

The network element level viewpoint is concerned with the information that is required to manage a network element (NE). This refers to the information required to manage the network element

function (NEF) and the physical aspects of the NE. The information may be derived from open systems other than the NE.

The network level viewpoint is concerned with the information representing the network, both physically and logically. It is concerned with how network element entities are related, topographically interconnected, and configured to provide and maintain end-to-end connectivity.

The service level viewpoint is concerned with how network level aspects (such as an end-to-end path) are utilized to provide a network service, and as such is concerned with the requirements of a network service (e.g., availability, cost, etc.) and how these requirements are met through the use of the network, and all related customer information.

The object classes that form the basis for the generic network information model are grouped into fragments. The purpose of defining fragments is only to have a document that is easier to read by grouping a limited number of object class definitions. Each fragment deals with a particular subject (e.g., network, managed element, transmission, support objects) but object classes of each fragment will be usable in various models depending on the functional area managed and/or on the level viewpoint considered.

7.2.1 High level overview

Clause 7.2.1.1 provides a high-level overview of each fragment with an emphasis of the containment relationship.

7.2.1.1 Network fragment

The network fragment is a grouping of object classes that represent collections of interconnected telecommunications and management objects (logical or physical) capable of exchanging information. These objects have one or more common characteristics, for example, they may be owned by a single customer or provider, or associated with a specific service network. A network may be nested within another (larger) network, thereby forming a containment relationship.

Information object classes (IOCs) in the network fragment are presented in Figures 1 and 2.
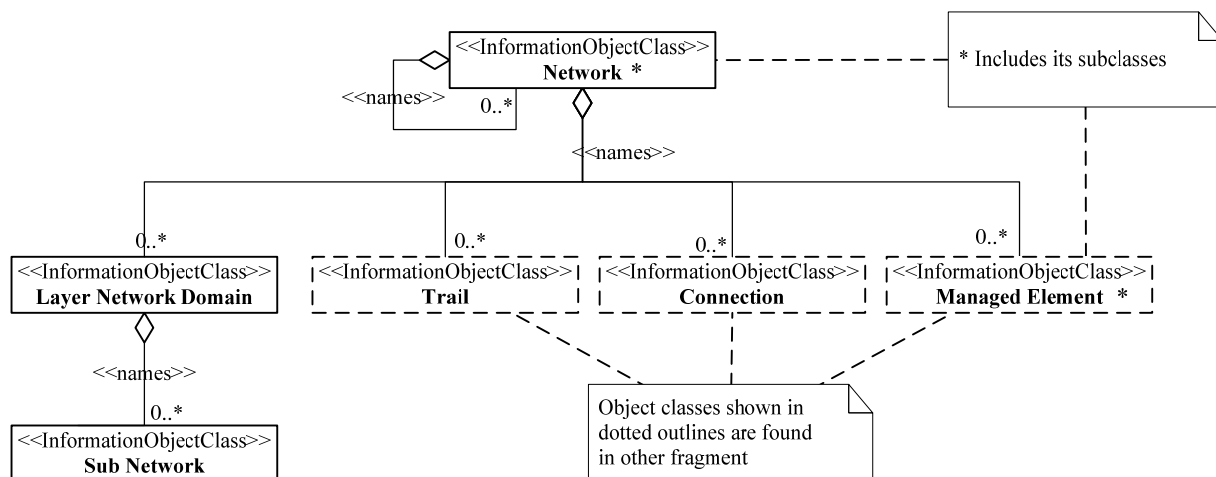
Figure 1 – Network fragment (part 1)
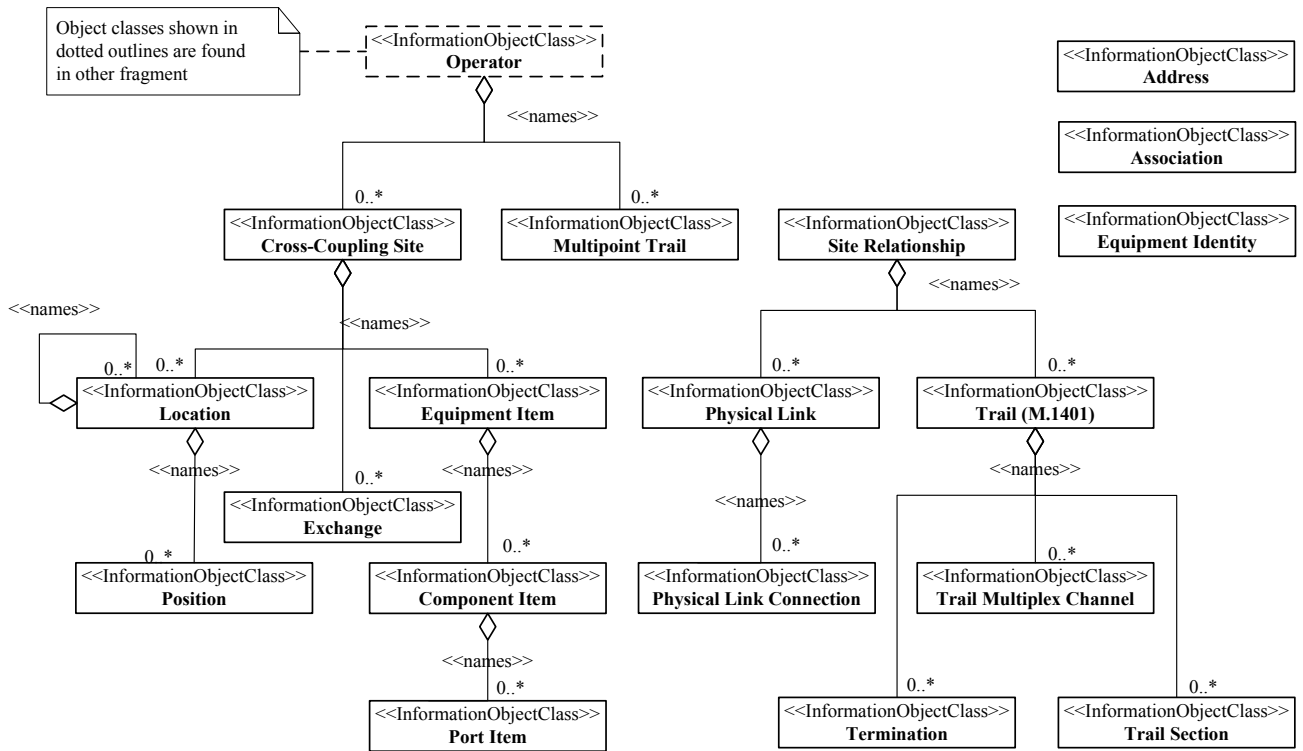
Figure 2 – Network fragment (part 2)

7.2.1.2   Managed element fragment

IOCs in managed element fragment are presented in Figure 3.
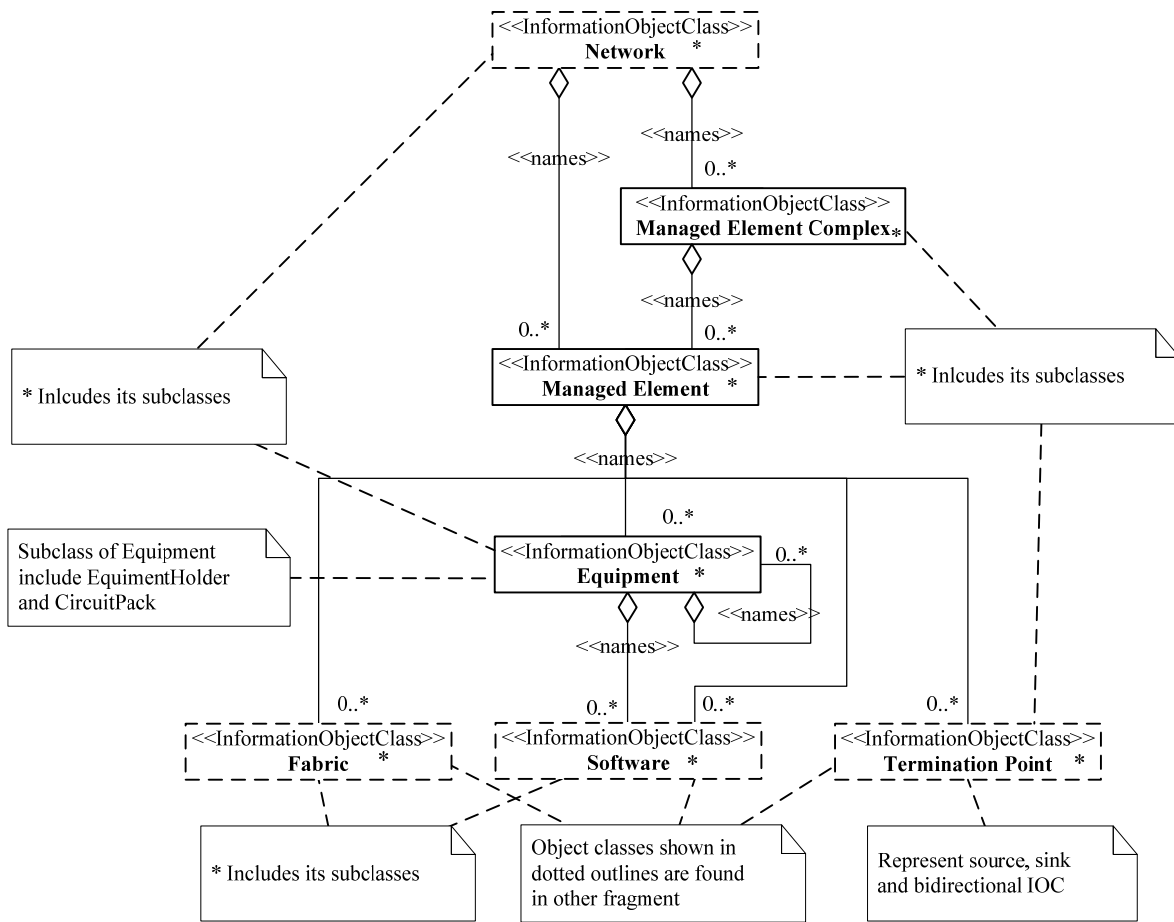
Figure 3 – Managed element fragment

7.2.1.3   Physical equipment fragment

IOCs in the physical equipment fragment are presented in Figure 4.
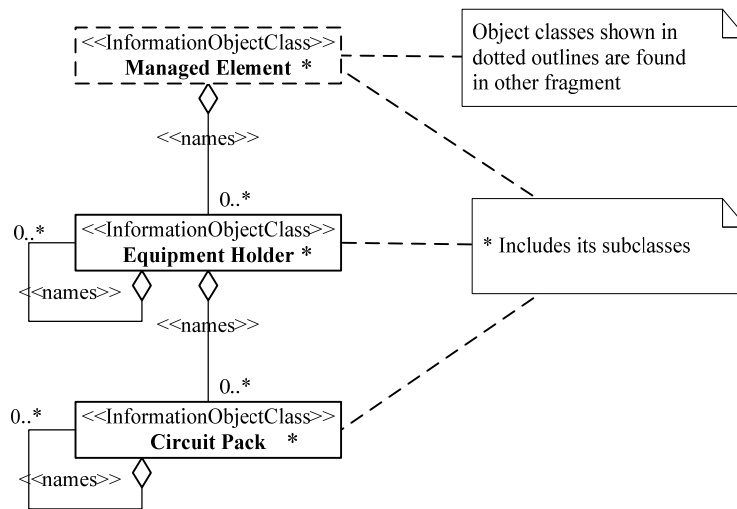
Figure 4 – Physical equipment fragment

7.2.1.4 Logical equipment fragment

IOCs in the logical equipment fragment are presented in Figure 5.
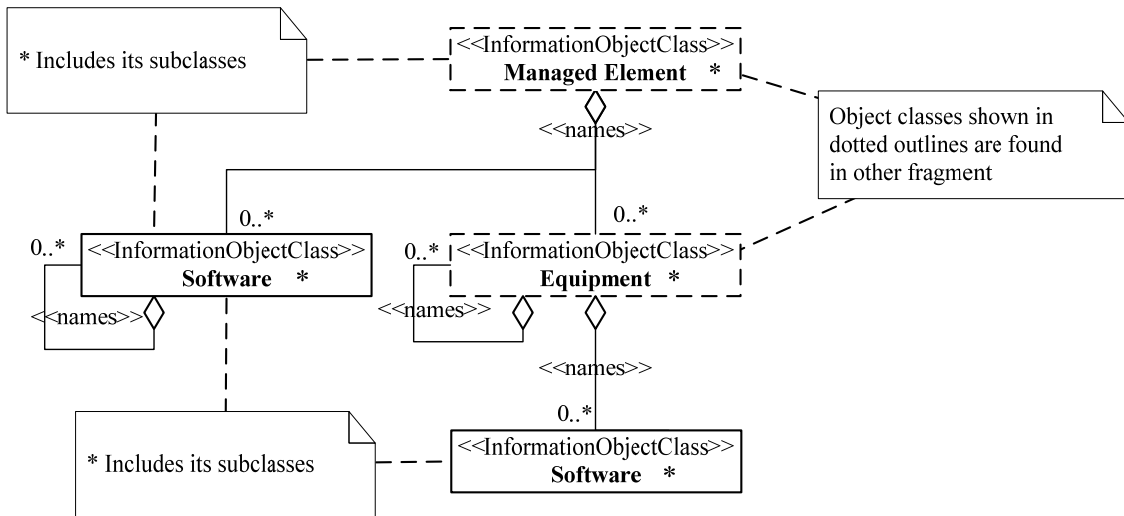
Figure 5 – Logical equipment fragment

7.2.1.5 Termination point fragment – Network element view

IOCs in termination point fragment for the element view are presented in Figure 6.
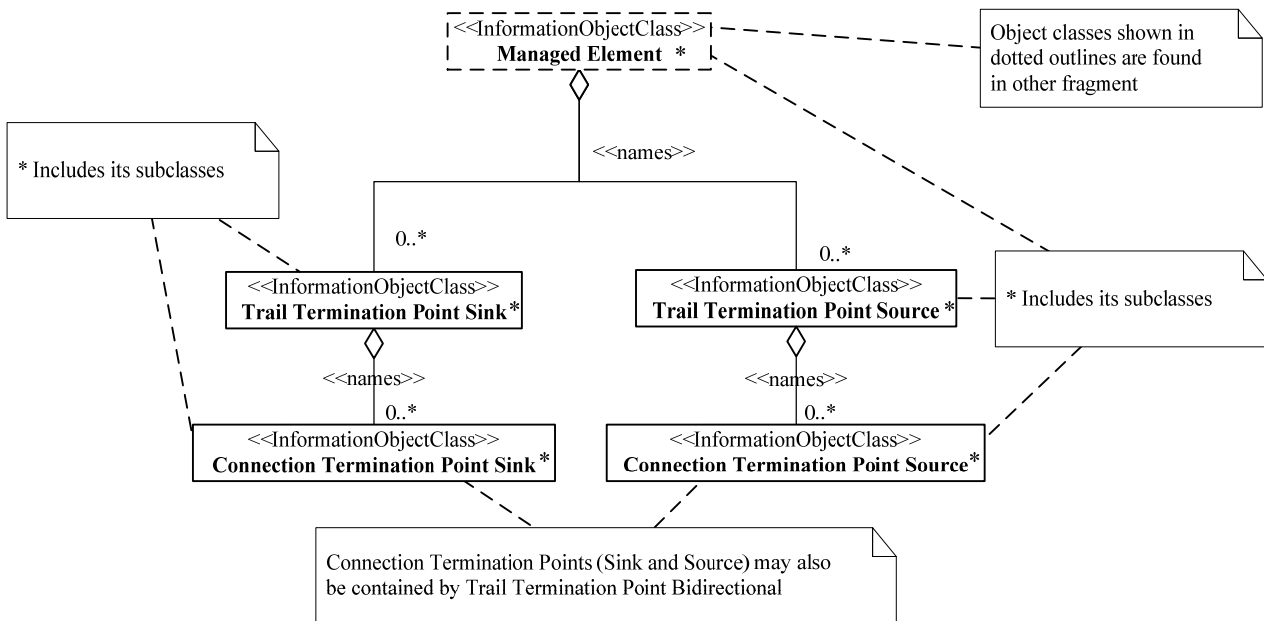
Figure 6 – Termination point fragment – Network element view

7.2.1.6   Termination point fragment – Network view

IOCs in termination point fragment for the network view are presented in Figure 7.
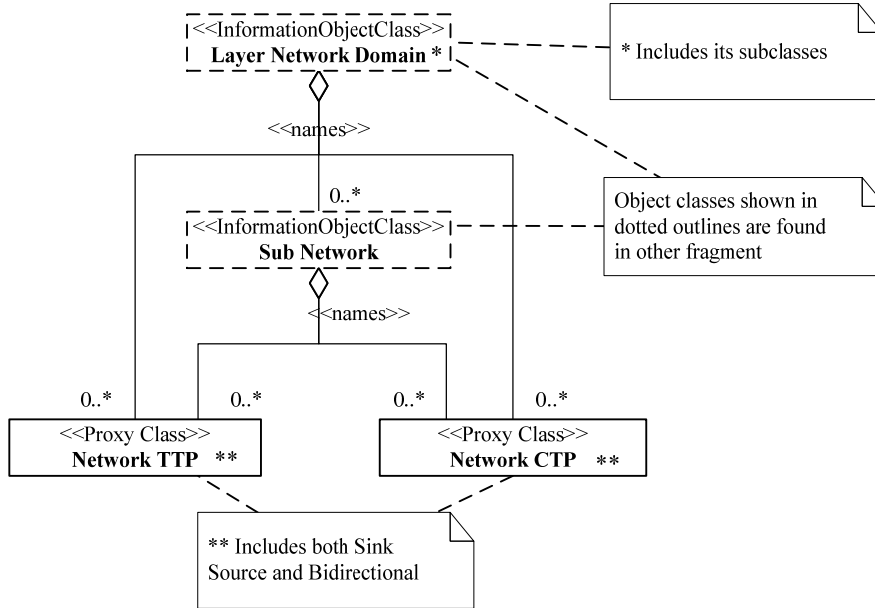
Figure 7 – Termination point fragment – Network view

7.2.1.7   Topology and connectivity fragment

IOCs in the topology and connectivity fragment for the network view are presented in Figure 8.
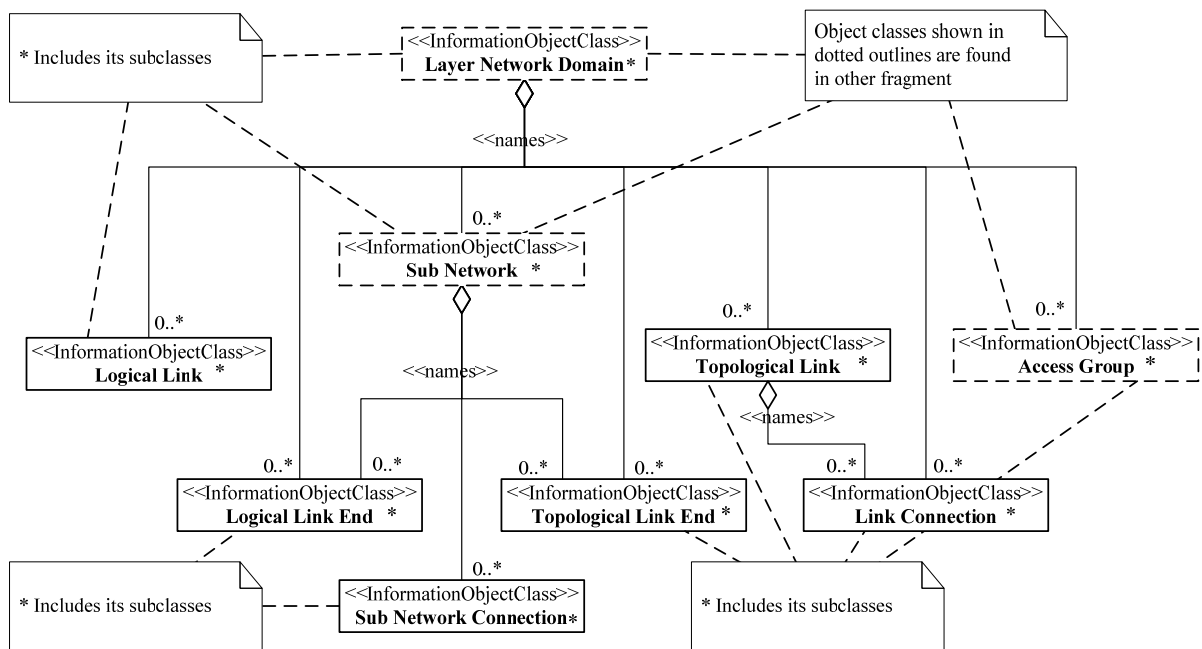
Figure 8 – Topology and connectivity fragment

7.2.1.8   Telemetry fragment

IOCs in the telemetry fragment are presented in Figure 9.
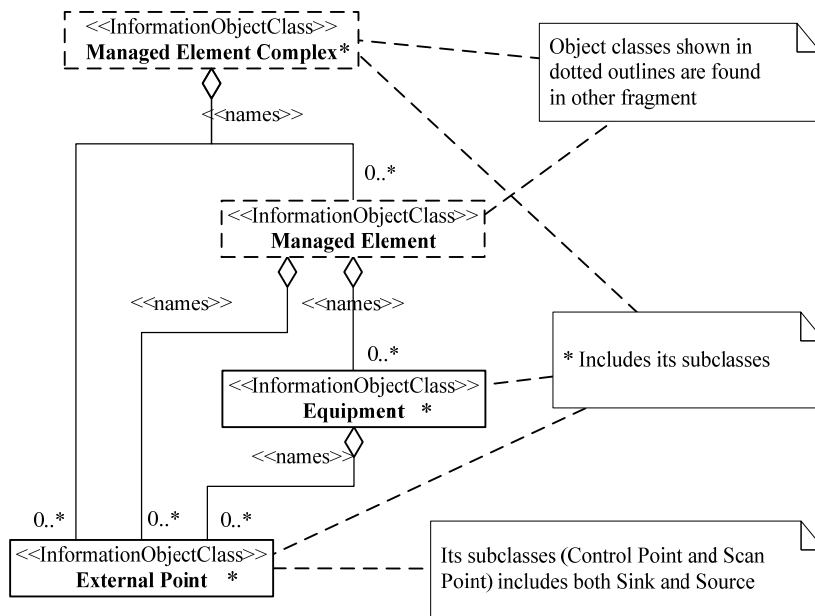
Figure 9 – Telemetry fragment

7.2.1.9   Transmission fragment

IOCs in the transmission fragment are presented in Figure 10.
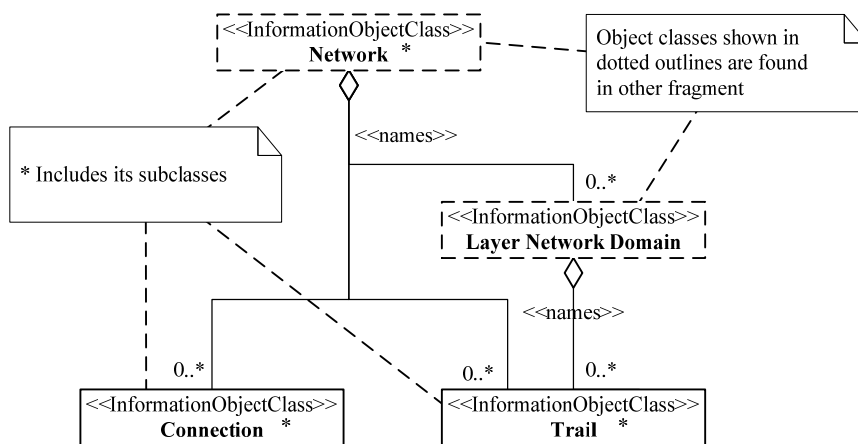
Figure 10 – Transmission fragment

7.2.1.10 Cross-connection fragment

IOCs in the cross-connection fragment are presented in Figure 11.
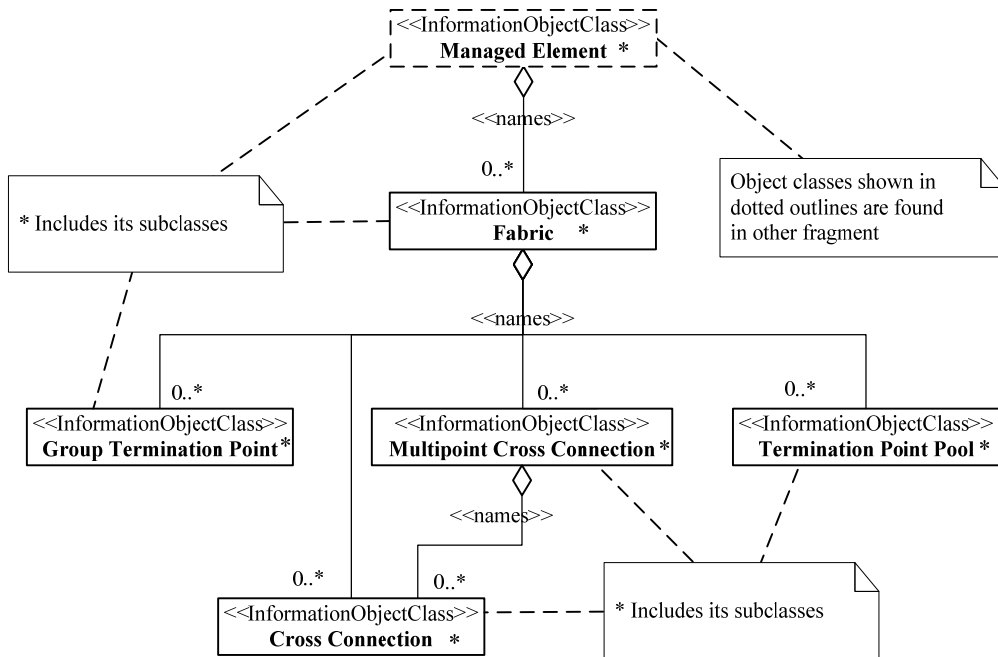
Figure 11 – Cross-connection fragment

7.2.1.11 Organization fragment

IOCs in the organization fragment are presented in Figure 12.
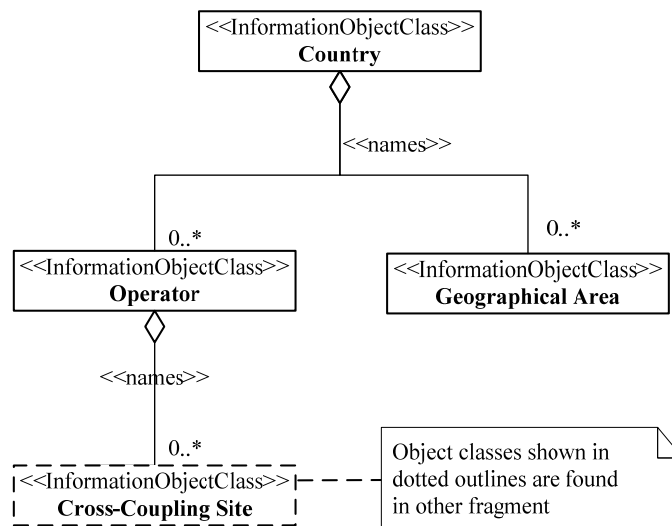
Figure 12 – Organization fragment

7.2.1.12 Connectionless network fragment

IOCs in the connectionless network fragment are presented in Figures 13 and 14.
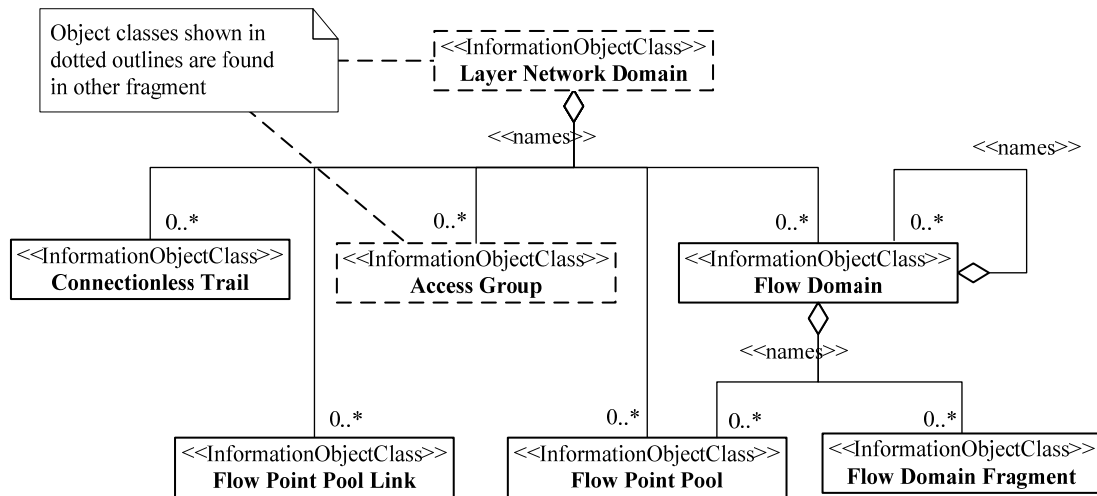
Figure 13 – Connectionless network fragment (part 1) – Network view
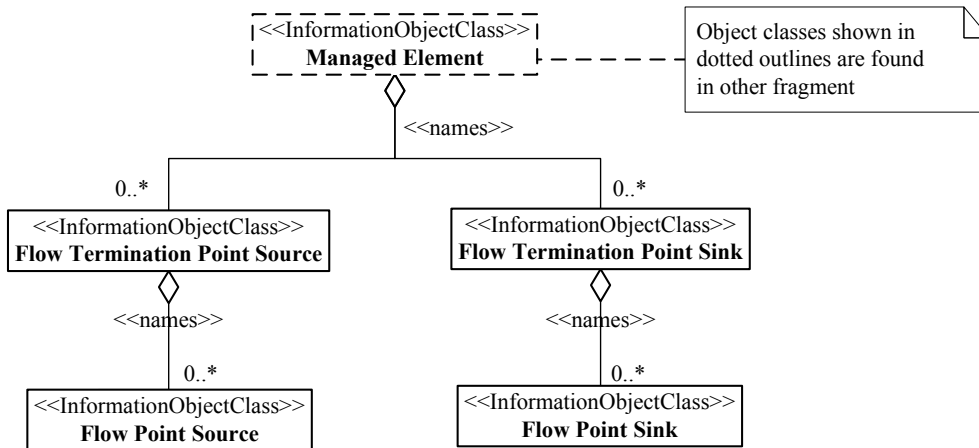
Figure 14 – Connectionless network fragment (part 2) – Network element view

7.2.1.13 Common information object

IOCs in the common information object fragment are presented in Figure 15.
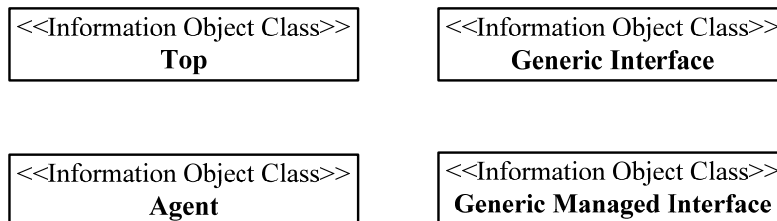
Figure 15 – Common information object fragment

7.2.2   Attributes and relationships

7.2.2.1   ER diagram of network fragment

The entity relationship (ER) diagrams of the network fragment are presented in Figures 16, 17 and 18.
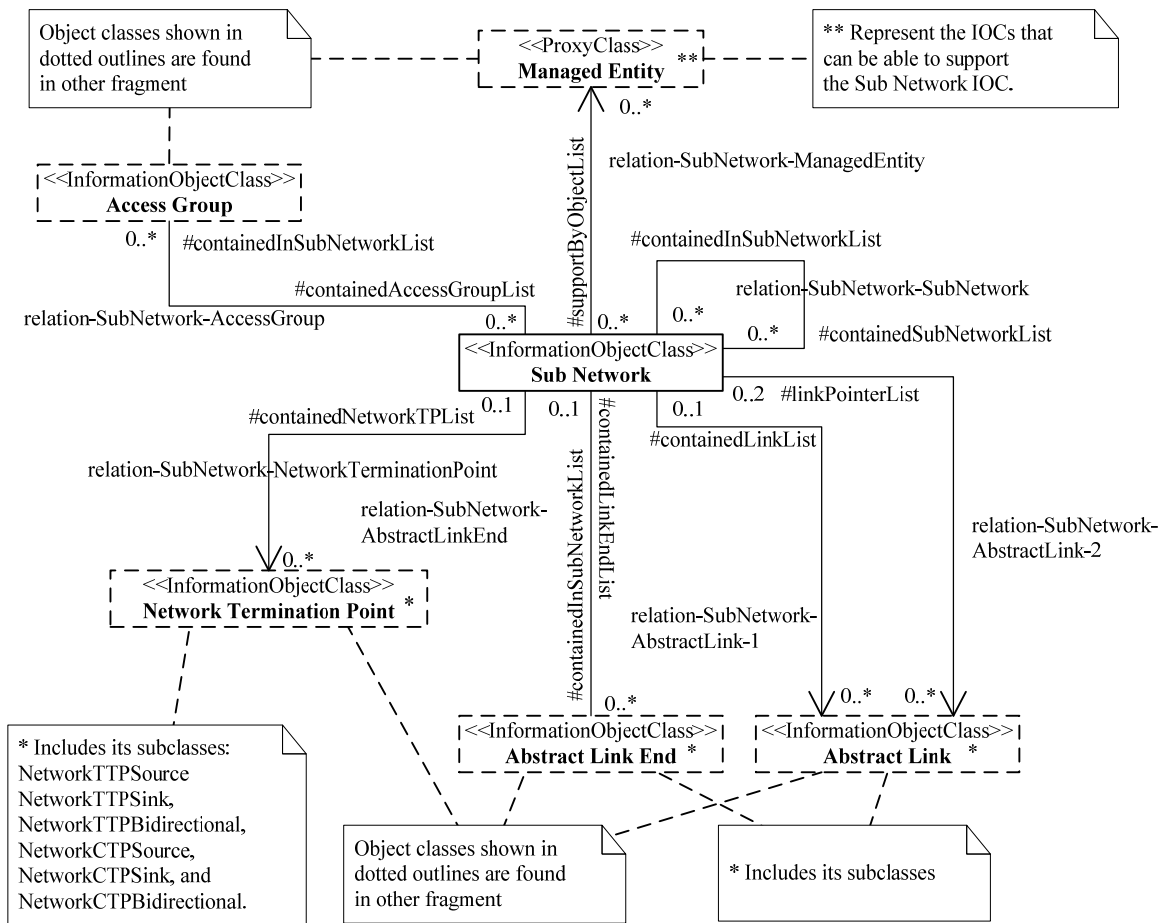
Figure 16 – ER diagram of network fragment (part 1)
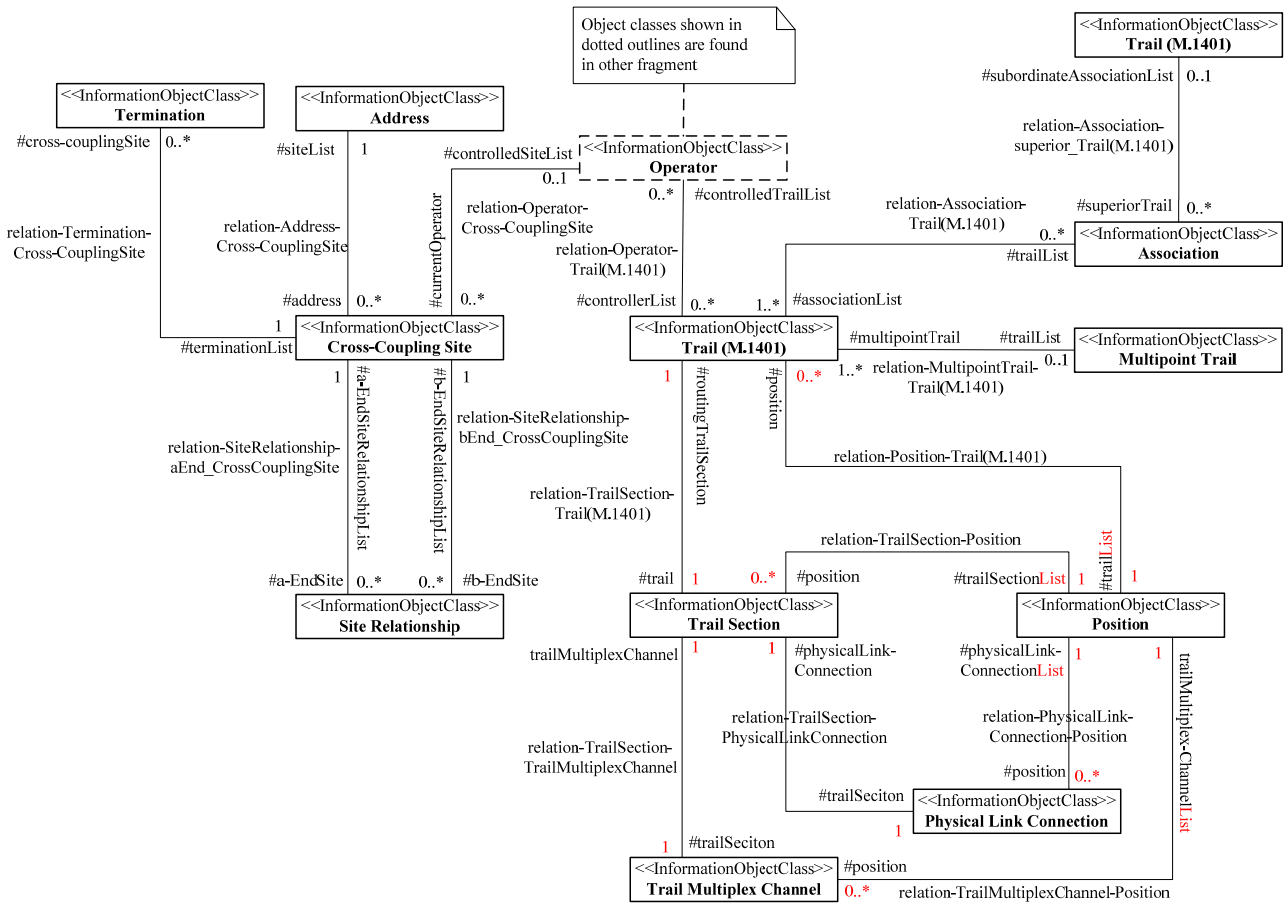
Figure 17 – ER diagram of network fragment (part 2)
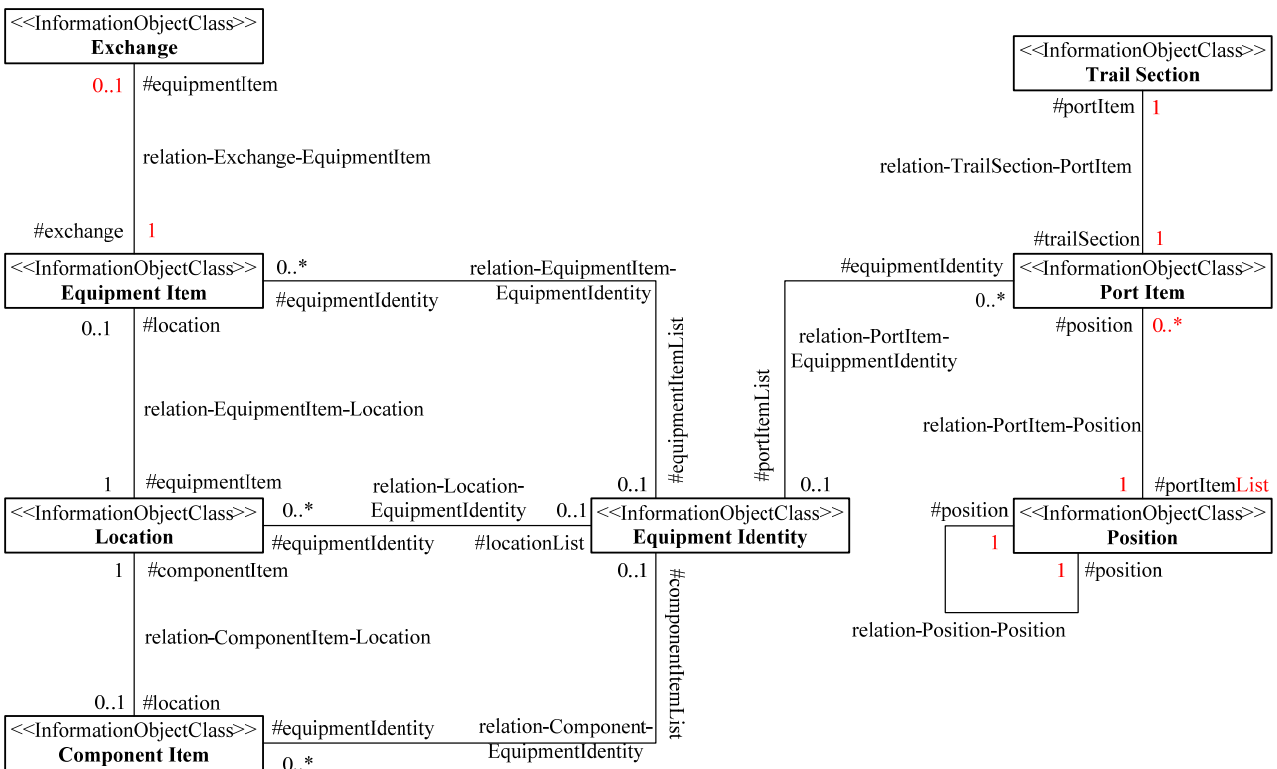
Figure 18 – ER diagram of network fragment (part 3)

7.2.2.2 ER diagram of managed element fragment

The ER diagram of the managed element fragment is presented in Figure 19.
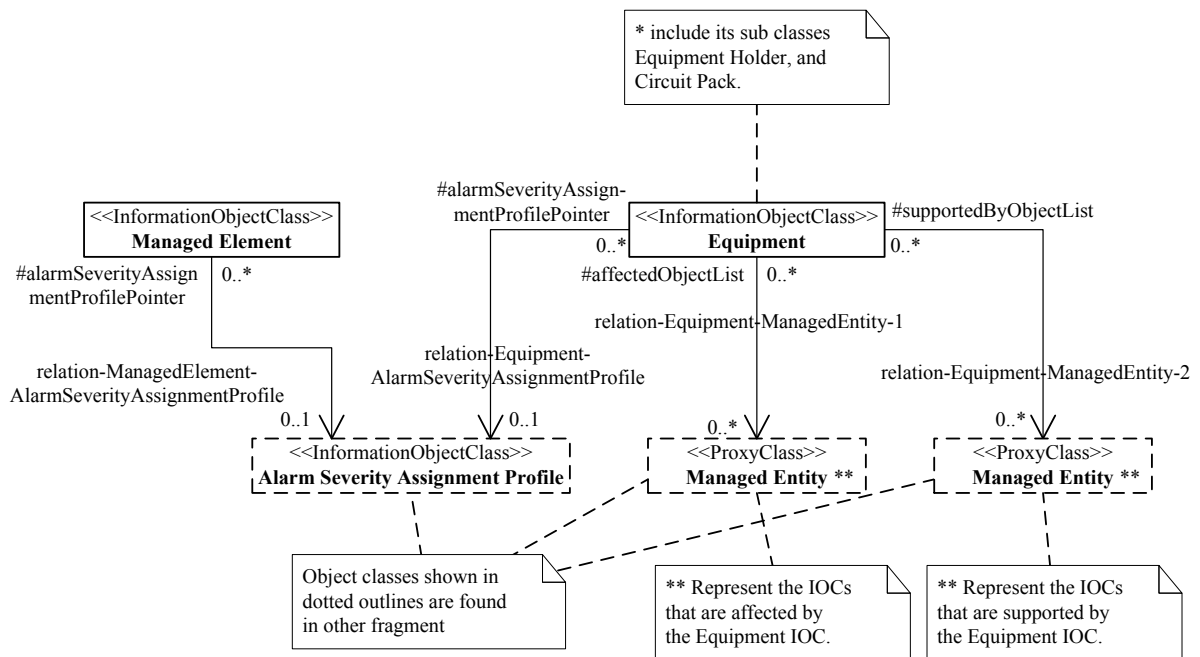
Figure 19 – ER diagram of managed element fragment

7.2.2.3 ER diagram of physical equipment fragment

The ER diagram of the physical equipment fragment is presented in Figure 20.
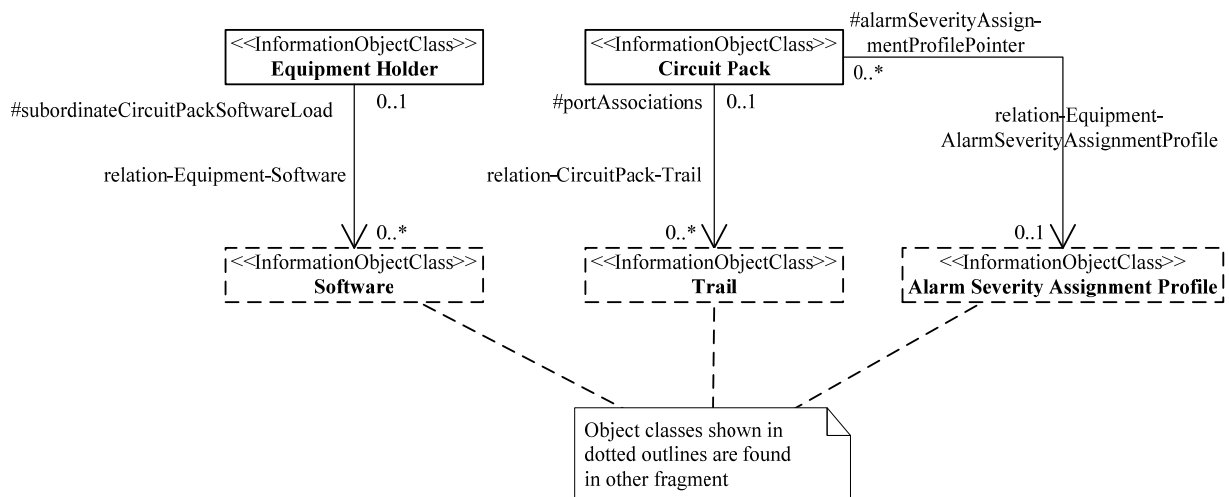
Figure 20 – ER diagram of physical equipment fragment

7.2.2.4 ER diagram of logical equipment fragment

The ER diagram of the logical equipment fragment is presented in Figure 21.

#alarmSeverityAssignmentProfilePointer   <<InformationObjectClass>> **Software**   #affectedObjectList

0..*   0..*

relation-Software-AlarmSeverityAssignmentProfile

relation-Software-ManagedEntity

0..1   0..*

<<InformationObjectClass>> **Alarm Severity Assignment Profile**

<<ProxyClass>> **Managed Entity** **

Object classes shown in dotted outlines are found in other fragment

** Represent the IOCs that are affected by the Software IOC.
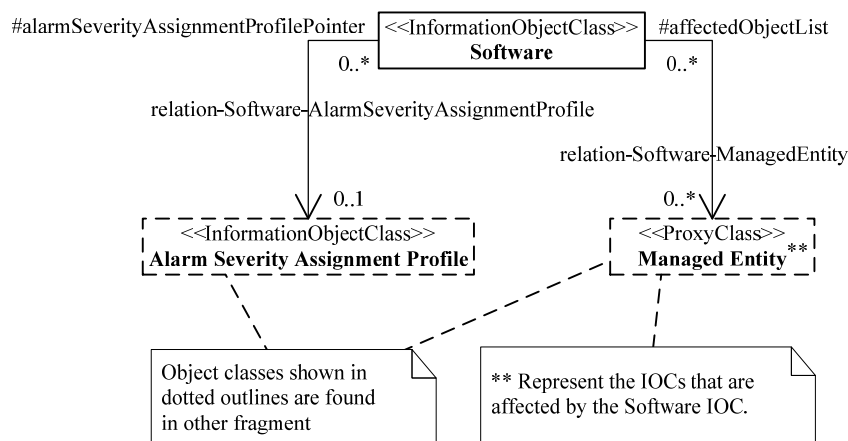
Figure 21 – ER diagram of logical equipment fragment

7.2.2.5 ER diagram of termination point fragment – Network element view

The ER diagram of the termination point fragment – Network element view is presented in Figure 22.
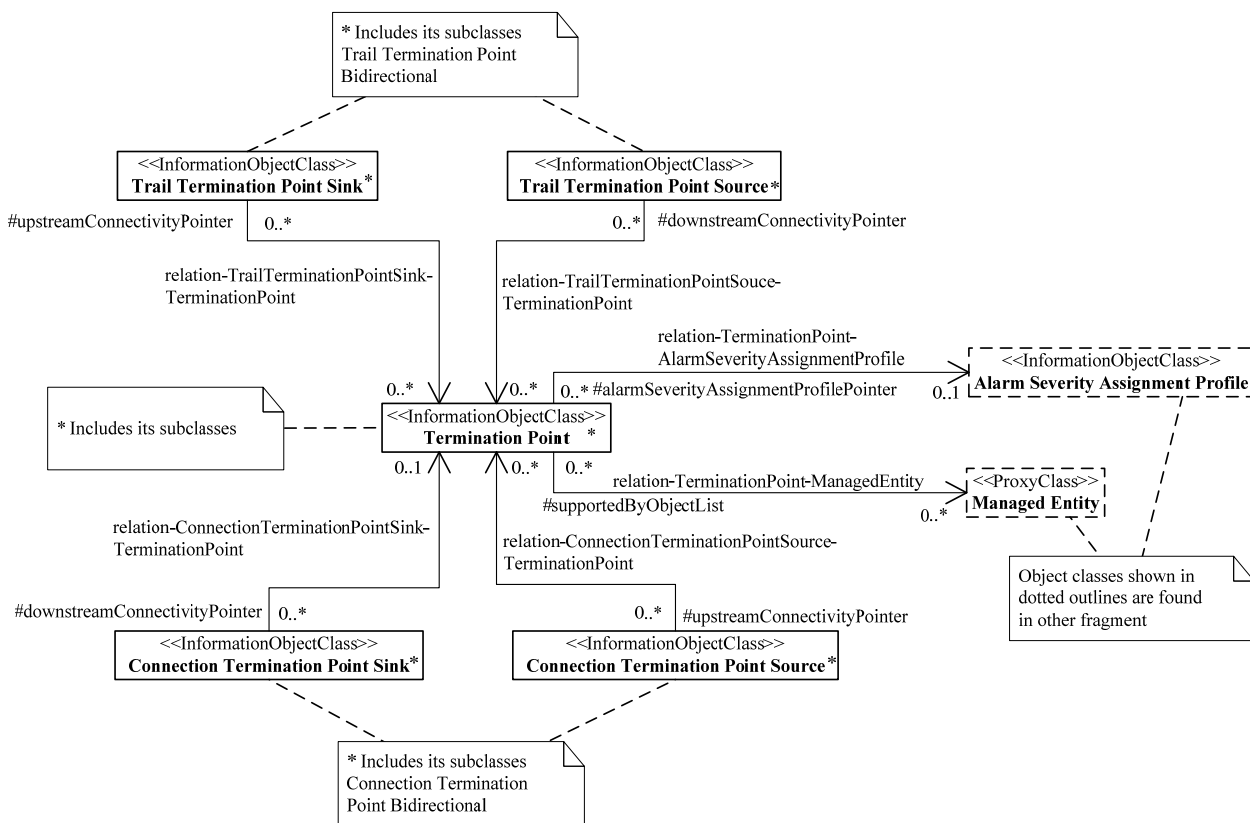
Figure 22 – ER diagram of termination point fragment – Network element view

7.2.2.6 ER diagram of termination point fragment – Network view

The ER diagrams of the termination point fragment – Network view are presented in Figures 23 and 24.
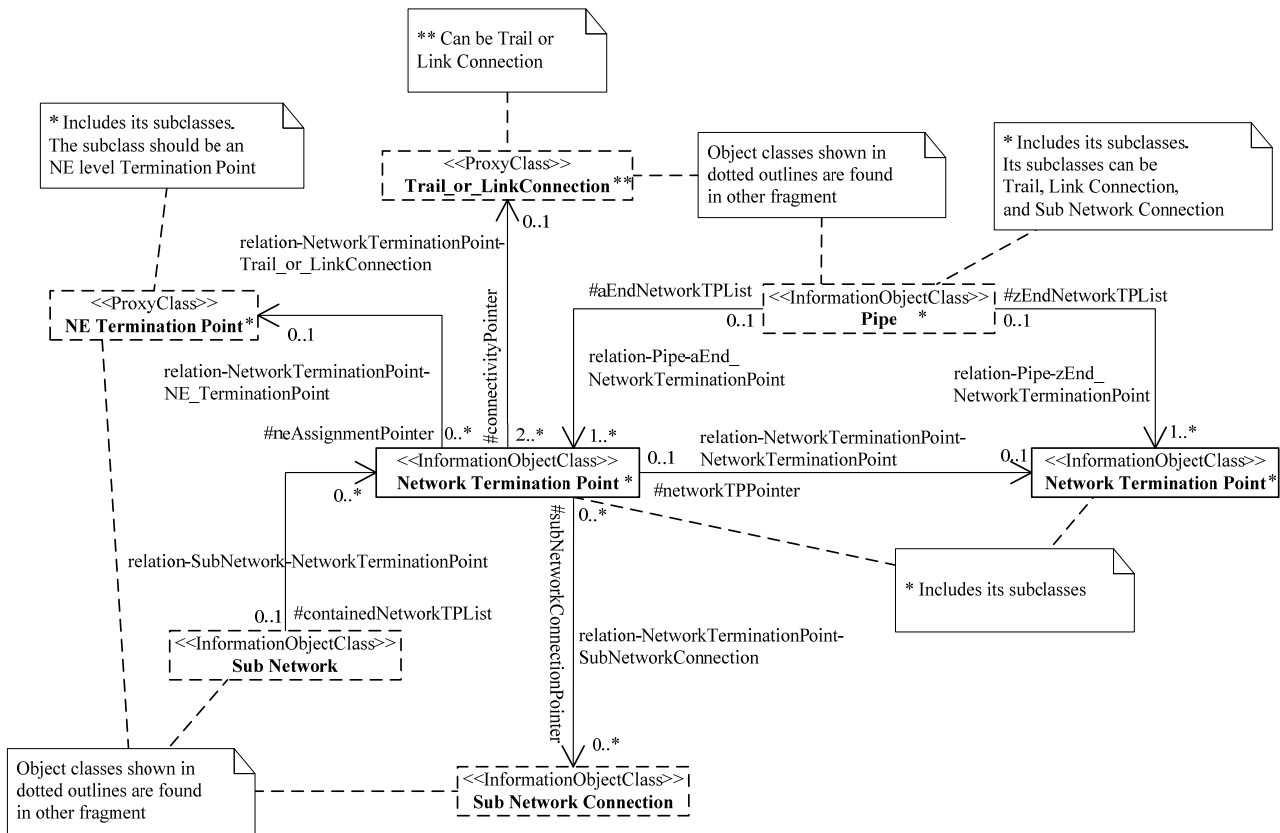
Figure 23 – ER diagram of termination point fragment – Network view (part 1)
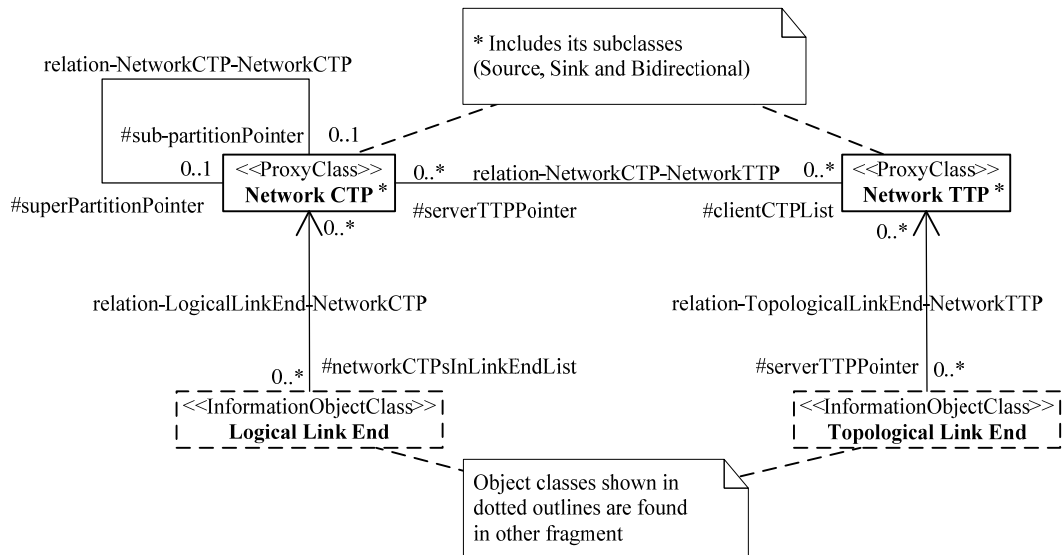
Figure 24 – ER diagram of termination point fragment – Network view (part 2)

7.2.2.7   Topology and connectivity fragment

The ER diagrams of the topology and connectivity fragment are presented in Figures 25 and 26.
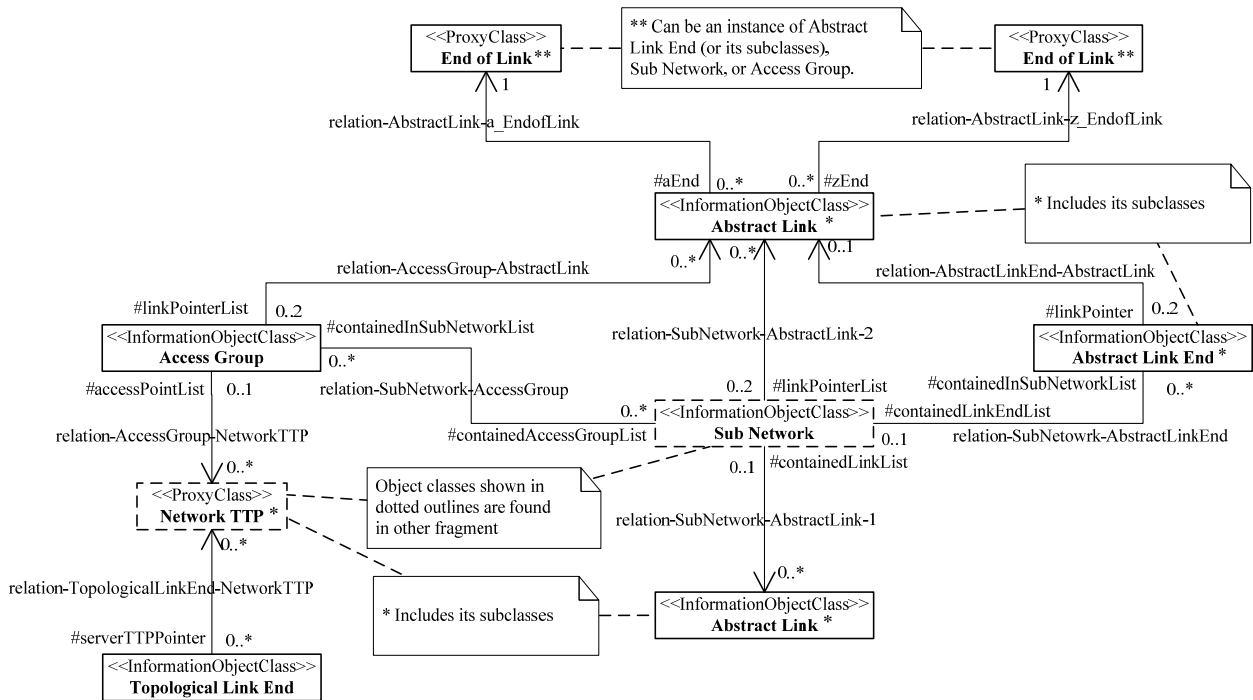
Figure 25 – ER diagram of topology and connectivity fragment (part 1)
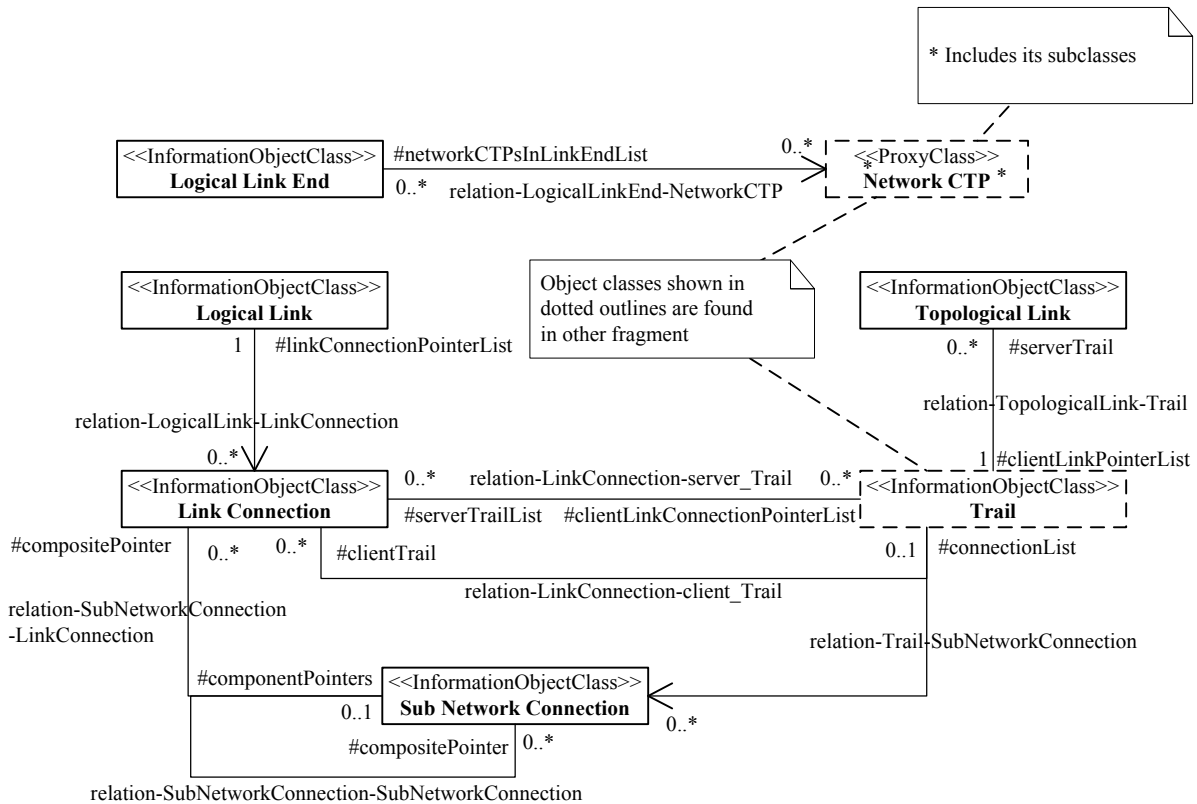
Figure 26 – ER diagram of topology and connectivity fragment (part 2)

7.2.2.8   ER diagram of telemetry fragment

The ER diagram of the telemetry fragment is presented in Figure 27.
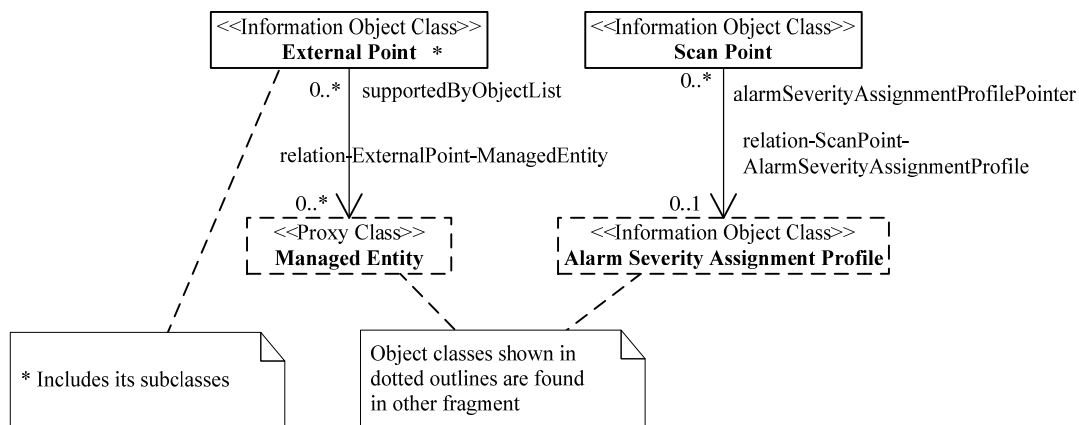
Figure 27 – ER diagram of telemetry fragment

7.2.2.9   ER diagram of transmission fragment

The ER diagrams of the trasmission fragment are presented in Figures 28 and 29.
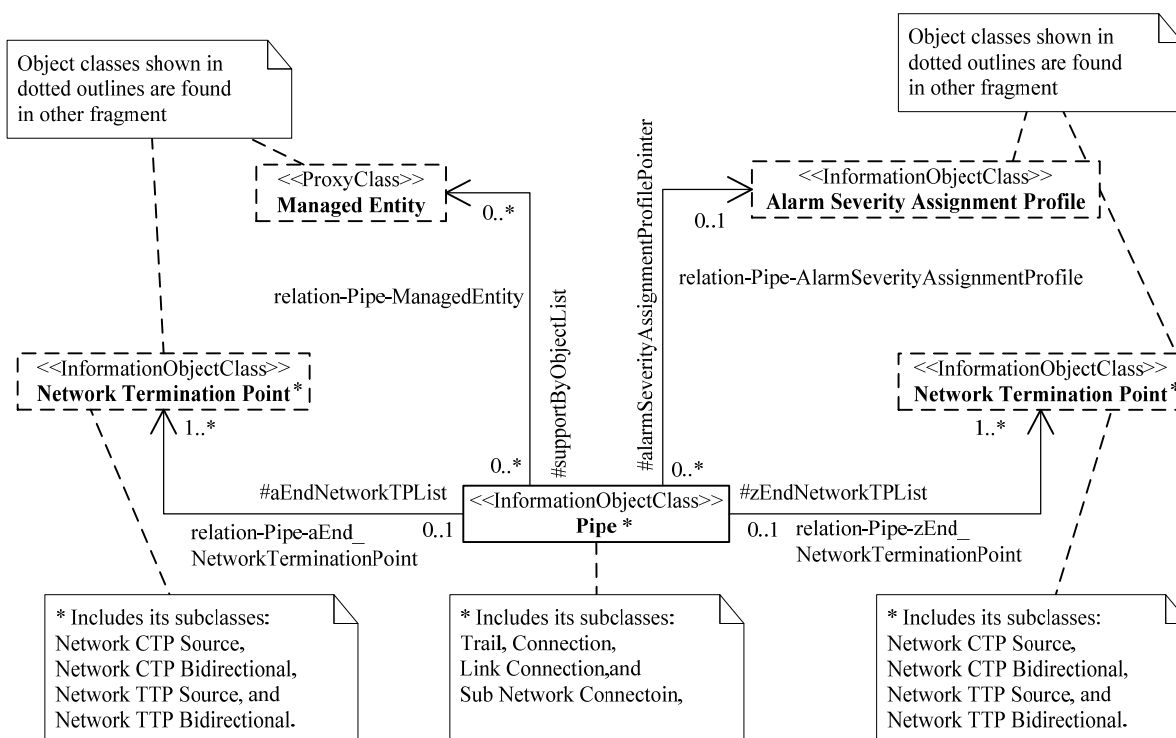
Figure 28 – ER diagram of transmission fragment (part 1)
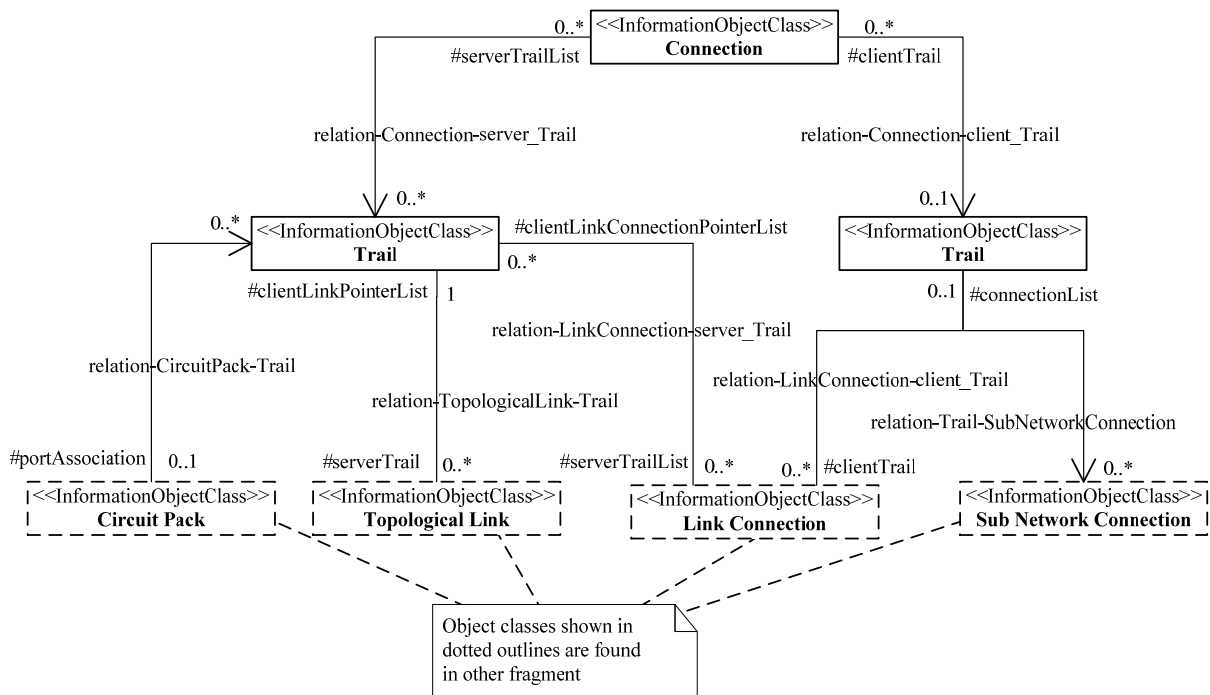
Figure 29 – ER diagram of transmission fragment (part 2)

7.2.2.10 ER diagram of cross-connection fragment

The ER diagram of the cross-connection fragment is presented in Figure 30.
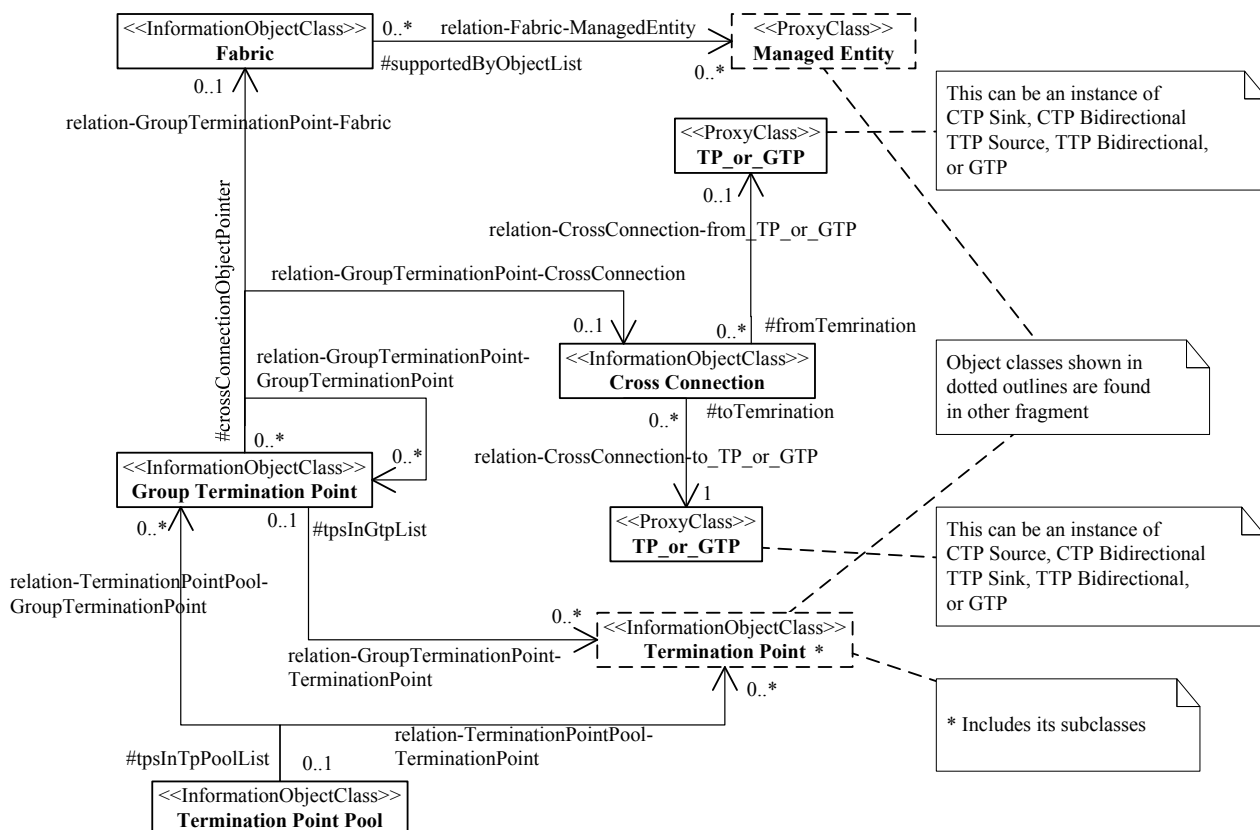
Figure 30 – ER diagram of cross-connection fragment

7.2.2.11 ER diagram of organization fragment

The ER diagram of the organization fragment is presented in Figure 31.
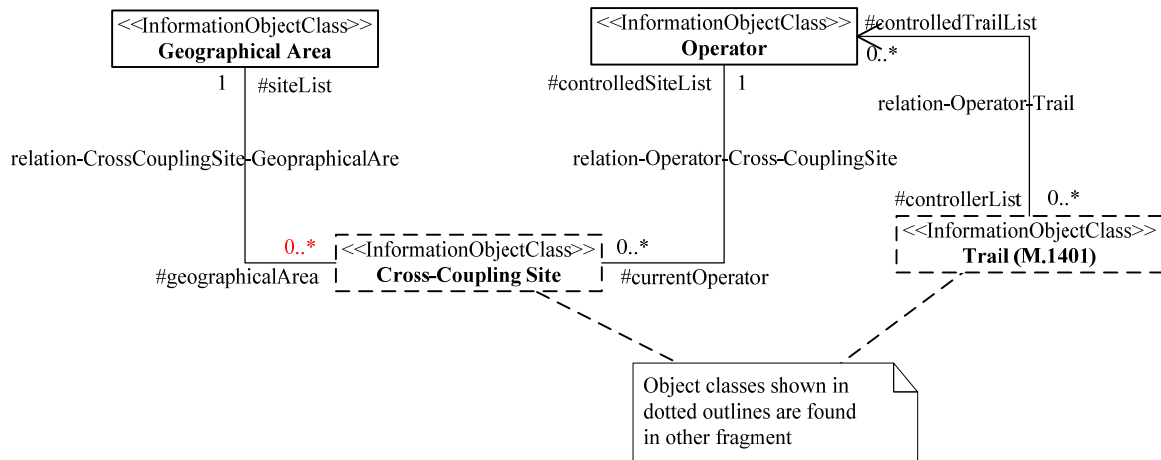
Figure 31 – ER diagram of organization fragment

7.2.2.12 ER diagram of connectionless network fragment

The ER diagram of the connectionless network fragment is presented in Figures 32, 33 and 34.
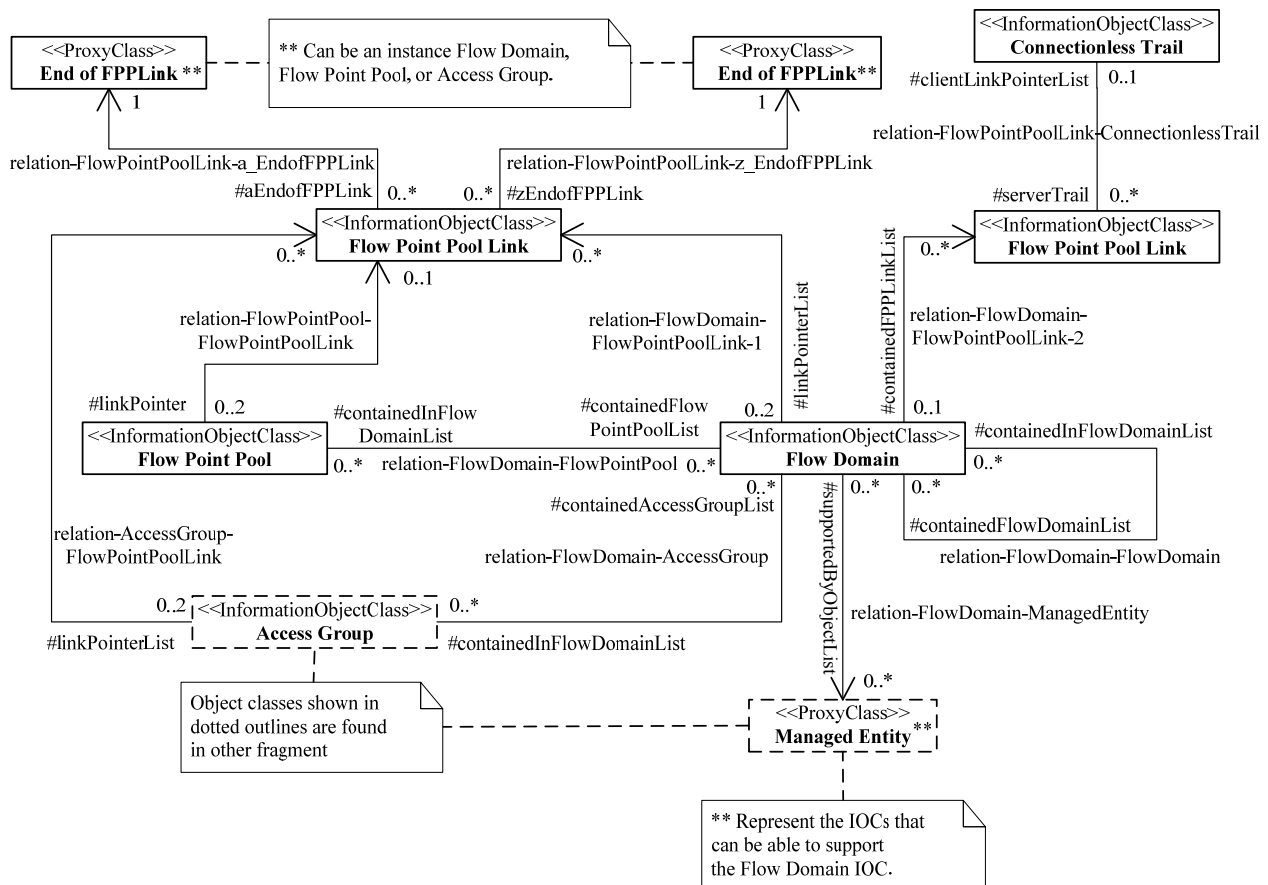
Figure 32 – ER diagram of connectionless network fragment (part 1)
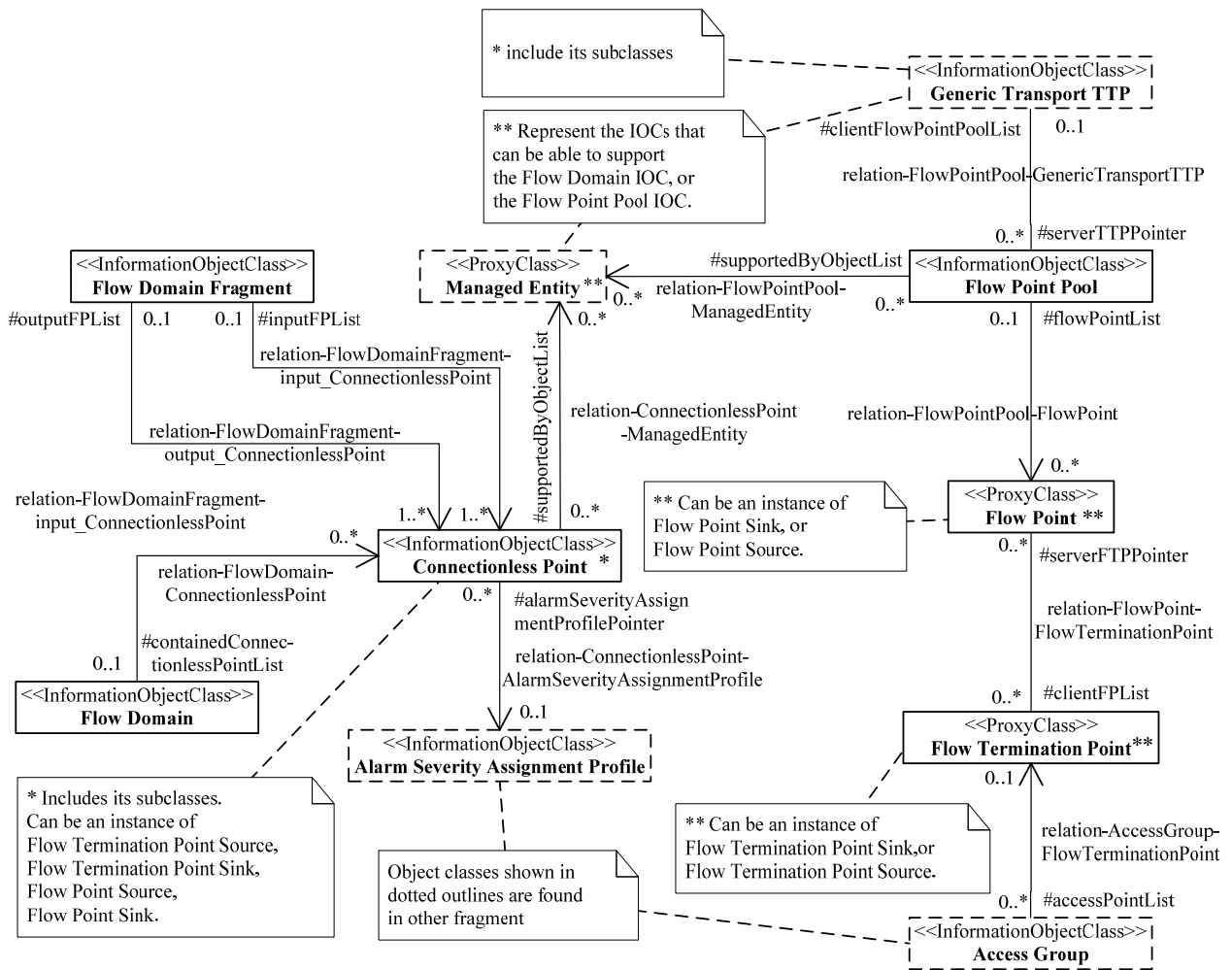
Figure 33 – ER diagram of the connectionless network (part 2)
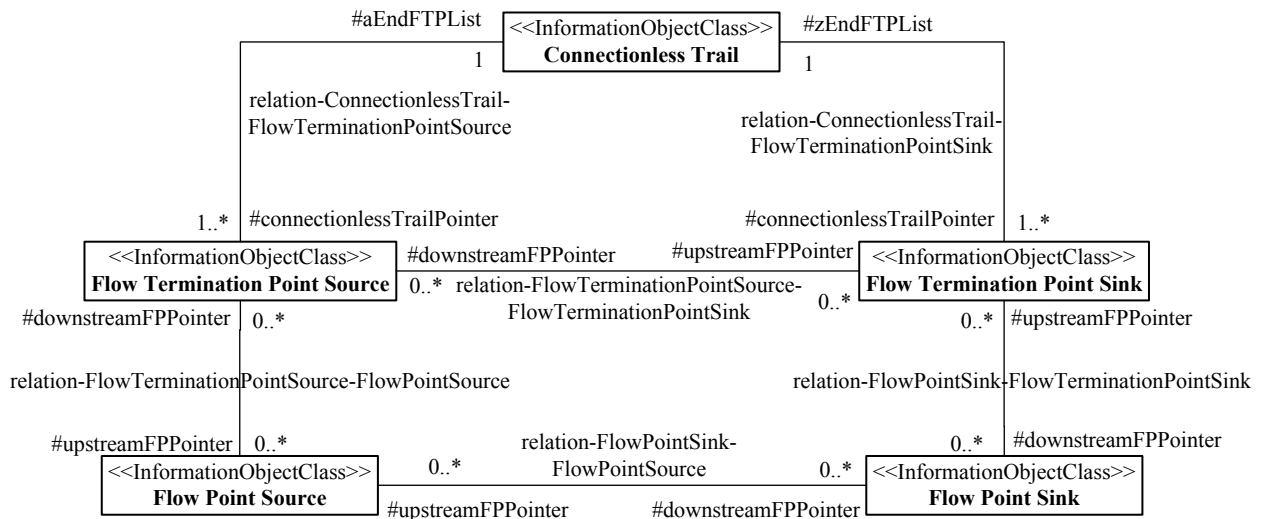
Figure 34 – ER diagram of the connectionless network (part 3)

7.2.3 Inheritance

7.2.3.1 Network fragment

The inheritance diagrams of the network fragment are presented in Figures 35 and 36.
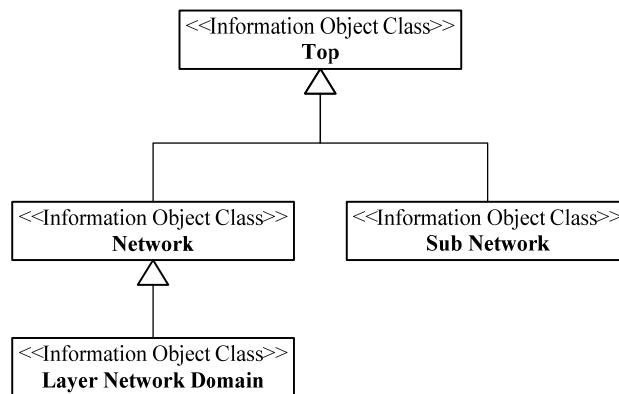
Figure 35 – Inheritance diagram of network fragment (part 1)
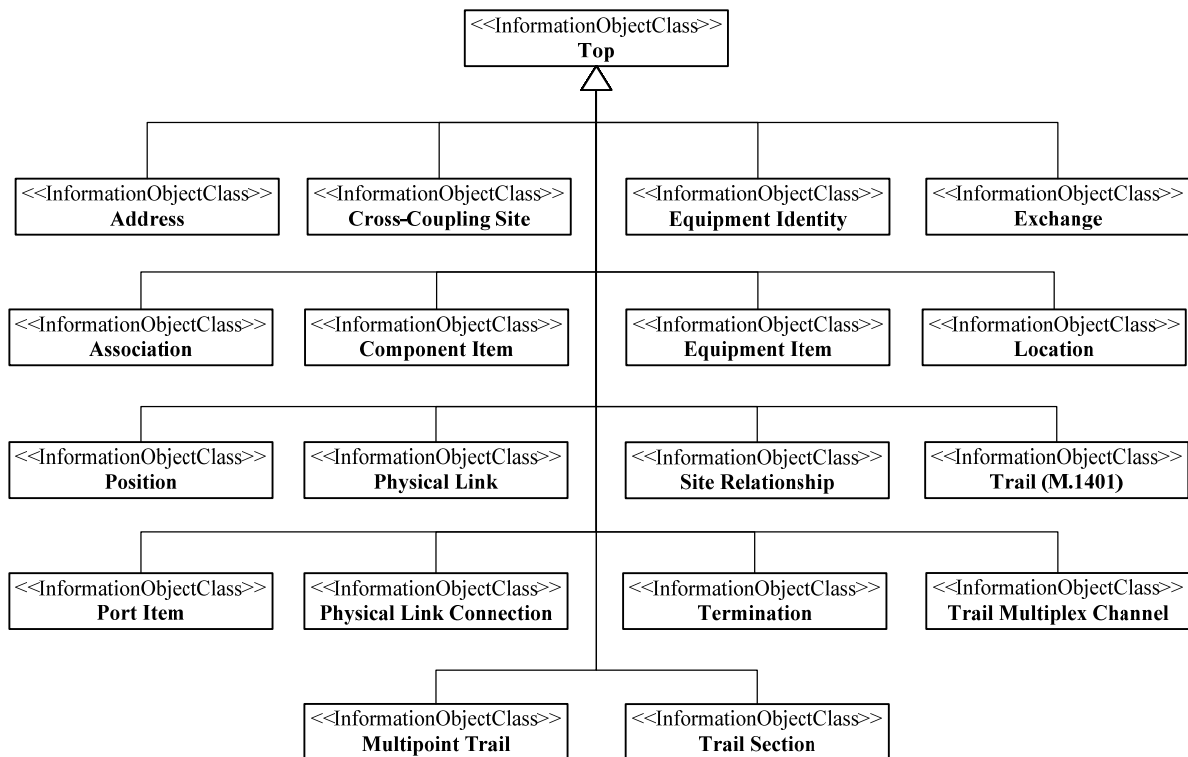
Figure 36 – Inheritance diagram of network fragment (part 2)

7.2.3.2 Managed element fragment

The inheritance diagram of the network element fragment is presented in Figure 37.
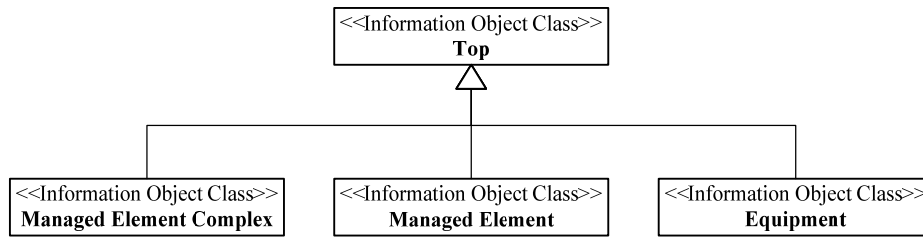
Figure 37 – Inheritance diagram of managed element fragment

7.2.3.3 Physical equipment fragment

The inheritance diagram of the physical equipment fragment is presented in Figure 38.
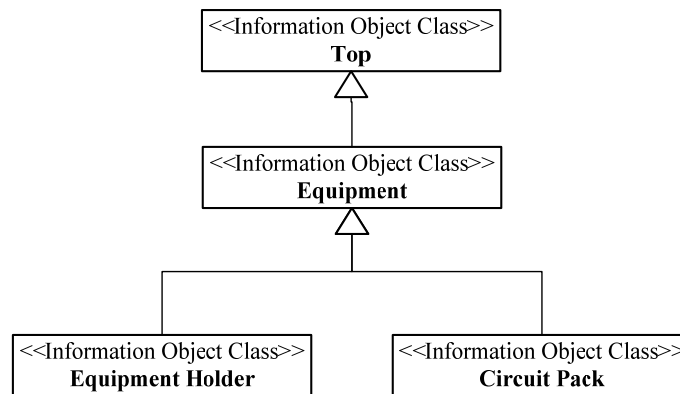
Figure 38 – Inheritance diagram of physical equipment fragment

7.2.3.4 Logical equipment fragment

The inheritance diagram of the logical equipment fragment is presented in Figure 39.
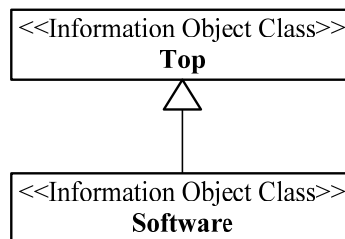
Figure 39 – Inheritance diagram of logical equipment fragment

7.2.3.5   Termination point fragment – Network element view

The inheritance diagram of the termination point fragment for the element view is presented in Figure 40.
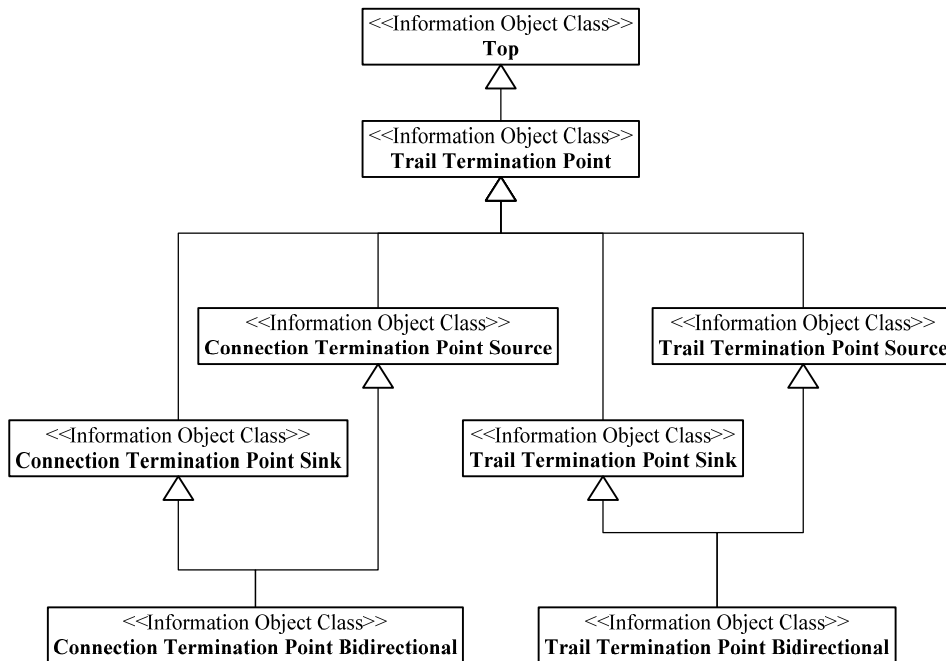
Figure 40 – Inheritance diagram of termination point fragment – Network element view

7.2.3.6   Termination point fragment – Network view

The inheritance diagram of the termination point fragment for the network view is presented in Figure 41.
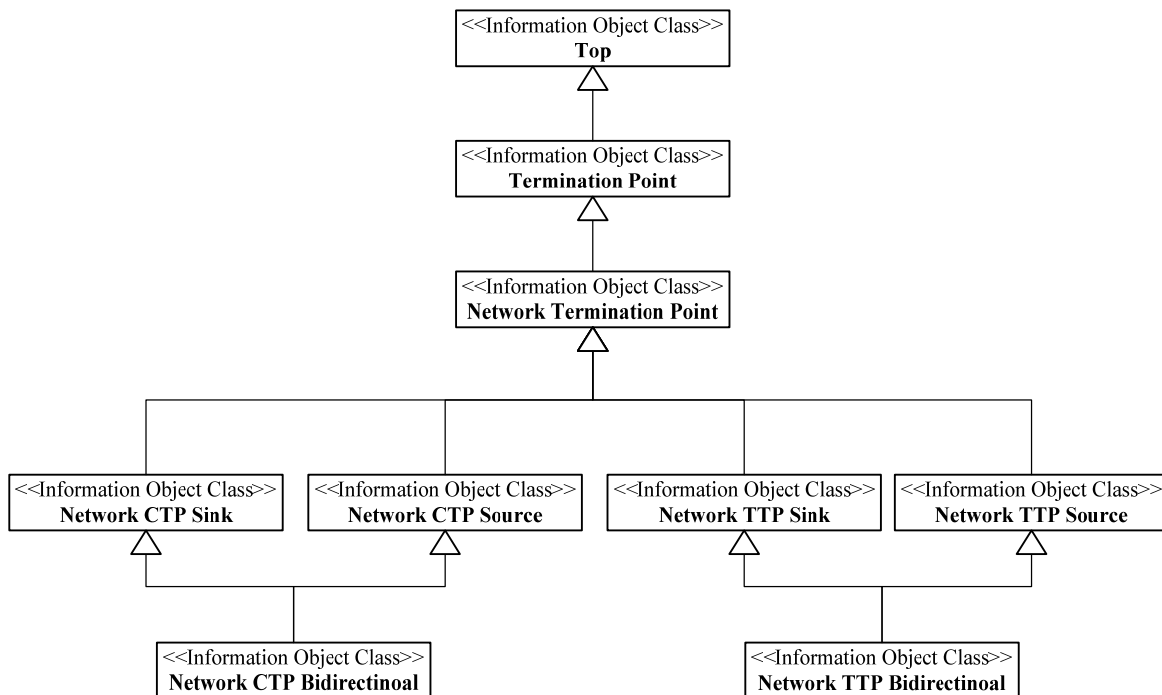
Figure 41 – Inheritance diagram of termination point fragment – Network view

7.2.3.7 Topology and connectivity fragment – Network view

The inheritance diagram of the topology and connectivity fragment is presented in Figure 42.
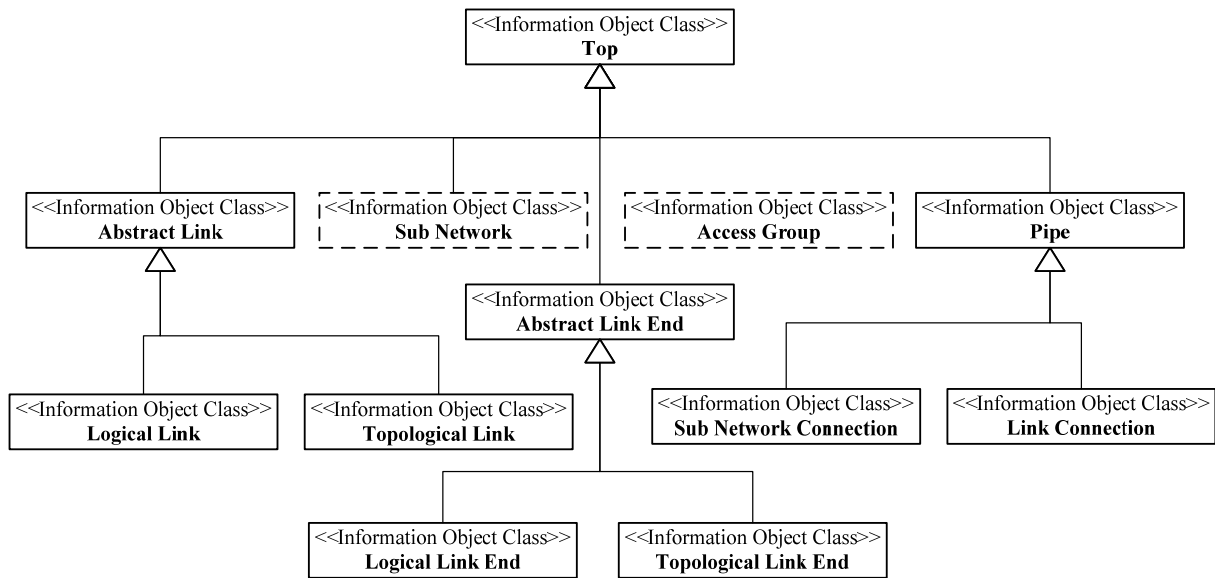
Figure 42 – Inheritance diagram of topology and connectivity fragment

7.2.3.8 Telemetry fragment

The inheritance diagram of the telemetry fragment is presented in Figure 43.
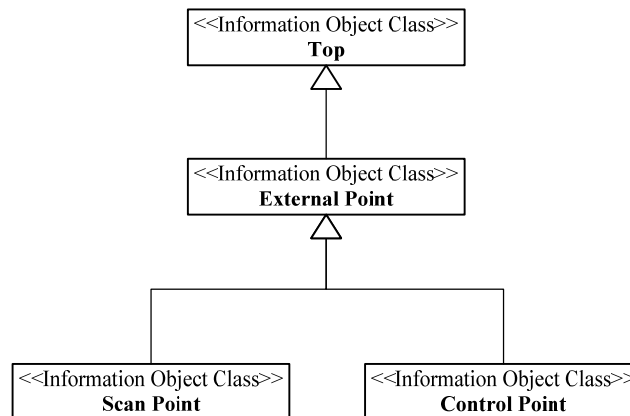
Figure 43 – Inheritance diagram of telemetry fragment

7.2.3.9 Transmission fragment

The inheritance diagram of the transmission fragment is presented in Figure 44.
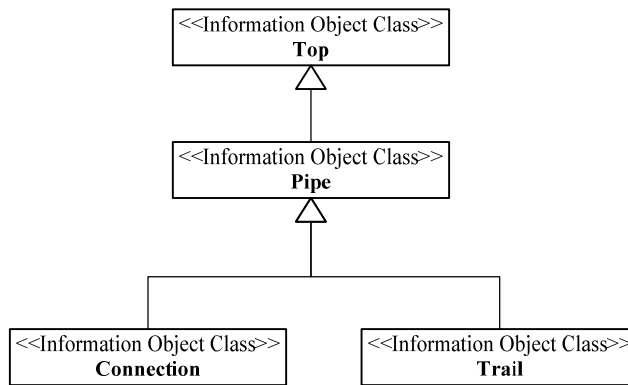
Figure 44 – Inheritance diagram of transmission fragment

7.2.3.10 Cross-connection fragment

The inheritance diagram of the cross-connection fragment is presented in Figure 45.
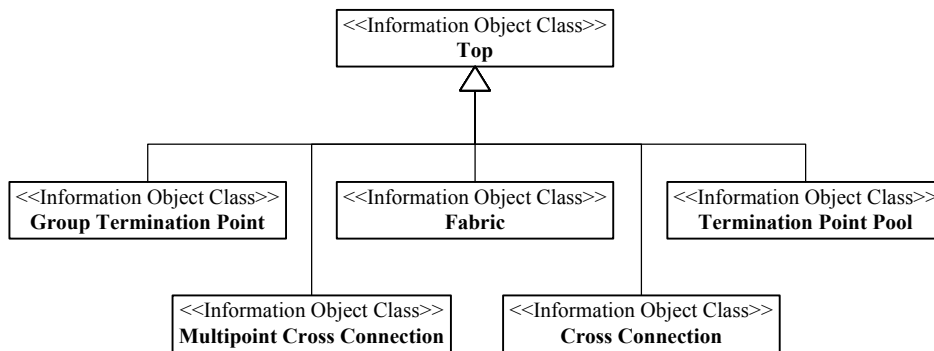
Figure 45 – Inheritance diagram of cross-connection fragment

7.2.3.11 Organization fragment

The inheritance diagram of the organization fragment is presented in Figure 46.
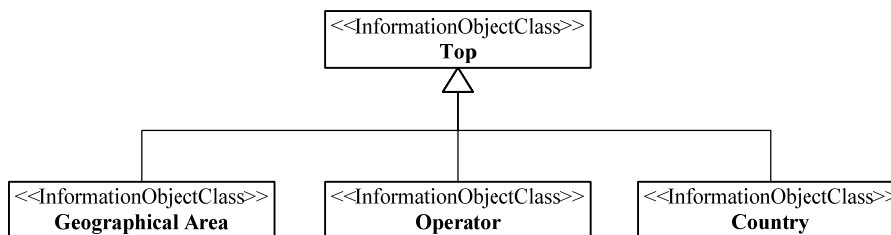
Figure 46 – Inheritance diagram of organization fragment

7.2.3.12 Connectionless network fragment

The inheritance diagrams of the connectionless network fragment are presented in Figures 47 and 48.
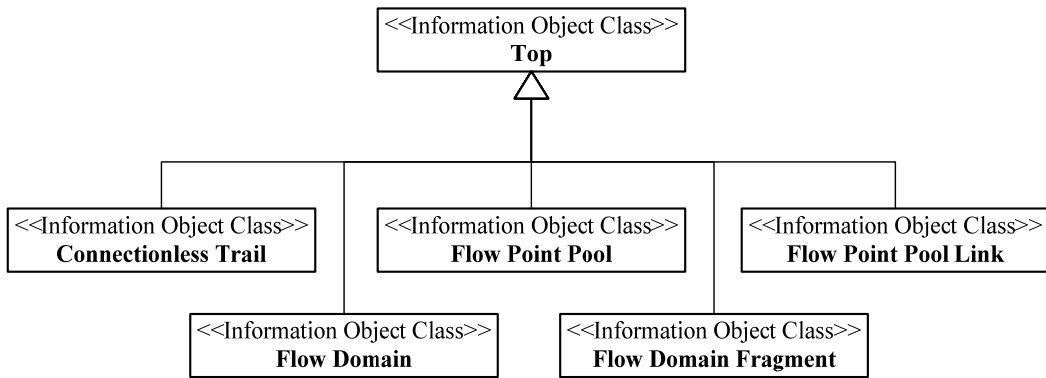
**Figure 47 – Inheritance diagram of connectionless
network fragment (part 1) – Network view**
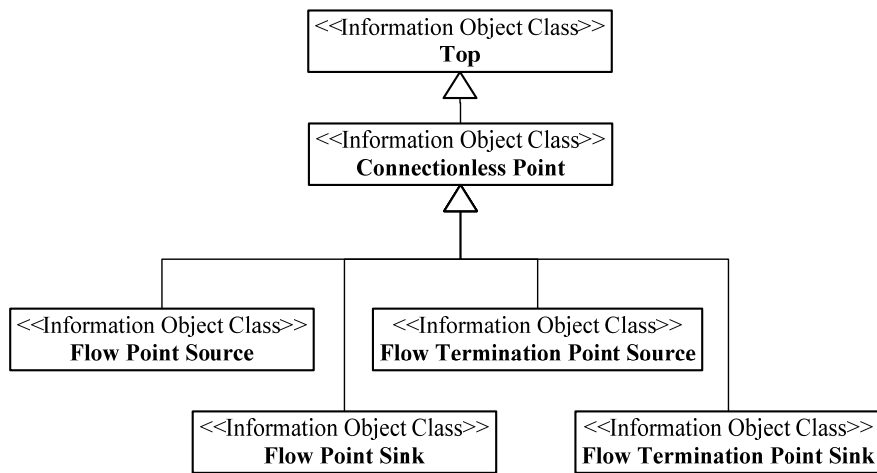
**Figure 48 – Inheritance diagram of connectionless
network fragment (part 2) – NE view**

7.2.3.13   Common objects fragment

The inheritance diagram of the common information objects fragment is presented in Figure 49.
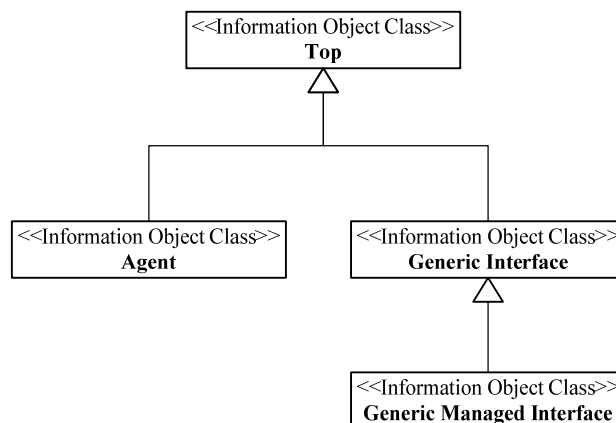
**Figure 49 – Inheritance diagram of common
information objects fragment**

7.3 Information object class definitions

7.3.1 Abstract Link

7.3.1.1 Definition

The abstract link IOC gives a topological description of the capacity between two adjacent Subnetworks, or two Link Ends; or a Subnetwork and an Access Group when Network trail termination points lie outside the boundary of the largest subnetwork.

7.3.1.2 Attributes

Table 1

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEnd	M	M	–	M	
availableLinkCapacity	M	M	–	–	
signalId	M	M	–	M	
usageCost	O	M	–	–	
userLabel	O	M	M	M	
zEnd	M	M	–	M	

7.3.1.3 Notifications

Table 2

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	M	
objectDeletion	M	

7.3.2 Abstract Link End

7.3.2.1 Definition

The Abstract Link End IOC is a class of managed objects which contains Network Connection Termination Points for the purpose of representing topology. The use made of individual attributes and notification is detailed below:

– available link end capacity: represents the spare capacity of the link end;

– link pointer: is a distinguished name of the related link managed object instance;

– contained in subnetwork list: is a distinguished name that represents the parent subnetwork of the logical link.

An attribute value change notification shall be emitted when the value of the availableLinkEndCapacity or the containedInSubNetworkList is changed.

7.3.2.2   Attributes

Table 3

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
availableLinkEndCapacity	M	M	–	–	
containedInSubNetworkList	O	M	M	M	
linkPointer	M	M	–	–	
signalId	M	M	–	–	
userLabel	O	M	M	M	

7.3.2.3   Notifications

Table 4

Name	Qualifier	Notes
attributeValueChange	M	
objectCreation	M	
objectDeletion	M	

7.3.3   Access Group

7.3.3.1   Definition

The Access Group IOC is a class of objects which groups Network Trail Termination Points of connection-oriented networks, or Flow Termination Points of connectionless network, for management purposes.

7.3.3.2   Attributes

Table 5

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
accessGroupId	M	M	–	–	
accessPointList	M	M	M	M	
containedInSubNetworkList	O	M	M	M	
containedInFlowDomainList	O	M	M	M	
linkPointerList	O	M	–	–	
signalId	M	M	–	–	
topologicalEndDirectionality	M	M	–	–	
userLabel	O	M	M	M	

7.3.3.3   Notifications

There are no notifications defined for this IOC.

7.3.4   Account

7.3.4.1   Definition

The Account IOC is a class of objects that provides information on agreed and delivered payments from a Customer.

7.3.4.2   Attributes

Table 6

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
accountContactList	O	M	M	M	
accountName	M	M	–	–	
additionalText	M	M	M	M	
contactObjectPtrList	O	M	M	M	

7.3.4.3   Notifications

There are no notifications defined for this IOC.

7.3.5   Address

7.3.5.1   Definition

An Address identifies a geographic location, which may contain a Cross-coupling site.

7.3.5.2   Attributes

Table 7

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
siteList	M	M	–	–	

Table 8

Name	Type	Description
siteList	LIST of ObjectInstance	An Address' subordinate Site is a role of a Cross-coupling site that is placed at the Address. An Address may have several Sites.

7.3.5.3   Notifications

There are no notifications defined for this IOC.

7.3.6   Agent

For further study.

7.3.7   Alarm Severity Assignment Profile

7.3.7.1   Definition

The alarm severity assignment profile IOC is a class of management support object that specifies the alarm severity assignment for managed objects.

7.3.7.2 Attributes

Table 9

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
alarmSeverityAssignmentList	M	M	M	M	
alarmSeverityAssignmentProfileId	M	M	–	M	

7.3.7.3 Notifications

Table 10

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	

7.3.8 Alarm reporting control (ARC) interval profile

7.3.8.1 Definition

This IOC defines the default alarm reporting control (ARC) intervals for the ARC states that support time-based transitions. An interval profile is only applicable for ARC states that automatically transition within an agent with time being a factor (but not necessarily the only factor) in the transition criteria from a mode of inhibited alarm reporting to a mode of allowed alarm reporting. Automatic agent state transitions from a mode of allowed alarm reporting to a mode of inhibited alarm reporting is prohibited. Support for this object is required only when settable intervals for the related ARC states are required.

7.3.8.2 Attributes

Table 11

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
arcDefaultNALMCDInterval	M	M	M	M	
arcDefaultNALMTIInterval	M	M	M	M	
arcIntervalProfileId	M	M	–	M	
userLabel	O	M	M	M	

7.3.8.3 Notifications

Table 12

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	

7.3.9 Association

7.3.9.1 Definition

An Association defines an ordered or unordered relationship between a Trail and some other Trails. The ordering is indicated by the Superior trail reference.

7.3.9.2 Attributes

Table 13

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
kind	M	M	–	–	
superiorTrail	O	M	–	–	
trailList	M	M	–	–	

Table 14

Name	Type	Description
kind	Kind ::= STRING (SIZE(2))	Kind indicates the usage of the Association. Kind is a 2-character field, adjusted to the left. S indicates reserve. In this case, Superior trail indicates the main trail, and Trail indicates the reserve trail.
superiorTrail	PointerOrNull	An Association's subordinate Superior trail is a role of a Trail that controls the Association. In case of an ordered relationship, the Association will have one and only one Superior trail. In case of an unordered relationship, the Association will have no Superior trail.
trailList	LIST of ObjectInstance	An Association's subordinate Trail is a role of a Trail being controlled by the Association. An Association must have one or more Trails. In case of an unordered relationship, the Association will have two or more Trails.

7.3.9.3 Notifications

There are no notifications defined for this IOC.

7.3.10 Attribute Ranges

7.3.10.1 Definition

The Attribute Ranges IOC allows the managed system to report the minimum and maximum values accepted by a certain attribute, as well as the granularity, or step increments, of the range.

Each Attribute Ranges instance contains ranges for attributes belonging to one IOC.

For each ManagedElement instance representing a network element, one or more Attribute Ranges instances may be created. Ranges are defined per ManagedElement instance. This allows for an attribute to have different ranges when it belongs to different network elements.

7.3.10.2   Attributes

Table 15

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
attributeRangesId	M	M	–	–	
kind	M	M	–	–	
ranges	M	M	–	–	

7.3.10.3   Notifications

There are no notifications defined for this IOC.

7.3.11   Circuit end point subgroup

7.3.11.1   Definition

A set of circuit end points that directly interconnects one exchange with another, having common values for the attributes listed in this package. Note that the term exchange includes PBX where applicable.

Annex A of [ITU-T E.410] contains additional information on circuit subgroup.

7.3.11.2   Attributes

Table 16

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
circuitDirectionality	M	M	–	–	
circuitEndPointSubgroupId	M	M	–	–	
informationTransferCapabilities	M	M	–	–	
labelOfFarEndExchange	M	M	–	–	
numberOfCircuits	M	M	–	–	
signallingCapabilities	M	M	–	–	
transmissionCharacteristics	M	M	–	–	
userLabel	M	M	M	M	

7.3.11.3   Notifications

Table 17

Name	Qualifier	Notes
attributeValueChange	M	
objectCreation	M	
objectDeletion	M	

7.3.12 Circuit Pack

7.3.12.1 Definition

The Circuit Pack IOC is a class of objects that represents a plug-in replaceable unit that can be inserted into or removed from the equipment holder of the network element.

Examples of plug-in cards include:

– line cards

– processors

– power supply units

The textType attribute (inherited from equipment) is used to indicate the type of the circuit pack. The value of this attribute should match one of the values of the acceptableCircuitPackTypeList attribute of the containing EquipmentHolder object.

The Circuit Pack may contain additional Circuit Pack objects.

7.3.12.2 Attributes

Table 18

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
acceptableCircuitPackTypeList	O	M	M	M	
administrativeState	M	M	M	M	
affectedObjectList	O	M	–	–	
alarmSeverityAssignmentProfilePointer	M	M	M	M	
alarmStatus	M	M	–	–	
availabilityStatus	M	M	–	–	
availableSignalRateList	O	M	–	–	
currentProblemList	M	M	–	–	
equipmentId	M	M	–	M	
locationName	O	M	M	M	
numberOfPorts	O	M	–	–	
operationalState	M	M	–	–	
replaceable	M	M	–	M	
portAssociations	O	M	–	–	
portSignalRateAndMappingList	O	M	M	M	
serialNumber	M	M	–	–	
supportedByObjectList	M	M	M	M	
typeText	M	M	–	M	
userLabel	O	M	M	M	
vendorName	O	M	M	M	
version	O	M	M	M	

7.3.12.3 Notifications

Table 19

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
environmentalAlarm	O	
equipmentAlarm	M	
objectCreation	M	
objectDeletion	M	
processingErrorAlarm	O	
stateChange	M	

7.3.13 Component Item

7.3.13.1 Definition

A Component item is a separate unit, e.g., a circuit card, within an Equipment item. A Component item has a specified Location, and a Component item has one or more Port items, which may provide inputs, outputs or both.

7.3.13.2 Attributes

Table 20

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
uniqueItemIdentification	M	M	–	–	
equipmentIdentity	M	M	–	–	
location	M	M	–	–	

Table 21

Name	Type	Description
identifier	STRING	A Component item is assigned a unique Identifier within the scope of the superior Equipment item.
uniqueItemIdentification	STRING	The manufacturer may assign a Unique item identification (UID) to a Component item.
equipmentIdentity	ObjectInstance	A Component item's subordinate Equipment identity is a role of an Equipment identity to which the Component item belongs.
location	ObjectInstance	A Component item's subordinate Location is a role of a Location subordinate to the Location of the Equipment item containing the Component item. Each Component item shall be assigned exactly one Location placement where the Component item can be found.

7.3.13.3 Notifications

There are no notifications defined for this IOC.

7.3.14 Connection

7.3.14.1 Definition

The Connection IOC is a class of objects responsible for the transparent transfer of information between connection termination points. A connection is a component of a trail. Several connections can be bundled into a higher rate trail. A sequence of one or more connections are linked together to form a trail. A connection may be either uni- or bidirectional.

7.3.14.2 Attributes

Table 22

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
a-TPInstance	M	M	–	M	
administrativeState	M	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
clientTrail	O	M	–	M	
connectionId	M	M	–	M	
currentProblemList	O	M	–	–	
directionality	M	M	–	–	
operationalState	M	M	–	–	
protected	O	M	–	M	
serverTrailList	O	M	–	M	
userLabel	O	M	M	M	
z-TPInstance	M	M	–	M	

7.3.14.3 Notifications

Table 23

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.15 Connectionless Point

7.3.15.1 Definition

The Connectionless Point IOC represents the termination of a transport entity, such as an instance representing a Connectionless Trail or a Flow Domain Fragment. Connectionless Point is the base class of Flow Point Source/Sink and Flow Termination Point Source/Sink. Connectionless Point is an abstract IOC used for inheritance purpose, and should not be instantiated. Connectionless Point provides a combined view of network level and network element level for the abstraction of commonalities of flow points.

7.3.15.2 Attributes

Table 24

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
locationName	O	M	M	M	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
supportedByObjectList	M	M	–	M	
signalId	M	M	–	M	
userLabel	O	M	M	M	

7.3.15.3 Notifications

Table 25

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.16 Connectionless Trail

7.3.16.1 Definition

Connectionless Trail represents the transfer of monitored adapted characteristic information of the client layer network between flow termination points. It is delimited by two flow termination points, one at each end of the connectionless trail. It represents the association between a source and destination on a per traffic unit or datagram basis. A connectionless trail is formed by associating flow terminations with a traffic unit or datagram. The aEndFTP attribute points to the instance of Flow Termination Point Source which sends the characteristic information, and the zEndFTP attribute Points to the instance of Flow Termination Point Sink which receives the characteristic information. A Connectionless Trail can only be unidirectional from the source to the sink.

7.3.16.2 Attributes

Table 26

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
aEndFTPList	M	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
clientLinkPointerList	O	M	–	–	
connectionlessTrailId	M	M	–	M	
currentProblemList	O	M	–	–	
operationalState	O	M	–	–	
userLabel	O	M	M	M	
signalId	M	M	–	M	
supportedByObjectList	O	M	M	M	
trafficDescriptor	O	M	M	M	
zEndFTPList	M	M	M	M	

7.3.16.3 Notifications

Table 27

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
communicationsAlarm	O	
stateChange	O	

7.3.17 Connection Termination Point Bidirectional

7.3.17.1 Definition

This IOC represents a termination point where a trail is both originated and terminated, i.e., the combined behaviour of the Connection Termination Point Sink and the Connection Termination Point Source object classes.

7.3.17.2 Attributes

Table 28

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
cTPId	O	M	–	M	
channelNumber	O	M	–	M	
characteristicInformation	O	M	–	M	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
downstreamConnectivityPointer	M	M	–	M	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
supportedByObjectList	M	M	–	–	
upstreamConnectivityPointer	M	M	–	M	

7.3.17.3 Notifications

Table 29

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.18 Connection Termination Point Sink

7.3.18.1 Definition

This IOC terminates a link connection. The downstream connectivity pointer attribute points to the termination point managed object, within the same managed element, that receives information (traffic) from this termination point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Trail Termination Point Sink, Trail Termination Point Bidirectional, Connection Termination Point Source, Connection Termination Point Bidirectional. The downstream connectivity pointer may identify one or more objects depending on whether the signal is connected to one or more termination point objects.

7.3.18.2   Attributes

Table 30

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
cTPId	O	M	–	M	
channelNumber	O	M	–	M	
characteristicInformation	O	M	–	M	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
downstreamConnectivityPointer	M	M	–	M	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
supportedByObjectList	M	M	–	–	

7.3.18.3   Notifications

Table 31

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.19   Connection Termination Point Source

7.3.19.1   Definition

This IOC originates a link connection. The upstream connectivity pointer attribute points to the termination point managed object, within the same managed element, that sends information (traffic) to this termination point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Trail Termination Point Source, Trail Termination Point Bidirectional, Connection Termination Point Sink, Connection Termination Point Bidirectional.

7.3.19.2 Attributes

Table 32

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
cTPId	O	M	–	M	
channelNumber	O	M	–	M	
characteristicInformation	O	M	–	M	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
supportedByObjectList	M	M	–	–	
upstreamConnectivityPointer	M	M	–	M	

7.3.19.3 Notifications

Table 33

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.20 Control Point

7.3.20.1 Definition

This IOC is used to control external devices associated with the managed system, such as relay closure for bell, lamp, generator, heater, or air conditioner. Each instance of this class represents one control point.

The current state of a control point can be either closed (i.e., activate) or open (i.e., released). A control point may optionally have a normal state (i.e., closed or open, one or the other).

The external device represented by a control point can be remotely operated through the 'control' action. A control operation can be momentary (i.e., momentarily close or open) or continuous (continuously close or open).

Valid control type of a control point may be momentary only, continuous only, or both. A control action will be denied if the control action type (continuous or momentary) is not valid for the control point.

7.3.21 Contact

7.3.21.1 Definition

This IOC refers to a person or organization having responsibility for one or more managed object instances.

Attributes whose values are names of other managed object instances (e.g., locationPointer) must have names of managed objects which actually exist.

The attributeValueChange notification is emitted when any of the following attributes change in value: contactDetails and telephoneNumberList. All attributeValueChange notifications shall include the Attribute Identifier List parameter. Conditions under which an attributeValueChange notification is emitted are stated in the behaviour of the appropriate package or attribute. In the absence of such a statement in the behaviour, the attribute does not cause an attributeValueChange notification to be emitted.

A value for the contactID attribute can only be provided when the object is created. Furthermore, once the object is created, the value of contactID may not be modified (i.e., the instance cannot be renamed). The contact object is created locally by the agent.

7.3.21.2 Attributes

Table 34

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
contactDetails	M	M	M	M	
contactCompany	O	M	M	M	
contactFunction	O	M	M	M	
contactID	M	M	–	M	
contactNames	O	M	M	M	
contactType	O	M	M	M	
electronicMailAddress	O	M	M	M	
facsimileTelephoneNumberList	O	M	M	M	
locationName	O	M	M	M	
telephoneNumberList	M	M	M	M	
typeText	O	M	M	M	
userLabel	O	M	M	M	

7.3.21.3 Notifications

Table 35

Name	Qualifier	Notes
attributeValueChange	M	
objectCreation	M	
objectDeletion	M	

7.3.22 Country

7.3.22.1 Definition

A Country with its Name and Country Code as defined in [ISO 3166-1].

7.3.22.2 Attributes

Table 36

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
code	M	M	–	–	
name	O	M	M	M	

Table 37

Name	Type	Description
code	STRING (SIZE(3))	The Country Code is a 3-character globally unique code that identifies each Country according to [ISO 3166-1].
name	STRING	The Country Name identifies a Country, dependency, or other area of particular geopolitical interest. Countries are assigned a globally unique Name in [ISO 3166-1].

7.3.22.3 Notifications

There are no notifications defined for this IOC.

7.3.23 Cross-connection

7.3.23.1 Definition

A managed object of this class represents an assignment relationship between the termination point or GTP object listed in the From Termination attribute and the termination point or GTP objects listed in the To Termination attribute of this managed object:

– The To Termination attribute will always be non-NULL.

– The From Termination attribute will only be NULL in the case of point-to-multipoint configurations.

If the From Termination attribute has a value of NULL, the assignment relationship is between the termination point object or the GTP object listed in the From Termination attribute of the containing Multipoint Cross-Connection managed object and the termination point object or GTP object listed in the To Termination attribute of this managed object.

A point-to-point cross-connection can be established between: one of CTP Sink, CTP Bidirectional, TTP Source, TTP Bidirectional, or GTP; and one of CTP Source, CTP Bidirectional, TTP Sink, TTP Bidirectional, or GTP.

In a unidirectional cross-connection, the termination or GTP object pointed to by the From Termination and the termination point or GTP object pointed to by the To Termination attribute (in this object or the containing mpCrossConnection) are related in such a way that traffic can flow between the termination points represented by these managed objects. In a bidirectional cross-connection, information flows in both directions.

If the objects listed in the From Termination and To Termination attributes are GTPs, the nth element of the From Termination GTP is related to the nth element of the To Termination GTP (for every n).

If the fromTermination attribute has a value of NULL, the directionality attribute must have the value 'unidirectional'.

The total rate of the From Terminations must be equal to the total rate of To Terminations.

The attribute Signal Type describes the signal that is cross-connected, and the termination points or GTPs that are cross-connected must have signal types that are compatible.

If an instance of this object class is contained in a multipoint cross-connection and the operational state of the containing multipoint cross-connection is 'disabled', the operational state of this object will also be 'disabled'.

The following are the definitions of the administrative state and the operational state attributes:

Administrative State:

–   Unlocked: The Cross-Connection object is administratively unlocked. Traffic is allowed to pass through the connection.

–   Locked: No traffic is allowed to pass through the Cross-Connection.

Operational State:

–   Enabled: The Cross-Connection is performing its normal function.

–   Disabled: The Cross-Connection is incapable of performing its normal cross-connection function.

7.3.23.2   Attributes

Table 38

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
crossConnectionId	M	M	–	–	
directionality	M	M	–	–	
fromTermination	M	M	–	–	
operationalState	M	M	–	–	
redline	O	M	M	M	
signalType	M	M	–	–	
toTermination	M	M	–	–	
userLabel	O	M	M	M	

7.3.23.3   Notifications

Table 39

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.24 Cross-Coupling Site

7.3.24.1 Definition

The Cross-coupling site allows termination of a Trail, e.g., in an exchange, at a subscriber's premises or other. In case of termination of the Trail, e.g., at the subscriber's premises or in an international transmission centre, the Operator's network is considered to exist at one side of the Cross-coupling site only, i.e., the Operator's network may not include the connection between the Cross-coupling site and the customer's equipment.

The Cross-coupling site allows cross-couplings to route a Trail through that node, and the Cross-coupling site allows cross-couplings between Trails within that Cross-coupling site. The cross-coupling may use internal equipment, termination points and internal Trails which are associated to the routed Trail.

The cross-couplings may be provided by automated management, e.g., in digital cross-connect or SDH network matrixes, or the cross-connect can be made manually as in a fibre matrix. However, a Cross-coupling site typically may contain more than a single piece of such Equipment items, and the individual Equipment item should not be registered as a Cross-coupling site.

A Cross-coupling site can be a transmission station, a radio station, a base station, an earth station, a distribution frame, or a junction box, which, as a special case, can be an end junction box.

A control station or sub-control station can be registered as a Cross-coupling site even if it may not provide for cross-couplings within that site.

A Cross-coupling site cannot be geographically distributed over more than one building. However, it is also permissible to define several Cross-coupling sites at the same Address. In this case, separate Trails and other resources shall be defined to route Trails between these Cross-coupling sites at the same Address.

A cross-coupling within a Cross-coupling site is typically made on the basis of a cross-coupling or routing order. Hence, the cross-couplings are considered to be semi-permanent. Junctions which contain permanent cross-couplings or permanently installed equipment are not Cross-coupling sites. Note that this permanently installed equipment outside Cross-coupling sites may still be subject to automatic surveillance by management functions.

A Cross-coupling site may contain one or more Exchanges, concentrators, routers and other equipment.

Cross-Coupling Sites of different Operators, e.g., in the same room, shall be defined as separate Cross-Coupling Sites. However, if the place is managed by one Operator only, the place should be defined as one Cross-Coupling Site locally to that Operator. The other Operator's Equipment items, Exchanges and Locations shall then be identified locally to this Operator's Cross-Coupling Site. Hence, registration of ownership of Equipment items is distinguished from naming of the Equipment items within the Cross-Coupling Site.

Aliases of Cross-Coupling Site identifiers are not permitted for communication between Operators of different Countries. However, Operators may exchange localIdentifiers that are local to a specific Operator, country or region.

Note that some Operators may use the Geographical Area name or an abbreviation for this, as a part of the Cross-Coupling Site identifier or for some of their Cross-Coupling Site Identifiers, while other Operators may not. Use of Geographical Area names may be useful for international Trails terminating in Geographical Areas, but may not be appropriate for Trails terminating in rural areas or even for local terminations in a Geographical Area. The name of the GeographicalArea, if any, will additionally be provided in the Cross-Coupling Site's subordinate Address.

An Operator is not required to limit the uniqueness of a siteDetail designation to a GeographicalArea or Operator, e.g., it could be globally unique.

Use of Local identifiers would be subject to national regulation and/or bilateral agreement between Operators, as stated in [ITU-T M.1400].

7.3.24.2 Attributes

Table 40

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
localIdentifier	M	M	–	–	
address	M	M	M	–	
a-EndSiteRelationshipList	M	M	M	–	
b-EndSiteRelationshipList	M	M	M	–	
currentOperator	M	M	M	–	
geographicalArea	M	M	M	–	
terminationList	M	M	M	–	

Table 41

Name	Type	Description
identifier	`Cross-CouplingSiteIdentifier ::= SEQUENCE { geographicalArea String, siteDetail String }`	The Identifier uniquely identifies the Cross-coupling site within the scope of an Operator. Cross-coupling sites of different Operators, e.g., in the same room, shall be defined as separate Cross-coupling sites. However, if the place is managed by one Operator only, the place should be defined as one Cross-coupling site locally to that Operator. The other Operator's Equipment items, Exchanges and Locations shall then be identified locally to this Operator's Cross-coupling site. Hence, registration of ownership of Equipment items is distinguished from naming of the Equipment items within the Cross-coupling site. Aliases of Cross-coupling site Identifiers are not permitted for communication between Operators of different Countries. However, Operators may exchange Local identifiers that are local to a specific Operator, country or region. Note that some Operators may use the name of the Geographical area, or an abbreviation for this, as a part of the Cross-coupling site Identifier or for some of their Cross-coupling site Identifiers, while other Operators may not. The name of the Geographical area, if any, will additionally be provided in the Cross-coupling site's subordinate Address. The identifier contains the following two fields: – geographicalArea : The Name of the Geographical area being referenced in the Cross-coupling site's subordinate Geographical area. See field length and use of characters in this Name. – siteDetail : An identifier of the Cross-coupling site that is at least unique within a Geographical area and an Operator. This requirement does not prohibit that someone choose to make the identifier independent of Geographical area or Operator. The identifier has up to six characters. Symbols that may be included are hyphen (-), underscore (_) and space ( ).
localIdentifier	`LocalIdentifier ::= String (SIZE (18))`	An identifier of the Cross-coupling site that is unique within an Operator, having up to 18 alphabetic and/or numeric characters. A Local identifier is specific to an Operator, country or region. Such use of Local identifiers would be subject to national regulation and/or bilateral agreement between Operators, as stated in [ITU-T M.1400].
address	`ObjectInstance`	A Cross-coupling site's subordinate Address is a role of an Address denoting a geographical location. A Cross-coupling site has one Address only, which is the physical location address of the Cross-coupling site. Note that the Cross-coupling site's subordinate Exchanges, Locations and Equipment items do not have separate references to Addresses, but their detailed addresses may be provided in address notes.
a-EndSiteRelationshipList	`SEQUENCE OF ObjectInstance`	A Cross-coupling site's A-end site relationship is a role of a Site relationship, of which the Cross-coupling site is referenced as an A-end site. A Cross-coupling site may have multiple A-end site relationships.

Table 41

Name	Type	Description
b-EndSiteRelationshipList	SEQUENCE OF ObjectInstance	A Cross-coupling site's B-end site relationship is a role of a Site relationship, of which the Cross-coupling site is referenced as a B-end site. A Cross-coupling site may have multiple B-end site relationships.
currentOperator	ObjectInstance	A Cross-coupling site's subordinate Current operator is a role of an Operator who is currently responsible for the Cross-coupling site. A Cross-coupling site may have one Current operator only. If the Current operator deviates from the superior Operator of the Cross-coupling site, it has to be explicitly provided.
geographicalArea	ObjectInstance	A Cross-coupling site's subordinate Geographical area is a role of a Geographical area subordinate to Country. The Name of this Geographical area is used as a part of the Cross-coupling site Identifier.
terminationList	SEQUENCE OF ObjectInstance	A Cross-coupling site's subordinate Termination is a role of a Trail's subordinate Termination. A Trail may have two Terminations, and a Cross-coupling site may have one or two Terminations for each Trail.

7.3.24.3   Notifications

There are no notifications defined for this IOC.

7.3.25   Current Alarm Summary Control

7.3.25.1   Definition

The Current Alarm Summary Control IOC is a class of support objects that provide the criteria for generation of current alarm summary reports. An object is included in a current alarm summary report if:

–   the object is included in the Object List (if the list is non-empty);

–   the object has an Alarm Status that is present in the Alarm Status List (if the list is non-empty);

–   the object has an alarm (or potential alarm) with a Perceived Severity and Probable Cause matching members of the Perceived Severity List (if non-empty) and Probable Cause List (if non-empty), respectively.

If the Object List is empty, then the criteria in the Current Alarm Summary Control are applied to all objects in the Managed System. If any of the other criteria are empty, then they are not used in selecting objects that will appear in the current alarm summary report.

A single object may appear in a report multiple times if it has multiple outstanding alarm conditions that match the Perceived Severity List and Probable Cause List criteria.

The semantics of associated attributes are as follows:

a)   *Alarm Status List*

The Alarm Status List attribute type describes criteria for inclusion in a current alarm summary report. The Alarm Status List consists of a set of possible Alarm Status. In order to be included in a current alarm summary report, an object shall have an Alarm Status that matches one of the states in the Alarm Status List.

If the Alarm Status List has a null value, the Alarm Status of the objects in the Object List is not used as a criterion for inclusion in the current alarm summary report.

b)   *Object List*

The Object List attribute type describes a set of object instances.

c)   *Perceived Severity List*

The Perceived Severity List attribute type describes criteria for inclusion in a current alarm summary report. It consists of a set of possible Perceived Severities. In order to be included in a current alarm summary report, an object must have an outstanding alarm (or potential alarm) that has a Perceived Severity that matches one of the elements in the Perceived Severity List.

If the Perceived Severity List has a null value, the Perceived Severity of the objects in the object list is not used as a criterion for inclusion in the current alarm summary report.

d)   *Probable Cause List*

The Probable Cause List attribute type describes criteria for inclusion in a current alarm summary report, consisting of a set of possible Probable Causes. In order to be included in a current alarm summary report, an object must have an outstanding alarm (or potential alarm) that has a Probable Cause that matches one of the elements in the Probable Cause List.

If the Probable Cause List has a null value, the Probable Cause of the objects in the object list is not used as a criterion for inclusion in the current alarm summary report.

7.3.25.2   Attributes

Table 42

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
alarmStatusList	M	M	M	M	
currentAlarmSummaryControlId	M	M	–	–	
objectList	M	M	M	M	
perceivedSeverityList	M	M	M	M	
probableCauseList	M	M	M	M	

7.3.25.3   Notifications

Table 43

Name	Qualifier	Notes
currentAlarmSummaryReport	M	

7.3.26   Equipment

7.3.26.1   Definition

The equipment IOC is a class of managed objects that represent physical components of a managed element, including replaceable components. An instance of this object class is present in a single geographic location. An equipment may be nested within another equipment, thereby creating a containment relationship.

7.3.26.2 Attributes

Table 44

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
affectedObjectList	O	M	–	–	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
currentProblemList	O	M	–	–	
equipmentId	M	M	–	M	
locationName	O	M	M	M	
operationalState	O	M	–	–	
replaceable	M	M	–	M	
serialNumber	M	M	–	–	
supportedByObjectList	M	M	M	M	
typeText	M	M	–	M	
userLabel	O	M	M	M	
vendorName	O	M	M	M	
version	O	M	M	M	

7.3.26.3 Notifications

Table 45

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
environmentalAlarm	O	
equipmentAlarm	O	
objectCreation	O	
objectDeletion	O	
processingErrorAlarm	O	
stateChange	O	

7.3.27 Equipment Identity

7.3.27.1 Definition

A category of equipment instances that may be characterized by a combination of:

- manufacturer name;
- manufacturer part number;
- manufacturer equipment version number;
- equipment category number;
- substitutability (upward/downward compatible replacement).

An Equipment identity may categorize a set of Equipment items, Component items, Port items, or Locations, but an Equipment identity cannot categorize items belonging to more than one of these classes simultaneously.

7.3.27.2 Attributes

Table 46

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
componentItemList	M	M	–	–	
equipmentItemList	M	M	–	–	
locationList	M	M	–	–	
portItemList	M	M	–	–	

Table 47

Name	Type	Description
identifier	String	A code that uniquely identifies a type of manufactured telecommunications network equipment or an assignable entity within a type of equipment. This code is assigned on behalf of the manufacturer.
componentItemList	SEQUENCE OF ObjectInstance	An Equipment identity's subordinate Component item is a role of a Component item belonging to the Equipment identity. An Equipment identity may relate to several Component items, and one Component item may relate to only one Equipment identity.
equipmentItemList	SEQUENCE OF ObjectInstance	An Equipment identity's subordinate Equipment item is a role of an Equipment item belonging to the Equipment identity. An Equipment identity may relate to several equipment items, and one Equipment item may relate to only one Equipment identity.
locationList	SEQUENCE OF ObjectInstance	An Equipment identity's subordinate Location is a role of a Location belonging to the Equipment identity. An Equipment identity may relate to several Locations, and one Location may relate to only one Equipment identity.
portItemList	SEQUENCE OF ObjectInstance	An Equipment identity's subordinate Port item is a role of a Port item belonging to the Equipment identity. An Equipment identity may relate to several Port items, and one Port item may relate to only one Equipment identity.

7.3.27.3 Notifications

There are no notifications defined for this IOC.

7.3.28 Equipment Item

7.3.28.1 Definition

An Equipment item provides a collection of functions and is considered as a unit from a placement point of view in a Location.

An Equipment item may be an Exchange, taking up a whole room, and it may be an individual circuit card.

7.3.28.2 Attributes

Table 48

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
uniqueItemIdentification	M	M	–	–	
equipmentIdentity	M	M	–	–	
exchange	M	M	–	–	
location	M	M	–	–	

Table 49

Name	Type	Description
identifier	`String`	An Equipment item is assigned a unique Identifier within the scope of its superior Cross-coupling site. Room identification may or may not be a part of the Equipment item Identifier. The Operator of the Cross-coupling site assigns the Equipment item Identifier, and different pieces of Equipment items within a Cross-coupling site may be owned or used by different entities. Aliases of Equipment item Identifiers are not permitted for communication between Operators. However, Operators may exchange additional Equipment item identifiers that are local to a specific Operator.
uniqueItemIdentification	`String`	The manufacturer may assign a Unique item identification (UID) to an Equipment item.
equipmentIdentity	`ObjectInstance`	An Equipment item's subordinate Equipment identity is a role of an Equipment identity to which the Equipment item belongs.
exchange	`ObjectInstance`	An Equipment item's subordinate Exchange is a role of an Exchange that is implemented by the Equipment item.
location	`ObjectInstance`	An Equipment item's subordinate Location is a role of a Location subordinate to the superior Cross-coupling site or a recursively subordinate Location. Each Equipment item shall be assigned exactly one Location placement where the Equipment item can be found.

7.3.28.3 Notifications

There are no notifications defined for this IOC.

7.3.29 Equipment Holder

7.3.29.1 Definition

The equipment holder IOC is a class of objects that represent physical resources of a network element that are capable of holding other physical resources. Examples of resources represented by instances of this object class are equipment bay, shelf and slot.

7.3.29.2 Attributes

Table 50

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
acceptableCircuitPackTypeList	O	M	M	M	
administrativeState	O	M	M	M	
affectedObjectList	O	M	–	–	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
currentProblemList	O	M	–	–	
equipmentHolderAddress	M	M	–	M	
equipmentHolderType	M	M	–	M	
equipmentId	M	M	–	M	
holderStatus	O	M	–	–	
locationName	O	M	M	M	
operationalState	O	M	–	–	
replaceable	M	M	–	M	
serialNumber	M	M	–	–	
subordinateCircuitPackSoftwareLoad	O	M	M	M	
supportedByObjectList	M	M	M	M	
typeText	M	M	–	M	
userLabel	O	M	M	M	
vendorName	O	M	M	M	
version	O	M	M	M	

7.3.29.3 Notifications

Table 51

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
environmentalAlarm	O	
equipmentAlarm	O	
objectCreation	O	
objectDeletion	O	
processingErrorAlarm	O	
stateChange	O	

7.3.30 Exchange

7.3.30.1 Definition

An Exchange is an entity that directs individual calls, packages or cells.

Exchanges can be switches, concentrators or routers. Exchanges can be customer exchanges or transit exchanges. Intelligent Network servers and Operations Support System servers are not Exchanges and are not Cross-coupling sites. A Cross-coupling site may contain several Exchanges of various types.

7.3.30.2 Attributes

Table 52

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
no	M	M	–	–	
equipmentItem	M	M	–	–	

Table 53

Name	Type	Description
no	String	The number No uniquely identifies an Exchange within the scope of a Cross-coupling site. The managing Operator of the superior Cross-coupling site decides the numbering.
		Note that it is permissible to define a Cross-coupling site for each Exchange or a set of Exchanges at the same Address. In this case, separate Trails and other resources are required to route Trails between these Cross-coupling sites at the same Address. See also under Cross-coupling site.
equipmentItem	ObjectInstance	An Exchange's subordinate Equipment item is a role of an Equipment item subordinate to a Cross-coupling site. The Exchange object class role is provided due to the specific identification of Exchanges different from identification of Equipment item in general. The reference via Equipment item provides a reference to the placement of the Exchange in a specific Location, e.g., in a room.

7.3.30.3 Notifications

There are no notifications defined for this IOC.

7.3.31 External Point

7.3.31.1 Definition

The External Point IOC is a superclass for Control Point and Scan Point IOCs which are used to control external devices or monitor external conditions respectively. This object class contains common aspects of Control Point and Scan Point object classes. The operational state and administrative state represent the state of the control and scan functions, i.e., not the state of the external entity.

7.3.31.2 Attributes

Table 54

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
externalPointId	M	M	–	M	
externalPointMessage	M	M	M	M	
locationName	O	M	M	M	
operationalState	M	M	–	–	
supportedByObjectList	M	M	–	–	

7.3.31.3 Notifications

Table 55

Name	Qualifier	Notes
attributeValueChange	M	
objectCreation	M	
objectDeletion	M	
stateChange	M	

7.3.32 Fabric

7.3.32.1 Definition

The fabric IOC represents the function of managing the establishment and release of cross-connections. It also manages the assignment of termination points to TP Pools and GTPs.

Administrative State:

– Unlocked: The fabric is allowed to perform its normal functions. Operations will be accepted to set up or remove cross-connections, to rearrange TP Pools, to add/remove termination points to/from GTPs.

– Locked: The fabric is not allowed to perform its normal functions. No operations will be accepted. No new cross-connection can be setup or removed, no TP Pool can be rearranged, and no termination points can be added/removed to/from GTPs.

Operational State:

– Enabled: When the fabric is in the enabled operational state, it may be fully-operational or partially-operational (partially operational is indicated by the availability status attribute), e.g.:

a) set up or remove any cross-connection;

b) rearrange TP Pools; and

c) add/remove termination points to/from GTPs.

– Disabled: The fabric is incapable of performing its normal function.

7.3.32.2 Attributes

Table 56

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
availabilityStatus	M	M	–	–	
fabricId	M	M	–	M	
listOfCharacteristicInfo	M	M	–	M	
operationalState	M	M	–	–	
supportedByObjectList	M	M	M	M	

7.3.32.3 Notifications

Table 57

Name	Qualifier	Notes
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.33 Flow Domain

7.3.33.1 Definition

The Flow Domain IOC represents the logical collections of flow (termination) points that are available for the purpose of transferring information. A Flow Domain instance exists within a single layer network. The attribute containedFlowDomainList will be null if there are no contained Flow Domains. The attribute containedInFlowDomainList will also be null if there are no containing (parent) Flow Domains.

7.3.33.2 Attributes

Table 58

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
availabilityStatus	O	M	–	–	
containedAccessGroupList	O	M	M	M	
containedFlowDomainList	O	M	M	M	
containedFlowPointPoolList	O	M	M	M	
containedFPList	O	M	M	M	
containedFPPLinkList	O	M	M	M	
containedInFlowDomainList	O	M	M	M	
flowDomainId	M	M	–	–	
linkPointerList	O	M	–	–	
operationalState	O	M	–	–	

Table 58

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
signalId	M	M	–	M	
supportedByObjectList	O	M	M	M	
usageState	O	M	–	–	
userLabel	O	M	M	M	

7.3.33.3 Notifications

Table 59

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.34 Flow Domain Fragment

7.3.34.1 Definition

The Flow Domain Fragment IOC represents a transport entity which transfers a grouping of traffic units (information) transparently across a flow domain. The Flow Domain Fragment is a class of objects that associate the flow point object(s) at the boundary of a flow domain, which are identified in the inputFPList attribute and the flow point object(s) listed in the outputFPList attribute of this managed object.

7.3.34.2 Attributes

Table 60

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
availabilityStatus	O	M	–	–	
fDFrConnectionType	O	M	–	M	
fDFrId	M	M	–	–	
inputFPList	M	M	M	M	
operationalState	O	M	–	–	
outputFPList	M	M	M	M	
protected	O	M	–	M	
userLabel	O	M	M	M	

7.3.34.3 Notifications

Table 61

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	
attributeValueChange	O	
stateChange	O	

7.3.35 Flow Point Pool

7.3.35.1 Definition

The Flow Point Pool IOC represents a subset of the Flow Points at the edge of one Flow Domain that are associated through the FPP Link with a corresponding subset of Flow points at the edge of another Flow Domain or access group for the purpose of transferring characteristic information.

This IOC is used to represent the termination of an FPP Link at a network layer. Flow Point Pools are managed entities that may represent certain kind of interfaces, such as UNI or NNIs, at a given layer. Flow Point Pools terminate FPPLinks for the purpose of representing topology. FPPs also contain Flow Points of the Flow Domain Fragment that are terminated on or traverse the interface.

7.3.35.2 Attributes

Table 62

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
containedInFlowDomainList	O	M	–	M	
currentProblemList	O	M	–	–	
flowPointList	O	M	M	M	
flowPointPoolId	M	M	–	M	
linkPointer	M	M	–	M	
fppDirectionality	M	M	–	M	
maxFPPAssignableCapacity	M	M	–	M	
operationalState	O	M	–	–	
serverTTPPointer	O	M	–	M	
supportedByObjectList	O	M	–	M	
totalFPPCapacity	M	M	–	M	
userLabel	O	M	M	M	

7.3.35.3 Notifications

Table 63

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	
attributeValueChange	O	

7.3.36 Flow Point Pool Link (FPPLink)

7.3.36.1 Definition

The Flow Point Pool Link IOC represents the topological relationship and available capacity between a pair of flow domains, or a flow domain and an access group, or a pair of access groups.

The serverTrail attribute is a pointer to the trail in the server layer network domain that supports this FPP Link. The serverTrail attribute may be null if the trail in the server layer network domain that supports this topological link is not assigned.

The totalFPPLinkCapacity attribute indicates the total amount of bandwidth available (both ingress and egress).

7.3.36.2 Attributes

Table 64

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEndofFPPLink	M	M	M	M	
fPPLinkId	M	M	M	–	
serverTrail	M	M	–	–	
signalId	M	M	–	M	
totalFPPLinkCapacity	O	M	–	–	
usageCost	O	M	–	–	
userLabel	O	M	M	M	
zEndofFPPLink	M	M	M	M	

7.3.36.3 Notifications

Table 65

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	
attributeValueChange	O	

7.3.37 Flow Point Sink

7.3.37.1 Definition

The Flow Point Sink IOC terminates link flows and/or originates flow domain flows. The resource receives information (traffic), via a link flow, from an instance representing Flow Point Source, and sends it on, via a flow domain flow, to instances representing either Flow Point Sources or a Flow Termination Point Sink in the same Flow Domain. This IOC inherits from IOC Connectionless Point.

The downstream FP pointer attribute points to the Connectionless Point IOC instances, within the same managed element, that receive information (traffic) from this flow point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Flow Termination Point Sink, Flow Point Source. The downstream FP pointer may identify one or more objects depending on whether the signal is pointed to one or more connectionless point objects.

7.3.37.2 Attributes

Table 66

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
fpId	C:M (Note)	M	–	M	
locationName	O	M	M	M	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
serverFTPPointer	O	M	–	–	
supportedByObjectList	M	M	–	M	
signalId	M	M	–	M	
upstreamFPPointer	M	M	–	M	
userLabel	O	M	M	M	
NOTE – The condition is if this IOC has an instance.					

7.3.37.3 Notifications

Table 67

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	
attributeValueChange	O	
stateChange	O	
communicationsAlarm	O	

7.3.38 Flow Point Source

7.3.38.1 Definition

The Flow Point Source IOC originates link flows and/or terminates flow domain flows. The resource sends information (traffic), via a line flow, to instances representing Flow Point Sink, and receives it, via a flow domain flow, from an instance representing either a Flow Point Sink or a Flow Termination Point Source in the same Flow Domain. This IOC inherits from IOC Connectionless Point.

The upstream FP pointer attribute points to the Connectionless Point IOC instances, within the same managed element, that send information (traffic) to this flow point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Flow Termination Point Source, Flow Point Sink.

7.3.38.2 Attributes

Table 68

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
serverFTPPointer	O	M	–	–	
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
downstreamFPPointer	M	M	–	M	
fpId	C:M (Note)	M	–	M	
locationName	O	M	M	M	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
serverFTPPointer	O	M	–	–	
supportedByObjectList	M	M	–	M	
signalId	M	M	–	M	
NOTE – The condition is if this IOC has an instance.					

7.3.38.3   Notifications

Table 69

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	
attributeValueChange	O	
stateChange	O	
communicationsAlarm	O	

7.3.39   Flow Termination Point Sink

7.3.39.1   Definition

The Flow Termination Point Sink IOC represents a class of managed objects that terminates connectionless trails. It represents the access point in a layer network which is a focus for both the trail relationship and the client/server relationship. This IOC inherits from IOC Connectionless Point.

The operational state reflects the perceived ability to receive a valid signal. If the flow termination point detects that a signal received has failed or it is unable to process the incoming signal, then the operational state will have the value disabled.

When the administrative state is locked, the flow termination point is administratively removed from service. When the administrative state is unlocked, the flow termination point is administratively in service. Changes to the administrative state have no effect on the connectionless trail pointer.

A change in the operational state shall cause a state change notification. If the administrative state is present in an instance of flow termination point sink IOC, it shall not emit a state change notification. However, subclasses of flow termination point sink IOC may modify this behaviour to require this notification. Subclasses of flow termination point sink shall specify the attributes for which attribute value change notifications should be generated.

The upstream FP pointer attribute points to the connectionless point IOC, within the same managed element, which sends information (traffic) to this flow termination point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Flow Point Sink (single or a concatenated sequence) or Flow Termination Point Source.

7.3.39.2   Attributes

Table 70

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
clientFPList	O	M	–	–	
connectionlessTrailPointer	O	M	M	–	

Table 70

ftpId	C:M (Note)	M	–	M	
locationName	O	M	M	M	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
supportableClientList	O	M	–	M	
supportedByObjectList	M	M	–	M	
upstreamFPPointer	M	M	–	M	
userLabel	O	M	M	M	
NOTE – The condition is if this IOC has an instance.					

7.3.39.3   Notifications

Table 71

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	
attributeValueChange	O	
stateChange	O	
communicationsAlarm	O	

7.3.40   Flow Termination Point Source

7.3.40.1   Definition

The Flow Termination Point Source IOC represents a class of managed objects that originates connectionless trails. It represents the access point in a layer network which is a focus for both the trail relationship and the client/server relationship. This IOC inherits from IOC Connectionless Point.

The operational state reflects the perceived ability to generate a valid signal. If the flow termination point detects that a valid signal cannot be generated, then the operational state will have the value disabled.

When the administrative state is locked, the flow termination point is administratively removed from service. When the administrative state is unlocked, the flow termination point is administratively in service. Changes to the administrative state have no effect on the connectionless trail pointer.

A change in the operational state shall cause a state change notification. If the administrative state is present in an instance of flow termination point source IOC, it shall not emit a state change notification. However, subclasses of flow termination point source IOC may modify this behaviour to require this notification. Subclasses of flow termination point source shall specify the attributes for which attribute value change notifications should be generated.

The downstream FP pointer attribute points to the Connectionless Point Flow Point Source or Flow Termination Point Sink IOC, within the same managed element, which receives information (traffic) from this flow termination point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Flow Point Source (single or a concatenated sequence or a set if pointed to more than one flow point source objects) or Flow Termination Point Sink (single or a set if pointed to more than one flow termination point sink objects).

7.3.40.2 Attributes

Table 72

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
clientFPList	O	M	–	–	
connectionlessTrailPointer	O	M	M	–	
downstreamFPPointer	M	M	–	M	
ftpId	C:M (Note)	M	–	M	
locationName	O	M	M	M	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
supportedByObjectList	M	M	–	M	
userLabel	O	M	M	M	
clientFPList	O	M	–	–	
NOTE – The condition is if this IOC has an instance.					

7.3.40.3 Notifications

Table 73

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	
attributeValueChange	O	
stateChange	O	
communicationsAlarm	O	

7.3.41 Generic interface

For further study.

7.3.42 Generic management interface

For further study.

7.3.43 Generic transport TTP

7.3.43.1 Definition

The Generic Transport TTP IOC is used to represent a physical port or endpoints of transport connections. It may be used by technology-specific models as an abstraction of an underlying transport layer.

7.3.43.2 Attributes

Table 74

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
clientFlowPointPoolList	O	M	M	M	
clientLinkEndPointerList	M	M	M	M	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
potentialCapacity	O	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
supportedByObjectList	M	M	–	–	
ttpPortID	O	M	–	–	
userLabel	O	M	M	M	

7.3.43.3 Notifications

Table 75

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.44 Geographical area

7.3.44.1 Definition

The Geographical Area IOC defines a geographical or administrative area defined by the authorities of that Country.

Different spellings dependent on the user are not permissible. In case the spelling given by the authorities exceeds 12 characters, or is not unique with 12 characters only, the Administration in that Country is responsible for assigning a unique identifier.

7.3.44.2 Attributes

Table 76

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
name	M	M	–	–	
siteList	M	M	–	–	

Table 77

Name	Type	Description
name	`String(SIZE(1..12))`	Name of the Geographical area as spelled by the authorities in that Country, i.e., in a national language of that Country. Note that different spellings dependent on the user are not permissible. Geographical area Name has up to 12 characters. Upper- and lower-case letters are permitted. Symbols that may be included in Geographical area Name are hyphen (-), underscore (_) and space ( ). In case the spelling given by the authorities exceeds 12 characters or is not unique with 12 characters only, the Administration in that Country is responsible for assigning a unique identifier.
siteList	`SEQUENCE OF ObjectInstance`	A Geographical area's subordinate Site is a role of a Cross-coupling site subordinate to Operator. This referenced Cross-coupling site's Identifier contains the Geographical area Name.

7.3.44.3 Notifications

There are no notifications defined for this IOC.

7.3.45 Group Termination Point (gtp)

7.3.45.1 Definition

This IOC represents a group of termination points treated as a single unit for management purposes such as cross-connections. The signalType attribute describes the composition of the GTP. When a termination point is involved in a GTP, it cannot be cross-connected independently of that GTP.

7.3.45.2 Attributes

Table 78

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
crossConnectionObjectPointer	M	M	–	–	
gtpId	M	M	–	–	
signalType	M	M	–	–	
tpsInGtpList	M	M	–	–	

7.3.45.3 Notifications

Table 79

Name	Qualifier	Notes
objectCreation	O	
objectDeletion	O	

7.3.46 Layer Network Domain

7.3.46.1 Definition

This IOC represents a transport administrative domain in which all resources pertain to the same ITU-T G.805 layer. It represents the topological aspects of the transport network layer. The signalId can be set upon creation of an instance of the Layer Network Domain to support the following typical operations:

a)   set the signalId value upon creation of the layer network domain;

b)   set the signalId attribute of a subnetwork (or abstract link, etc.) based on the value of the layer network domain instance referenced in the create request.

7.3.46.2 Attributes

Table 80

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
networkId	M	M	–	–	
signalId	M	M	–	M	
systemTitle	M	M	M	M	
userLabel	O	M	M	M	

7.3.46.3 Notifications

There are no notifications defined for this IOC.

7.3.47 Link Connection

7.3.47.1 Definition

The Link Connection IOC is a class of objects responsible for the transparent transfer of information between Network Connection Termination Points. A Link Connection may be a component of a Trail. A sequence of one or more Link Connections (and subnetwork connections) may be linked together to form a Trail.

A Link Connection may be either uni- or bidirectional.

A point-to-point unidirectional Link Connection can be established between a Network connection termination point source or Network connection termination point bidirectional; and a Network connection termination point sink or Network connection termination point bidirectional.

A point-to-point bidirectional Link Connection can be established between a Network connection termination point bidirectional; and a Network connection termination point bidirectional.

An operation to create a Link Connection will not be successful and will fail with an invalid TP type if a requested endpoint is a Network Trail Termination Point. For all types of Link Connection, the network termination point(s) pointed to by the A End attribute is related to the network termination point(s) pointed to by the Z End attribute in such a way that traffic can flow between the network termination points represented by these managed objects in a unidirectional or bidirectional manner as indicated by the directionality attribute.

7.3.47.2 Attributes

Table 81

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEndNetworkTPList	M	M	–	M	
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
clientTrail	O	M	–	M	
compositePointer	O	M	–	–	
connectionId	M	M	–	–	
currentProblemList	O	M	–	–	
directionality	M	M	–	–	
operationalState	O	M	–	–	
protected	O	M	–	M	
qualityOfConnectivityService	O	M	–	–	
serverTrailList	O	M	–	M	
signalId	M	M	–	M	
supportedByObjectList	O	M	M	M	
userLabel	O	M	M	M	
zEndNetworkTPList	M	M	–	M	

Table 82

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.48 Location

7.3.48.1 Definition

A Location is a subdivision of a Cross-coupling site. It is an object in which resources, such as Exchanges, Equipment items and termination points, are placed. It should be noted that the term "Location" is here given a particular meaning local to Cross-coupling site, and that this definition may not apply for the generic term location.

A Location can be a room, a frame, a rack, a block, a shelf or a slot in a shelf, and these may contain subordinate Locations recursively, with the following structure:

- S<> 'Location' Location: The recursion is indicated by the subordinate Location class inheriting properties by the S(chema) reference to its superior Location class.

7.3.48.2 Attributes

Table 83

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
uniqueItemIdentification	M	M	–	–	
componentItem	M	M	–	–	
equipmentIdentity	M	M	–	–	
equipmentItem	M	M	–	–	

Table 84

Name	Type	Description
identifier	`String`	The Identifier of a Location uniquely identifies a Location within a superior Location or Cross-coupling site. The Identifier may consist of both digits and letters. The Location Identifier is assigned by the Operator of the Cross-coupling site.
uniqueItemIdentification	`String`	The manufacturer may assign a Unique item identification (UID) to a Location.
componentItem	`ObjectInstance`	A Location's subordinate Component item is a role of a Component item of an Equipment item in this Location.
equipmentIdentity	`ObjectInstance`	A Location's subordinate Equipment identity is a role of an Equipment identity to which the Location belongs.
equipmentItem	`ObjectInstance`	A Location's subordinate Equipment item is a role of an Equipment item being placed in this Location.

7.3.48.3 Notifications

There are no notifications defined for this IOC.

7.3.49 Logical link

7.3.49.1 Definition

A logical link IOC represents a link that may be administratively composed of link connections or bandwidth that may be provided by one or more topological links or other logical links.

7.3.49.2 Attributes

Table 85

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEnd	M	M	–	M	
availableLinkCapacity	M	M	–	–	
linkConnectionPointerList	O	M	M	M	
linkDirectionality	M	M	–	–	
linkId	M	M	–	–	
signalId	M	M	–	M	
usageCost	O	M	–	–	
userLabel	O	M	M	M	
zEnd	M	M	–	M	

7.3.49.3 Notifications

Table 86

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	M	
objectDeletion	M	

7.3.50 Logical Link End

7.3.50.1 Definition

The Logical Link End IOC represents the end of a logical link. When present, the Network CTPs In Link End List Package identifies the network CTPs that are present in the Logical Link End.

7.3.50.2 Attributes

Table 87

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
availableLinkEndCapacity	M	M	–	–	
containedInSubNetworkList	O	M	M	M	
linkEndId	M	M	–	–	
linkPointer	M	M	–	–	
logicalEndDirectionality	M	M	–	–	
networkCTPsInLinkEndList	O	M	–	–	
signalId	M	M	–	–	
userLabel	O	M	M	M	

7.3.50.3 Notifications

Table 88

Name	Qualifier	Notes
attributeValueChange	M	
objectCreation	M	
objectDeletion	M	

7.3.51 Managed element

7.3.51.1 Definition

The managed element IOC is a class of objects representing telecommunications equipment or TMN entities (either groups or parts) within the telecommunications network that performs managed element functions, i.e., provides support and/or service to the subscriber. Managed elements may or may not additionally perform mediation/OS functions. A managed element communicates with the manager (directly or indirectly) over one or more standard Q-interfaces for the purpose of being monitored and/or controlled. A managed element contains equipment that may or may not be geographically distributed.

7.3.51.2 Attributes

Table 89

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	M	M	–	–	
currentProblemList	O	M	–	–	
externalTime	O	M	M	M	
locationName	O	M	M	M	
managedElementId	M	M	–	–	
managedElementType	M	M	–	–	
modelCode	M	M	–	–	
neAliases	O	M	–	–	
operationalState	M	M	–	–	
systemTimingSource	O	M	M	M	
systemTitle	M	M	M	M	
usageState	M	M	–	–	
userLabel	O	M	M	M	
vendorName	O	M	M	M	
version	O	M	M	M	

7.3.51.3 Notifications

Table 90

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	M	
environmentalAlarm	M	
equipmentAlarm	M	
objectCreation	O	
objectDeletion	O	
processingErrorAlarm	M	
stateChange	O	

7.3.52 Managed Element Complex

7.3.52.1 Definition

The Managed Element Complex IOC is a class of managed objects that represent a collection of network elements. A manager can reference and manage one or more NEs belonging to the complex represented by an instance of this object class.

7.3.52.2 Attributes

Table 91

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
managedElementComplexId	M	M	–	–	
systemTitle	M	M	M	M	

7.3.52.3 Notifications

Table 92

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	

7.3.53 Multipoint cross-connection

7.3.53.1 Definition

The multipoint cross-connection IOC represents an assignment relationship between the termination point or GTP object listed in the fromTermination attribute and the termination point or GTP objects listed in the toTermination attributes of the contained cross-connection object instances.

A multipoint cross-connection can be established between one of CTP Sink, CTP Bidirectional, TTP Source, TTP Bidirectional, or GTP; and a set whose members are CTP Source, CTP Bidirectional, TTP Sink, TTP Bidirectional, or GTP.

The fromTermination attribute will always be non-NULL. The termination point or GTP object pointed to by the fromTermination attribute is related to all the termination point or GTP objects pointed to by the toTermination attribute of the contained crossConnection managed objects in such a way that traffic can flow between the termination points represented by these managed objects. Information flows from the From Termination to the To Termination of the contained cross-connection objects.

If the objects listed in the fromTermination attribute and in the toTermination attribute of the contained crossConnection objects are GTPs, the nth element of the From Termination GTP is related to the nth element of the To Termination GTP (for every n). The total rate of the fromTerminations must be equal to the total rate of toTerminations in each contained cross-connection object. The attribute Signal Type describes the signal that is cross-connected. The termination points or GTPs that are cross-connected must have signal types that are compatible. The following are the definitions of the administrative state and the operational state attributes:

Administrative State:

–	Unlocked: The mpCrossConnection object is administratively unlocked. It allows traffic to pass through each contained connection depending on its administrative state.

–	Locked: No traffic is allowed to pass through the Cross-Connection between the cross-connected termination points. The effect of this value overrides the effect of the administrative state of each contained cross-connection.

Operational State: The operational state of a Multipoint Cross-Connection object reflects the overall health of the cross-connection including all the Cross-Connection objects contained in the Multipoint Cross-Connection.

–   Enabled: The Cross-Connection performs its normal function. Note that some (but not all) of the cross-connection objects contained in the Multipoint Cross-Connection may be disabled.

–   Disabled: The Cross-Connection is incapable of performing its normal cross-connection function. All the cross-connection objects contained in the Multipoint Cross-Connection are disabled.

Availability Status:

The supported values for this attribute are:

–   In test

–   Degraded:

The Multipoint Cross-Connection is degraded in some respect. For instance, if one or more (but not all) Cross-Connection objects contained in the Multipoint Cross-Connection are disabled, the Multipoint Cross-Connection will be considered as degraded. The Multipoint Cross-Connection remains available for service (i.e., its operational state is enabled) while it is degraded.

–   Empty SET.

When the attribute value change notification is present, the attributeValueChange notification shall be emitted when userLabel or redline changes value (when the attributes are present). When the state change notification package is present, the stateChange notification shall be emitted when operationalState or administrativeState changes value.

7.3.53.2 Attributes

Table 93

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
availabilityStatus	M	M	–	–	
fromTermination	M	M	–	–	
mpCrossConnectionId	M	M	–	–	
operationalState	M	M	–	–	
redline	O	M	M	M	
signalType	M	M	–	–	
userLabel	O	M	M	M	

7.3.53.3 Notifications

Table 94

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.54 Multipoint Trail

7.3.54.1 Definition

A Multipoint trail is a connected set of Trails that are connecting three or more endpoints. A Multipoint trail can reside within one Cross-coupling site, or it may connect two or more Cross-coupling sites.

7.3.54.2 Attributes

Table 95

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
localIdentifier	M	M	–	M	
trailList	M	M	M	M	

Table 96

Name	Type	Description
identifier	String	The Identifier uniquely identifies the Multipoint trail within the scope of an Operator. This means that if the resources of a Multipoint trail are shared between Operators, each Operator may assign its local Identifier to the Multipoint trail. This scheme is different from Identifiers of Trails within the Multipoint trail, as they are identified locally to Site relations.
localIdentifier	String(SIZE(1..26))	An identifier of a Multipoint trail that is unique within an Operator, having up to 26 alphabetic and/or numeric characters. A Local identifier is specific to an Operator, country or region. Such use of Local identifiers would be subject to national regulation and/or bilateral agreement between Operators, as stated in [ITU-T M.1400].
trailList	SEQUENCE OF ObjectInstance	A Multipoint trail's subordinate Trail is a role of a Trail that is contained in the Multipoint trail.

7.3.54.3 Notifications

There are no notifications defined for this IOC.

7.3.55 Named cross-connection

7.3.55.1 Definition

The Named Cross-Connection IOC is a subclass of Cross-Connection with two (additional) mandatory attributes:

– Redline: This attribute identifies whether the associated object instance is red lined, e.g., identified as being part of a sensitive circuit;

– CrossConnectionName: This attribute is a descriptive name for the cross-connection object instance.

7.3.55.2 Attributes

Table 97

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
crossConnectionId	M	M	–	–	
crossConnectionName	M	M	M	M	
directionality	M	M	–	–	
fromTermination	M	M	–	–	
operationalState	M	M	–	–	
redline	M	M	M	M	
signalType	M	M	–	–	
toTermination	M	M	–	–	
userLabel	O	M	M	M	

7.3.55.3 Notifications

Table 98

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.56 Named multipoint cross-connection

7.3.56.1 Definition

The Named Multipoint Cross-Connection IOC is a subclass of Multipoint Cross-Connection with two (additional) mandatory attributes:

– Redline: This attribute identifies whether the associated object instance is red lined, e.g., identified as being part of a sensitive circuit;

– CrossConnectionName: This attribute is a descriptive name for the multipoint cross-connection object instance.

7.3.56.2 Attributes

Table 99

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
availabilityStatus	M	M	–	–	
crossConnectionName	M	M	M	M	
fromTermination	M	M	–	–	
mpCrossConnectionId	M	M	–	–	
operationalState	M	M	–	–	
redline	M	M	M	M	
signalType	M	M	–	–	
userLabel	O	M	M	M	

7.3.56.3 Notifications

Table 100

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.57 Network

7.3.57.1 Definition

The Network IOC is a class of objects that are collections of interconnected telecommunications and management objects (logical or physical) capable of exchanging information. These objects have one or more common characteristics, for example, they may be owned by a single customer or provider, or associated with a specific service network.

A network may be nested within another (larger) network, thereby forming a containment relationship.

An example of a network that is contained in another network is a transmission sub-network. It is owned by a single Administration and can only perform transmission functions.

7.3.57.2 Attributes

Table 101

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
networkId	M	M	–	–	
systemTitle	M	M	M	M	
userLabel	O	M	M	M	

7.3.57.3 Notifications

There are no notifications defined for this IOC.

7.3.58 Network CTP Bidirectional

7.3.58.1 Definition

This IOC represents a termination point where a Link Connection or a Subnetwork Connection is both originated and terminated, i.e., the combined behaviour of the Network CTP Source and Network CTP Sink IOCs.

7.3.58.2 Attributes

Table 102

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
channelNumber	O	M	–	M	
characteristicInformation	O	M	–	M	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
cTPId	O	M	–	M	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
serverTTPPointer	O	M	–	–	

Table 102

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
sub-partitionPointer	O	M	–	–	
superPartitionPointer	O	M	–	–	
supportedByObjectList	M	M	–	–	
userLabel	O	M	M	M	

7.3.58.3   Notifications

Table 103

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.59   Network CTP Sink

7.3.59.1   Definition

The Network CTP Sink IOC is a class of objects that terminates Link connections and/or originates Subnetwork Connections. The resource receives information (traffic), via a Link connection, from an instance representing a NetworkConnection Termination Point, and sends it on, via a Subnetwork Connection, to instances representing either NWCTP Sources or a NWTTP Sink in the same Subnetwork.

An instance of this class may only have connectivity relationships (link connection or subnetwork connection) with instances that represent Network Connection Termination Points, Source or Bidirectional, which are at the same layer.

An instance of this class may be subnetwork connected, via a Subnetwork Connection, to a single instance which represents a Network Trail Termination Point, Sink or Bidirectional, at the same layer.

The Subnetwork Connection Pointer attribute points to the managed object representing the relationship with the network termination point(s), within the same Subnetwork, that receive(s) information (traffic) from this network termination point, or is null.

The referenced managed object shall represent a Subnetwork Connection. Where the NWCTP sink participates in many subnetwork connections for different subnetworks, the Subnetwork Connection Pointer is null. Any network termination points identified by the related Subnetwork Connection indicate that a relationship exists, but this does not indicate that information can flow between the network termination points. This capability is indicated by a combination of the State Attributes including the Operational State.

The Connectivity Pointer attribute points to the managed object representing the Connection which relates this instance to the instance representing the Network Connection Termination Point, Source or Bidirectional, that sends information (traffic) to this network termination point, or is null.

7.3.59.2 Attributes

Table 104

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
channelNumber	O	M	–	M	
characteristicInformation	O	M	–	M	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
cTPId	O	M	–	M	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
serverTTPPointer	O	M	–	–	
sub-partitionPointer	O	M	–	–	
superPartitionPointer	O	M	–	–	
supportedByObjectList	M	M	–	–	
userLabel	O	M	M	M	

7.3.59.3 Notifications

Table 105

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.60 Network CTP Source

7.3.60.1 Definition

The Network CTP Source IOC is a class of objects that originates Link connections and/or terminates Subnetwork Connections. The resource sends information (traffic), via a Link connection, to instances representing Network Connection Termination Points, and receives it, via a Subnetwork Connection, from an instance representing either a NWCTP Sink or a NWTTP Source in the same Subnetwork.

An instance of this class may only have connectivity relationships (link connection or subnetwork connection) with instances that represent Network Connection Termination Points, Sink or Bidirectional, which are at the same layer.

An instance of this class may be subnetwork connected, via a Subnetwork Connection, to a single instance which represents a Network Trail Termination Point, Source or Bidirectional, at the same layer.

The Subnetwork Connection Pointer attribute points to the managed object representing the relationship with the network termination point, within the same Subnetwork, that sends information (traffic) to this network termination point, or is null. The referenced managed object shall represent a Subnetwork Connection.

Where the NWCTP source participates in many subnetwork connections for different subnetworks, the Subnetwork Connection Pointer is null. Any network termination points identified by the related Subnetwork Connection indicate that a relationship exists, but this does not indicate that information can flow between the network termination points. This capability is indicated by a combination of the State Attributes, including the Operational State.

The Connectivity Pointer attribute points to the managed object representing the Connection which relates this instance to the instance representing the Network Connection Termination Point, Sink or Bidirectional, that receives information (traffic) from this network termination point, or is null.

7.3.60.2 Attributes

Table 106

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
channelNumber	O	M	–	M	
characteristicInformation	O	M	–	M	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
cTPId	O	M	–	M	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	

Table 106

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
serverTTPPointer	O	M	–	–	
sub-partitionPointer	O	M	–	–	
superPartitionPointer	O	M	–	–	
supportedByObjectList	M	M	–	–	
userLabel	O	M	M	M	

7.3.60.3 Notifications

Table 107

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.61 Network Termination Point

7.3.61.1 Definition

The Network Termination Point IOC represents the network termination of a transport entity, such as an instance representing a Trail or a Link Connection. The sncPointer is used to point to a Subnetwork Connection. However, not all network termination points will have a flexible connection, and it may be more appropriate to point to another network termination point, for example, in a regenerator the two network connection termination points would point to each other as there is no flexibility between them. In this instance, the networkTPPointer shall be used. Both pointers are conditional.

The Connectivity Pointer attribute points to the object instance that represents the Link connection or Trail which relates this instance to other instance(s) representing the Network Termination Point(s).

7.3.61.2 Attributes

Table 108

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
supportedByObjectList	M	M	–	–	
userLabel	O	M	M	M	

7.3.61.3 Notifications

Table 109

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.62 Network TTP Bidirectional

7.3.62.1 Definition

The Network TTP Bidirectional IOC represents a termination point where a network viewpoint Trail or Subnetwork Connection is both originated and terminated, i.e., the combined behaviour of the Network TTP Source and Network TTP Sink IOCs.

7.3.62.2 Attributes

Table 110

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
clientCTPList	O	M	–	–	
clientLinkEndPointerList	O	M	–	–	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
supportableClientList	O	M	–	M	
supportedByObjectList	M	M	–	–	
tTPId	O	M	–	M	
userLabel	O	M	M	M	

7.3.62.3 Notifications

Table 111

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.63 Network TTP Sink

7.3.63.1 Definition

The Network TTP Sink IOC is a class of objects that terminate Trails and Subnetwork Connections in the Network viewpoint. An instance of this class may only have Trail relationships with Network Trail Termination Points, Source or Bidirectional, which are at the same layer. An instance of this class may be subnetwork connected, via a Subnetwork Connection, to a single Network Connection Termination Point Sink or Bidirectional, or a Network Trail Termination Point Source at the same layer.

The Subnetwork Connection Pointer attribute points to the managed object representing the relationship with one or more Network Connection Termination Points, within the same Subnetwork, that send information (traffic) to this network termination point, or is null.

Any network termination point identified by the related Subnetwork Connection indicates that a relationship exists, but this does not indicate that information can flow between the network termination points. This capability is indicated in a combination of the State attributes, including the Operational State.

The Connectivity Pointer attribute points to the managed object representing the Trail which relates this instance to the instances representing the Network Trail Termination Points, that send information (traffic) to this network termination point at the same layer, or is null.

This managed object represents the network termination of a transport entity, such as an instance representing a Trail or a Link Connection. The sncPointer is used to point to a Subnetwork Connection. However, not all network termination points will have a flexible connection, and it may be more appropriate to point to another network termination point, for example, in a regenerator the two network connection termination points would point to each other as there is no flexibility between them. In this instance, the networkTPPointer shall be used. Both pointers are conditional.

The Connectivity Pointer attribute points to the object instance that represents the Link connection or Trail which relates this instance to other instance(s) representing the Network Termination Point(s).

This managed object represents the termination of a transport entity, such as a trail or a connection. The characteristic information attribute is used to identify equivalence between subclasses of termination points in order to determine whether cross-connection or connectivity is possible.

The operational state reflects the perceived ability to generate and/or receive a valid signal. Subclasses of termination point shall specify the attributes and states for which attribute value change and state change notifications will be generated.

7.3.63.2 Attributes

Table 112

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
clientCTPList	O	M	–	–	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
supportableClientList	O	M	–	M	
supportedByObjectList	M	M	–	–	
tTPId	O	M	–	M	
userLabel	O	M	M	M	

7.3.63.3 Notifications

Table 113

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.64 Network TTP Source

7.3.64.1 Definition

The Network TTP Source IOC is a class of objects that originate Trails and Subnetwork Connections in the Network viewpoint.

An instance of this class may only have Trail relationships with Network Trail Termination Points, Sink or Bidirectional, which are at the same layer.

An instance of this class may be subnetwork connected, via a Subnetwork Connection, to a single Network Connection Termination Point Source or Bidirectional, or a Network Trail Termination Point Sink at the same layer. It may also be connected, via a Subnetwork Connection, to multiple instances of Network CTPs at the same layer when it is operating in the broadcast mode in order to transmit multiple copies of the same signal.

The Subnetwork Connection Pointer attribute points to the managed object representing the relationship with one or more Network Connection Termination Points, within the same Subnetwork, that receive information (traffic) from this network termination point, or is null.

Any network termination point identified by the related Subnetwork Connection indicates that a relationship exists, but this does not indicate that information can flow between the network termination points. This capability is indicated by a combination of the State Attributes, including the Operational State.

The Connectivity Pointer attribute points to the managed object representing the Trail which relates this instance to the instances representing the Network Trail Termination Points, that receive information (traffic) from this network termination point at the same layer, or is null.

7.3.64.2   Attributes

Table 114

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
clientCTPList	O	M	–	–	
clientLinkEndPointerList	O	M	–	–	
configuredConnectivity	O	M	–	–	
connectivityPointer	O	M	–	–	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
locationName	O	M	M	M	
neAssignmentPointer	O	M	–	–	
networkLevelPointer	O	M	M	M	
networkTPPointer	O	M	–	–	
operationalState	O	M	–	–	
pointDirectionality	M	M	–	–	
signalId	M	M	–	M	
subNetworkConnectionPointer	O	M	–	–	
supportableClientList	O	M	–	M	
supportedByObjectList	M	M	–	–	
tTPId	O	M	–	M	
userLabel	O	M	M	M	

7.3.64.3 Notifications

Table 115

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.65 Operator

7.3.65.1 Definition

Operator is an organization responsible for identification and management of telecommunication resources.

The Operator must be legally recognized by the telecommunication Administration of the Country, or delegation thereof. An Operator may or may not correspond to a trading partner. An Operator can be a network operator or service provider.

Both the national authority and the Operators should note that each Operator would be registered as a separate entity in each Country in which it operates, and is required to report country-specific information to each national authority. This may or may not imply a need for a multinational Operator to use different ICCs in each Country.

Multinational Operators are encouraged to ensure that they are registered in each Country in which they operate.

7.3.65.2 Attributes

Table 116

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
icc	M	M	–	–	
controlledSiteList	M	M	M	M	
controlledTrailList	M	M	M	M	

Table 117

Name	Type	Description
icc	ICC ::= String(SIZE (1..6))	The ITU Carrier Code provides a unique identifier of an Operator within a Country. The assignment of ICCs may be delegated to a lower-level regional administration (for example, a province). The ICC is used as an indispensable part in the assignment of identifiers for interworking between Operators. It is permissible that an operator uses one ICC for assignment of identifiers, while other operator codes are used for ordering, billing, etc. ICC is a 1- to 6-character alphanumeric field.
controlledSiteList	SEQUENCE OF ObjectInstance	An Operator's subordinate Controlled site is a role of a Cross-coupling site that is currently owned by the Operator, but not identified locally to this Operator. If the Operator owns Cross-coupling sites that are not identified locally to this Operator, this reference has to be explicitly provided.
controlledTrailList	SEQUENCE OF ObjectInstance	An Operator's subordinate Controlled trail is a role of a Trail being controlled by the Operator. An Operator may have many Controlled trails. Note that Controlled trail indicates responsibility for maintenance and not ownership.

7.3.65.3   Notifications

There are no notifications defined for this IOC.

7.3.66   Physical Link

7.3.66.1   Definition

A Physical Link represents a set of parallel physical transport resources between two Cross-coupling sites. The physical transport resources are called Physical link connections.

All Physical Link connections in a Physical Link shall be routed in the same cable branches. A cable branch connects either two Cross-Coupling Sites or two junctions where the pairs of the cable branch are split into pairs of cable branches leading to two or more different Cross-Coupling Sites. Cable branches represent one layer of the physical network, and Physical Links represent the layer at which resources are allocated to route Trails of multiplex groups or other usages.

A Physical Link is terminated in exactly two Cross-Coupling Sites, which allow for termination of or cross-couplings between Physical link connections. A Physical Link cannot terminate in a junction that requires construction work to provide the couplings. Note that attributes of physical resources are different from attributes of logical resources and trail notions.

Note that Physical Links are identified independently from Trail identifiers within the same Site Relationship. This allows cable and radio resources to be identified independently from Trails and the concerns of customers in the use of Trail identifiers.

7.3.66.2   Attributes

Table 118

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	

Table 119

Name	Type	Description
identifier	String	The Identifier of a Physical link uniquely identifies the Physical link within the Site relationship. Note that Physical links are identified independently from Trail Identifiers within the same Site relationship. This allows cable and radio resources to be identified independently from Trails and the concerns of customers in the use of Trail Identifiers.

7.3.66.3 Notifications

There are no notifications defined for this IOC.

7.3.67 Physical Link Connection

7.3.67.1 Definition

A Physical link connection represents a physical resource between two Cross-coupling sites and can be allocated to a single Trail. The resource may represent a single fibre, a pair, a set of two pairs or other, which is planned to be used as a section of a Trail.

7.3.67.2 Attributes

Table 120

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
position	M	M	–	–	
trailSection	M	M	–	–	

Table 121

Name	Type	Description
identifier	String	The Identifier of a Physical link connection uniquely identifies the Physical link connection within the Physical link. The syntax of the Identifier may indicate that it represents a single branch (e.g., 3a), a pair (3), a set of two pairs (3-) or other.
position	ObjectInstance	A Physical link connection's subordinate Position is a role of a Position on which the Physical link connection is terminated.
trailSection	ObjectInstance	A Physical link connection's subordinate Trail section is a role of a Trail section in a Trail.

7.3.67.3 Notifications

There are no notifications defined for this IOC.

7.3.68 Pipe

7.3.68.1 Definition

The pipe IOC is a class of objects which ensure the transfer of information between two or more termination points. The directionality attribute indicates whether transmission is unidirectional or bidirectional. The Signal Id attribute describes the signal that is transferred across a Connectivity instance. The managed objects representing the network termination points that are related by this instance must have signal Ids that are compatible.

If an instance of this class is bidirectional, the a- and z-termination points shall also be bidirectional. If an instance of this class is unidirectional, the a-point shall be the source TP or bidirectional TP and the z-termination point shall be the sink TP or bidirectional TP.

For unidirectional connections, the aEndNWTPList attribute shall identify the source end. The operational state indicates the capability to carry a signal.

7.3.68.2   Attributes

Table 122

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEndNetworkTPList	M	M	–	M	
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
currentProblemList	O	M	–	–	
directionality	M	M	–	–	
operationalState	O	M	–	–	
protected	O	M	–	M	
qualityOfConnectivityService	O	M	–	–	
signalId	M	M	–	M	
supportedByObjectList	O	M	M	M	
userLabel	O	M	M	M	
zEndNetworkTPList	M	M	–	M	

7.3.68.3   Notifications

Table 123

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.69   Port Item

7.3.69.1   Definition

A Port item defines a functional unit of a Component item of an Equipment item. The Port item can be sender, receiver, or bidirectional. It may also be possible to modify the function of a Port item.

7.3.69.2 Attributes

Table 124

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
equipment identity	M	M	–	–	
position	M	M	–	–	
trailSection	M	M	–	–	

Table 125

Name	Type	Description
identifier	String	A Port item is assigned a unique Identifier within the scope of its superior Component item.
equipmentIdentity	ObjectInstance	A Port item's subordinate Equipment identity is a role of an Equipment identity to which the Port item belongs.
position	ObjectInstance	A Port item's subordinate Position is a role of a Position that terminates the Port item.
trailSection	ObjectInstance	A Port item's subordinate Trail section is a role of a Trail section in a Trail.

7.3.69.3 Notifications

There are no notifications defined for this IOC.

7.3.70 Position

7.3.70.1 Definition

A Position is a unit that is used to enter terminations and cross-couplings. The Position can be an individual pin, a pair of pins or a group of pins, depending on the design, planned or actual use of the Position.

7.3.70.2 Attributes

Table 126

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
physicalLinkConnectionList	M	M	–	–	
portItemList	M	M	–	–	
position	M	M	–	–	
trailList	M	M	–	–	
trailMultiplexChannelList	M	M	–	–	
trailSectionList	M	M	–	–	

Table 127

Name	Type	Description
identifier	String	A Position is assigned a unique Identifier within the scope of its superior Location. The Identifier may, e.g., indicate a group of pins (3), or an individual pin (3a).
physicalLinkConnectionList	SEQUENCE OF ObjectInstance	A Position's subordinate Physical link connection is a role of a Physical link connection being terminated on this Position.
portItemList	SEQUENCE OF ObjectInstance	A Position's subordinate Port item is a role of a Port item being terminated on this Position. Note that the Position can be on the slot of the shelf. This allows cables to be terminated on the slot of the shelf and not on the card, and thus allows the card to be easily replaceable.
position	ObjectInstance	A Position's subordinate Position is a role of another Position that is connected by Cross-coupling or termination to this Position. Note that the Cross-coupling or termination is assigned no direction. This means, e.g., that if the termination is from a position (i.e., a connector) on a slot in a shelf to a pin group on a block, only the names of the two Positions indicate the direction.
trailList	SEQUENCE OF ObjectInstance	A Position's subordinate Trail is a role of a Trail being terminated on this Position.
trailMultiplexChannelList	SEQUENCE OF ObjectInstance	A Position's subordinate Trail multiplex channel is a role of a Trail multiplex channel being terminated on this Position.
trailSectionList	SEQUENCE OF ObjectInstance	A Position's subordinate Trail section is a role of a Trail section in a Trail.

7.3.70.3 Notifications

There are no notifications defined for this IOC.

7.3.71 Protection Group

7.3.71.1 Definition

The Protection Group contains zero or more Protection Unit objects for defining a protection switching relationship where one or more standby (i.e., backup) entities provide protection for one or more working (i.e., more regular or preferred) entities.

The invokeProtection action can be used to request a lockout, a forced switch, or a manual switch (i.e., normal switch) on one or more protectionUnit instances contained in the protectionGroup object. The releaseProtection action can be used to release a lockout, a forced switch, or a manual switch (i.e., normal switch) on one or more protectionUnit instances contained in the protectionGroup object.

The protectionSwitchReporting notification is emitted from the Protection Group object to report any protection switch events, such as protection switching (forced switch, manual switch, or automatic switch), protection release (release of forced switch, manual switch, or automatic switch), lockout or release of lockout.

If the attributeValueChangeNotification package is present, then changes to the protectionGroupType attribute, the revertive attribute or the waitToRestoreTime attribute shall cause an attributeValueChange notification to be emitted.

The protectionGroupType attribute shall have the value 'colon' when more than one Protection Unit is protected. Changing the value of this attribute between 'plus' and 'colon' is allowed when only one

protected protectionUnit and one protecting Protection Unit are contained by the Protection Group. The change from 'plus' to 'colon' is only allowed if the underlying resources support M:N protection.

This object class is used for representing a protection system. The invokeProtection action switches always from protected unit to protecting unit. Either all or none of the Protection Unit instances within a Protection Group object shall have the priorityPkg package. It is to be noted that, before the creation of the Protection Group object, the supported by object list (sbol) attribute of a reliable resource such as termination point object may point to an unreliable resource object such as circuit pack. But once the protection group object is created, the sbol attribute would start pointing at the protection group object

7.3.71.2 Attributes

Table 128

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
availabilityStatus	M	M	–	–	
currentProblemList	O	M	–	–	
lockedInCondition	M	M	M	M	
operationalState	M	M	–	–	
protectionGroupId	M	M	–	–	
protectionGroupType	M	M	M	M	
revertive	M	M	M	M	
supportedByObjectList	M	M	–	–	
waitToRestoreTime	M	M	M	M	

7.3.71.3 Notifications

Table 129

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
protectionAlarm	O	
protectionSwitchReporting	M	
stateChange	M	

7.3.72 Protection Unit

7.3.72.1 Definition

The Protection Unit IOC is used to represent the protected (i.e., working, regular, or preferred) or protecting (i.e., backup or standby) resource in a protection system. Instances of this IOC are instantiated according to the protection schemes adopted by the NE. A Protection Unit instance is deleted when the resource object instance pointed to by the Unreliable Resource Pointer attribute is deleted, and may be created automatically when the associated resource object is created.

Instances of this IOC may also be created and deleted in order to reflect local modifications in the protection schemes. The attributeValueChange notification is used to notify changes of the Reliable Resource Pointer, Protection Status, and Priority attributes.

7.3.72.2 Attributes

Table 130

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
priority	O	M	M	M	
protecting	M	M	–	–	
protectionStatusR1	M	M	–	–	
protectionUnitId	M	M	–	–	
reliableResourcePointerR1	M	M	–	–	
unreliableResourcePointerR1	M	M	–	–	

7.3.72.3 Notifications

Table 131

Name	Qualifier	Notes
attributeValueChange	O	

7.3.73 Scan Point

7.3.73.1 Definition

The Scan Point IOC is used to monitor external conditions related to the managed element, for that, events of external devices (such as power failure, fire alarm, door open, humidity, etc.) are monitored. Each instance of this object class represents one scan point.

Environmental alarm will be emitted if a scan point detects an abnormal condition.

The text message specified in the externalPointMessage attribute is to be included in the additionalText field of the environmentalAlarm notification when an alarm is emitted for the scan point. The severity of such alarms can be configured using the alarmSeverityAssignment-ProfilePointer.

The currentProblemList represents the current problems of the external entity being monitored, i.e., not current problems with the scan function itself. The probable cause of the currentProblemList is by itself not a precise indicator of service affecting alarms (e.g., due to standby resources) and the serviceAffected attribute is used as a unifying indicator of service affecting conditions.

7.3.73.2 Attributes

Table 132

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
currentProblemList	M	M	–	–	
externalPointId	M	M	–	M	
externalPointMessage	M	M	M	M	
locationName	O	M	M	M	
operationalState	M	M	–	–	
serviceAffected	M	M	–	–	
supportedByObjectList	M	M	–	–	

7.3.73.3 Notifications

Table 133

Name	Qualifier	Notes
attributeValueChange	M	
environmentalAlarm	M	
objectCreation	M	
objectDeletion	M	
stateChange	M	

7.3.74 Service

7.3.74.1 Definition

The Service IOC is a class of objects that represent offerings from a provider that supplies specific network functionality to one or more customers. A service may or may not be tariffed. Services may be nested, thereby creating a containment relationship. The Service Type identifies the distinguishing characteristics of the Service. The Supported Service Name List identifies other Services supported by the Service, and the Supported By Object List identifies the objects that support the Service.

7.3.74.2 Attributes

Table 134

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmStatus	O	M	–	–	
currentProblemList	O	M	–	–	
operationalState	O	M	–	–	
serviceID	M	M	–	–	

Table 134

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
serviceType	M	M	M	M	
supportedByObjectList	O	M	M	M	
supportedServiceNameList	O	M	M	M	
usageState	O	M	–	–	

7.3.74.3 Notifications

Table 135

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
qualityOfServiceAlarm	M	
stateChange	O	

7.3.75 Service Access Domain

7.3.75.1 Definition

This IOC represents a Service Access Domain consisting of Service Access Groups having similar characteristics (e.g., supporting the same bandwidths).

7.3.75.2 Attributes

Table 136

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aliasName	O	M	–	M	
listOfSags	M	M	M	M	
providerRequestNumber	M	M	–	–	
sadId	M	M	–	M	
serviceCustomerContact	M	M	M	M	
serviceDescription	O	M	–	M	
serviceProviderContact	M	M	–	–	
serviceType	M	M	–	M	

7.3.75.3 Notifications

Table 137

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	

7.3.76 Service Access Group

7.3.76.1 Definition

This IOC represents a Service Access Group consisting of Service Access Points having similar characteristics (e.g., supporting the same bandwidths). If the administrative state is locked, then all the SAPs in the SAG are locked

7.3.76.2 Attributes

Table 138

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
aliasName	O	M	–	M	
listOfSaps	M	M	M	M	
sagId	M	M	–	M	
sagLocation	M	M	–	M	

7.3.76.3 Notifications

Table 139

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	

7.3.77 Service Access Equipment View

7.3.77.1 Definition

The Service Access Equipment View IOC represents customer-owned equipment that terminates Services. The SC updates information in this IOC to correctly reflect the actual state of the service access equipment in the SC's premises.

7.3.77.2 Attributes

Table 140

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
dateOfInstallation	O	M	–	–	
equipmentId	M	M	–	M	
equipmentManufacturer	O	M	M	M	
equipmentType	O	M	M	M	
expectedDateOfInstallation	O	M	M	M	
listOfSaps	M	M	M	M	
locationAddress	M	M	–	M	
modelType	O	M	M	M	
operationalState	O	M	M	M	
procedure	O	M	M	M	

7.3.77.3 Notifications

Table 141

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	

7.3.78 Service Modify Request

7.3.78.1 Definition

This IOC represents SC's request to modify an existing service. It is a superclass from which service-specific subclasses are derived. When changes to the service occur as a result of such a modification request, or for any other reason, the object representing the affected service will issue the appropriate attribute value change notifications. After all the modifications requested by the SC through this object have been resolved, this object will be deleted and a notification of its deletion shall be sent to the SC.

7.3.78.2 Attributes

Table 142

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aliasName	O	M	–	M	
availabilityStatus	O	M	–	–	
intervalsOfDay	O	M	–	M	
providerRequestNumber	M	M	–	–	
requestReceptionTime	M	M	–	–	

Table 142

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
schedulerName	O	M	M	M	
serviceCustomerContact	O	M	–	M	
serviceInstance	M	M	–	M	
serviceRequestState	M	M	–	–	
weekMask	O	M	–	M	

7.3.78.3　Notifications

Table 143

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	

7.3.79　Service Request History Record

7.3.79.1　Definition

This IOC represents a history record of the content of a service (update) request by the SC to a service request. The Service Request History Record is created when the service customer issues an updateService towards a Current Service Request (and subclasses) and contains a record of the attribute values specified in the request. The service provider also creates a Service Request History Record of the initial service request values (when the SC creates the currentServiceRequest).

7.3.79.2　Attributes

Table 144

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aliasName	O	M	–	–	
intervalsOfDay	O	M	–	–	
requestReceptionTime	M	M	–	–	
requestSequenceNumber	M	M	–	–	
requestedInitialServiceAdministrativeState	O	M	–	–	
schedulerName	O	M	–	–	
serviceAvailabilityDate	O	M	–	–	
serviceCustomerContact	O	M	–	M	
serviceDescription	O	M	–	–	
serviceTerminationDate	O	M	–	–	
serviceType	O	M	–	–	
weekMask	O	M	–	–	

7.3.79.3 Notifications

Table 145

Name	Qualifier	Notes
objectCreation	M	
objectDeletion	M	

7.3.80 Site Relationship

7.3.80.1 Definition

A Site relationship is a combination of exactly two Cross-coupling sites.

The two Cross-Coupling Sites may be different or the same. The last case is used in case of identification of internal Trails within a Cross-Coupling Site. The scope of the SiteRelationship identifier may be global in case of international Trails, which means that all fields are required to be filled in. The scope may be a Country in case of inter-operator Trails within that Country, which means that the two countryCodes may be left out. The scope may be the Operator in case of intra-operator Trails, which means that the two iccs may be left out, and only the two Cross-Coupling Site Identifiers are filled in.

A Cross-Coupling Site localIdentifier is specific to an Operator, country or region. Such use of localIdentifiers would be subject to national regulation and/or bilateral agreement between Operators, as stated in [ITU-T M.1400]. Aliases of Cross-Coupling Site identifiers are not permitted for communication between Operators of different Countries. However, Operators may exchange localIdentifiers that are local to a specific Operator, country or region.

7.3.80.2 Attributes

Table 146

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
localIdentifier	M	M	–	–	
a-EndSite	M	M	–	–	
b-EndSite	M	M	–	–	

Table 147

Name	Type	Description

identifier	`SiteRelationshipId ::= SEQUENCE`
	`{`
	`    a-End  EndSiteId,`
	`    b-End  EndSiteId`
	`}`
	`EndSiteId ::= SEQUENCE {`
	`    countryCode  CountryCode,`
	`    icc          ICC,`
	`    site         SiteId`
	`}`
	`CountryCode ::= String (SIZE 3)`
	`ICC ::= String(SIZE 1..6)`
	`SiteId ::= String`
		An Identifier of a Site relationship is an attribute group that uniquely identifies the Site relationship. The scope of the identification may be global in case of international Trails, which means that all fields are required to be filled in. The scope may be a Country in case of inter-operator Trails within that Country, which means that the two Country Codes may be left out. The scope may be the Operator in case of intra-operator Trails, which means that the two ICCs may be left out, and only the two Cross-coupling site Identifiers are filled in. This last case is outside the scope of this Recommendation.

localIdentifier	`SiteRelationshipLocalId ::=`
	`SEQUENCE {`
	`    a-End  EndSiteLocalId,`
	`    b-End  EndSiteLocalId`
	`}`
	`EndSiteLocaleId ::= String`
		The Local identifier of a Site relationship is an attribute group that uniquely identifies the Site relationship.
		A Local identifier is specific to an Operator, country or region. Such use of Local identifiers would be subject to national regulation and/or bilateral agreement between Operators, as stated in [ITU-T M.1400].
		Aliases of Cross-coupling site Identifiers are not permitted for communication between Operators of different Countries. However, Operators may exchange Local identifiers that are local to a specific Operator, country or region.

a-EndSite	`EndSiteId`	The A-end site is a role of the Cross-coupling site having the distinguished name that comes first in the alphabet. The distinguished name consists of Country Code, ICC and Cross-coupling site Identifier, in that sequence.
b-EndSite	`EndSiteId`	The B-end site is a role of the Cross-coupling site having the distinguished name that comes last in the alphabet. The distinguished name consists of Country Code, ICC and Cross-coupling site Identifier, in that sequence.

7.3.80.3   Notifications

There are no notifications defined for this IOC.

7.3.81   Software

7.3.81.1   Definition

The Software IOC is a class of objects that represent logical information stored in equipment, including programs and data tables.

Software may be nested within other software, thereby creating a containment relationship.

7.3.81.2 Attributes

Table 148

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
affectedObjectList	O	M	–	–	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
currentProblemList	O	M	–	–	
operationalState	O	M	–	–	
softwareId	M	M	–	M	
userLabel	O	M	M	M	
vendorName	O	M	M	M	
version	O	M	M	M	

7.3.81.3 Notifications

Table 149

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	O	
objectDeletion	O	
processingErrorAlarm	O	
stateChange	O	

7.3.82 Sub Network

7.3.82.1 Definition

The Sub Network IOC represents logical collections of network termination points.

If present, the attribute containedSubNetworkList will be null if there are no contained Subnetworks.

The attribute containedInSubNetworkList will also be null if there are no containing (parent) Subnetworks.

7.3.82.2 Attributes

Table 150

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
availabilityStatus	O	M	–	–	
containedAccessGroupList	O	M	M	M	
containedInSubNetworkList	O	M	M	M	
containedLinkEndList	O	M	M	M	
containedLinkList	O	M	M	M	
containedNetworkTPList	O	M	M	M	
containedSubNetworkList	O	M	M	M	
linkPointerList	O	M	–	–	
operationalState	O	M	–	–	
signalId	M	M	–	M	
subNetworkId	M	M	–	–	
supportedByObjectList	O	M	M	M	
usageState	O	M	–	–	
userLabel	O	M	M	M	

7.3.82.3 Notifications

Table 151

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	M	
objectDeletion	M	
stateChange	O	

7.3.83 Sub Network Connection

7.3.83.1 Definition

The Subnetwork Connection IOC is a class of objects that associate the network termination point object identified in the A end attribute and the network termination point object(s) listed in the Z end attribute of this managed object.

The Subnetwork Connection may be set up between network termination points (or groups of network termination points) specified explicitly, or implicitly between managed objects acting as containers of network termination point managed object instances from which any idle network termination point or group may be used.

If the managed objects listed in the A End and Z End attributes represent groups, the nth element of the A end group is related to the nth element of every Z end group (for every n). There shall be n elements in each group involved in the Subnetwork Connection. For a group with n elements, the Signal Id shall be taken to be a bundle of n times the characteristic information of the individual elements, all of which are the same.

A point-to-point unidirectional Subnetwork Connection can be established between one of Network connection termination point sink, Network connection termination point bidirectional, Network trail termination point source, Network trail termination point bidirectional or Network group termination point; and one of Network connection termination point source, Network connection termination point bidirectional, Network trail termination point sink, Network trail termination point bidirectional or Network group termination point.

A point-to-point bidirectional Subnetwork Connection can be established between one of Network connection termination point bidirectional, Network trail termination point bidirectional or Network group termination point; and one of Network connection termination point bidirectional, Network trail termination point bidirectional or Network group termination point.

A point-to-multipoint unidirectional Subnetwork Connection can be established between one of Network connection termination point sink, Network connection termination point bidirectional, Network trail termination point source, Network trail termination point bidirectional or Network group termination point; and a set whose members are Network connection termination point sources, Network connection termination point bidirectionals, Network trail termination point sinks, Network trail termination point bidirectional or Network group termination point.

A point-to-multipoint bidirectional Subnetwork Connection can be established between one of Network connection termination point bidirectional, Network trail termination point bidirectional or Network group termination; and a set whose members are Network connection termination point bidirectionals, Network trail termination point bidirectionals or Network group termination points. The componentPackage is supported where the Subnetwork Connection is made up of a number of component Subnetwork Connections, and Link Connections, within the same layer.

7.3.83.2 Attributes

Table 152

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEndNetworkTPList	M	M	–	M	
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	
componentPointers	O	M	–	–	
compositePointer	O	M	–	–	
currentProblemList	O	M	–	–	
directionality	M	M	–	–	
operationalState	O	M	–	–	
protected	O	M	–	M	
qualityOfConnectivityService	O	M	–	–	
signalId	M	M	–	M	
supportedByObjectList	O	M	M	M	
relatedRoutingProfile	O	M	–	–	
subNetworkConnectionId	M	M	–	–	
userLabel	O	M	M	M	
zEndNetworkTPList	M	M	–	M	

7.3.83.3 Notifications

Table 153

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.84 Termination

7.3.84.1 Definition

A Trail's subordinate Termination indicates termination in a Cross-coupling site. A Trail will normally have two Terminations.

7.3.84.2 Attributes

Table 154

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
direction	M	M	–	–	
cross-couplingSite	M	M	–	–	

Table 155

Name	Type	Description
direction	`IA5String` `(WITH COMPONENTS {"S", "R", "T"})(SIZE(1))`	A Termination's Direction indicates transmission direction of the Trail. The Direction can be S(ender), R(eceiver) or T(wo-way). If the Direction is S(ender), then the Direction of the other Termination is R(eceiver) and vice versa. If the D(irection) is T(wo-way), then the Direction of the other Termination is T(wo-way), as well.
cross-couplingSite	`ObjectInstance`	A Termination's subordinate Cross-coupling site is a role of a Cross-coupling site. A Termination has just one Cross-coupling site, and a Cross-coupling site may have one or two Terminations for a Trail.

7.3.84.3 Notifications

There are no notifications defined for this IOC.

7.3.85 Termination Point

7.3.85.1 Definition

This IOC represents the termination of a transport entity, such as a trail or a connection. The characteristic information attribute is used to identify equivalence between subclasses of termination points in order to determine whether cross-connection or connectivity is possible. The operational state reflects the perceived ability to generate and/or receive a valid signal. Subclasses

of termination point shall specify the attributes and states for which attribute value change and state change notifications will be generated.

7.3.85.2 Attributes

Table 156

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
networkLevelPointer	O	M	M	M	
operationalState	O	M	–	–	
supportedByObjectList	M	M	–	–	

7.3.85.3 Notifications

Table 157

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.86 Termination Point Pool (tpPool)

7.3.86.1 Definition

The TerminationPoint Pool IOC represents a set of termination points or GTPs that are used for some management purpose, such as routing. A termination point that is a member of a GTP cannot be a member of a tpPool independent of the remainder of the GTP.

7.3.86.2 Attributes

Table 158

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
connectedTpCount	M	M	–	–	
idleTpCount	M	M	–	–	
totalTpCount	M	M	–	–	
tpPoolId	M	M	–	–	
tpsInTpPoolList	M	M	–	–	

7.3.86.3   Notifications

There are no notifications defined for this IOC.

7.3.87   Top

For further study.

7.3.88   Topological Link

7.3.88.1   Definition

The Topological Link IOC represents a link in a client layer provided by one and only one server trail. The serverTrail attribute is a pointer to the trail in the server layer network domain that supports this topological link. The serverTrail attribute may be null if the trail in the server layer network domain that supports this topological link is not assigned.

The use made of the individual attributes and notifications is detailed below:

–   total link capacity: the total number of Link Connections or bandwidth available;

–   maximum link connection count: the maximum number of link connections available on connection with flexible bandwidth management;

–   potential link capacity: the number of potential Link Connections or potential bandwidth that could be provisioned;

–   provisioned link capacity: the number of provisioned Link Connections or the provisioned bandwidth;

–   provisioned link connection count: the number of link connections assigned using flexible bandwidth management.

An attribute value change notification shall be emitted when the value of the totalLinkCapacity, maximumLinkConnectionCount, potentialLinkCapacity, provisionedLinkCapacity or provisionedLinkConnectionCount is changed.

7.3.88.2   Attributes

Table 159

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEnd	M	M	–	M	
availableLinkCapacity	M	M	–	–	
directionality	M	M	–	–	
linkId	M	M	–	–	
maximumLinkConnectionCount	O	M	–	–	
potentialLinkCapacity	O	M	–	–	
provisionedLinkCapacity	O	M	–	–	
provisionedLinkConnectionCount	O	M	–	–	
serverTrail	M	M	–	–	
signalId	M	M	–	M	
totalLinkCapacity	O	M	–	–	
usageCost	O	M	–	–	
userLabel	O	M	M	M	
zEnd	M	M	–	M	

7.3.88.3 Notifications

Table 160

Name	Qualifier	Notes
attributeValueChange	O	
objectCreation	M	
objectDeletion	M	

7.3.89 Topological Link End

7.3.89.1 Definition

The Topological Link End object class represents the end of a topological link when viewed from the point perspective. The Topological Link End object is related to one and only one network TTP in the server layer.

The use made of the individual attributes and notifications is detailed below:

– total link end capacity: the total number of network CTPs or the bandwidth available;

– maximum network CTP count: the maximum number of network CTPs available at the LinkEnd when using flexible bandwidth management;

– potential link end capacity: the number of potential network CTPs or potential bandwidth that could be provisioned;

– provisioned link end capacity: the number of provisioned network CTPs or the provisioned bandwidth;

– provisioned network CTP count: the number of network CTP assigned to the link end when using flexible bandwidth management.

An attribute value change notification shall be emitted when the value of the totalLinkEndCapacity, maximumNetworkCTPCount, potentialLinkEndCapacity, provisionedLinkEndCapacity or provisionedNetworkCTPCount is changed.

7.3.89.2 Attributes

Table 161

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
availableLinkEndCapacity	M	M	–	–	
containedInSubNetworkList	O	M	M	M	
linkEndId	M	M	–	–	
linkPointer	M	M	–	–	
maximumNetworkCTPCount	O	M	–	–	
pointDirectionality	M	M	–	–	
potentialLinkEndCapacity	O	M	–	–	
provisionedLinkEndCapacity	O	M	–	–	
provisionedNetworkCTPCount	O	M	–	–	
serverTTPPointer	M	M	–	–	

Table 161

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
signalId	M	M	–	–	
totalLinkEndCapacity	O	M	–	–	
userLabel	O	M	M	M	

7.3.89.3 Notifications

Table 162

Name	Qualifier	Notes
attributeValueChange	M	
objectCreation	M	
objectDeletion	M	

7.3.90 Trail

7.3.90.1 Definition

The Trail IOC is responsible for the integrity of transfer of characteristic information from one or more other layer networks.

A Trail is composed of two or more Network Trail Termination Points and one or more Link Connections or Subnetwork Connections, and associated Network Connection Termination Points.

A point-to-point unidirectional Trail can be established between a Network TTP source or Network TTP bid; and a Network TTP sink or Network TTP bid.

A point-to-point bidirectional Trail can be established between a Network TTP bid; and a Network TTP bid. For all types of Trail, the termination point(s) pointed to by the A End attribute is related to the network termination point(s) pointed to by the Z End attribute in such a way that traffic can flow between the network termination points represented by these managed objects in a unidirectional or bidirectional manner as indicated by the directionality attribute.

The layerConnectionList attribute, when present, lists the subnetwork connections and link connections (in the same layer) which compose the trail. This represents a single partitioned view of the decomposition of a trail into its component subnetwork connections and link connections.

7.3.90.2 Attributes

Table 163

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
aEndNetworkTPList	M	M	–	M	
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
availabilityStatus	O	M	–	–	

Table 163

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
clientLinkConnectionPointerList	O	M	–	–	
clientLinkPointerList	O	M	–	–	
connectionList	O	M	–	M	
currentProblemList	O	M	–	–	
directionality	M	M	–	–	
operationalState	O	M	–	–	
protected	O	M	–	M	
qualityOfConnectivityService	O	M	–	–	
signalId	M	M	–	M	
supportedByObjectList	O	M	M	M	
trafficDescriptor	O	M	M	M	
trailId	M	M	–	M	
userLabel	O	M	M	M	
zEndNetworkTPList	M	M	–	M	

7.3.90.3 Notifications

Table 164

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.91 Trail [ITU-T M.1401]

7.3.91.1 Definition

A Trail provides a transport of signals between two Cross-coupling sites.

The Cross-Coupling Site terminations of a Trail may be located in Cross-Coupling Sites within different Countries, by different Operators, the same Operator, or within one and the same Cross-Coupling Site – in case of internal Trails. Also, the Trail may be terminated at the customer premises, i.e., outside the Cross-Coupling Site.

The Trail may be routed via several connected Cross-Coupling Sites. The routing and involved cross-couplings of the Trail are established on a semi-permanent basis based on a coupling order. However, switching to alternate Trails may be provided dynamically.

A Trail may be routed on other Trails, e.g., each Operator may define a separate Trail identifier for the routing within its domain, while a common inter-operator Trail is defined for the total routing. Also, the detailed routing within a Cross-Coupling Site may be defined in a separate internal Trail.

A Trail may be involved as a part of a multipoint Trail, e.g., a ring. In this case, no Trail should be defined to pass the branching points. However, Trails routed on subordinate Trail multiplex channels may be routed through the branching points.

The Trail may be established as a means to configure the Operator's network or be established to provide a service or product to a customer.

The Trail may provide:

–   a transmission system functionality, e.g., a coax system between two pieces of line termination equipments;

–   a multiplex group capacity, e.g., an SDH link;

–   a reserve functionality, e.g., an alternate routing for a multiplex group;

–   a traffic capacity, e.g., for routing of traffic between two (neighbouring) Exchanges;

–   a user functionality, e.g., a leased line between two customers.

Note that Trails are semi-permanent, which means that Trails do not comprise temporary dialled circuits, which directs traffic over a series of Trails. Also, Trails are not permanent cable resources between two (neighbouring) junction boxes. Dialled circuits are switched dynamically, and cable resources are installed permanently. Dialled circuits are established on the basis of a call attempt per call, per file transfer or per packet and are not established based on a coupling order. Cable resources are established based on construction plans and not on coupling orders.

The identifier of the Trail's superior Site Relationship is independent of the identifiers of the Exchanges, Locations or Equipments in which the Trail is terminated. Note also that the identifier of the superior Site Relationship is independent of traffic or transmission direction of the Trail.

–   Size is a 5-character field of decimal digits adjusted to the right without leading zeros.

–   Unit is given in an alphanumeric 4-character field and is adjusted to the left.

–   This field must be provided if size is provided, or size may be a multiple of a default unit.

–   Signalling is a 20-character alphanumeric field adjusted to the left. The permissible values are for further study.

–   The priority field length is 1 character, and the permissible values are 1, 2 and 3, or the field may be left blank.

–   The hours specified by limit are counted from the moment when the limit is given. The field length is 2 decimal digits, with leading zeros, or the field may be left blank.

When transferred between time zones, the deadline shall be given in standard GMT. When communicating within a time zone, two operators may agree to use local time. Each of the four fields (i.e., day, month, year and hour) is given by 2 decimal numbers with leading zeros. Either all fields are filled in or all are left blank. The fields may be calculated automatically from limit and entering time when entered, be transformed to GMT when transferred and recalculated to local time at the receiving end if the communicating users are made aware of this conversion.

–   Deadline has the substructure (day, month, year and hour) and the fields may be separated by punctuation marks (.).

–   A localIdentifier has up to 26 alphabetic and/or numeric characters. Use of Local identifiers would be subject to national regulation and/or bilateral agreement between Operators, as stated in [ITU-T M.1400].

7.3.91.2   Attributes

Table 165

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
bandwidth	M	M	–	–	
identifier	M	M	–	–	
localIdentifier	M	M	–	–	
signalling	M	M	–	–	
urgency	M	M	–	–	
associationList	M	M	–	–	
controllerList	M	M	–	–	
multipointTrail	M	M	–	–	
position	M	M	–	–	
routingTrailSection	M	M	–	–	
subordinateAssociationList	M	M	–	–	

Table 166

Name	Type	Description

bandwidth	`TrailBandwidth ::= SEQUENCE {`
	`  actual  Bandwidth,`
	`  maximum  Bandwidth,`
	`}`
	`Bandwidth ::= SEQUENCE {`
	`  size  String(SIZE (5)),`
	`  unit  String(SIZE (5))`
	`}`
		This attribute group defines the capacity of the medium.
		It can provide the actual bandwidth allocated to this trail and the maximum available capacity of the medium.
		For either actual or maximum bandwidth, two fields are contained:
		– Size: the Size of the bandwidth as a multiple of the unit being given in the Unit field. This is a 5-character field of decimal digits adjusted to the right without leading zeros.
		– Unit: the unit being used to give the Size of the bandwidth. The Unit is given in an alphanumeric 4-character field and is adjusted to the left. (NOTE – This field must be provided if Size is provided, or Size may be a multiple of a default unit.)

identifier	`String`	The Identifier of a Trail uniquely identifies the Trail within the Site relationship. Note that the Identifier of the Trail's superior Site relationship is independent of the identifiers of the Exchanges, Locations or Equipments in which the Trail is terminated. Note also that the Identifier of the superior Site relationship is independent of traffic or transmission direction of the Trail.

Table 166

Name	Type	Description
localIdentifier	String(SIZE(1..26))	An identifier of a Trail that is unique within an Operator, having up to 26 alphabetic and/or numeric characters. A Local identifier is specific to an Operator, country or region. Such use of Local identifiers would be subject to national regulation and/or bilateral agreement between Operators, as stated in [ITU-T M.1400].
signalling	String(SIZE(20))	This attribute indicates the signalling system or signalling type being used on the Trail. The attribute is a 20-character alphanumeric field adjusted to the left. The permissible values are for further study.

urgency	Urgency ::= SEQUENCE {
	  deadline DateAndTime,
	  limit
	String(SIZE(2)),
	  priority IA5String
	}
	DateAndTime ::= SEQUENCE {
	  date Date,
	  time Time
	}
	Date ::= SEQUENCE {
	  day String(SIZE(2)),
	  month
	String(SIZE(2)),
	  year String(SIZE(2))
	}
	Time ::= SEQUENCE {
	  hour String(SIZE(2))
	}
		Urgency defines priority of restoration and may define a deadline for the restoration.
		Urgency has the following three fields:
		– Deadline: defines date and hour for completion of the restoration.
		  When transferred between time zones, the Deadline shall be given in standard GMT.
		  When communicating within a time zone, two operators may agree to use local time.
		  Each of the four fields is given by 2 decimal numbers with leading zeros. Either all fields are filled in or all are left blank.
		  The fields may be calculated automatically from Limit and entering time when entered, be transformed to GMT when transferred and recalculated to local time at the receiving end if the communicating users are made aware of this conversion.
		  The attribute has the substructure given below, and the fields may be separated by punctuation marks (.).
		– Limit: defines number of hours for the restoration to be completed. The hours are counted from the moment when the Limit is given. The field length is 2 decimal digits, with leading zeros, or the field may be left blank.
		– Priority: defines priority classes for restoration. The field length is 1 character, and the permissible values are 1, 2 and 3, or the field may be left blank.

associationList	SEQUENCE OF ObjectInstance	A Trail's subordinate Association is a role of an Association. A Trail may be involved in several Associations.
controllerList	SEQUENCE OF Objectinstance	A Trail's subordinate Controller is a role of an Operator. A Trail may have several Controllers listed in falling priority. Note that Controller indicates responsibility for maintenance and not ownership.
multipointTrail	ObjectInstance	A Trail's subordinate Multipoint trail is a role of a Multipoint trail that is supported by the Trail.

Table 166

Name	Type	Description
position	`ObjectInstance`	A Trail's subordinate Position is a role of a Position that terminates the Trail.
routingTrailSection	`ObjectInstance`	A Trail's subordinate Routing trail section is a role of a Trail section in the routing of another Trail, which is routed on the current Trail.
subordinateAssociationList	`SEQUENCE OF ObjectInstance`	A Trail's subordinate Subordinate association is a role of an Association. A Trail may have several Subordinate associations.

7.3.91.3 Notifications

There are no notifications defined for this IOC.

7.3.92 Trail Multiplex Channel

7.3.92.1 Definition

A Trail may be split into several parallel Trail multiplex channels. The Trail multiplex channels in a Trail may have different capacities. All Trail multiplex channels in a Trail have the same routing, as the routing is assigned to Trails only, and not to Trail multiplex channels.

Each Trail multiplex channel is terminated in the same multiplex Equipment item as the superior Trail. The Trail may be terminated at the higher capacity side of the Equipment item, while the Trail multiplex channels are terminated at the lower capacity side. Also, Trail multiplex channels and Trails may be terminated at Connection termination points or Trail termination points inside the Equipment item, as may be the case in SDH network matrixes.

Trail multiplex channels may be implemented by different technologies, like frequency multiplexing, pulse code multiplexing, etc.

7.3.92.2 Attributes

Table 167

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
number	M	M	–	–	
position	M	M	–	–	
trailSection	M	M	–	–	

Table 168

Name	Type	Description
number	`String`	Trail multiplex channels are numbered within their superior Trail. Note that this naming scheme is different from naming of linkConnections within links within layerNetworkDomains. However, the scheme does not prohibit definition of a Trail for each link, as long as all linkConnections have the same routing.
position	`ObjectInstance`	A Trail multiplex channel's subordinate Position is a role of a Position on which the Trail multiplex channel is terminated.
trailSection	`ObjectInstance`	A Trail multiplex channel's subordinate Trail section is a role of a Trail section in the routing of the Trail.

7.3.92.3 Notifications

There are no notifications defined for this IOC.

7.3.93 Trail Section

7.3.93.1 Definition

A Trail section is any element that makes up the routing of a Trail [ITU-T M.1401].

Normally, Trail sections are connected in series to define the routing.

However, a Trail section may also define parallel elements.

Example of a two-pair circuit: The Trail is defined as a series of Trail sections, each of these Trail sections is split into two parallel Trail sections, representing individual cable pair.

Example of diverse routing of a two-pair circuit: The Trail is split into two parallel Trail sections representing a circuit pair, each Trail section is defined as a series of Trail sections, representing individual cable pairs. A more comprehensive registration can be obtained by letting the two parallel Trail sections represent one individual Trail each, with separate Identifiers, each of these Trails is defined as a series of Trail sections, representing individual cable pairs.

There is no defined hierarchy between Trail sections by containment or references. However, the subordinate Trail sections are immediately following their superior Trail section, and information in each Trail section indicates if they represent an individual fibre, a pair, or a set of pairs.

Users may do both selection and projection of Trail sections within a Trail. Selection means that only Trail sections within a geographical area may be listed. Projection means that only Trail sections connecting different Cross-coupling sites may be listed, etc.

7.3.93.2 Attributes

Table 169

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
identifier	M	M	–	–	
physicalLinkConnection	M	M	–	–	
portItem	M	M	–	–	
position	M	M	–	–	
trail	M	M	–	–	
trailMultiplexChannel	M	M	–	–	

Table 170

Name	Type	Description
identifier	String	A Trail section may have an Identifier that uniquely identifies the Trail section within the Trail.
physicalLinkConnection	ObjectInstance	A Trail section's subordinate Physical link connection is a role of a Physical link connection that is included in the routing of the Trail.
portItem	ObjectInstance	A Trail section's subordinate Port item is a role of a Port item that is included in the routing of the Trail.
position	ObjectInstance	A Trail section's subordinate Position is a role of a Position that is included in the routing of the Trail.
trail	ObjectInstance	A Trail section's subordinate Trail is a role of a Trail that is included in the routing of the Trail.
trailMultiplexChannel	ObjectInstance	A Trail section's subordinate Trail multiplex channel is a role of a Trail multiplex channel that is included in the routing of the Trail.

7.3.93.3 Notifications

There are no notifications defined for this IOC.

7.3.94 Trail Termination Point Bidirectional

7.3.94.1 Definition

This managed object represents a termination point where a trail is both originated and terminated, i.e., the combined behaviour of the trailTerminationPointSink and the trailTerminationPointSource object classes.

7.3.94.2 Attributes

Table 171

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
downstreamConnectivityPointer	M	M	–	M	
networkLevelPointer	O	M	M	M	
operationalState	M	M	–	–	
supportableClientList	O	M	–	M	
supportedByObjectList	M	M	–	–	
tTPId	O	M	–	M	
upstreamConnectivityPointer	M	M	–	M	

7.3.94.3 Notifications

Table 172

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.95 Trail Termination Point Sink

7.3.95.1 Definition

The Trail Termination Point Sink IOC represents a termination point where a trail is terminated. It represents the access point in a layer network which is a focus for both the trail relationship and the client/server relationship:

– The operational state reflects the perceived ability to receive a valid signal. If the termination point detects that a signal received has failed or it is unable to process the incoming signal, then the operational state will have the value disabled.

– When the administrative state is locked, the termination point is administratively removed from service. When the administrative state is unlocked, the termination point is administratively in service. Changes to the administrative state have no effect on the connectivity pointer.

– A change in the operational state shall cause a state change notification. If administrative state is present in an instance of trail termination point sink class, it shall not emit a state change notification. However, subclasses of trail termination point sink class may modify this behaviour to require this notification.

– Subclasses of trail termination point sink shall specify the attributes for which attribute value change notifications should be generated.

– The upstream connectivity pointer attribute points to the termination point managed object, within the same managed element, that sends information (traffic) to this termination point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Connection Termination Point Sink or Bidirectional (single or a concatenated sequence) or Trail Termination Point Source or Bidirectional.

7.3.95.2 Attributes

Table 173

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	

Table 173

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
networkLevelPointer	O	M	M	M	
operationalState	M	M	–	–	
supportableClientList	O	M	–	M	
supportedByObjectList	M	M	–	–	
tTPId	O	M	–	M	
upstreamConnectivityPointer	M	M	–	M	

7.3.95.3 Notifications

Table 174

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.96 Trail Termination Point Source

7.3.96.1 Definition

The Trail Termination Point Source IOC represents a termination point where a trail is originated. It represents the access point in a layer network which is a focus for both the trail relationship and the client/server relationship:

– The operational state reflects the perceived ability to generate a valid signal. If the termination point detects that a valid signal cannot be generated, then the operational state will have the value disabled.

– When the administrative state is locked, the termination point is administratively removed from service. When the administrative state is unlocked, the termination point is administratively in service. Changes to the administrative state have no effect on the connectivity pointer.

– A change in the operational state shall cause a state change notification. If administrative state is present in an instance of trail termination point source class, it shall not emit a state change notification. However, subclasses of trail termination point source class may modify this behaviour to require this notification.

– Subclasses of trail termination point source shall specify the attributes for which attribute value change notifications should be generated.

– The downstream connectivity pointer attribute points to the termination point managed object, within the same managed element, that receives information (traffic) from this termination point at the same layer, or is null. The referenced object shall be an instance of one of the following classes or its subclasses: Connection Termination Point Source or Bidirectional (single or a concatenated sequence or a set if connected to more than one connection termination point source objects) or Trail Termination Point Sink or

Bidirectional (single or a set if connected to more than one trail termination point sink objects).

7.3.96.2 Attributes

Table 175

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	O	M	M	M	
alarmSeverityAssignmentProfilePointer	O	M	M	M	
alarmStatus	O	M	–	–	
characteristicInformation	O	M	–	M	
crossConnectionObjectPointer	O	M	–	–	
currentProblemList	O	M	–	–	
downstreamConnectivityPointer	M	M	–	M	
networkLevelPointer	O	M	M	M	
operationalState	M	M	–	–	
supportableClientList	O	M	–	M	
supportedByObjectList	M	M	–	–	
tTPId	O	M	–	M	

7.3.96.3 Notifications

Table 176

Name	Qualifier	Notes
attributeValueChange	O	
communicationsAlarm	O	
objectCreation	O	
objectDeletion	O	
stateChange	O	

7.3.97 Transport Service

7.3.97.1 Definition

This IOC represents a transport service that cannot be instantiated; service-specific subclasses of this class can be instantiated.

Values of attributes of subclasses of this IOC can be set through management operations or through the creation of an instance of a service-specific subclass of the Service Modify Request IOC.

If an attribute is supported by the SLA, and it can be set by the SC, and the SC has not specified its value in the service request, then it shall have its default value when this MO is instantiated.

7.3.97.2 Attributes

Table 177

Attribute Name	Support Qualifier	Read Qualifier	Write Qualifier	Create Qualifier	Requirements IDs
administrativeState	M	M	M	M	
aliasName	O	M	–	M	
availabilityStatus	O	M	–	–	
bandwidth	M	M	M	M	
intervalsOfDay	O	M	M	M	
operationalState	M	M	–	–	
schedulerName	O	M	–	–	
serviceCustomerContact	M	M	M	M	
serviceDescription	O	M	–	M	
serviceID	M	M	–	M	
serviceProviderContact	M	M	–	–	
serviceTerminationDate	M	M	M	M	
weekMask	O	M	M	M	

7.3.97.3 Notifications

Table 178

Name	Qualifier	Notes
attributeValueChange	M	
objectCreation	M	
objectDeletion	M	
qualityOfServiceAlarm	M	
stateChange	M	

7.4 Information relationship definitions

Relationship	Support Qualifier	Requirement IDs
Relation-AbstractLink-a_EndofLink	M	
Relation-AbstractLink-z_EndofLink	M	
Relation-AbstractLinkEnd-AbstractLink	M	
Relation-AccessGroup-AbstractLink	O	
Relation-AccessGroup-FlowPointPoolLink	O	
Relation-AccessGroup-NetworkTTP	M	
Relation-AccessGroup-FlowTerminationPoint	M	
Relation-Association-superior_Trail	O	
Relation-Association-Trail	M	
Relation-CircuitPack-AlarmSeverityAssignmentProfile	M	

Relationship	Support Qualifier	Requirement IDs
`Relation-CircuitPack-Trail`	O	
`Relation-ComponentItem-EquipmentIdentity`	M	
`Relation-ComponentItem-Location`	M	
`Relation-Connection-client_Trail`	O	
`Relation-Connection-server_Trail`	O	
`Relation-ConnectionlessPoint-AlarmSeverityAssignmentProfile`	O	
`Relation-ConnectionlessPoint-ManagedEntity`	M	
`Relation-ConnectionlessTrail-AlarmSeverityAssignmentProfile`	O	
`Relation-ConnectionlessTrail-FlowTerminationPointSink`	M	
`Relation-ConnectionlessTrail-FlowTerminationPointSource`	M	
`Relation-ConnectionTerminationPointSink-TerminationPoint`	M	
`Relation-ConnectionTerminationPointSource-TerminationPoint`	M	
`Relation-CrossConnection-from_TP_or_GTP`	M	
`Relation-CrossConnection-to_TP_or_GTP`	M	
`Relation-CrossCouplingSite-Operator`	M	
`Relation-CrossCouplingSite-GeographicalArea`	M	
`Relation-Equipment-AlarmSeverityAssignmentProfile`	O	
`Relation-Equipment-ManagedEntity-1`	O	
`Relation-Equipment-ManagedEntity-2`	M	
`Relation-EquipmentHolder-Software`	O	
`Relation-EquipmentItem-EquipmentIdentity`	M	
`Relation-EquipmentItem-Location`	M	
`Relation-Exchange-EquipmentItem`	M	
`Relation-ExternalPoint-ManagedEntity`	M	
`Relation-Fabric-ManagedEntity`	M	
`Relation-FlowDomain-AccessGroup`	O	
`Relation-FlowDomain-ConnectionlessPoint`	O	
`Relation-FlowDomain-FlowDomain`	O	
`Relation-FlowDomain-FlowPointPool`	O	
`Relation-FlowDomain-FlowPointPoolLink-1`	O	
`Relation-FlowDomain-FlowPointPoolLink-2`	O	
`Relation-FlowDomain-ManagedEntity`	O	
`Relation-FlowDomainFragment-input_ConnectionlessPoint`	M	
`Relation-FlowDomainFragment-output_ConnectionlessPoint`	M	
`Relation-FlowPoint-FlowTerminationPoint`	O	
`Relation-FlowPointPool-FlowPoint`	M	
`Relation-FlowPointPool-FlowPointPoolLink`	M	
`Relation-FlowPointPool-GenericTransportTTP`	O	
`Relation-FlowPointPool-ManagedEntity`	O	
`Relation-FlowPointPoolLink-AlarmSeverityAssignmentProfile`	O	

Relationship	Support Qualifier	Requirement IDs
Relation-FlowPointPoolLink-a_EndofFPPLink	M	
Relation-FlowPointPoolLink-z_EndofFPPLink	M	
Relation-FlowPointPoolLink-ConnectionlessTrail	O	
Relation-FlowPointSink-FlowPointSource	M	
Relation-FlowPointSink-FlowTerminationPointSink	M	
Relation-FlowTerminationPointSource-FlowPointSource	M	
Relation-FlowTerminationPointSource-FlowTerminationPointSink	M	
Relation-GroupTerminationPoint-CrossConnection	M	
Relation-GroupTerminationPoint-Fabric	M	
Relation-GroupTerminationPoint-GroupTerminationPoint	M	
Relation-GroupTerminationPoint-TerminationPoint	M	
Relation-LinkConnection-client_Trail	O	
Relation-LinkConnection-server_Trail	O	
Relation-Location-EquipmentIdentity	M	
Relation-LogicalLinkEnd-NetworkCTP	O	
Relation-LogicalLink-LinkConnection	O	
Relation-ManagedElement-AlarmSeverityAssignmentProfile	O	
Relation-MultipointTrail-Trail [ITU-T M.1401]	M	
Relation-NetworkCTP-NetworkCTP	O	
Relation-NetworkCTP-NetworkTTP	O	
Relation-NetworkTerminationPoint-NE_TerminationPoint	O	
Relation-NetworkTerminationPoint-NetworkTerminationPoint	O	
Relation-NetworkTerminationPoint-SubNetworkConnection	O	
Relation-NetworkTerminationPoint-Trail_or_LinkConnection	O	
Relation-Operator-Trail[ITU-T M.1401]	M	
Relation-PhysicalLinkConnection-Position	M	
Relation-Pipe-AlarmSeverityAssignmentProfile	O	
Relation-Pipe-ManagedEntity	O	
Relation-Pipe-aEnd_NetworkTerminationPoint	M	
Relation-Pipe-zEnd_NetworkTerminationPoint	M	
Relation-PortItem-EquipmentIdentity	M	
Relation-PortItem-Position	M	
Relation-Position-Position	M	
Relation-ScanPoint-AlarmSeverityAssignmentProfile	O	
Relation-SiteRelationship-aEnd_CrossCouplingSite	M	
Relation-SiteRelationship-bEnd_CrossCouplingSite	M	
Relation-Software-AlarmSeverityAssignmentProfile	O	
Relation-Software-ManagedEntity	O	
Relation-SubNetwork-AbstractLink-1	O	
Relation-SubNetwork-AbstractLink-2	O	

Relationship	Support Qualifier	Requirement IDs
`Relation-SubNetwork-AbstractLinkEnd`	O	
`Relation-SubNetwork-AccessGroup`	O	
`Relation-SubNetwork-ManagedEntity`	O	
`Relation-SubNetwork-NetworkTerminationPoint`	O	
`Relation-SubNetwork-SubNetwork`	O	
`Relation-SubNetworkConnection-LinkConnection`	O	
`Relation-SubNetworkConnection-SubNetworkConnection`	O	
`Relation-Termination-Cross-CouplingSite`	M	
`Relation-TerminationPoint-AlarmSeverityAssignmentProfile`	O	
`Relation-TerminationPoint-ManagedEntity`	M	
`Relation-TerminationPointPool-GroupTerminationPoint`	M	
`Relation-TerminationPointPool-TerminationPoint`	M	
`Relation-TopologicalLink-Trail`	M	
`Relation-TopologicalLinkEnd-NetworkTTP`	M	
`Relation-Trail-SubNetworkConnection`	O	
`Relation-Trail[ITU-T M.1401]-Position`	M	
`Relation-TrailMultiplexChannel-Position`	M	
`Relation-TrailSection-PhysicalLinkConnection`	M	
`Relation-TrailSection-PortItem`	M	
`Relation-TrailSection-Position`	M	
`Relation-TrailSection-Trail [ITU-T M.1401]`	M	
`Relation-TrailSection-TrailMultiplexChannel`	M	
`Relation-TrailTerminationPointSink-TerminationPoint`	M	
`Relation-TrailTerminationPointSource-TerminationPoint`	M	

7.4.1 Relation-AbstractLink-a_EndofLink (M)

7.4.1.1 Definition

This represents a unidirectional relation from the IOC `AbstractLink` (including its subclasses `Topological Link` and `Logical Link`) to the ProxyClass `End of Link` (can be child classes of `Abstract Link End`, `Sub Network`, and `Access Group`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.1.2 Roles

Name	Definition
aEnd	This role (when present) represents the `Abstract Link` (including its subclasses) capability to identify one `End of Link` (the starting point for a unidirectional link). When this role is present, the `AbstractLink.aEnd` shall carry the DN of one of the following IOCs: child classes of `Abstract Link End`, `Sub Network`, and `Access Group`.

7.4.1.3 Constraint

Name	Definition
fromEnd_for_unidirectional_Link	When the Abstract Link is a unidirectional link, the aEnd shall point to the starting point of the link.

7.4.2 Relation-AbstractLink-z_EndofLink (M)

7.4.2.1 Definition

This represents a unidirectional relation from the IOC `AbstractLink` (including its subclasses `Topological Link` and `Logical Link`) to the ProxyClass `End of Link` (can be child classes of `Abstract Link End`, `Sub Network`, and `Access Group`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.2.2 Roles

Name	Definition
zEnd	This role (when present) represents the `Abstract Link` (including its subclasses) capability to identify the other `End of Link` (the ending point for a unidirectional link). When this role is present, the `AbstractLink.zEnd` shall carry the DN of one of the following IOCs: child classes of `Abstract Link End`, `Sub Network`, and `Access Group`.

7.4.2.3 Constraint

Name	Definition
toEnd_for_unidirectional_Link	When the Abstract Link is a unidirectional link, the zEnd shall point to the ending point of the link.

7.4.3 Relation-AbstractLinkEnd-AbstractLink (M)

7.4.3.1 Definition

This represents a unidirectional relation from the IOC `Abstract Link End` (including its child classes `Topological Link End` and `Logical Link End`) to the IOC `Abstract Link` (including its child classes `Topological Link` and `Logical Link`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.3.2 Roles

Name	Definition
linkPointer	This role (when present) represents the `Abstract Link End` (including its subclasses) capability to identify the `Abstract Link` (including its subclasses) that is terminated by this `Link End`. When this role is present, the `AbstractLinkEnd.linkPointer` shall carry the DN of `Abstract Link` or one of its subclasses `Topological Link`, `Logical Link`.

7.4.3.3 Constraint

Name	Definition
–	–

7.4.4 Relation-AccessGroup-AbstractLink (O)

7.4.4.1 Definition

This represents a unidirectional relation from the IOC `Access Group` to the IOC `Abstract Link` (including its subclasses `Topological Link` and `Logical Link`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.4.2 Roles

Name	Definition
linkPointerList	This role (when present) represents the `Access Group` capability to identify the list of Abstract Links (including its subclasses) that are terminated by this `Access Group`. When this role is present, the `AccessGroup.linkPointerList` shall carry the set of DN(s) of child classes of `Abstract Link` (`Topological Link`, `Logical Link`).

7.4.4.3 Constraint

Name	Definition
–	–

7.4.5 Relation-AccessGroup-FlowPointPoolLink (O)

7.4.5.1 Definition

This represents a unidirectional relation from the IOC `Access Group` to the IOC `Flow Point Pool Link`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.5.2 Roles

Name	Definition
fppLinkPointerList	This role (when present) represents the `Access Group` capability to identify the list of Flow Point Pool Links that are terminated by this `Access Group`. When this role is present, the **`AccessGroup.fppLinkPointerList`** shall carry the set of DN(s) of **`Flow Point Pool Link.`**

7.4.5.3 Constraint

Name	Definition
–	–

7.4.6 Relation-AccessGroup-FlowTerminationPoint (M)

7.4.6.1 Definition

This represents a unidirectional relation from the IOC `Access Group` to the ProxyClass `Flow Termination Point` (can be `Flow Termination Point Source` and `Flow Termination Point Sink`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.6.2 Roles

Name	Definition
accessPointList	This role (when present) represents the `Access Group` capability to identify the list of connectionless access points that are administratively grouped by this `Access Group`. When this role is present, the `AccessGroup.accessPointList` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Source`, `Flow Termination Point Sink`.

7.4.6.3 Constraint

Name	Definition
mutually_exclusive_to_Relation-AccessGroup-NetworkTTP	This relation is mutually exclusive to the Relation-AccessGroup-NetworkTTP.

7.4.7 Relation-AccessGroup-NetworkTTP (M)

7.4.7.1 Definition

This represents a unidirectional relation from the IOC `Access Group` to the ProxyClass `Network TTP` (can be `Network TTP Source`, `Network TTP Sink` and `Network TTP Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.7.2 Roles

Name	Definition
accessPointList	This role (when present) represents the `Access Group` capability to identify the list of `Network TTPs` that are administratively grouped by this `AccessGroup`. When this role is present, the `AccessGroup.accessPointList` shall carry the set of DN(s) of the following IOCs: `Network TTP Source`, `Network TTP Sink` or `Network TTP Bidirectional`.

7.4.7.3 Constraint

Name	Definition
mutually_exclusive_to_Relation-AccessGroup-FlowTerminationPoint	This relation is mutually exclusive to the Relation-AccessGroup-FlowTerminationPoint.

7.4.8 Relation-Association-superior_Trail (O)

7.4.8.1 Definition

This represents a bidirectional relation between the IOC `Association` and the IOC `Trail` [ITU-T M.1401].

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.8.2 Roles

Name	Definition
superiorTrail	This role (when present) represents the `Association` capability to identify the `Trail[ITU-T M.1401]` that controls this `Association`. When this role is present, the `Association.superiorTrail` shall carry the DN of `Trail[ITU-T M.1401]`.
subordinateAssociationList	This role (when present) represents the `Trail[ITU-T M.1401]` capability to identify the `Association` that is subordinate to this `Trail`. When this role is present, the `Trail[ITU-T M.1401].subordinateAssociationList` shall carry the set of DN(s) of `Association`.

7.4.8.3 Constraint

Name	Definition
Ordered-relationship	This relation exists when the association is an ordered relationship.

7.4.9 Relation-Association-Trail (M)

7.4.9.1 Definition

This represents a bidirectional relation between the IOC `Association` and the IOC `Trail [ITU-T M.1401]`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.9.2 Roles

Name	Definition
trailList	This role (when present) represents the `Association` capability to identify the `Trail[ITU-T M.1401]` that is controlled by this `Association`. When this role is present, the `Association.trailList` shall carry the set of DN(s) of `Trail[ITU-T M.1401]`.
associationList	This role (when present) represents the `Trail[ITU-T M.1401]` capability to identify the `Associations` that this `Trail` is involved in. When this role is present, the `Trail[ITU-T M.1401].associationList` shall carry the set of DN(s) of `Association`.

7.4.9.3 Constraint

Name	Definition
–	–

7.4.10 Relation-CircuitPack-AlarmSeverityAssignmentProfile (M)

7.4.10.1 Definition

This represents a unidirectional relation from the IOC `Circuit Pack` to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.10.2 Roles

Name	Definition
alarmSeverityAssignmentProfilePointer	This role (when present) represents the `Circuit Pack` capability to identify the `Alarm Severity Assignment Profile` that is associated with this `Equipment`. When this role is present, the `CircuitPack.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.10.3 Constraint

Name	Definition
–	–

7.4.11 Relation-CircuitPack-Trail (O)

7.4.11.1 Definition

This represents a unidirectional relation from the IOC `Circuit Pack` to the IOC `Trail`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.11.2 Roles

Name	Definition
portAssociations	This role (when present) represents the `Circuit Pack` capability to identify the `list of Trails` that is associated with the ports of this `Circuit Pack`. When this role is present, the `CircuitPack.portAssociations` shall carry the set of pairs of port Number and the DN of the associated `Trail`.

7.4.11.3 Constraint

Name	Definition
–	–

7.4.12 Relation-ComponentItem-EquipmentIdentity (M)

7.4.12.1 Definition

This represents a bidirectional relation between the IOC `Component Item` and the IOC `Equipment Identity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.12.2 Roles

Name	Definition
equipmentIdentity	This role (when present) represents the `Component Item` capability to identify the `Equipment Identity` to which the `Component Item` belongs. When this role is present, the `ComponentItem.equipmentIdentity` shall carry the DN of `Equipment Identity`.
componentItemList	This role (when present) represents the `Equipment Identity` capability to identify the `Component Item(s)` belonging to this `Equipment identity`. When this role is present, the `EquipmentIdentity.componentItemList` shall carry the set of DN(s) of `ComponentItem`.

7.4.12.3 Constraint

Name	Definition
–	–

7.4.13 Relation-ComponentItem-Location (M)

7.4.13.1 Definition

This represents a bidirectional relation between the IOC `Component Item` and the IOC `Location`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.13.2 Roles

Name	Definition
location	This role (when present) represents the `Component Item` capability to identify the `Location` subordinate to the Location of the EquipmentItem containing the ComponentItem, where this `Component Item` can be found. When this role is present, the `ComponentItem.location` shall carry the DN of `Location`.
componentItem	This role (when present) represents the `Location` capability to identify the `Component Item` of an Equipment Item in this `Location`. When this role is present, the `Location.componentItem` shall carry the DN of `ComponentItem`.

7.4.13.3 Constraint

Name	Definition
–	–

7.4.14 Relation-Connection-client_Trail (O)

7.4.14.1 Definition

This represents a unidirectional relation from the IOC `Connection` to the IOC `Trail`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.14.2 Roles

Name	Definition
clientTrail	This role (when present) represents the `Connection` capability to identify the `Trail` in the same network layer as the connection served by this Connection object. When this role is present, the `Connection.clientTrail` shall carry the DN of `Trail`.

7.4.14.3 Constraint

Name	Definition
connection_serves_trail	The connection serves a client trail.

7.4.15 Relation-Connection-server_Trail (O)

7.4.15.1 Definition

This represents a unidirectional relation from the IOC `Connection` to the IOC `Trail`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.15.2 Roles

Name	Definition
serverTrailList	This role (when present) represents the `Connection` capability to identify the list of `Trails` in a lower order network layer which may be used in parallel to serve this `Connection`. When this role is present, the `Connection.serverTrailList` shall carry the set of DN(s) of `Trail`.

7.4.15.3 Constraint

Name	Definition
connection_supported_by_trail	The connection is supported by a trail.

7.4.16 Relation-ConnectionlessPoint-AlarmSeverityAssignmentProfile (O)

7.4.16.1 Definition

This represents a unidirectional relation from the IOC `Connectionless Point` (including its child classes `Flow Termination Point Source`, `Flow Termination Point Sink`, `Flow Point Source`, `Flow Point Sink`) to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.16.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Connectionless Point` (including its child classes `Flow Termination Point Source`, `Flow Termination Point Sink`, `Flow Point Source`, `Flow Point Sink`) capability to identify the Alarm Severity Assignment Profile that is associated with this `Connectionless Point`. When this role is present, the `ConnectionlessPoint.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.16.3 Constraint

Name	Definition
–	–

7.4.17 Relation-ConnectionlessPoint-ManagedEntity (M)

7.4.17.1 Definition

This represents a unidirectional relation from the IOC `Connectionless Point` (including its child classes `Flow Point Source/Sink`, and `Flow Termination Point Source/Sink`) to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.17.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Connectionless Point` (including its child classes `Flow Point Source/Sink`, and `Flow Termination Point Source/Sink`) capability to identify the list of `Managed Entities` that are capable of directly affecting this `Connectionless Point`. When this role is present, the `ConnectionlessPoint.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.17.3 Constraint

Name	Definition
–	–

7.4.18 Relation-ConnectionlessTrail-AlarmSeverityAssignmentProfile (O)

7.4.18.1 Definition

This represents a unidirectional relation from the IOC `Connectionless Trail` to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.18.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Connectionless Trail` capability to identify the Alarm Severity Assignment Profile that is associated with this `Connectionless Trail`. When this role is present, the `ConnectionlessTrail.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.18.3 Constraint

Name	Definition
–	–

7.4.19 Relation-ConnectionlessTrail-FlowTerminationPointSink (M)

7.4.19.1 Definition

This represents a bidirectional relation between the IOC `Connectionless Trail` and the IOC `Flow Termination Point Sink`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.19.2 Roles

Name	Definition
zEndFTP	This role (when present) represents the `Connectionless Trail` capability to identify the `Flow Termination Point Sink` where this connectionless trail is terminated. When this role is present, the `ConnectionlessTrail.zEndFTP` shall carry the DN of `Flow Termination Point Sink`.
connectionlessTrailPointer	This role (when present) represents the `Flow Termination Point Sink` capability to identify the `Connectionless Trail` that is terminated by this `Flow Termination Point Sink`. When this role is present, the `FlowTerminationPointSink.connectionlessTrailPointer` shall carry the DN of `Connectionless Trail`.

7.4.19.3 Constraint

Name	Definition
–	–

7.4.20 Relation-ConnectionlessTrail-FlowTerminationPointSource (M)

7.4.20.1 Definition

This represents a bidirectional relation between the IOC `Connectionless Trail` and the IOC `Flow Termination Point Source`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.20.2 Roles

Name	Definition
aEndFTP	This role (when present) represents the `Connectionless Trail` capability to identify the `Flow Termination Point Source` where this connectionless trail is started. When this role is present, the `ConnectionlessTrail.aEndFTP` shall carry the DN of `Flow Termination Point Source`.
connectionlessTrailPointer	This role (when present) represents the `Flow Termination Point Source` capability to identify the `Connectionless Trail` that starts from this `Flow Termination Point Source`. When this role is present, the `FlowTerminationPointSource.connectionlessTrailPointer` shall carry the DN of `Connectionless Trail`.

7.4.20.3 Constraint

Name	Definition
–	–

7.4.21 Relation-ConnectionTerminationPointSink-TerminationPoint (M)

7.4.21.1 Definition

This represents a unidirectional relation from the IOC `Connection Termination Point Sink` to the IOC `Termination Point` (including its child classes `Trail Termination Point Sink`, `Trail Termination Point Bidirectional`, `Connection Termination Point Source`, `Connection Termination Point Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.21.2 Roles

Name	Definition
downstreamConnectivityPointer	This role (when present) represents the `Connection Termination Point Sink` capability to identify the Termination Point within the same ME, which receives information (traffic) from this termination point at the same layer, or is null. When this role is present, the `ConnectionTerminationPointSink.downstreamConnectivityPointer` shall carry the set of DN(s) of the following IOCs: `Trail Termination Point Sink`, `Trail Termination Point Bidirectional`, `Connection Termination Point Source`, `Connection Termination Point Bidirectional`.

7.4.21.3 Constraint

Name	Definition
–	–

7.4.22 Relation-ConnectionTerminationPointSource-TerminationPoint (M)

7.4.22.1 Definition

This represents a unidirectional relation from the IOC `Connection Termination Point Source` to the IOC `Termination Point` (including its child classes `Trail Termination Point Source`, `Trail Termination Point Bidirectional`, `Connection Termination Point Sink`, `Connection Termination Point Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.22.2 Roles

Name	Definition
upstreamConnectivityPointer	This role (when present) represents the `Connection Termination Point Source` capability to identify the Termination Point within the same ME, which sends information (traffic) to this termination point at the same layer, or is null. When this role is present, the `ConnectionTerminationPointSource.upstreamConnectivityPointer` shall carry the set of DN(s) of the following IOCs: `Trail Termination Point Source`, `Trail Termination Point Bidirectional`, `Connection Termination Point Sink`, `Connection Termination Point Bidirectional`.

7.4.22.3 Constraint

Name	Definition
–	–

7.4.23 Relation-CrossConnection-from_TP_or_GTP (M)

7.4.23.1 Definition

This represents a unidirectional relation from the IOC `Cross Connection` to the ProxyClass TP_or_GTP (can be `Connection Termination Point Sink`, `Connection Termination Point Bidirectional`, `Trail Termination Point Source`, `Trail Termination Point Bidirectional`, or `Group Termination Point` composed of members of one of these categories).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.23.2 Roles

Name	Definition
fromTermination	This role (when present) represents the `Cross Connection` capability to identify one `Termination Point` or `Group Termination Point` for the assignment relationship between a pair of Termination Points or Group Termination Points (the starting point for a unidirectional cross-connection). When this role is present, the `CrossConnection.fromTermination` shall carry the DN of one of the following IOCs: `Connection Termination Point Sink`, `Connection Termination Point Bidirectional`, `Trail Termination Point Source`, `Trail Termination Point Bidirectional`, or `Group Termination Point` composed of members of one of these categories), or can be NULL.

7.4.23.3 Constraint

Name	Definition
null_fromTermination_value	If the fromTermination attribute has a value of NULL, the assignment relationship is between the termination point or the GTP listed in the fromTermination attribute of the containing Multipoint Cross-Connection, and the termination point or GTP listed in the ToTermination attribute of this Cross-Connection.

7.4.24 Relation-CrossConnection-to_TP_or_GTP (M)

7.4.24.1 Definition

This represents a unidirectional relation from the IOC `Cross Connection` to the ProxyClass TP_or_GTP (can be `Connection Termination Point Source`, `Connection Termination Point Bidirectional`, `Trail Termination Point Sink`, `Trail Termination Point Bidirectional`, or `Group Termination Point` composed of members of one of these categories).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.24.2 Roles

Name	Definition
toTermination	This role (when present) represents the `Cross Connection` capability to identify one `Termination Point` or `Group Termination Point` for the assignment relationship between a pair of Termination Points or Group Termination Points (the ending point for a unidirectional cross-connection). When this role is present, the `CrossConnection.toTermination` shall carry the DN of one of the following IOCs: `Connection Termination Point Source`, `Connection Termination Point Bidirectional`, `Trail Termination Point Sink`, `Trail Termination Point Bidirectional`, or `Group Termination Point` composed of members of one of these categories).

7.4.24.3 Constraint

Name	Definition
–	–

7.4.25 Relation-CrossCouplingSite-Operator (M)

7.4.25.1 Definition

This represents a bidirectional relation between the IOC `Cross-Coupling Site` and the IOC `Operator`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.25.2 Roles

Name	Definition
currentOperator	This role (when present) represents the `Cross-Coupling Site` capability to identify the `Operator` that is currently responsible for this `Cross-Coupling Site`. When this role is present, the `Cross-CouplingSite.currentOperator` shall carry the DN of `Operator`.
controlledSiteList	This role (when present) represents the `Operator` capability to identify the `Cross-Coupling Site(s)` that is currently owned by this `Operator`. When this role is present, the `Operator.controlledSiteList` shall carry the set of DN(s) of `Cross-Coupling Site`.

7.4.25.3 Constraint

Name	Definition
–	–

7.4.26 Relation-CrossCouplingSite-GeographicalArea (M)

7.4.26.1 Definition

This represents a bidirectional relation between the IOC `Cross-Coupling Site` and the IOC `Geographical Area`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.26.2 Roles

Name	Definition
geographicalArea	This role (when present) represents the `Cross-Coupling Site` capability to identify the `Geographical Area` that this `Cross-Coupling Site` belongs to. When this role is present, the `Cross-CouplingSite.geographicalArea` shall carry the DN of `Geographical Area`.
siteList	This role (when present) represents the `Geographical Area` capability to identify the `Cross-Coupling Site` that belongs to this `Geographical Area`. When this role is present, the `GeographicalArea.siteList` shall carry the set of DN(s) of `Cross-Coupling Site`.

7.4.26.3 Constraint

Name	Definition
–	–

7.4.27 Relation-Equipment-AlarmSeverityAssignmentProfile (O)

7.4.27.1 Definition

This represents a unidirectional relation from the IOC `Equipment` to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.27.2 Roles

Name	Definition
alarmSeverityAssignmentProfilePointer	This role (when present) represents the `Equipment` (including its child classes: `Equipment Holder` and `Circuit Pack`) capability to identify the `Alarm Severity Assignment Profile` that is associated with this `Equipment`. When this role is present, the `Equipment.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.27.3 Constraint

Name	Definition
–	–

7.4.28 Relation-Equipment-ManagedEntity-1 (O)

7.4.28.1 Definition

This represents a unidirectional relation from the IOC `Equipment` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.28.2 Roles

Name	Definition
affectedObjectList	This role (when present) represents the `Equipment` (including its child classes: `Equipment Holder` and `Circuit Pack`) capability to identify the list of Managed Entities that can be directly affected by a change in state or deletion of this `Equipment`. When this role is present, the `Equipment.affectedObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.28.3 Constraint

Name	Definition
–	–

7.4.29 Relation-Equipment-ManagedEntity-2 (M)

7.4.29.1 Definition

This represents a unidirectional relation from the IOC `Equipment Holder` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.29.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Equipment` (including its child classes: `Equipment Holder` and `Circuit Pack`) capability to identify the list of Managed Entities that are capable of directly affecting this `Equipment`. When this role is present, the `Equipment.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.29.3 Constraint

Name	Definition
–	–

7.4.30 Relation-EquipmentHolder-Software (O)

7.4.30.1 Definition

This represents a unidirectional relation from the IOC `EquipmentHolder` to the IOC `Software`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.30.2 Roles

Name	Definition
subordinateCircuitPackSoftwareLoad	This role (when present) represents the `EquipmentHolder` capability to identify the Software, if any, that is currently designated as the one to be loaded to the containing circuit pack whenever automatic reload of software is needed. When this role is present, the `EquipmentHolder.subordinateCircuitPackSoftwareLoad` may carry the ordered set of DN(s) of `Software`.

7.4.30.3 Constraint

Name	Definition
–	–

7.4.31 Relation-EquipmentItem-EquipmentIdentity (M)

7.4.31.1 Definition

This represents a bidirectional relation between the IOC `Equipment Item` and the IOC `Equipment Identity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.31.2 Roles

Name	Definition
equipmentIdentity	This role (when present) represents the `Equipment Item` capability to identify the `Equipment Identity` to which the `Equipment Item` belongs. When this role is present, the `EquipmentItem.equipmentIdentity` shall carry the DN of `Equipment Identity`.
equipmentItemList	This role (when present) represents the `Equipment Identity` capability to identify the `Equipment Item(s)` belonging to this `Equipment Identity`. When this role is present, the `EquipmentIdentity.equipmentItemList` shall carry the set of DN(s) of `Equipment Item`.

7.4.31.3 Constraint

Name	Definition
–	–

7.4.32 Relation-EquipmentItem-Location (M)

7.4.32.1 Definition

This represents a bidirectional relation between the IOC `Equipment Item` and the IOC `Location`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.32.2 Roles

Name	Definition
location	This role (when present) represents the `Equipment Item` capability to identify the `Location` subordinate to the superior Cross-coupling site or a recursively subordinate Location, where this `Equipment Item` can be found. When this role is present, the `EquipmentItem.location` shall carry the DN of `Location`.
equipmentItem	This role (when present) represents the `Location` capability to identify the `Equipment Item` being placed in this `Location`. When this role is present, the `Location.equipmentItem` shall carry the DN of `EquipmentItem`.

7.4.32.3 Constraint

Name	Definition
–	–

7.4.33 Relation-Exchange-EquipmentItem (M)

7.4.33.1 Definition

This represents a bidirectional relation between the IOC `Exchange` and the IOC `Equipment Item`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.33.2 Roles

Name	Definition
equipmentItem	This role (when present) represents the `Exchange` capability to identify the `Equipment Item` which provides a reference to the placement of the `Exchange` in a specific Location. When this role is present, the `Exchange.equipmentItem` shall carry the set of DN of `Port Item`.
exchange	This role (when present) represents the `Equipment Item` capability to identify the `Exchange` that is implemented by this `Equipment Item`. When this role is present, the `EquipmentItem.exchange` shall carry the DN of `Exchange`.

7.4.33.3 Constraint

Name	Definition
–	–

7.4.34 Relation-ExternalPoint-ManagedEntity (M)

7.4.34.1 Definition

This represents a unidirectional relation from the IOC `External Point` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.34.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `External Point` capability to identify the list of Managed Entities that are capable of directly affecting this `External Point`. When this role is present, the `ExternalPoint.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.34.3 Constraint

Name	Definition
–	–

7.4.35 Relation-Fabric-ManagedEntity (M)

7.4.35.1 Definition

This represents a unidirectional relation from the IOC `Fabric` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.35.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Fabric` capability to identify the list of Managed Entities that are capable of directly affecting this `Fabric`. When this role is present, the `fabric.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.35.3 Constraint

Name	Definition
–	–

7.4.36 Relation-FlowDomain-AccessGroup (O)

7.4.36.1 Definition

This represents a bidirectional relation between the IOC `Flow Domain` and the IOC `Access Group`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.36.2 Roles

Name	Definition
containedAccessGroupList	This role (when present) represents the `Flow Domain` capability to identify the list of `Access Groups` that are contained in this `Flow Domain`. When this role is present, the `FlowDomain.containedAccessGroupList` shall carry the set of DNs of `Access Group`.
containedInFlowDomainList	This role (when present) represents the `Access Group` capability to identify the list of parent Flow Domains that contain this Access Group. When this role is present, the `AccessGroup.containedInFlowDomainList` shall carry the set of DN(s) of `Flow Domain`.

7.4.36.3 Constraint

Name	Definition
partitioning_supported	This relation is present when an Access Group is contained in a Flow Domain.

7.4.37 Relation-FlowDomain-ConnectionlessPoint (O)

7.4.37.1 Definition

This represents a unidirectional relation from the IOC `Flow Domain` to the IOC `Network Connectionless Point` (including its child classes `Flow (Termination) Point Source/Sink`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.37.2 Roles

Name	Definition
containedConnectionlessPointList	This role (when present) represents the `Flow Domain` capability to identify the list of `Connectionless Points` that are contained in this `Flow Domain`. When this role is present, the `FlowDomain.containedConnectionlessPointList` shall carry the set of DN(s) of child classes of `Connectionless Point` (`Flow (Termination) Point Source/Sink`).

7.4.37.3 Constraint

Name	Definition
–	–

7.4.38 Relation-FlowDomain-FlowDomain (O)

7.4.38.1 Definition

This represents a bidirectional relation between the IOC `Flow Domain` and the IOC `Flow Domain`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.38.2 Roles

Name	Definition
containedFlowDomainList	This role (when present) represents the `Flow Domain` capability to identify the list of `Flow Domains` that are contained in this `Flow Domain`. When this role is present, the `FlowDomain.containedFlowDomainList` shall carry the set of DN(s) of `Flow Domain`.
containedInFlowDomainList	This role (when present) represents the `Flow Domain` capability to identify the list of parent `Flow Domains` that contain this `Flow Domain`. When this role is present, the `FlowDomain.containedInFlowDomainList` shall carry the set of DN(s) of `Flow Domain`.

7.4.38.3 Constraint

Name	Definition
partitioning_supported	This relation is present when an Access Group is contained in a Flow Domain.

7.4.39 Relation-FlowDomain-FlowPointPool (O)

7.4.39.1 Definition

This represents a bidirectional relation between the IOC `Flow Domain` and the IOC `Flow Point Pool`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.39.2 Roles

Name	Definition
containedFlowPointPoolList	This role (when present) represents the `Flow Domain` capability to identify the list of `Flow Point Pools` that are contained in this `Flow Domain`. When this role is present, the `FlowDomain.containedFlowPointPoolList` shall carry the set of DN(s) of `Flow Point Pool`.
containedInFlowDomainList	This role (when present) represents the `Flow Point Pool` capability to identify the list of parent `Flow Domains` that contain this `Flow Point Pool`. When this role is present, the `FlowPointPool.containedInFlowDomainList` shall carry the set of DN(s) of `Flow Domain`.

7.4.39.3 Constraint

Name	Definition
partitioning_supported	This relation is present when a Flow Point Pool is contained in a Flow Domain.

7.4.40 Relation-FlowDomain-FlowPointPoolLink-1 (O)

7.4.40.1 Definition

This represents a unidirectional relation from the IOC `Flow Domain` to the IOC `Flow Point Pool Link`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.40.2 Roles

Name	Definition
fppLinkPointerList	This role (when present) represents the `Flow Domain` capability to identify the list of Flow Point Pool Links that are terminated by this `Flow Domain`. When this role is present, the `FlowDomain.fppLinkPointerList` shall carry the set of DN(s) of `Flow Point Pool Link`.

7.4.40.3 Constraint

Name	Definition
–	–

7.4.41 Relation-FlowDomain-FlowPointPoolLink-2 (O)

7.4.41.1 Definition

This represents a unidirectional relation from the IOC `Flow Domain` to the IOC `Flow Point Pool Link`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.41.2 Roles

Name	Definition
containedFppLinkList	This role (when present) represents the `Flow Domain` capability to identify the list of Flow Point Pool Links that are contained in this `Flow Domain` through partitioning. When this role is present, the `FlowDomain.containedFppLinkList` shall carry the set of DN(s) of `Flow Point Pool Link`.

7.4.41.3 Constraint

Name	Definition
partitioning_supported	There are contained FPPLinks in the flow Domain (partitioning is supported).

7.4.42 Relation-FlowDomain-ManagedEntity (O)

7.4.42.1 Definition

This represents a unidirectional relation from the IOC `Flow Domain` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.42.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Flow Domain` capability to identify the list of `Managed Entities` that are capable of directly affecting this `Flow Domain`. When this role is present, the `FlowDomain.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.42.3 Constraint

Name	Definition
–	–

7.4.43 Relation-FlowDomainFragment-input_ConnectionlessPoint (M)

7.4.43.1 Definition

This represents a unidirectional relation between the IOC `Flow Domain Fragment` to the IOC `Connectionless Point` (including its child classes: `Flow (Termination) Point Source/Sink`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.43.2 Roles

Name	Definition
inputFPList	This role (when present) represents the `Flow Domain Fragment` capability to identify one or more input `Connectionless Points` that terminate this `Flow Domain Fragment`. When this role is present, the `FlowDomain.inputFPList` shall carry the set of DN(s) of `Connectionless Point` (including its child classes: `Flow (Termination) Point Source/Sink`).

7.4.43.3 Constraint

Name	Definition
none_empty_FPList	The value of the inputFPList cannot be empty.

7.4.44 Relation-FlowDomainFragment-output_ConnectionlessPoint (M)

7.4.44.1 Definition

This represents a unidirectional relation between the IOC `Flow Domain Fragment` to the IOC `Connectionless Point` (including its child classes: `Flow (Termination) Point Source/Sink`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.44.2 Roles

Name	Definition
outputFPList	This role (when present) represents the `Flow Domain Fragment` capability to identify one or more output `Connectionless Points` that terminate this `Flow Domain Fragment`. When this role is present, the `FlowDomain.outputFPList` shall carry the set of DN(s) of `Connectionless Point` (including its child classes: `Flow (Termination) Point Source/Sink`).

7.4.44.3 Constraint

Name	Definition
none_empty_FPList	The value of the outputFPList cannot be empty.

7.4.45 Relation-FlowPoint-FlowTerminationPoint (O)

7.4.45.1 Definition

This represents a bidirectional relation between the ProxyClass `Flow Point` (can be `Flow Point`

Sink/Source) and the ProxyClass `Flow Termination Point` (can be `Flow Termination Point Sink/Source`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.45.2 Roles

Name	Definition
serverFTPPointer	This role (when present) represents the `Flow Point` capability to identify the `Flow Termination Points` that may serve this `Flow Point` in another layer. When this role is present, the `FlowPoint(Sink/Source).serverFTPPointer` shall carry the set of DN(s) of `FlowTerminationPoint(Sink/Source)`.
clientFPList	This role (when present) represents the `Flow Termination Point` capability to identify the list of `Flow Points` (including `Sink/Source`) which are clients of this Flow Point in another layer. When this role is present, the `FlowPoint(Sink/Source).clientFPList` shall carry the set of DN(s) of the `Flow Point(Sink/Source)`.

7.4.45.3 Constraint

Name	Definition
–	–

7.4.46 Relation-FlowPointPool-FlowPoint (M)

7.4.46.1 Definition

This represents a unidirectional relation from the IOC `Flow Point Pool` to the ProxyClass `Flow Point` (can be `Flow Point Source` or `Flow Point Sink`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.46.2 Roles

Name	Definition
flowPointList	This role (when present) represents the `Flow Point Pool` capability to identify the Flow Points that are present in this Flow Point Pool. When this role is present, the `FlowPointPool.flowPointList` shall carry the set of DN(s) of `Flow Point Source` or `Flow Point Source`.

7.4.46.3 Constraint

Name	Definition
–	–

7.4.47 Relation-FlowPointPool-GenericTransportTTP (O)

7.4.47.1 Definition

This represents a bidirectional relation between the IOC `Flow Point Pool` and the IOC `Generic Transport TTP`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.47.2 Roles

Name	Definition
serverTTPPointer	This role (when present) represents the `Flow Point Pool` capability to identify the `Generic Transport TTPs` that may serve this `Flow Point Pool` in another layer. When this role is present, the `FlowPointPool.serverTTPPointer` shall carry the set of DN(s) of the IOC: `Network Generic Transport TTP` or its child classes.
clientFlowPointPoolList	This role (when present) represents the `Generic Transport TTP` capability to identify the list of `Flow Point Pools` in the client layer network domain(s) that are supported by this `Generic Transport TTP`. When this role is present, the `GenericTransportTTP.clientFlowPointPoolList` shall carry the set of DN(s) of the `Flow Point Pool`.

7.4.47.3 Constraint

Name	Definition
–	–

7.4.48 Relation-FlowPointPool-ManagedEntity (O)

7.4.48.1 Definition

This represents a unidirectional relation from the IOC `Flow Point Pool` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.48.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Flow Point Pool` capability to identify the list of `Managed Entities` that are capable of directly affecting this `Flow Point Pool`. When this role is present, the `FlowPointPool.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.48.3 Constraint

Name	Definition
–	–

7.4.49 Relation-FlowPointPool-FlowPointPoolLink (M)

7.4.49.1 Definition

This represents a unidirectional relation from the IOC `Flow Point Pool` to the IOC `Flow Point Pool Link`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.49.2 Roles

Name	Definition
linkPointer	This role (when present) represents the `Flow Point Pool` capability to identify the Flow Point Pool Link that is terminated by this `Flow Point Pool`. When this role is present, the `FlowPointPool.linkPointer` shall carry the DN of `Flow Point Pool Link`.

7.4.49.3 Constraint

Name	Definition
–	–

7.4.50 Relation-FlowPointPoolLink-AlarmSeverityAssignmentProfile (O)

7.4.50.1 Definition

This represents a unidirectional relation from the IOC `Flow Point Pool Link` to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.50.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Flow Point Pool Link` capability to identify the Alarm Severity Assignment Profile that is associated with this `Flow Point Pool Link`. When this role is present, the `FlowPointPoolLink.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.50.3 Constraint

Name	Definition
–	–

7.4.51 Relation-FlowPointPoolLink-a_EndofFPPLink (M)

7.4.51.1 Definition

This represents a unidirectional relation from the IOC `Flow Point Pool Link` to the ProxyClass `End of FPPLink` (can be `Flow Point Pool`, `Flow Domain`, and `Access Group`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.51.2 Roles

Name	Definition
aEndofFPPLink	This role (when present) represents the `Flow Point Pool Link` capability to identify one End of the `FPPLink` (the starting point for a unidirectional link). When this role is present, the `PointPool.aEndofFPPLink` shall carry the DN of one of the following IOCs: `Flow Point Pool`, `Flow Domain`, and `Access Group`.

7.4.51.3 Constraint

Name	Definition
fromEnd_for_unidirectional_Link	When the Flow Point Pool Link is a unidirectional link, the aEndofFPPLink shall point to the starting point of the link.

7.4.52 Relation-FlowPointPoolLink-z_EndofFPPLink (M)

7.4.52.1 Definition

This represents a unidirectional relation from the IOC `Flow Point Pool Link` to the ProxyClass `End of FPPLink` (can be `Flow Point Pool`, `Flow Domain`, and `Access Group`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.52.2 Roles

Name	Definition
zEndofFPPLink	This role (when present) represents the `Flow Point Pool Link` capability to identify the other End of the `FPPLink` (the ending point for a unidirectional link). When this role is present, the `FlowPointPool.zEndofFPPLink` shall carry the DN of one of the following IOCs: `Flow Point Pool`, `Flow Domain`, and `Access Group`.

7.4.52.3 Constraint

Name	Definition
toEnd_for_unidirectional_Link	When the Flow Point Pool Link is a unidirectional link, the zEndofFPPLink shall point to the ending point of the FPPLink.

7.4.53 Relation-FlowPointPoolLink-ConnectionlessTrail (O)

7.4.53.1 Definition

This represents a bidirectional relation from the IOC `Flow Point Pool Link` to the IOC `Connectionless Trail`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.53.2 Roles

Name	Definition
serverTrail	This role (when present) represents the `Flow Point Pool Link` capability to identify the `Connectionless Trail` in the server layer that supports the `Flow Point Pool Link` in a client layer. When this role is present, the `FlowPointPoolLink.serverTrail` shall carry the DN of `Connectionless Trail`.
clientLinkPointerList	This role (when present) represents the `Connectionless Trail` capability to identify the list of `Flow Point Pool Links` that reflect the capacity of the `Trail` in the client layer network domain(s). When this role is present, the `ConnectionlessTrail.clientLinkPointerList` shall carry the set of DN(s) of `Flow Point Pool Link`.

7.4.53.3 Constraint

Name	Definition
–	–

7.4.54 Relation-FlowPointSink-FlowPointSource (M)

7.4.54.1 Definition

This represents a bidirectional relation between the IOC `Flow Point Sink` and the IOC `Flow Point Source`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.54.2 Roles

Name	Definition
downstreamFPPointer	This role (when present) represents the `Flow Point Sink` capability to identify the list of `Flow Point Source` within the same ME, which receives information (traffic) from this `Flow Point Sink` at the same layer, or is null. When this role is present, the `FlowPointSink.downstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Sink, Flow Point Source`.
upstreamFPPointer	This role (when present) represents the `Flow Point Source` capability to identify the list of `Flow Point Sinks` within the same ME, which send information (traffic) to this `Flow Point Source` at the same layer, or is null. When this role is present, the `FlowPointSource.upstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Source, Flow Point Sink`.

7.4.54.3 Constraint

Name	Definition
–	–

7.4.55 Relation-FlowPointSink-FlowTerminationPointSink (M)

7.4.55.1 Definition

This represents a bidirectional relation between the IOC `Flow Point Sink` and the IOC `Flow Termination Point Sink`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.55.2 Roles

Name	Definition
downstreamFPPointer	This role (when present) represents the `Flow Point Sink` capability to identify the list of `Flow Termination Point Sink` within the same ME, which receives information (traffic) from this `Flow Point Sink` at the same layer, or is null. When this role is present, the `FlowPointSink.downstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Sink, Flow Point Source`.
upstreamFPPointer	This role (when present) represents the `Flow Termination Point Sink` capability to identify the list of `Flow Point Sink` within the same ME, which sends information (traffic) to this `Flow Termination Point Sink` at the same layer, or is null. When this role is present, the `FlowTerminationPointSink.upstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Source, Flow Point Sink`.

7.4.55.3 Constraint

Name	Definition
–	–

7.4.56 Relation-FlowTerminationPointSource-FlowPointSource (M)

7.4.56.1 Definition

This represents a bidirectional relation between the IOC `Flow Termination Point Source` and the IOC `Flow Point Source`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.56.2 Roles

Name	Definition
downstreamFPPointer	This role (when present) represents the `Flow Termination Point Source` capability to identify the list of `Flow Point Source` within the same ME, which receives information (traffic) from this `Flow Termination Point Source` at the same layer, or is null. When this role is present, the `FlowTerminationPointSource.downstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Sink`, `Flow Point Source`.
upstreamFPPointer	This role (when present) represents the `Flow Point Source` capability to identify the list of `Flow Termination Point Source` within the same ME, which sends information (traffic) to this `Flow Point Source` at the same layer, or is null. When this role is present, the `FlowPointSource.upstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Source`, `Flow Point Sink`.

7.4.56.3 Constraint

Name	Definition
–	–

7.4.57 Relation-FlowTerminationPointSource-FlowTerminationPointSink (M)

7.4.57.1 Definition

This represents a bidirectional relation between the IOC `Flow Termination Point Source` and the IOC `Flow Termination Point Sink`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.57.2 Roles

Name	Definition
downstreamFPPointer	This role (when present) represents the `Flow Termination Point Source` capability to identify the list of `Flow Termination Point Sink` within the same ME, which receives information (traffic) from this `Flow Termination Point Source` at the same layer, or is null. When this role is present, the `FlowTerminationPointSource.downstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Sink`, `Flow Point Source`.
upstreamFPPointer	This role (when present) represents the `Flow Termination Point Sink` capability to identify the list of `Flow Termination Point Source` within the same ME, which sends information (traffic) to this `Flow Termination Point Sink` at the same layer, or is null. When this role is present, the `FlowTerminationPointSink.upstreamFPPointer` shall carry the set of DN(s) of the following IOCs: `Flow Termination Point Source`, `Flow Point Sink`.

7.4.57.3 Constraint

Name	Definition
–	–

7.4.58 Relation-GroupTerminationPoint-CrossConnection (M)

7.4.58.1 Definition

This represents a unidirectional relation from the IOC `Group Termination Point` to the IOC `Cross Connection`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.58.2 Roles

Name	Definition
crossConnectionObjectPointer	This role (when present) represents the `Group Termination Point` capability to identify the Cross Connections that this `Group Termination Point` points to. When this role is present, the `GroupTerminationPoint.crossConnectionObjectPointer` shall carry the DN of `Cross Connection`, or set of DN(s) of `Cross Connection` for multiple cross connections.

7.4.58.3 Constraint

Name	Definition
mutually_exclusive_to_Relation-GroupTerminationPoint-CrossConnection_and_ Relation-GroupTerminationPoint-GroupTerminationPoint	This relation is mutually exclusive to the relation-GroupTerminationPoint-CrossConnection and Relation-GroupTerminationPoint-GroupTerminationPoint.

7.4.59 Relation-GroupTerminationPoint-Fabric (M)

7.4.59.1 Definition

This represents a unidirectional relation from the IOC `Group Termination Point` to the IOC `Fabric`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.59.2 Roles

Name	Definition
crossConnectionObjectPointer	This role (when present) represents the `Group Termination Point` capability to identify the `Fabric` that this `Group Termination Point` points to. When this role is present, the `GroupTerminationPoint.crossConnectionObjectPointer` shall carry the DN of `Fabric`.

7.4.59.3 Constraint

Name	Definition
mutually_exclusive_to_Relation-GroupTerminationPoint-CrossConnection_and_ Relation-GroupTerminationPoint-GroupTerminationPoint	This relation is mutually exclusive to the relation-GroupTerminationPoint-CrossConnection and Relation-GroupTerminationPoint-GroupTerminationPoint.

7.4.60 Relation-GroupTerminationPoint-GroupTerminationPoint (M)

7.4.60.1 Definition

This represents a unidirectional relation from the IOC `Group Termination Point` to the IOC `Group Termination Point`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.60.2 Roles

Name	Definition
crossConnectionObjectPointer	This role (when present) represents the `Group Termination Point` capability to identify the GroupTermination Points that this `Group Termination Point` points to for multiple cross-connections. When this role is present, the `GroupTerminationPoint.crossConnectionObjectPointer` shall carry a pair of DNs of Group Termination Point for upstream and downstream.

7.4.60.3 Constraint

Name	Definition
mutually_exclusive_to_Relation-GroupTerminationPoint-CrossConnection_and_Relation-GroupTerminationPoint-Fabric	This relation is mutually exclusive to the relation-GroupTerminationPoint-CrossConnection and Relation-GroupTerminationPoint-Fabric.

7.4.61 Relation-GroupTerminationPoint-TerminationPoint (M)

7.4.61.1 Definition

This represents a unidirectional relation from the IOC `Group Termination Point` to the IOC `Termination Point` (including its child classes).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.61.2 Roles

Name	Definition
tpsInGtpList	This role (when present) represents the `Group Termination Point` capability to identify the Termination Points that are represented by this `Group Termination Point`. When this role is present, the `GroupTerminationPoint.tpsInGtpList` shall carry the set of DN(s) of child classes of `Termination Points`.

7.4.61.3 Constraint

Name	Definition
–	–

7.4.62 Relation-LinkConnection-client_Trail (O)

7.4.62.1 Definition

This represents a bidirectional relation between the IOC `Link Connection` and the IOC `Trail`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.62.2 Roles

Name	Definition
clientTrail	This role (when present) represents the `Link Connection` capability to identify the `Trail` in the same network layer as the connection served by this Link Connection object. When this role is present, the `LinkConnection.clientTrail` shall carry the DN of `Trail`.
connectionList	This role (when present) represents the `Trail` capability to identify the list of `Link Connections` and `Sub Network Connections` in a given layer which may compose the Trail in the same layer. When this role is present, the `Trail.connectionList` shall carry the ordered set of DN(s) of `Link Connection` and `Sub Network Connection`.

7.4.62.3 Constraint

Name	Definition
connection_serves_trail	The link connection serves a client trail.

7.4.63 Relation-LinkConnection-server_Trail (O)

7.4.63.1 Definition

This represents a bidirectional relation between the IOC `Link Connection` and the IOC `Trail`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.63.2 Roles

Name	Definition
serverTrailList	This role (when present) represents the `Link Connection` capability to identify the list of `Trails` in a lower order network layer which may be used in parallel to serve this `Link Connection`. When this role is present, the `LinkConnection.serverTrailList` shall carry the set of DN(s) of `Trail`.
clientLinkConnectionPointerList	This role (when present) represents the `Trail` capability to identify the list of `Link Connections` in the client layer network domain(s) that are supported by the Trail. When this role is present, the `Trail.clientLinkConnectionPointerList` shall carry the set of DN(s) of `Link Connection`.

7.4.63.3 Constraint

Name	Definition
connection_supported_by_trail	The link connection is supported by a trail.

7.4.64 Relation-Location-EquipmentIdentity (M)

7.4.64.1 Definition

This represents a bidirectional relation between the IOC `Location` and the IOC `Equipment Identity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.64.2 Roles

Name	Definition
equipmentIdentity	This role (when present) represents the `Location` capability to identify the `Equipment Identity` to which the `Location` belongs. When this role is present, the `Location.equipmentIdentity` shall carry the DN of `Equipment Identity`.
locationList	This role (when present) represents the `Equipment Identity` capability to identify the `Location(s)` belonging to this `Equipment Identity`. When this role is present, the `EquipmentIdentity.locationList` shall carry the set of DN(s) of `Location`.

7.4.64.3 Constraint

Name	Definition
–	–

7.4.65 Relation-LogicalLinkEnd-NetworkCTP (O)

7.4.65.1 Definition

This represents a unidirectional relation from the IOC `Logical Link End` to the ProxyClass `Network CTP` (can be `Network CTP Source`, `Network CTP Sink`, `Network CTP Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.65.2 Roles

Name	Definition
networkCTPsInLinkEndList	This role (when present) represents the `Logical Link End` capability to identify the list of `Network CTPs` that are represented by this `Logical Link End`. When this role is present, the `LogicalLinkEnd.networkCTPsInLinkEndList` shall carry the set of DN(s) of one kind of `Network CTPs` (including `Network CTP Source`, `Network CTP Sink`, `Network CTP Bidirectional`).

7.4.65.3 Constraint

Name	Definition
–	–

7.4.66 Relation-LogicalLink-LinkConnection (O)

7.4.66.1 Definition

This represents a unidirectional relation from the IOC `Logical Link` and the IOC `Link Connection`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.66.2 Roles

Name	Definition
linkConnectionPointerList	This role (when present) represents the `Logical Link` capability to identify the list of `Link Connections` in a given layer which may compose this Logical Link in the same layer. When this role is present, the `LogicalLink.linkConnectionPointerList` shall carry the set of DN(s) of `Link Connection`.

7.4.66.3 Constraint

Name	Definition
–	–

7.4.67 Relation-ManagedElement-AlarmSeverityAssignmentProfile (O)

7.4.67.1 Definition

This represents a unidirectional relation from the IOC `Managed Element` to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.67.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Managed Element` capability to identify the `Alarm Severity Assignment Profile` that is associated with this `Managed Element`. When this role is present, the `ManagedElement.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.67.3 Constraint

Name	Definition
–	–

7.4.68 Relation-MultipointTrail-Trail [ITU-T M.1401] (M)

7.4.68.1 Definition

This represents a bidirectional relation between the IOC `Multipoint Trail` and the IOC `Trail [ITU-T M.1401]`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.68.2 Roles

Name	Definition
trailList	This role (when present) represents the `Multipoint Trail` capability to identify the `Trail(s)[ITU-T M.1401]` that is contained in this `Multipoint Trail`. When this role is present, the `MultipointTrail.trailList` shall carry the set of DN(s) of `Trail [ITU-T M.1401]`.
multipointTrail	This role (when present) represents the `Trail [ITU-T M.1401]` capability to identify the `Multipoint Trail` that is supported by this `Trail [ITU-T M.1401]`. When this role is present, the `Trail [ITU-T M.1401].multipointTrail` shall carry the DN of `Multipoint Trail`.

7.4.68.3 Constraint

Name	Definition
–	–

7.4.69 Relation-NetworkCTP-NetworkCTP (O)

7.4.69.1 Definition

This represents a bidirectional relation between the ProxyClass `Network CTP` (Source/Sink/Bidirectional) and the ProxyClass `Network CTP` (Source/Sink/Bidirectional).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.69.2 Roles

Name	Definition
sub-partitionPointer	This role (when present) represents the `Network CTP` `(Source/Sink/Bidirectional)` capability to identify the `Network CTP (Source/Sink/Bidirectional)` which is in a lower level partition. When this role is present, the `NetworkCTP (Source/Sink/Bidirectional).sub-partitionPointer` shall carry the DN of `Network CTP (Source/Sink/Bidirectional)`.
superPartitionPointer	This role (when present) represents the `Network CTP` `(Source/Sink/Bidirectional)` capability to identify the `Network CTP (Source/Sink/Bidirectional)` which is in a higher level partition. When this role is present, the `NetworkCTP(Source/Sink/Bidirectional).superPartitionPointer` shall carry the DN of `Network CTP (Source/Sink/Bidirectional)`.

7.4.69.3 Constraint

Name	Definition
–	–

7.4.70 Relation-NetworkCTP-NetworkTTP (O)

7.4.70.1 Definition

This represents a bidirectional relation between the ProxyClass `Network CTP` (Source/Sink/Bidirectional) and the ProxyClass `Network TTP` (Source/Sink/Bidirectional).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.70.2 Roles

Name	Definition
serverTTPPointer	This role (when present) represents the `Network CTP` capability to identify the `Network TTPs` which may serve this Network CTP `(Source/Sink/Bidirectional)` in another layer. When this role is present, the `NetworkCTP(Source/Sink/Bidirectional).serverTTPPointer` shall carry the set of DN(s) of `Network CTP(Source/Sink/Bidirectional)`.
clientCTPList	This role (when present) represents the `Network TTP` capability to identify the `list of Network CTPs` (including `Source/Sink/Bidirectional`) which are clients of this Network TTP (can be Source/Sink/Bidirectional) in another layer. When this role is present, the `NetworkTTP(Source/Sink/Bidirectional).clientCTPList` shall carry the set of DN(s) of `Network CTP (Source/Sink/Bidirectional)`.

7.4.70.3 Constraint

Name	Definition
–	–

7.4.71 Relation-NetworkTerminationPoint-NE_TerminationPoint (O)

7.4.71.1 Definition

This represents a unidirectional relation from the IOC `Network Termination Point` (including its child classes `Network CTP/TTP Source/Sink/Bidirectional`) to the ProxyClass `NE Termination Point` (NE level `Termination Point`, including its child classes `Trail/Connection Termination Point Source/Sink/Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.71.2 Roles

Name	Definition
neTerminationPoint	This role (when present) represents the `Network Termination Point` (including its child classes `Network CTP/TTP Source/Sink/Bidirectional`) capability to identify the `NE Termination Point` which represents the functionality which supports this lowest level `Termination Points (TTP/CTP Source/Sink/Bidirectional)`. When this role is present, the `NetworkTerminationPoint(Source/Sink/Bidirectional).neTerminationPoint` shall carry the DN of NE Termination Point (including its child classes `Trail/Connection Termination Point Source/Sink/Bidirectional`).

7.4.71.3 Constraint

Name	Definition
–	–

7.4.72 Relation-NetworkTerminationPoint-NetworkTerminationPoint (O)

7.4.72.1 Definition

This represents a unidirectional relation between the IOC `Network Termination Point` (including its child classes `Network CTP/TTP Source/Sink/Bidirectional`) and the IOC `Network Termination Point` (including its child classes `Network CTP/TTP Source/Sink/Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.72.2 Roles

Name	Definition
networkTPPointer	This role (when present) represents the `Network Termination Point` (including its child classes `Network CTP/TTP Source/Sink/Bidirectional`) capability to identify the `Network Termination Point` (including its child classes `Network CTP/TTP Source/Sink/Bidirectional`) which is associated with this Network TP. When this role is present, the `NetworkTerminationPoint(Source/Sink/ Bidirectional).networkTPPointer` shall carry the DN of Network Termination Point (including its child classes `Network CTP/TTP Source/Sink/Bidirectional`).

7.4.72.3 Constraint

Name	Definition
no_flexibility	There is no flexibility between network termination points (degenerate case only).

7.4.73 Relation-NetworkTerminationPoint-SubNetworkConnection (O)

7.4.73.1 Definition

This represents a unidirectional relation from the IOC `Network Termination Point` (including its child classes: `Network CTP/TTP Source/Sink/Bidirectional`) to the IOC `Sub Network Connection`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.73.2 Roles

Name	Definition
subNetworkConnectionPointer	This role (when present) represents the `Network Termination Point` (including its child classes) capability to identify the ordered list of Sub Network Connection(s) which have a relationship with the `Network Termination Point`. When this role is present, the `Network Termination Point.subNetworkConnectionPointer` shall carry the ordered set of DN(s) of `SubNetwork`, or can be null.

7.4.73.3 Constraint

Name	Definition
–	–

7.4.74 Relation-NetworkTerminationPoint-Trail_or_LinkConnection (O)

7.4.74.1 Definition

This represents a unidirectional relation from the IOC `Network Termination Point` (including its child classes: `Network CTP/TTP Source/Sink/Bidirectional`) to the ProxyClass `Trail_or_LinkConnection` (can be `Trail` or `Link Connection`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.74.2   Roles

Name	Definition
connectivityPointer	This role (when present) represents the `Network Termination Point` (including its child classes) capability to identify the `Trail` or `Link Connection` which is terminated by the `Network Termination Point`. When this role is present, the `NetworkTerminationPoint.connectivityPointer` shall carry the DN of the following IOCs: `Trail`, `Link Connection`.

7.4.74.3   Constraint

Name	Definition
–	–

7.4.75   Relation-Operator-Trail [ITU-T M.1401] (M)

7.4.75.1   Definition

This represents a bidirectional relation between the IOC `Operator` and the IOC `Trail` [ITU-T M.1401].

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.75.2   Roles

Name	Definition
controlledTrailList	This role (when present) represents the `Operator` capability to identify the `Trail(s)` that is currently owned by this `Operator`. When this role is present, the `Operator.controlledTrailList` shall carry the set of DN(s) of `Trail [ITU-T M.1401]`.
controllerList	This role (when present) represents the `Trail` capability to identify the `Operator` that is currently responsible for this `Trail`. When this role is present, the `Trail [ITU-T M.1401].controllerList` shall carry the list of DN(s) of `Operator`.

7.4.75.3   Constraint

Name	Definition
–	–

7.4.76   Relation-PhysicalLinkConnection-Position (M)

7.4.76.1   Definition

This represents a bidirectional relation between the IOC `Physical Link Connection` and the IOC `Position`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.76.2 Roles

Name	Definition
position	This role (when present) represents the `Physical Link Connection` capability to identify the `Position` that terminates the `Physical Link Connection`. When this role is present, the `PhysicalLinkConnection.position` shall carry the DN of `Position`.
physicalLinkConnectionList	This role (when present) represents the `Position` capability to identify the `Physical Link Connection(s)` being terminated on this `Position`. When this role is present, the `Position.physicalLinkConnectionList` shall carry the set of DN(s) of `Physical Link Connection`.

7.4.76.3 Constraint

Name	Definition
–	–

7.4.77 Relation-PortItem-EquipmentIdentity (M)

7.4.77.1 Definition

This represents a bidirectional relation between the IOC `Port Item` and the IOC `Equipment Identity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.77.2 Roles

Name	Definition
equipmentIdentity	This role (when present) represents the `Port Item` capability to identify the `Equipment Identity` to which the `Port Item` belongs. When this role is present, the `PortItem.equipmentIdentity` shall carry the DN of `Equipment Identity`.
portItemList	This role (when present) represents the `Equipment Identity` capability to identify the `Port Item(s)` belonging to this `Equipment Identity`. When this role is present, the `EquipmentIdentity.portItemList` shall carry the set of DN(s) of `Port Item`.

7.4.77.3 Constraint

Name	Definition
–	–

7.4.78 Relation-PortItem-Position (M)

7.4.78.1 Definition

This represents a bidirectional relation between the IOC `Port Item` and the IOC `Position`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.78.2 Roles

Name	Definition
position	This role (when present) represents the `Port Item` capability to identify the `Position` that terminates this `Port Item`. When this role is present, the `PortItem.position` shall carry the DN of `Position`.
portItemList	This role (when present) represents the `Position` capability to identify the `Port Item(s)` being terminated on this `Position`. When this role is present, the `Position.portItemList` shall carry the set of DN(s) of `Port Item`.

7.4.78.3 Constraint

Name	Definition
–	–

7.4.79 Relation-Position-Position (M)

7.4.79.1 Definition

This represents a bidirectional relation between the IOC `Position` and the IOC `Position`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.79.2 Roles

Name	Definition
position	This role (when present) represents the `Position` capability to identify another `Position` that is connected by cross-coupling or termination to this `Position`. When this role is present, the `Position.position` shall carry the DN of `Position`.
position	The same as above.

7.4.79.3 Constraint

Name	Definition
–	–

7.4.80 Relation-Pipe-AlarmSeverityAssignmentProfile (O)

7.4.80.1 Definition

This represents a unidirectional relation from the IOC `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.80.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) capability to identify the Alarm Severity Assignment Profile that is associated with this `Pipe`. When this role is present, the `Pipe.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.80.3 Constraint

Name	Definition
–	–

7.4.81 Relation-Pipe-ManagedEntity (O)

7.4.81.1 Definition

This represents a unidirectional relation from the IOC `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.81.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) capability to identify the list of Managed Entities that are capable of directly affecting this `Pipe`. When this role is present, the `Pipe.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.81.3 Constraint

Name	Definition
–	–

7.4.82 Relation-Pipe-aEnd_NetworkTerminationPoint (M)

7.4.82.1 Definition

This represents a unidirectional relation from the IOC `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) to the IOC `Network Termination Point` (including its child classes `Network TTP Source`, `Network TTP Bidirectional`, `Network CTP Source`, and `Network CTP Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.82.2 Roles

Name	Definition
aEndNetworkTPList	This role represents the `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) capability to identify the list of source or bidirectional Network Termination Points that this `Pipe` points to. When this role is present, the `Pipe.aEndNetworkTPList` shall carry the set of DN(s) of child classes of `Network Termination Point` (including `Network TTP Source`, `Network TTP Bidirectional`, `Network CTP Source`, and `Network CTP Bidirectional`).

7.4.82.3 Constraint

Name	Definition
source_or_bidirectional_TPs	If the `Pipe` is bidirectional, the aEndNetworkTPLists shall also be bidirectional. If the `Pipe` is unidirectional, the aEndNetworkTPList shall be the source TPs or bidirectional TPs. For unidirectional connections, the aEndNetworkTPList attribute shall identify the source end.

7.4.83 Relation-Pipe-zEnd_NetworkTerminationPoint (M)

7.4.83.1 Definition

This represents a unidirectional relation from the IOC `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) to the IOC `Network Termination Point` (including its child classes `Network TTP Sink`, `Network TTP Bidirectional`, `Network CTP Sink`, and `Network CTP Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.83.2 Roles

Name	Definition
zEndNetworkTPList	This role represents the `Pipe` (including its child classes `Connection`, `Link Connection`, `Sub Network Connection`, and `Trail`) capability to identify the list of sink or bidirectional Network Termination Points that this `Pipe` points to. When this role is present, the `Pipe.zEndNetworkTPList` shall carry the set of DN(s) of child classes of `Network Termination Point` (including `Network TTP Sink`, `Network TTP Bidirectional`, `Network CTP Sink`, and `Network CTP Bidirectional`).

7.4.83.3 Constraint

Name	Definition
source_or_bidirectional_TPs	If the `Pipe` is bidirectional, the zEndNetworkTPLists shall also be bidirectional. If the `Pipe` is unidirectional, the zEndNetworkTPList shall be the source TPs or bidirectional TPs. For unidirectional connections, the zEndNetworkTPList attribute shall identify the source end.

7.4.84 Relation-ScanPoint-AlarmSeverityAssignmentProfile (O)

7.4.84.1 Definition

This represents a unidirectional relation from the IOC `Scan Point` to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.84.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Scan Point` capability to identify the `Alarm Severity Assignment Profile` that is associated with this `Scan Point`. When this role is present, the `ScanPoint.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.84.3 Constraint

Name	Definition
–	–

7.4.85 Relation-SiteRelationship-aEnd_CrossCouplingSite (M)

7.4.85.1 Definition

This represents a bidirectional relation between the IOC `Site Relationship` and the IOC `Cross-Coupling Site`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.85.2 Roles

Name	Definition
a-EndSite	This role (when present) represents the `Site Relationship` capability to identify one `Cross-Coupling Site` that this `Site Relationship` points to using the a-EndSite. When this role is present, the `SiteRelationship.a-EndSite` shall carry the DN of `Cross-Coupling Site`.
a-EndSiteRelationshipList	This role (when present) represents the `Cross-Coupling Site` capability to identify the list of `Site Relationships` whose a-EndSite points to this `Cross-Coupling Site`. When this role is present, the `Cross-CouplingSite.a-EndSiteRelationshipList` shall carry the set of DN(s) of `Site Relationship`.

7.4.85.3 Constraint

Name	Definition
–	–

7.4.86 Relation-SiteRelationship-bEnd_CrossCouplingSite (M)

7.4.86.1 Definition

This represents a bidirectional relation between the IOC `Site Relationship` and the IOC `Cross-Coupling Site`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.86.2 Roles

Name	Definition
b-EndSite	This role (when present) represents the `Site Relationship` capability to identify the other `Cross-Coupling Site` that this `Site Relationship` points to using the b-EndSite. When this role is present, the `SiteRelationship.b-EndSite` shall carry the DN of `Cross-Coupling Site`.
b-EndSiteRelationshipList	This role (when present) represents the `Cross-Coupling Site` capability to identify the list of `Site Relationships` whose b-EndSite points to this `Cross-Coupling Site`. When this role is present, the `Cross-CouplingSite.b-EndSiteRelationshipList` shall carry the set of DN(s) of `Site Relationship`.

7.4.86.3 Constraint

Name	Definition
–	–

7.4.87 Relation-Software-AlarmSeverityAssignmentProfile (O)

7.4.87.1 Definition

This represents a unidirectional relation from the IOC `Software` to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.87.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Software` capability to identify the Alarm Severity Assignment Profile that is associated with this `Software`. When this role is present, the `Software.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.87.3 Constraint

Name	Definition
–	–

7.4.88 Relation-Software-ManagedEntity (O)

7.4.88.1 Definition

This represents a unidirectional relation from the IOC `Software` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.88.2 Roles

Name	Definition
affectedObjectList	This role (when present) represents the `Software` capability to identify the list of Managed Entities that can be directly affected by a change in state or deletion of this `Software`. When this role is present, the `Software.affectedObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.88.3 Constraint

Name	Definition
–	–

7.4.89 Relation-SubNetwork-AbstractLink-1 (O)

7.4.89.1 Definition

This represents a unidirectional relation from the IOC `Sub Network` to the IOC `Abstract Link` (including its subclasses `Topological Link` and `Logical Link`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.89.2 Roles

Name	Definition
containedLinkList	This role (when present) represents the `Sub Network` capability to identify the list of Abstract Links (including its child classes) that are contained in this `Sub Network` through partitioning. When this role is present, the `SubNetwork.containedLinkList` shall carry the set of DN(s) of child classes of `Abstract Link` (`Topological Link`, `Logical Link`).

7.4.89.3 Constraint

Name	Definition
partitioning_supported	There are contained links in the Sub Network (partitioning is supported).

7.4.90 Relation-SubNetwork-AbstractLink-2 (O)

7.4.90.1 Definition

This represents a unidirectional relation from the IOC `Sub Network` to the IOC `Abstract Link` (including its subclasses `Topological Link` and `Logical Link`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.90.2 Roles

Name	Definition
linkPointerList	This role (when present) represents the `Sub Network` capability to identify the list of Abstract Links (including its subclasses) that are terminated by this `Sub Network`. When this role is present, the `SubNetwork.linkPointerList` shall carry the set of DN(s) of child classes of `Abstract Link` (`Topological Link`, `Logical Link`).

7.4.90.3 Constraint

Name	Definition
link_terminated_by_SubNetwork	A link is terminated by this sub network.

7.4.91 Relation-SubNetwork-AbstractLinkEnd (O)

7.4.91.1 Definition

This represents a bidirectional relation between the IOC `Sub Network` to the IOC `Abstract Link End` (including its child classes `Topological Link End` and `Logical Link End`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.91.2 Roles

Name	Definition
containedLinkEndList	This role (when present) represents the `Sub Network` capability to identify the list of Abstract Link Ends (including its subclasses) that are contained in this Sub Network through partitioning. When this role is present, the `SubNetwork.containedLinkEndList` shall carry the set of DN(s) of child classes of `Abstract Link End` (`Topological Link End`, `Logical Link End`).
containedInSubNetworkList	This role (when present) represents the `Abstract Link End` capability to identify the list of parent Sub Networks that contain this `Abstract Link End`. When this role is present, the `Abstract Link End.containedInSubNetworkList` shall carry the set of DN(s) of `Sub Network`.

7.4.91.3 Constraint

Name	Definition
partitioning_supported	There are contained link ends in the subnetwork instance (partitioning is supported).

7.4.92 Relation-SubNetwork-AccessGroup (O)

7.4.92.1 Definition

This represents a bidirectional relation between the IOC `Sub Network` and the IOC `Access Group`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.92.2 Roles

Name	Definition
containedAccessGroupList	This role (when present) represents the `Sub Network` capability to identify the list of `Access Groups` that are contained in this Subnetwork. When this role is present, the `SubNetwork.containedAccessGroupList` shall carry the set of DN(s) of `Access Group`.
containedInSubNetworkList	This role (when present) represents the `Access Group` capability to identify the list of parent Sub Networks that contain this `Access Group`. When this role is present, the `AccessGroup.containedInSubNetworkList` shall carry the set of DN(s) of `Sub Network`.

7.4.92.3 Constraint

Name	Definition
partitioning_supported	This relation is present when an Access Group is contained in a Sub Network.

7.4.93 Relation-SubNetwork-ManagedEntity (O)

7.4.93.1 Definition

This represents a unidirectional relation from the IOC `Sub Network` to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.93.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Sub Network` capability to identify the list of Managed Entities that are capable of directly affecting this `Sub Network`. When this role is present, the `SubNetwork.supportedByObjectList` shall carry the set of DN(s) of `Managed Entity` (to be replaced by the actual IOCs).

7.4.93.3 Constraint

Name	Definition
–	–

7.4.94 Relation-SubNetwork-NetworkTerminationPoint (O)

7.4.94.1 Definition

This represents a unidirectional relation from the IOC `Sub Network` to the IOC `Network Termination Point` (including its child classes `Network CTP Source`, `Network CTP Sink`, `Network CTP Bidirectional`, `Network TTP Source`, `Network TTP Sink`, and `Network TTP Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.94.2 Roles

Name	Definition
containedNetworkTPList	This role (when present) represents the `Sub Network` capability to identify the list of Network Termination Points that are contained in this `Sub Network`. When this role is present, the `SubNetwork.containedNetworkTPList` shall carry the set of DN(s) of child classes of `Network Termination Point` (`Network CTP Source`, `Network CTP Sink`, `Network CTP Bidirectional`, `Network TTP Source`, `Network TTP Sink`, and `Network TTP Bidirectional`).

7.4.94.3 Constraint

Name	Definition
–	–

7.4.95 Relation-SubNetwork-SubNetwork (O)

7.4.95.1 Definition

This represents a bidirectional relation between the IOC `Sub Network` and the IOC `Sub Network`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.95.2 Roles

Name	Definition
containedSubNetworkList	This role (when present) represents the `Sub Network` capability to identify the list of `Sub Networks` that are contained in this Sub Network through partitioning. When this role is present, the `SubNetwork.containedSubNetworkList` shall carry the set of DN(s) of `Sub Network`.
containedInSubNetworkList	This role (when present) represents the `Sub Network` capability to identify the list of parent Sub Networks that contain this Sub Network. When this role is present, the `SubNetwork.containedInSubNetworkList` shall carry the set of DN(s) of `Sub Network`.

7.4.95.3 Constraint

Name	Definition
partitioning_supported	This relation is present when a Sub Network is contained in another Sub Network.

7.4.96 Relation-SubNetworkConnection-LinkConnection (O)

7.4.96.1 Definition

This represents a bidirectional relation between the IOC `Sub Network Connection` and the IOC `Link Connection`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.96.2 Roles

Name	Definition
componentPointers	This role (when present) represents the `Sub Network Connection` capability to identify the list of `Link Connections` that are components of the `Sub Network Connection`, within a given layer. When this role is present, the `SubNetworkConnection.componentPointers` shall carry the ordered set of DN(s) of `Link Connection` and `Sub Network Connection`.
compositePointer	This role (when present) represents the `Link Connection` capability to identify a `Sub Network Connection` that is composed of a sequence of `Link Connections` or `Sub Network Connections` in the same layer, including this `Link Connection`. When this role is present, the `LinkConnection.compositePointer` shall carry the DN of `Sub Network Connection`.

7.4.96.3 Constraint

Name	Definition
composed_SubNetworkConnection	This relation is present when a Sub Network Connection is composed of other SubNetwork Connections and Link Connections in the same layer.

7.4.97 Relation-SubNetworkConnection-SubNetworkConnection (O)

7.4.97.1 Definition

This represents a bidirectional relation between the IOC `Sub Network Connection` and the IOC `Sub Network Connection`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.97.2 Roles

Name	Definition
componentPointers	This role (when present) represents the `Sub Network Connection` capability to identify the list of `Sub Network Connections` that are components of this `Sub Network Connection`, within a given layer. When this role is present, the `SubNetworkConnection.componentPointers` shall carry the ordered set of DN(s) of `Sub Networks` and `Link Connections`.
compositePointer	This role (when present) represents the `Sub Network Connection` capability to identify a `Sub Network Connection` that is composed of a sequence of `Sub Network Connections` or `Link Connections` in the same layer, including this `Sub Network Connection`. When this role is present, the `SubNetworkConnection.compositePointer` shall carry the DN of `Sub Network Connection`.

7.4.97.3 Constraint

Name	Definition
composed_SubNetworkConnection	This relation is present when a Sub Network Connection is composed of other SubNetwork Connections and Link Connections in the same layer.

7.4.98 Relation-Termination-Cross-CouplingSite (M)

7.4.98.1 Definition

This represents a bidirectional relation between the IOC `Termination` and the IOC `Cross-Coupling Site`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.98.2 Roles

Name	Definition
cross-couplingSite	This role (when present) represents the `Termination` capability to identify the `Cross-Coupling Site` that this `Termination` belongs to. When this role is present, the `Termination.cross-couplingSite` shall carry the DN of `Cross-Coupling Site`.
terminationList	This role (when present) represents the `Cross-Coupling Site` capability to identify the list of `Terminations` that this `Cross-Coupling Site` has for each trail. When this role is present, the `Cross-CouplingSite.terminationList` shall carry the set of DN(s) of `Termination`.

7.4.98.3 Constraint

Name	Definition
–	–

7.4.99 Relation-TerminationPoint-AlarmSeverityAssignmentProfile (O)

7.4.99.1 Definition

This represents a unidirectional relation from the IOC `Termination Point` (including its child classes `Trail/Connection Termination Point Source/Sink/Bidirectional`, `Network CTP/TTP Source/Sink/Bidirectional`) to the IOC `Alarm Severity Assignment Profile`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.99.2 Roles

Name	Definition
alarmSeverityAssignmentProfile Pointer	This role (when present) represents the `Termination Point` (including its child classes `Trail/Connection Termination Point Source/Sink/Bidirectional`, `Network CTP/TTP Source/Sink/Bidirectional`) capability to identify the `Alarm Severity Assignment Profile` that is associated with this `Termination Point`. When this role is present, the `TerminationPoint.alarmSeverityAssignmentProfilePointer` shall carry the DN of `Alarm Severity Assignment Profile`.

7.4.99.3 Constraint

Name	Definition
–	–

7.4.100 Relation-TerminationPoint-ManagedEntity (M)

7.4.100.1 Definition

This represents a unidirectional relation from the IOC `Termination Point` (including its child classes `Trail/Connection Termination Point Source/Sink/Bidirectional`, `Network CTP/TTP Source/Sink/Bidirectional`) to the ProxyClass `Managed Entity`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.100.2 Roles

Name	Definition
supportedByObjectList	This role (when present) represents the `Termination Point` (including its child classes `Trail/Connection Termination Point Source/Sink/Bidirectional`, `Network CTP/TTP Source/Sink/Bidirectional`) capability to identify the list of `Managed Entity` that is capable of directly affecting this `Termination Point`. When this role is present, the `TerminationPoint.supportedByObjectList` shall carry the set of DN(s) of Managed Entity (to be replaced by the actual IOCs).

7.4.100.3 Constraint

Name	Definition
–	–

7.4.101 Relation-TerminationPointPool-GroupTerminationPoint (M)

7.4.101.1 Definition

This represents a unidirectional relation from the IOC `Termination Point Pool` to the IOC `Group Termination Point`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.101.2 Roles

Name	Definition
tpsInTpPoolList	This role (when present) represents the `Termination Point Pool` capability to identify the `Termination Points` and `Group Termination Points` that are represented by this `Termination Point Pool`. When this role is present, the `TerminationPointPool.tpsInTpPoolList` shall carry the set of DN(s) of Group Termination Points or child classes of `Termination Points`.

7.4.101.3 Constraint

Name	Definition
–	–

7.4.102 Relation-TerminationPointPool-TerminationPoint (M)

7.4.102.1 Definition

This represents a unidirectional relation from the IOC `Termination Point Pool` to the IOC `Termination Point` (including its child classes).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.102.2 Roles

Name	Definition
tpsInTpPoolList	This role (when present) represents the `Termination Point Pool` capability to identify the `Termination Points` and `Group Termination Points` that are represented by this `Termination Point Pool`. When this role is present, the `TerminationPointPool.tpsInTpPoolList` shall carry the set of DN(s) of Group Termination Points or child classes of `Termination Points`.

7.4.102.3 Constraint

Name	Definition
–	–

7.4.103 Relation-TopologicalLink-Trail (M)

7.4.103.1 Definition

This represents a bidirectional relation between the IOC `Topological Link` and the IOC `Trail`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.103.2 Roles

Name	Definition
serverTrail	This role (when present) represents the `Topological Link` capability to identify the `Trail` in the server layer that supports the `Topological Link` in a client layer. When this role is present, the `TopologicalLink.serverTrail` shall carry the DN of `Trail`.
clientLinkPointerList	This role (when present) represents the `Trail` capability to identify the `Topological Links` that reflect the capacity of the `Trail` in the client layer network domain(s). When this role is present, the `Trail.clientLinkPointerList` shall carry the set of DN(s) of `Topological Link`.

7.4.103.3 Constraint

Name	Definition
–	–

7.4.104 Relation-TopologicalLinkEnd-NetworkTTP (M)

7.4.104.1 Definition

This represents a unidirectional relation from the IOC `Topological Link End` to the ProxyClass `Network TTP` (can be `Network TTP Source`, `Network TTP Sink`, and `Network TTP Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.104.2 Roles

Name	Definition
serverTTPPointer	This role (when present) represents the `Topological Link End` capability to identify the list of `Network TTPs` that may serve this `Topological Link End` in another layer. When this role is present, the `TopologicalLinkEnd.serverTTPPointer` shall carry the set of DN(s) of the following IOCs: `Network TTP Source`, `Network TTP Sink` or `Network TTP Bidirectional`.

7.4.104.3 Constraint

Name	Definition
–	–

7.4.105 Relation-Trail-SubNetworkConnection (O)

7.4.105.1 Definition

This represents a unidirectional relation from the IOC `Trail` to the IOC `Sub Network Connection`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.105.2 Roles

Name	Definition
connectionList	This role (when present) represents the `Trail` capability to identify the list of `Sub Network Connections` and `Link Connections` in a given layer which may compose the `Trail` in the same layer. When this role is present, the `Trail.connectionList` shall carry the ordered set of DN(s) of `Link Connection` and `Sub Network Connection`.

7.4.105.3 Constraint

Name	Definition
connection_serves_trail	The sub network connection serves a client trail.

7.4.106 Relation-Trail [ITU-T M.1401]-Position (M)

7.4.106.1 Definition

This represents a bidirectional relation between the IOC `Trail` and the IOC `Position`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.106.2 Roles

Name	Definition
position	This role (when present) represents the `Trail [ITU-T M.1401]` capability to identify the `Position` that terminates the `Trail`. When this role is present, the `Trail [ITU-T M.1401].position` shall carry the DN of `Position`.
trailList	This role (when present) represents the `Position` capability to identify the `Trail(s)` being terminated on this `Position`. When this role is present, the `Position.trailList` shall carry the set of DN(s) of `Trail [ITU-T M.1401]`.

7.4.106.3 Constraint

Name	Definition
–	–

7.4.107 Relation-TrailMultiplexChannel-Position (M)

7.4.107.1 Definition

This represents a bidirectional relation between the IOC `Trail Multiplex Channel` and the IOC `Position`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.107.2 Roles

Name	Definition
position	This role (when present) represents the `Trail Multiplex Channel` capability to identify the `Position` on which the `Trail multiplex channel` is terminated. When this role is present, the `TrailMultiplexChannel.position` shall carry the DN of `Position`.
trailMultiplexChannelList	This role (when present) represents the `Position` capability to identify the `Trail Multiplex Channel(s)` being terminated on this `Position`. When this role is present, the `Position.trailMultiplexChannelList` shall carry the set of DN(s) of `Trail Multiplex Channel`.

7.4.107.3 Constraint

Name	Definition
–	–

7.4.108 Relation-TrailSection-PhysicalLinkConnection (M)

7.4.108.1 Definition

This represents a bidirectional relation between the IOC `Trail Section` and the IOC `Physical Link Connection`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.108.2 Roles

Name	Definition
physicalLinkConnection	This role (when present) represents the `Trail Section` capability to identify the `Physical Link Connection` that is included in the routing of the `Trail`. When this role is present, the `TrailSection.physicalLinkConnection` shall carry the DN of `Physical Link Connection`.
trailSection	This role (when present) represents the `Physical Link Connection` capability to identify the `Trail Section` whose routing of the `Trail` includes the `Physical Link Connection`. When this role is present, the `PhysicalLinkConnection.trailSection` shall carry the DN of `Trail Section`.

7.4.108.3 Constraint

Name	Definition
–	–

7.4.109 Relation-TrailSection-PortItem (M)

7.4.109.1 Definition

This represents a bidirectional relation between the IOC `Trail Section` and the IOC `Port Item`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.109.2 Roles

Name	Definition
portItem	This role (when present) represents the `Trail Section` capability to identify the `Port Item` that is included in the routing of the `Trail`. When this role is present, the `TrailSection.portItem` shall carry the DN of `Port Item`.
trailSection	This role (when present) represents the `Port Item` capability to identify the `Trail Section` in a `Trail`. When this role is present, the `PortItem.trailSection` shall carry the DN of `Trail Section`.

7.4.109.3 Constraint

Name	Definition
–	–

7.4.110 Relation-TrailSection-Position (M)

7.4.110.1 Definition

This represents a bidirectional relation between the IOC `Trail Section` and the IOC `Position`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.110.2 Roles

Name	Definition
position	This role (when present) represents the `Trail Section` capability to identify the `Position` that is included in the routing of the `Trail`. When this role is present, the `TrailSection.position` shall carry the DN of `Position`.
trailSectionList	This role (when present) represents the `Position` capability to identify the `Trail Section(s)` whose routing of the `Trail` includes the `Position`. When this role is present, the `Position.trailSectionList` shall carry the set of DN(s) of `Trail Section`.

7.4.110.3 Constraint

Name	Definition
–	–

7.4.111 Relation-TrailSection-Trail [ITU-T M.1401] (M)

7.4.111.1 Definition

This represents a bidirectional relation between the IOC `Trail Section` and the IOC `Trail` [ITU-T M.1401].

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.111.2 Roles

Name	Definition
trail	This role (when present) represents the `Trail Section` capability to identify the `Trail` [ITU-T M.1401] that is included in the routing of the `Trail`. When this role is present, the `TrailSection.trail` shall carry the DN of `Trail` [ITU-T M.1401].
routingTrailSection	This role (when present) represents the `Trail` [ITU-T M.1401] capability to identify the `Trail Section` in the routing of another `Trail`, which is routed on the current `Trail` [ITU-T M.1401]. When this role is present, the `Trail.routingTrailSection` shall carry the DN of `Trail Section`.

7.4.111.3 Constraint

Name	Definition
–	–

7.4.112 Relation-TrailSection-TrailMultiplexChannel (M)

7.4.112.1 Definition

This represents a bidirectional relation between the IOC `Trail Section` and the IOC `Trail Multiplex Channel`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.112.2 Roles

Name	Definition
trailMultiplexChannel	This role (when present) represents the `Trail Section` capability to identify the `Trail Multiplex Channel` that is included in the routing of the `Trail`. When this role is present, the `TrailSection.trailMultiplexChannel` shall carry the DN of `Trail Multiplex Channel`.
trailSection	This role (when present) represents the `Trail Multiplex Channel` capability to identify the `Trail Section` in the routing of the `Trail`. When this role is present, the `TrailMultiplexChannel.trailSection` shall carry the DN of `Trail Section`.

7.4.112.3 Constraint

Name	Definition
–	–

7.4.113 Relation-TrailTerminationPointSink-TerminationPoint (M)

7.4.113.1 Definition

This represents a unidirectional relation from the IOC `Trail Termination Point Sink` to the IOC `Termination Point` (including its child classes `Trail Termination Point Source`, `Trail Termination Point Bidirectional`, `Connection Termination Point Sink`, `Connection Termination Point Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.113.2 Roles

Name	Definition
upstreamConnectivityPointer	This role (when present) represents the `Trail Termination Point Sink` capability to identify the Termination Point within the same ME, which sends information (traffic) to this Termination Point at the same layer, or is null. When this role is present, the `TrailTerminationPointSink.upstreamConnectivityPointer` shall carry the set of DN(s) of the following IOCs: `Trail Termination Point Source`, `Trail Termination Point Bidirectional`, `Connection Termination Point Sink`, `Connection Termination Point Bidirectional`.

7.4.113.3 Constraint

Name	Definition
–	–

7.4.114 Relation-TrailTerminationPointSource-TerminationPoint (M)

7.4.114.1 Definition

This represents a unidirectional relation from the IOC `Trail Termination Point Source` to the IOC `Termination Point` (including its child classes `Trail Termination Point Sink`, `Trail Termination Point Bidirectional`, `Connection Termination Point Source`, `Connection Termination Point Bidirectional`).

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

7.4.114.2 Roles

Name	Definition
downstreamConnectivityPointer	This role (when present) represents the `Trail Termination Point Source` capability to identify the Termination Point within the same ME, which receives information (traffic) from this Termination Point at the same layer, or is null. When this role is present, the `TrailTerminationPointSource.downstreamConnectivityPointer` shall carry the set of DN(s) of the following IOCs: `Trail Termination Point Sink, Trail Termination Point Bidirectional, Connection Termination Point Source, Connection Termination Point Bidirectional.`

7.4.114.3 Constraint

Name	Definition
–	–

8 Common information definitions

8.1 Attributes

Table 179

Name	Type	Description
accessGroupId	```NameType ::= CHOICE { numericName INTEGER, pString String } String ::= GraphicString```	This attribute is the identifier of an instance of this managed object class.
accessPointList	```TPList ::= SET OF DistinguishedName```	The Access Point List attribute lists all the Network Trail Termination Points or Flow Termination Points within an instance of the IOC Access Group.
acceptableCircuitPackTypeList	```AcceptableCircuitPackTypeList ::= SET OF String```	This attribute indicates the types of the circuit packs that can be contained in an equipment holder object.
accountContactList	```AccountContactList ::= SET OF PersonReach PersonReach ::= SEQUENCE { number PersonNumber, name PersonName, phone PersonPhone OPTIONAL, loc PersonLocation OPTIONAL, email PersonEmail OPTIONAL, fax PersonFax OPTIONAL, respon PersonRespon OPTIONAL, ... } PersonEmail ::= String (SIZE(0..64)) PersonFax ::= String (SIZE(0..64)) PersonLocation ::=PremisesAddress PersonName ::= String (SIZE(0..64)) PersonNumber ::= String (SIZE(0..64)) PersonPhone ::= String (SIZE(0..64)) PersonRespon ::= String (SIZE(0..64))```	The Account Contact List attribute specifies the individuals in the manager's organization, who can be contacted regarding the account.

Table 179

Name	Type	Description
accountName	`AccountName ::= String(SIZE(0..64))`	The Account Name attribute is the name given to an account by the customer, where an account is a customer or agency entity that may be billed by the service provider or that may take responsibility for performing network management services for the customer. The Account Name is the RDN of the Account object.
additionalText	`AdditionalText ::= String(SIZE (0..256))`	The Additional Text attribute contains additional pertinent enterprise information that describes the Account. This enterprise information pertains to the way the customer and the service provider interact when conducting business.

administrativeState	`AdministrativeState ::= ENUMERATED {`
	`    locked,`
	`    unlocked,`
	`    shuttingDown`
	`}`
		This attribute is to indicate the administrative state of the managed entity, which has three possible values: locked, unlocked, and shuttingDown. See [ITU-T X.731] for details.

aEnd	`ObjectInstance ::= DistinguishedName`	This attribute is a pointer to a subnetwork, a link end or an access group in the same network layer domain.
aEndFTPLIST	`ObjectList ::= SET OF DistinguishedName`	The value of this attribute identifies one or more Flow Termination Point instances, which represents the source end of a connectionless Trail. This attribute cannot be null.
aEndNetworkTPList	`ObjectList`	The value of this attribute identifies one or more network termination points of an instance of a subclass of the Connectivity object class. This attribute cannot be null.
aEndofFPPLink	`ObjectInstance`	This attribute is a pointer to a flow domain, a flow point pool or an access group in the same network layer domain. This attribute identifies the end of the FPP link at one extremity.
affectedObjectList	`ObjectList`	The Affected Object List attribute type specifies the object instances which can be directly affected by a change in state or deletion of a given managed object. The attribute does not force internal details to be specified, but only the necessary level of detail required for management.

Table 179

Name	Type	Description
alarmSeverityAssignmentList	```AlarmSeverityAssignmentList::= SET OF AlarmSeverityAssignment AlarmSeverityAssignment ::= SEQUENCE { problem ProbableCause, severityAssignedServiceAffecting AlarmSeverityCode OPTIONAL, severityAssignedNonServiceAffecting AlarmSeverityCode OPTIONAL, severityAssignedServiceIndependent AlarmSeverityCode OPTIONAL } AlarmSeverityCode ::= ENUMERATED { non-alarmed(0), minor(1), major(2), critical(3), warning(4) } ProbableCause ::= CHOICE { globalValue OBJECT IDENTIFIER, localValue INTEGER }```	The Alarm Severity Assignment List is an attribute type whose value provides a listing of all abnormal conditions that may exist in instances of an object class, and shows the assigned alarm severity information (minor, major, etc.) for each condition.
alarmSeverityAssignmentProfileP ointer	```PointerOrNull ::= CHOICE { pointer DistinguishedName, null NULL }```	This attribute identifies an Alarm Severity Assignment Profile object.

Table 179

Name	Type	Description
alarmStatus	```AlarmStatus ::= ENUMERATED { cleared, activeReportable-Indeterminate, activeReportable-Warning, activeReportable-Minor, activeReportable-Major, activeReportable-Critical, activePending }```	The Alarm Status attribute type indicates the occurrence of an abnormal condition relating to an object. This attribute may also function as a summary indicator of alarm conditions associated with a specific resource. It is used to indicate the existence of an alarm condition, a pending alarm condition such as threshold situations, or (when used as a summary indicator) the highest severity of active alarm conditions. When used as a summary indicator, the order of severity (from highest to lowest) is: activeReportable-Critical activeReportable-Major activeReportable-Minor activeReportable-Indeterminate activeReportable-Warning activePending cleared.
alarmStatusList	```AlarmStatusList ::= SET OF AlarmStatus```	The Alarm Status List attribute type describes criteria for inclusion in a current alarm summary report. The Alarm Status List consists of a set of possible Alarm Status. In order to be included in a current alarm summary report, an object shall have an Alarm Status that matches one of the states in the Alarm Status List. If the Alarm Status List has null value, the Alarm Status of the objects in the Object List is not used as a criterion for inclusion in the current alarm summary report.
aliasName	```AliasName ::= String```	Customer supplied alias identifier for an IOC instance.
allomorphs	```Allomorphs ::= SET OF ObjectClass```	
arcDefaultNALMCDInterval	```ArcDefaultNALMCDInterval ::= ArcTime ArcTime ::= CHOICE { noAdjustment NULL, time ArcInterval -- minutes } ArcInterval ::= INTEGER (0..5940) -- minutes (max of 99 hours)```	This attribute defines the default/initial value for the ARC interval timer of the ARC nalm-ti state if another interval is not specified in the management request to transition to the state.

Table 179

Name	Type	Description
arcDefaultNALMTIInterval	`ArcDefaultNALMTIInterval ::= ArcTime`	This attribute defines the default/initial value for the ARC interval timer of the ARC nalm-ti state if another interval is not specified in the management request to transition to the state.

a-TPInstance	`RelatedObjectInstance ::= CHOICE {`
	`    notAvailable    NULL,`
	`    relatedObject   DistinguishedName`
	`}`
		The A-Termination Point Instance attribute type identifies one of the two termination points of an instance of the connectivity object class or one of its subclasses.

availabilityStatus	`AvailabilityStatus ::= SET OF INTEGER {`
	`    inTest(0),`
	`    failed(1),`
	`    powerOff(2),`
	`    offline(3),`
	`    offDuty(4),`
	`    dependency(5),`
	`    degraded(6),`
	`    notInstalled(7),`
	`    logFull(8)`
	`}`
		This attribute indicates the availability status of instances of the IOC.

availableLinkCapacity	`Capacity ::= CHOICE {`
	`    numberOfLinkConnections   INTEGER,`
	`    bandwidth                 Bandwidth`
	`}`
	`Bandwidth ::= SEQUENCE OF SEQUENCE {`
	`    ingress    INTEGER,`
	`    egress     INTEGER`
	`} -- (Units: kbit/s)`
		This attribute indicates the available capacity of a link expressed as either the number of link connections that are available or the bandwidth that is available to that link.

availableLinkEndCapacity	`PointCapacity ::= CHOICE {`
	`    numberOfTPs     INTEGER,`
	`    bandwidth       Bandwidth`
	`}`
		This attribute indicates the number of Network CTPs associated with a Link End that has spare capacity or the amount of spare bandwidth associated with a Link End.

availableSignalRateList	`AvailableSignalRateList ::= SET OF SignalRate`
	`SignalRate ::= CHOICE {`
	`    objectClass     OBJECT IDENTIFIER,`
	`    characteristicInformation`
	`            CharacteristicInformation`
	`}`
		This attribute identifies the signal rates supported by the circuit pack entity.

Table 179

Name	Type	Description
bandwidth	```M3108-1-Bandwidth::= CHOICE { bitsPerSecond Number, kiloBitsPerSecond Number, megaBitsPerSecond Number, gigaBitsPerSecond Number, teraBitsPerSecond Number } Number ::= INTEGER```	
channelNumber	`ChannelNumber ::= INTEGER`	
characteristicInformation	`CharacteristicInformation ::= OBJECT IDENTIFIER`	The value of this attribute is used to verify the connectability of instances of the termination point subclasses.
circuitDirectionality	```CircuitDirectionality ::= ENUMERATED { onewayOut, onewayIn, twoway }```	The attribute type specifies the directionality of the circuits in the circuit subgroup.
clientCTPList	`ObjectList`	This attribute defines the CTP or list of CTPs which are clients of a TTP or TTPs in another layer. Usually a single TTP in a higher order layer will support a number of CTPs in a lower order layer. Alternatively, where concatenation is used, a number of TTPs in a lower order layer may serve a CTP or CTPs in a higher order layer.
clientFlowPointPoolList	`ObjectList`	This attribute is a set of pointers to the Flow Point Pools in the client that are supported later by the TTP instance.
clientFPList	`ObjectList`	This attribute defines the FP or list of FPs which are clients of a FTP or FTPs in another layer. Usually a single FTP in a higher order layer will support a number of FPs in a lower order layer. Alternatively, where concatenation is used, a number of FTPs in a lower order layer may serve a FP or FPs in a higher order layer.
clientLinkConnectionPointerList	`ObjectList`	This attribute is a set of pointers to the link connections in the client layer network domain(s) that are supported by the trail.

Table 179

Name	Type	Description
clientLinkEndPointerList	`ObjectList`	This attribute is a set of pointers to the link ends that reflect the properties of a network trail termination point in the client layer network domain(s).
clientLinkPointerList	`ObjectList`	This attribute is a set of pointers to the topological links (also including FPP Links) that reflect the capacity of a trail in the client layer network domain(s).
clientTrail	`ObjectInstance`	The value of this attribute identifies the trail object instance in the same network layer as the connection served by a connection object.
componentPointers	`ObjectList`	This attribute is used where the Sub Network Connection is made up of a number of component Sub Network Connections and Link Connections within the same layer.
compositePointer	`RelatedObjectInstance`	This attribute is used where the connectivity instance is a component of a Subnetwork Connection within the same layer.

configuredConnectivity	`ConfiguredConnectivity ::= ENUMERATED {`
	`        sourceConnect,`
	`        sinkConnect,`
	`        bidirectionalConnect,`
	`        noConnect`
	`}`
		This attribute indicates the configured connectivity of a Network Termination Point managed object (or subclass). The possible values for this attribute are sourceConnect, sinkConnect, bidirectionalConnect and noConnect. For a Network Termination Point managed object with pointDirectionality equal to sink, the allowed values for this attribute are noConnect and sinkConnect. For a Network Termination Point managed object with pointDirectionality equal to source, the allowed values for this attribute are noConnect and sourceConnect. For a Network Termination Point managed object with pointDirectionality equal to bidirectional, the allowed values for this attribute are noConnect and bidirectionalConnect. For some technologies, sinkConnect and sourceConnect may also be allowed for a bidirectional Network Termination Point managed object.

connectedTpCount	`Count ::= INTEGER`	This attribute indicates the total number of termination points associated with a tpPool that have been connected.

Table 179

Name	Type	Description
connectionlessTrailId	`NameType`	This attribute is the identifier of an instance of Connectionless Trail IOC.
connectionlessTrailPointer	`ObjectInstance`	This attribute points to the connectionless trail terminated by a flow termination point source/sink.
connectionList	`ObjectList`	This attribute defines the list of Link Connections and subnetwork connections in a given layer which may compose a Trail in the same layer. This composition of Connectivity instances may be a simple sequence or, in the multipoint case, a tree structure.

connectivityPointer	`ConnectivityPointer ::= CHOICE {`
	`    none            NULL,`
	`    single          DistinguishedName,`
	`    concatenated    SET OF DistinguishedName`
	`}`
		This attribute points to the Link connection or Trail terminated by the Network Termination Point.

contactDetails	`ContactDetails ::= String(SIZE(0..128))`	The detailed contact information.

contactID	`SimpleNameType ::= CHOICE {`
	`    number    INTEGER,`
	`    string    String`
	`}`
		The identifier of the Contact object.

contactCompany	`ContactCompany ::= String(SIZE(64))`	This attribute specifies the company name that a specific contact works for or is associated with.

contactFunction	`ContactFunction ::= ENUMERATED {`
	`    other,`
	`    customerMaintenanceManager,`
	`    providerMaintenanceManager,`
	`    customerAccountManager,`
	`    providerAccountManager,`
	`    fieldServiceManager,`
	`    repairman,`
	`    tester,`
	`    screener}`
		This attribute provides information about the work function performed by the contact person.

Table 179

Name	Type	Description

contactNames	```Names ::= SET OF Name```
	 ```Name ::= CHOICE {```
	 ``` null NULL,```
	 ``` classAndInstance SEQUENCE {```
	 ``` managedObjectClass ObjectClass,```
	 ``` managedObjectInstance ObjectInstance,```
	 ``` ...```
	 ``` },```
	 ``` ...```
	 ```}```
		The contact names.

contactObjectPtrList	```ContactObjectPtrList ::= SET OF ObjectInstance```	The Contact Object Pointer List attribute points to instances of the Contact object that represents individuals in the agent's or manager's organization.

contactType	```ContactType::= ENUMERATED {```
	 ``` other,```
	 ``` contacts-for-equipment-related-activities,```
	 ``` contacts-for-location-related-activities,```
	 ``` contacts-for-circuit-related-activities,```
	 ``` contacts-for-provider-related-activities,```
	 ``` contacts-for-service-related-activities,```
	 ``` contacts-for-facility-related-activities,```
	 ``` contacts-for-customer-related-activities,```
	 ``` contacts-for-vendor-related-activities,```
	 ``` contacts-for-manufacturer-related-activities,```
	 ``` contacts-for-software-related-activities,```
	 ``` contacts-for-function-related-activities```
	 ```}```
		This attribute provides information about the type of contact.

containedAccessGroupList	```ObjectList```	This attribute defines the list of Access Group instances which are contained in a Sub Network or a Flow Domain.
containedFlowDomainList	```ObjectList```	This attribute is used to describe the internal topology of a flow domain (in a given layer). This topology comprises FPP links and flow domains. The flow domains are listed in this attribute.

Table 179

Name	Type	Description
containedFlowPointPoolList	`ObjectList`	This attribute is used to describe the internal topology of a subnetwork from the point perspective (in a given layer). This topology comprises Flow Point Pool and FPP Link. The Flow Point Pools are listed in this attribute.
containedFPList	`ObjectList`	This attribute is a list of pointers to Flow (Termination) Point instances that are contained in the Flow Domain instance.
containedFPPLinkList	`ObjectList`	This attribute is used to describe the internal topology of a flow domain (in a given layer). This topology comprises FPP links and flow domains. The FPP links are listed in this attribute.
containedInFlowDomainList	`ObjectList`	This attribute defines the list of parent Flow Domains which contain the instance of the corresponding IOC.
containedInSubNetworkList	`ObjectList`	This attribute defines the list of parent Subnetworks which contain the Access Group, Link End, or Subnetwork in a given layer.
containedLinkEndList	`ObjectList`	This attribute is used to describe the internal topology of a subnetwork from the point perspective (in a given layer). This topology comprises link ends and subnetworks. The link ends are listed in this attribute.
containedLinkList	`ObjectList`	This attribute is used to describe the internal topology of a subnetwork (in a given layer). This topology comprises links and subnetworks. The links are listed in this attribute.
containedNetworkTPList	`ObjectList`	This attribute is a list of pointers to network TPs that are contained in a subnetwork.
containedSubNetworkList	`ObjectList`	This attribute is used to describe the internal topology of a subnetwork (in a given layer). This topology comprises links and subnetworks. The subnetworks are listed in this attribute.
crossConnectionName	`CrossConnectionName ::= String`	This attribute is a descriptive name for a cross-connection or multipoint cross-connection managed object.

Table 179

Name	Type	Description
crossConnectionObjectPointer	```CrossConnectionObjectPointer ::=CHOICE { notConnected ObjectInstance, -- Fabric object connected ObjectInstance, -- Cross-connection object multipleConnections MultipleConnections } MultipleConnections ::= SET OF CHOICE { downstreamNotConnected ObjectInstance, downstreamConnected ObjectInstance, upstreamNotConnected ObjectInstance, upstreamConnected ObjectInstance }```	This attribute points to a managed object such as a Cross-connection, a GTP or a Fabric. When a termination point is neither connected nor reserved for connection, its crossConnectionObjectPointer points to the Fabric object responsible for its connection.
currentAlarmSummaryControlId	```NameType```	This current Alarm Summary Control Id is an attribute type whose distinguished value can be used as a Relative Distinguished Name (RDN) when naming an instance of the Current Alarm Summary Control managed object class.
currentControlState	```ControlState ::= ENUMERATED { closed, open }```	This attribute indicates the current state of the control point.
currentProblemList	```CurrentProblemList ::= SET OF CurrentProblem CurrentProblem ::= SEQUENCE { problem ProbableCause, alarmStatus AlarmStatus }```	The Current Problem List attribute type identifies the current existing problems, with severity, associated with the managed object.
dateOfInstallation	```Time ::= GeneralizedTime -- without fractions of seconds, -- with time zone indication.```	
directionality	```Directionality ::= ENUMERATED { unidirectional, bidirectional }```	The Directionality attribute type specifies whether the associated managed object is uni- or bidirectional.

Table 179

Name	Type	Description
| downstreamConnectivityPointer | ```
DownstreamConnectivityPointer ::= CHOICE {
    none              NULL,
    single            DistinguishedName,
    concatenated      SEQUENCE OF ObjectInstance,
    broadcast         SET OF ObjectInstance,
    broadcastConcatenated
            SET OF SEQUENCE OF ObjectInstance
}
``` | The matching for equality is applicable for all choices of the syntax. The set operations are permitted only when the choice of the syntax correspond to either broadcast or concatenated broadcast. |
| downstreamFPPointer | ```
DownstreamFPPointer ::= CHOICE {
    none      NULL,
    single    ObjectInstance,
    broadcast SET OF ObjectInstance
}
``` | The downstream connectivity pointer attribute points to the connectionless point managed object, within the same managed element that receives information (traffic) from this connectionless point instance at the same layer, or is null. |
| electronicMailAddress | ```
ElectronicMailAddress ::= SET OF
String(SIZE(0..64))
``` | This attribute specifies the electronic mail address associated with an object. |
|  | ```
EquipmentHolderAddress ::= SET OF String
``` | This attribute indicates the physical location of the resource represented by the equipmentHolder instance. Depending on the containment hierarchy of the equipmentHolder in the managed system, the value of this attribute may vary. For example, if a system has three levels of equipment holders representing Bay, Shelf and Slot respectively (i.e., the managed Element contains multiple Bay equipment holders, each Bay equipment holder contains multiple Shelf equipment holders and each Shelf equipment holder contains multiple Slot equipment holders), then: |

Table 179

Name	Type	Description
		– for the equipmentHolder representing a Bay, the Frame Identification code may be used as the value of this attribute; – for the equipmentHolder representing a Shelf, the Bay Shelf code may be used as the value of this attribute; – for the equipmentHolder representing a Slot, the position code may be used as the value of this attribute. If the system uses only one level of equipment holder that represents the Shelves (i.e., the managedElement contains multiple Shelf equipment holders, and each Shelf equipment holder contains a circuit pack), then the value of this attribute is a sequence of the Frame Identification code and the Bay Shelf Code.
equipmentHolderType	`EquipmentHolderType ::= String`	The equipment holder type attribute indicates the type of equipment holder using a character string. The example values for the character string may be bay, shelf, drawer, slot and rack.
equipmentManufacturer	`EquipmentManufacturer ::= String`	
equipmentType	`EquipmentType ::= String`	
expectedDateOfInstallation	`Time`	
externalPointId	`INTEGER`	This attribute identifies the port number where the monitored or controlled external device is attached. It also serves as the naming attribute for the managed object.
externalPointMessage	`ExternalPointMessage ::= String`	This attribute can provide some textual definition of the external point. It can also be used for identifying the location of the external point.
externalTime	`ExternalTime ::= GeneralizedTime`	The External time attribute provides time-of-day system time. The attribute functions as a reference for all time stamp activities in the managed element.

facsimileTelephoneNumberList	`TelephoneNumberList ::= SET OF`
	`    TelephoneNumber(SIZE (0..64))`
	`TelephoneNumber ::= String(SIZE(0..32))`
		This attribute specifies telephone numbers for facsimile terminals associated with an object.

Table 179

Name	Type	Description
fDFrConnectionType	```FDFrConnectionType ::= ENUMERATED { point-to-point, point-to-multipoint, multipoint-to-multipoint }```	This attribute describes the Connection type of the FDFr instance, the possible type can be: – multipoint-to-multipoint – point-to-point – point-to-multipoint
fPList	ObjectList	This attribute lists the Flow Points (Source/Sink) represented by this managed entity.
fPPLinkId	NameType	This attribute is the identifier of an instance of the IOC: Flow Point Pool Link.
fromTermination	PointerOrNull	This attribute identifies a TTP (source or bidirectional), a CTP (sink or bidirectional) or a GTP composed of members of one of these categories.
holderStatus	```HolderStatus ::= CHOICE { holderEmpty NULL, inTheAcceptableList CircuitPackType, notInTheAcceptableList CircuitPackType, unknownType NULL } CircuitPackType ::= PrintableString```	The holderStatus attribute indicates the status of the physical holder. It specifies if the holder is empty or has a circuitPack of specific type (that may or not be acceptable to the holder) or has an indeterminate type.
idleTpCount	Count	This attribute indicates the total number of termination points associated with a tpPool that are in an operational state of enabled and that are available for Cross-Connection.

Table 179

Name	Type	Description
informationTransferCapabilities	```InformationTransferCapabilities ::= ENUMERATED {` ` speech,` ` audio3pt1,` ` audio7,` ` audioComb,` ` digitalRestricted56,` ` digitalUnrestricted64` `-- "..." these ellipses defined in ASN.1 amendment` `-- are used here to indicate that this is` `-- an extensible type and additional enumerations` `-- may be added in the future` `}```	The attribute type specifies the different service types such as speech, 64 kbits unrestricted data supported by the circuit subgroup.
inputFPList	`ObjectList`	This attribute identifies the list of input flow (termination) points of a flow domain fragment instance.
intervalsOfDay	```IntervalsOfDay ::= SET OF SEQUENCE {` ` intervalStart Time24,` ` intervalEnd Time24` `}` `Time24 ::= SEQUENCE {` ` hour INTEGER (0..23),` ` minute INTEGER (0..59)` `}```	See [ITU-T X.734] for details.
kind	`Kind ::= String`	This attribute holds a string representing the name of an object class for which the AttributeRanges instance is defining attribute ranges.
labelOfFarEndExchange	`UserLabel ::= String`	This attribute type assigns a user friendly name to the Far End Exchange terminating this circuit subgroup.
linkConnectionPointerList	`ObjectList`	This attribute defines the list of Link Connections in a given layer which may compose a Logical Link in the same layer.
linkDirectionality	```LinkDirectionality ::= ENUMERATED {` ` unidirectional,` ` bidirectional,` ` undefined` `}```	The Link Directionality attribute type specifies whether the associated link managed object is uni- or bidirectional, or undefined

Table 179

Name	Type	Description
linkPointer	`RelatedObjectInstance`	The Link Pointer attribute points to a link from a link end for connection-oriented network; or points to a FPP link from a flow point pool for connectionless network.
linkPointerList	`ObjectList`	This attribute points to the links terminated by the subnetwork or the link terminated by an access group for connection-oriented networks; or the FPP links terminated by the flow domain or the FPP link terminated by an access group for connectionless networks.
listOfCharacteristicInfo	`ListOfCharacteristicInformation ::=` `    SET OF CharacteristicInformation`	This attribute lists the characteristic information types that can be cross-connected by a Fabric.
listOfSags	`ListOfSags ::= SET OF SagId` `SagId ::= NameType`	
listOfSaps	`ListOfSaps ::= SET OF Sap` `Sap ::= String`	

locationAddress	`LocationAddress ::= SEQUENCE {`
	`    premisesName    PremisesName,`
	`    premisesAddress PremisesAddress,`
	`    ...`
	`}`
	`PremisesName::= String(SIZE(0..64))`
	`PremisesAddress::= SEQUENCE {`
	`    civicAddress    String(SIZE(0..64)),`
	`    city            String(SIZE(0..64)),`
	`    state           String(SIZE(0..64)),`
	`    zip             String(SIZE(0..64)),`
	`    ...`
	`}`	

locationName	`LocationName ::= String`	The Location Name attribute type identifies a location.

Table 179

Name	Type	Description

lockedInCondition	`LockedInCondition ::= SEQUENCE {`
	`    settingWindowTime    INTEGER,`
	`        -- number of seconds`
	`    releasingWindowTime  INTEGER,`
	`        -- number of seconds`
	`    hitsCount            INTEGER`
	`}`
		This read-write attribute specifies the criteria of the locked-in condition. The criteria includes the automatic protection switching (APS) rate and the associated setting and releasing time windows. If the number of APS of a Protection Unit reaches the value specified in the hitsCount field within a moving time window of specified length, the Protection Unit will enter the locked-in condition. Each switch to protection and its subsequent release is considered as one hit. The length of the time window for entering the locked-in condition is specified in the settingWindowTime field. Once a Protection Unit is in the locked-in condition, future request of APS will be denied until the locked-in condition is released. The release criterion is no APS request within another moving time window. The length of this time window is specified in the releasingWindowTime field.

logicalEndDirectionality	`PointDirectionality ::= ENUMERATED {`
	`    sink,`
	`    source,`
	`    bidirectional`
	`}`
		The Logical End Directionality attribute type specifies whether the associated link end managed object is sink, source, or bidirectional.

managedElementType	`ManagedElementType ::= SET OF CHOICE {`
	`        meTypeString    String,`
	`        meTypeOID       OBJECT IDENTIFIER`
	`}`
		This attribute holds a set of either textual strings or values from a predefined set (Object Identifiers) that describe the generic type of the Network Element modelled by the ManagedElementR2 instance. Multiple managed element type values may be used to describe hybrid equipment.

maxFPPAssignableCapacity	`Bandwidth`	This attribute indicates the maximum amount of bandwidth assignable to the flow point pool link, in both the ingress and egress directions.
maximumLinkConnectionCount	`Count`	This attribute indicates the maximum number of link connections associated with a link when flexible bandwidth allocation is supported.
maximumNetworkCTPCount	`Count`	This attribute indicates the maximum number of Network CTPs associated with a Link End.

Table 179

Name	Type	Description
modelCode	`ModelCode ::= String`	This attribute stores the product model code of the Network Element. The product model code is the manufacturer's model identification information. It is vendor-provided information that the vendor uses to distinguish the network element among a family of products. This attribute is useful for OSSs performing equipment discovery and inventory processes.
modelType	`ModelType ::= String`	
nameBinding	`NameBinding`	
neAliases	`NeAliases ::= SET OF String`	This attribute is used to hold aliases given by the EMS to a certain Managed Element instance. Having such aliases available via the EMS/NMS interface is useful for relating Network Element names entered at the EMS, via the Graphical User Interface or otherwise, to those found on the NMS user interface. More importantly, these aliases may appear in alarms sent by certain EMS software outside the interface. Thus, it would be crucial for the NMS to recognize such aliases in order to perform alarm correlation or other fault and performance functions.

neAssignmentPointer	`NeAssignmentPointer ::= CHOICE {`
	`    notAvailable    NULL,`
	`    relatedObject   DistinguishedName,`
	`    string          String`
	`}`
		The NE Assignment Pointer attribute points from the lowest level Network TP in the partitioning hierarchy to a NE TP which represents the functionality which supports the Network TP. The sub-partition pointer for a NWCTP which utilizes the NE assignment pointer will be NULL.

networkCTPsInLinkEndList	`TPList`	This attribute lists the NetworkCTPs that are represented by a Link End.
networkLevelPointer	`ObjectInstance`	The network level pointer identifies a network level object. The value of the network level pointer shall only be modified by the managing system.
networkTPPointer	`RelatedObjectInstance`	The Network TP Pointer attribute points to a network termination point.

Table 179

Name	Type	Description
normalControlState	`ControlState`	This attribute indicates the normal state of the control point.
numberOfCircuits	`NumberOfCircuits ::= INTEGER`	The number of circuits in a circuit subgroup.
numberOfPorts	`Count`	This attribute indicates the total number of ports supported by the circuit pack.
objectClass		
objectList	`ObjectList`	The Object List attribute type describes a set of object instances.

operationalState	`OperationalState ::= ENUMERATED {`
	    `enabled,`
	    `disabled`
	`}`
		This attribute is to indicate the operability of the managed entity, which has two possible values: disabled and enabled. See [ITU-T X.731] for details.

outputFPList	`ObjectList`	This attribute identifies the list of output flow (termination) points of a flow domain fragment instance.
packages	`Packages`	

perceivedSeverityList	`PerceivedSeverityList ::= SET OF PerceivedSeverity`
	`PerceivedSeverity ::= ENUMERATED {`
	    `indeterminate(0),`
	    `-- used when it is not possible to assign`
	    `-- the following values:`
	    `critical(1),`
	    `major(2),`
	    `minor(3),`
	    `warning(4),`
	    `cleared(5)`
	`}`
		The Perceived Severity List attribute type describes criteria for inclusion in a current alarm summary report. It consists of a set of possible Perceived Severities. In order to be included in a current alarm summary report, an object must have an outstanding alarm (or potential alarm) that has a Perceived Severity that matches one of the elements in the Perceived Severity List.
		If the Perceived Severity List has null value, the Perceived Severity of the objects in the object list is not used as a criterion for inclusion in the current alarm summary report.

pointDirectionality	`PointDirectionality`	This attribute indicates the directionality of a networkTP or Connectionless Point managed object instance. For a Connectionless Point, only the "source" or "sink" can be used as the attribute value.

Table 179

Name	Type	Description
| portAssociations | ```
PortAssociations ::= SET OF PortAssociation
PortAssociation ::= SEQUENCE {
    portId          NameType,
    portTrail       PointerOrNull
    -- the choice of NULL means unassigned
}
``` | This attribute is a sequence of pairs that relate a port on the multiport circuit pack with the associated entity. |
| portSignalRateAndMappingList | ```
PortSignalRateAndMappingList ::= SET OF SEQUENCE {
    portId          NameType,
    signalRate      SignalRate,
    mappingList     MappingList OPTIONAL
}
MappingList ::= SEQUENCE OF PayloadLevel
PayloadLevel ::= CharacteristicInformation
``` | This attribute identifies the signal rate associated with a circuit pack port (e.g., port = 0, rate = stm1) and its payload mapping (e.g., au3 or au4). The signal rate and payload mapping is provisionable. For example, a port with signal rate stm4 may have a payload mapping of au4-4. Another possible mapping of this rate is a sequence of four individual au4 (i.e., au4, au4, au4, au4) or a sequence of mixed au3 and au4 (e.g., au3, au3, au3, au4, au4, au3, au3, au3). |
potentialCapacity	```Capacity```	This attribute indicates the number of link connections or the amount of bandwidth that has not yet been assigned to a Link but that could be assigned to the Link from the server trail.
potentialLinkCapacity	```Capacity```	This attribute indicates the number of link connections or the amount of bandwidth that has not yet been assigned to a Link but that could be assigned to the Link from the server trail.
potentialLinkEndCapacity	```PointCapacity```	This attribute indicates the number of Network CTP or the amount of bandwidth that has not yet been assigned to a Link End but that could be assigned to the Link End from the server trail termination point.
priority	```INTEGER```	This attribute specifies the priority of the service (e.g., traffic) carried on the resource associated with the protected protectionUnit instance. Valid values for this attribute are integers, where the value 1 indicates the highest priority, and a larger value indicates a lower priority. For a protecting protectionUnit, the value of this attribute indicates the priority of choice of the protecting protectionUnit relative to other available protecting protectionUnit(s) within the same protectionGroup. The lower the value, the more preferred the protectionUnit is relative to other protectionUnits.

Table 179

Name	Type	Description
probableCauseList	`ProbableCauseList ::= SET OF ProbableCause`	The Probable Cause List attribute type describes criteria for inclusion in a current alarm summary report, consisting of a set of possible Probable Causes. In order to be included in a current alarm summary report, an object must have an outstanding alarm (or potential alarm) that has a Probable Cause that matches one of the elements in the Probable Cause List. If the Probable Cause List has a null value, the Probable Cause of the objects in the object list is not used as a criterion for inclusion in the current alarm summary report.

procedure	`Procedure ::= CHOICE {`
	`    name     String,`
	`    number   INTEGER`
	`}`	

protected	`Boolean`	This attribute identifies whether the associated managed object is protected or not. The value TRUE implies it is protected.
protecting	`Boolean`	This attribute specifies the type of the protectionUnit. A value of TRUE indicates that the protectionUnit is a protecting (i.e., backup or standby) unit. A value of FALSE indicates that the protectionUnit is a protected (i.e., a regular, working, or preferred) unit.

protectionGroupType	`ProtectionGroupType ::= ENUMERATED {`
	`    plus, -- 1+1 (1 plus 1) or hot-standby`
	`    colon -- M:N (M for N)`
	`}`
		This attribute specifies whether the protection scheme used is 1 + 1 (plus) or M:N (colon). M:N includes the cases where M = 1 and/or N = 1.

protectionStatusR1	`ProtectionStatusR1 ::= SET OF CHOICE {`
	`    noRequest      NULL,`
	`    doNotRevert    NULL,`
	`    manualSwitch   ManualSwitch,`
	`    autoSwitch     AutoSwitch,`
	`    forcedSwitch   ForcedSwitch,`
	`    lockout        Lockout,`
	`    releaseFailed  NULL,`
	`    resourceFailed NULL,`
	`    lockedIn       NULL`
	`}`	

Table 179

Name	Type	Description
| | ```
ManualSwitch ::= SEQUENCE {
      switchStatus    SwitchStatus,
      relatedUnit     FromAndToProtectionUnit
}
AutoSwitch ::= SEQUENCE {
      switchStatus        SwitchStatus,
      relatedUnit         FromAndToProtectionUnit,
      autoSwitchReason    AutoSwitchReason
}
ForcedSwitch ::= SEQUENCE {
      switchStatus    SwitchStatus,
      relatedUnit     FromAndToProtectionUnit
}
Lockout ::= CHOICE {
      switchStatus    SwitchStatus,
      releaseFailed   NULL
}
SwitchStatus ::= ENUMERATED {
      pending,
      completed,
      operateFailed
}
FromAndToProtectionUnit ::= CHOICE {
      fromProtectionUnitNumber   RDNSequence,
      toProtectionUnitNumber     RDNSequence
}
AutoSwitchReason ::= ENUMERATED {
      waitToRestore,
      resourceDegrade,
      resourceFailed
}
``` | |
| providerRequestNumber | ```
RequestNumber ::= INTEGER
``` | This attribute is a unique identifier provided by the SP to identify the request. The providerRequestNumber attribute is an attribute type whose distinguished value can be used as a RDN when naming an instance of the current service request and service modify request object class. |
| provisionedLinkCapacity | ```
Capacity
``` | This attribute indicates the number of link connections assigned to a Link or the amount of bandwidth assigned to a Link. |

Table 179

Name	Type	Description
provisionedLinkConnectionCount	`Count`	This attribute indicates the number of link connections assigned to that link when flexible bandwidth allocation is supported.
provisionedLinkEndCapacity	`PointCapacity`	This attribute indicates the number of network CTPs assigned to a LinkEnd or the amount of bandwidth assigned to a LinkEnd.
provisionedNetworkCTPCount	`Count`	This attribute indicates the number of Network CTPs associated with a Link End that has been assigned.
qualityOfConnectivityService	`ObjectInstance`	This attribute indicates the quality of service for Connectivity and its subclasses, and requires further definition.
ranges	```Ranges ::= SET OF CHOICE {` ` integerRange AttributeChoiceInteger,` ` realRange AttributeChoiceReal` `}` `AttributeChoiceInteger ::= SEQUENCE {` ` attributeName String,` ` minimumValue INTEGER,` ` maximumValue INTEGER,` ` granularity INTEGER` `}` `AttributeChoiceReal ::= SEQUENCE {` ` attributeName String,` ` minimumValue REAL,` ` maximumValue REAL` `}```	This attribute stores the ranges for attributes. Ranges may be defined for attributes of type INTEGER or type REAL. The 'attributeName' field specifies the name of the attribute for which a range is being defined. The range is then defined using the 'minimum', 'maximum', and 'granularity' fields.
redline	`Boolean`	This attribute identifies whether the associated managed object is red lined, e.g., identified as being part of a sensitive circuit.
relatedRoutingProfile	`ObjectInstance`	
reliableResourcePointerR1	```ResourcePointer ::= CHOICE{` ` null NULL,` ` objectInstances SET OF ObjectInstance` `}```	The value of the reliableResourcePointerR1 attribute points to the reliable resource(s) (e.g., the functional objects) that is/are associated with the Protection Unit instance.

Table 179

Name	Type	Description
replaceable	`Replaceable`	The Replaceable attribute type indicates whether the associated managed object is replaceable or non-replaceable.
requestReceptionTime	`Time`	The year, month, day, hour, minute and seconds fields are compared in order to determine whether the specified value is greater or less than the value of the attribute. The values for the year, month, day, hour, minute and seconds are determined from their character string representation. The year value is first compared. If equal, the month value is compared and soon until the compared fields are not equal.
requestedInitialService-AdministrativeState	`RequestedInitialService-AdministrativeState ::= AdministrativeState`	This attribute represents Service Administrative State, Link Connection Service Administrative State.
requestSequenceNumber	`RequestNumber`	The requestSequenceNumber attribute is an attribute type whose distinguished value can be used as a RDN when naming an instance of the service request history record object class.
revertive	`Boolean`	This attribute indicates whether the protection scheme is revertive or not. If the value of this attribute is TRUE, the traffic is returned to the protected protectionUnit instance that initiated the switch after the fault clears and the waitToRestoreTime interval (if any) has expired. If the value of this attribute is FALSE, then after the fault has cleared, traffic does not revert to the protectionUnit that initiated the switch.
sadId	`SadId ::= NameType`	The sadID attribute is an attribute type whose distinguished value can be used as a RDN when naming an instance of the service access domain object class.
sagId	`SagId`	The sagID attribute is an attribute type whose distinguished value can be used as a RDN when naming an instance of the service access group object class.
sagLocation	`SagLocation ::= LocationAddress`	
schedulerName	`ObjectInstance`	See [ITU-T X.734] for details.

Table 179

Name	Type	Description
serialNumber	`SerialNumber ::= String`	The serial number attribute type identifies the serial number of the physical resource.
serverFTPPointer	`ObjectList`	This attribute defines the FTP which may serve a FP in another layer. Usually a FTP or FTPs in a higher order layer will serve a FP or FPs in a lower order layer.
serverTTPPointer	`ObjectList`	This attribute defines the TTP which may serve a CTP and/or link End in another layer. Usually a TTP or TTPs in a higher order layer will serve a CTP or CTPs in a lower order layer.
serverTrail	`RelatedObjectInstance`	This attribute points to a trail (including a connectionless trail) in the server layer that supports the link (include FPPlink) in a client layer.
serverTrailList	`ObjectList`	The value of this attribute identifies the trail objects (in most cases one) in a lower order network layer which may be used in parallel to serve a connection object.
serviceAffected	`Boolean`	This attribute indicates whether the alarm condition for monitored external device is service affecting or not.
serviceAvailabilityDate	`Time`	Date the service is due to be provisioned and placed in the requested Service Administrative State.

serviceCustomerContact	`Contact ::= CHOICE {`
	`    person        PersonReach,`
	`    contactObject  ObjectInstance`
	`    -- the ObjectInstance points to an instance`
	`    -- of a X.790 Contact object.`
	`}`
		The Customer contact person who may be called by the SP, who is knowledgeable and may be called for problems or questions concerning the service that has been ordered.

serviceDescription	`ServiceDescription ::= String(SIZE(0..256))`	The name of a profile of service characteristics (associated with the service type) defined and supported by the SP. Examples of the service characteristics that may be included in the profile are directionality, channelization, signalling options, protection, quality of service objectives, application, etc. Service values of this attribute are not subject to standardization and are defined by the contract.

Table 179

Name	Type	Description
serviceID	`ServiceId ::= NameType`	The Service ID is an attribute type whose distinguished value can be used as an RDN when naming an instance of the Management Operations Schedule object class.
serviceInstance	`ObjectInstance`	This attribute represents Circuit Number, Link Connection Identifier.
serviceProviderContact	`Contact`	The provider contact information for use by the SC in resolving questions or problems with the service.

serviceRequestState	`ServiceRequestState ::= ENUMERATED {`
	`    pre-processing,`
	`    open-active,`
	`    pending,`
	`    closed`
	`}`
		This parameter indicates that the request is in progress. Valid values are:
		Pre-processing – Indicates that the service request is currently being checked for validity of request parameters.
		Open/active – Indicates that the service request is open and is being actively processed.
		
		Pending – Indicates that the service request is deactivated for reasons such as waiting for additional information, completion of other supporting tasks. Activation from this pending state is required before processing can be continued.
		Closed – Indicates that the service request is closed either as a result of successful completion or error or because the request was cancelled.

serviceTerminationDate	`ServiceTerminationDate ::= CHOICE {`
	`    time            Time,`
	`    continuous      NULL`
	`}`
	`-- continuous means that no termination date`
	`-- has been specified, this is the default value`
	`-- for ServiceTerminationDate`
		The year, month, day, hour, minute and seconds fields are compared in order to determine whether the specified value is greater or less than the value of the attribute. The values for the year, month, day, hour, minute and seconds are determined from their character string representation. The year value is first compared. If equal, the month value is compared and soon until the compared fields are not equal

serviceType	`ServiceType ::=CHOICE{`
	`    serviceTypeNumber    INTEGER,`
	`    string               String,`
	`    oid                  OBJECT IDENTIFIER,`
	`    ...`
	`}`
		The service Type attribute identifies the distinguishing characteristics of a Service.

Table 179

Name	Type	Description
signalId	```SignalId ::= CHOICE {` ` simple CharacteristicInformation,` ` bundle Bundle,` ` complex SEQUENCE OF Bundle` `}` `Bundle ::= SEQUENCE {` ` characteristicInfoType` ` CharacteristicInformation,` ` bundlingFactor INTEGER` `}```	This attribute defines the characteristic information of the layer (in the G.805 sense) to which the entity under consideration belongs. It is used to determine whether subnetwork connection/connectivity is possible. The signal Id may be a simple rate and format, a bundle of entities with the same characteristic information which forms an aggregate signal, or a complex type containing groupings of different bundles. The complex type may be applicable to certain multimedia applications involving multiple parallel connections between endpoint locations.
signalType	```SignalType ::= CHOICE {` ` simple CharacteristicInformation,` ` bundle Bundle,` ` complex SEQUENCE OF Bundle` `}```	This attribute uniquely identifies the signal type of a cross-connection, TP pool or GTP. The signal type can either be simple, bundle, or complex. If the signal type is simple, it consists of a single type of characteristic information. If the signal type is bundle, it is made up of a number of signal types all of the same characteristic information. If the signal type is complex, it consists of a sequence of bundle signal type. The order in the complex signal type represents the actual composition of the signal.
signallingCapabilities	```SignallingCapabilities ::= ENUMERATED {` ` isup,` ` isup92,` ` itu-tNo5,` ` r2,` ` itu-tNo6,` ` tup` `-- this is an extensible type and additional` `-- enumerations may be added in the future` `}```	The attribute type specifies the signalling types supported by the circuit subgroup.
subNetworkConnectionPointer	```SubNetworkConnectionPointerList ::=` ` SEQUENCE OF RelatedObjectInstance```	The Subnetwork Connection Pointer attribute points to the ordered list of subnetwork Connection(s) which have a relationship with the network termination point. When no subnetwork connection is present, this pointer points to a subnetwork or is NULL. This list has a single entry for point-to-point applications, and may have multiple entries for point-to-multipoint applications.

Table 179

Name	Type	Description

subordinateCircuitPackSoftware Load	`SubordinateCircuitPackSoftwareLoad ::= CHOICE {`
	`    notApplicable          NULL,`
	`    softwareInstances      SEQUENCE OF`
	`ObjectInstance,`
	`    softwareIdentifiers    SEQUENCE OF String`
	`}`
		This attribute indicates the software, if any, which is currently designated as the one to be loaded to the containing circuit pack whenever automatic reload of software is needed. The values of this attribute may be one of the following: sequence of printable string, sequence of object instance or NULL. The NULL choice is used when the contained circuit pack is not software loadable, or no software load has been designated. The choice of sequence of ObjectInstance identifies an ordered set of software instances. This ordered set can be used to specify the order in which the software is to be downloaded. It is recommended to note in the ICS if the ordering is significant. When the choice of PrintableString is used, the semantics is a local matter.

sub-partitionPointer	`RelatedObjectInstance`	The Sub-partition Pointer is a pointer to a Network CTP which is in a lower level partition. Where the lowest level of NWCTP points to a NE CTP via the NE Assignment Pointer, the value of the Sub-partition Pointer is null.
superPartitionPointer	`RelatedObjectInstance`	The Super Partition Pointer is a pointer to a Network CTP which is in a higher level partition. It will only be present for those Network CTPs in the lower partition which has a direct correspondence to the Network CTPs at the higher level. It can be null.
supportableClientList	`SupportableClientList ::= SET OF ObjectClass`	The value of this attribute is the list of object classes representing the clients that the particular managed object is capable of supporting. This may be a subset of the client layers identified in [b-ITU-T G.803] by the particular server layer managed object.
supportedByObjectList	`ObjectList`	The Supported By Object List is an attribute type whose value identifies a set of object instances which are capable of directly affecting a given managed object. The object instances include both physical and logical objects. This attribute does not force internal details to be specified, but only the necessary level of detail required for management. If the object instances supporting the managed object are unknown to that object, then this attribute is an empty set.

Table 179

Name	Type	Description
supportedServiceNameList	`ObjectList`	This attribute specifies the services supported by a given managed object.
systemTimingSource	```SystemTimingSource ::= SEQUENCE { primaryTimingSource SystemTiming, secondaryTimingSource SystemTiming OPTIONAL } SystemTiming ::= SEQUENCE { sourceType SourceType, sourceID ObjectInstance OPTIONAL -- not needed for internal source } SourceType ::= ENUMERATED { internalTimingSource, remoteTimingSource, slavedTimingTerminationSignal }```	The System Timing Source attribute is used to specify the primary and secondary managed element timing source for synchronization.
systemTitle	```SystemTitle ::= CHOICE { distinguishedName DistinguishedName, oid OBJECT IDENTIFIER, nothing NULL }```	This attribute may be used in naming instances of System managed object class.
telephoneNumberList	`TelephoneNumberList`	A list of contact telephone numbers.
toTermination	`Pointer ::= ObjectInstance`	This attribute identifies a CTP (source or bidirectional), a TTP (sink or bidirectional) or a GTP composed of members of one of these categories.
topologicalEndDirectionality	```TopologicalEndDirectionality ::= ENUMERATED { undefined, sink, source, bidirectional }```	The Topological End Directionality attribute type specifies whether the associated link end managed object is sink, source, bidirectional, or undefined.
totalFPPLinkCapacity	`Bandwidth`	This attribute identifies the total bandwidth that is available to the FPP link.

Table 179

Name	Type	Description
totalFPPCapacity	`BandWidth`	This attribute indicates the total amount of bandwidth supported on the flow point pool, including both assigned and unassigned bandwidth, based on the amount of bandwidth provided by the underlying server layer link.
totalLinkCapacity	`Capacity`	This attribute indicates the total capacity of a Link which may be the number of Link connections contained in a Link or the total bandwidth available to the Link.
totalLinkEndCapacity	`PointCapacity`	This attribute indicates the total capacity of a Link End which is either the total number of NetworkCTPs associated with a Link End or the total bandwidth of the Link End.
totalTpCount	`Count`	This attribute indicates the total number of termination points associated with a tpPool.
tpsInGtpList	`TpsInGtpList ::= SET OF ObjectInstance`	This attribute lists the termination points that are represented by a GTP.
tpsInTpPoolList	`ListOfTPs ::= SET OF ObjectInstance`	This attribute lists the termination points that are represented by a TP Pool.
trafficDescriptor	`TrafficDescriptor ::= ObjectInstance`	This attribute contains the traffic descriptor of a trail (connection-oriented or connectionless). It is to be used with flexible bandwidth allocation.

transmissionCharacteristics	`TransmissionCharacteristics ::= BIT STRING {`
	`    satellite(0),`
	`    dCME(1),`
	`    echoControl(2)`
	`}`
		This attribute type specifies the different transmission characteristics such as satellite, echo control supported or not supported by the circuit subgroup. The bit positions are set to indicate if a particular characteristic is supported.

Table 179

Name	Type	Description

ttpPortID	<pre>PortIDType ::= SEQUENCE {
	    managedElement String,
	    bay String OPTIONAL,
	    shelf String OPTIONAL,
	    drawer String OPTIONAL,
	    slot String OPTIONAL,
	    port String
	}</pre>
		This attribute stores references to the Physical Port that supports this generic transport TTP.

typeText	`TypeText ::= String`	This attribute gives a textual description of the type of the resource.
unreliableResourcePointerR1	`ResourcePointer`	The value of the unreliableResourcePointerR1 attribute points to the unreliable resource(s) (e.g., circuit pack) that is/are associated with the Protection Unit instance.
upstreamConnectivityPointer	`ConnectivityPointer`	The matching for equality is applicable for all the choices of the syntax.

upstreamFPPointer	<pre>UpstreamFPPointer ::= CHOICE {
	    none NULL,
	    single ObjectInstance,
	    broadcast SET OF ObjectInstance
	}</pre>
		The upstream FP pointer attribute points to the connectionless point managed object, within the same managed element, that sends information (traffic) to this connectionless point instance at the same layer, or is null.

usageCost	`UsageCost ::= INTEGER(0..255)`	This attribute contains the costs for a transport entity. It is to be used as selection/routing criteria.

usageState	<pre>UsageState ::= ENUMERATED {
	    idle,
	    active,
	    busy
	}</pre>
		See [ITU-T X.731] for details.

userLabel	`UserLabel`	The User Label attribute type assigns a user friendly name to the associated object.

Table 179

Name	Type	Description
validControlType	```ValidControlType ::= ENUMERATED { momentaryOnly, continuousOnly, both }```	This attribute indicates the valid type of control signal for this control point.
vendorName	```VendorName ::= String```	The Vendor Name attribute type identifies the vendor of the associated managed object.
version	```Version ::= String```	The Version attribute type identifies the version of the associated managed object.
waitToRestoreTime	```INTEGER```	This attribute specifies the amount of time, in seconds, to wait after a fault clears before restoring traffic to the protected protectionUnit that initiated the switching.
weekMask	```WeekMask ::= SET OF SEQUENCE { daysOfWeek DaysOfWeek, intervalsOfDay IntervalsOfDay } DaysOfWeek ::= BIT STRING { sunday(0), monday(1), tuesday(2), wednesday(3), thursday(4), friday(5), saturday(6) } (SIZE(7))```	See [ITU-T X.734] for details.
zEnd	```ObjectInstance```	This attribute is a pointer to a subnetwork, a link end, or access group in the same network layer domain.
zEndFTPLIST	```ObjectList```	The value of this attribute identifies one or more Flow Termination Point instances, which represents the sink end of a connectionless Trail. This attribute cannot be null.

Table 179

Name	Type	Description
	ObjectList	The value of this attribute identifies one or more network termination points of an instance of a subclass of the Connectivity object class.
zEndofFPPLink	ObjectInstance	This attribute is a pointer to a flow domain, a flow point pool or an access group in the same network layer domain. This attribute identifies the link end at the other extremity.
z-TPInstance	RelatedObjectInstance	The Z-Termination Point Instance attribute type identifies one of the two termination points of an instance of the connectivity object class.

8.2 Notifications

Table 180

Name	Type	Description
attributeValueChange	`AttributeValueChangeInfo`	This notification type is used to report changes to the attribute such as addition or deletion of members to one or more set valued attributes, replacement of the value of one or more attributes and setting attribute values to their defaults.
communicationsAlarm	`AlarmInfo`	This notification type is used to report when the object detects a communications error.
currentAlarmSummaryReport	`AlarmSummaryData`	
environmentalAlarm	`AlarmInfo`	This notification type is used to report a problem in the environment.
equipmentAlarm	`AlarmInfo`	This notification type is used to report a failure in the equipment.
objectCreation	`ObjectInfo`	This notification type is used to report the creation of a managed object to another open system.
objectDeletion	`ObjectInfo`	This notification type is used to report the deletion of a managed object to another open system.
processingErrorAlarm	`AlarmInfo`	This notification type is used to report processing failure in a managed object.
protectionAlarm	`ProtectionAlarmInfo`	
protectionSwitchReportingR1	`ProtectionSwitchReportingInfo`	The protectionSwitchReporting notification is emitted from the protectionGroup object to report any protection switch events.
qualityofServiceAlarm	`AlarmInfo`	This notification type is used to report a failure in the quality of service of the managed object.
stateChange	`StateChangeInfo`	This notification type is used to report the change in the value of one or more state attributes of a managed object that result through either internal operation of the managed object or via management operation.

Appendix I

(This appendix does not form an integral part of this Recommendation)

The larger part of the IOCs defined in this Recommendation is based on existing protocol-specific managed objects as shown in Table I.1.

Table I.1 – IOC mapping with protocol-specific managed object classes

M.3160	M.3100	M.3108.1	Q.821	X.790
Abstract Link	AbstractLink			
Abstract Link End	AbstractLinkEndR1			
Access Group	AccessGroup			
Account				Account
Alarm Severity Assignment Profile	AlarmSeverityAssignmentProfile			
Alarm Reporting Control (Arc) Interval Profile	ArcIntervalProfile			
Attribute Ranges	AttributeRanges			
Circuit End Point Subgroup	CircuitEndPointSubgroup			
Circuit Pack	CircuitPackR1			
Connection	ConnectionR1			
Connection Termination Point Bidirectional	ConnectionTermination-PointBidirectional			
Connection Termination Point Sink	ConnectionTerminationPointSink			
Connection Termination Point Source	ConnectionTerminationPointSource			
Control Point	ControlPoint			
Cross Connection	CrossConnectionR1			
Contact				Contact
Current Alarm Summary Control			CurrentAlarmSummaryControl	
Equipment	EquipmentR2			
Equipment Holder	EquipmentHolder			
External Point	ExternalPoint			
Fabric	FabricR4			
Generic Transport TTP	GenericTransportTTPR1			
Group Termination Point (gtp)	gtpR1			
Layer Network Domain	LayerNetworkDomainR1			
Link Connection	LinkConnection			
Logical Link	LogicalLink			
Logical Link End	LogicalLinkEndR1			

Table I.1 – IOC mapping with protocol-specific managed object classes

M.3160	M.3100	M.3108.1	Q.821	X.790
Managed Element	ManagedElementR2			
Managed Element Complex	ManagedElementComplex			
Multipoint Cross Connection	mpCrossConnectionR1			
Named Cross Connection	NamedCrossConnection			
Named Multipoint Cross Connection	NamedMpCrossConnection			
Network CTP Bidirectional	NetworkCTPBidirectional			
Network CTP Sink	NetworkCTPSink			
Network CTP Source	NetworkCTPSource			
Network	NetworkR1			
Network Termination Point	NetworkTerminationPoint			
Network TTP Bidirectional	NetworkTTPBidirectionalR1			
Network TTP Sink	NetworkTTPSinkR1			
Network TTP Source	NetworkTTPSource			
Pipe	PipeR2			
Protection Group	ProtectionGroupR2			
Protection Unit	ProtectionUnitR1			
Scan Point	ScanPoint			
Service				Service
Service Access Domain		ServiceAccessDomain R1		
Service Access Group		ServiceAccessGroup		
Service Access Equipment View		ServiceAccessEquipme nt View		
Service Modify Request		ServiceModifyRequest		
Service Request History Record		ServiceRequestHistory Record		
Software	SoftwareR1			
Sub Network	SubNetwork			
Sub Network Connection	SubNetworkConnection			
Termination Point	TerminationPoint			
Termination Point Pool (tpPool)	TpPool			
Topological Link	TopologicalLink			
Topological Link End	TopologicalLinkEndR1			
Trail	TrailR2			

Table I.1 – IOC mapping with protocol-specific managed object classes

M.3160	M.3100	M.3108.1	Q.821	X.790
Trail Termination Point Bidirectional	TrailTerminationPointBidirectional			
Trail Termination Point Sink	TrailTerminationPointSink			
Trail Termination Point Source	TrailTerminationPointSource			
Transport Service		TransportService		

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