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UNIÓN INTERNACIONAL DE TELECOMUNICACIONES

UIT-T

SECTOR DE NORMALIZACIÓN
DE LAS TELECOMUNICACIONES
DE LA UIT

G.853.1

(11/96)

SERIE G: SISTEMAS Y MEDIOS DE TRANSMISIÓN,
SISTEMAS Y REDES DIGITALES

Sistemas de transmisión digital – Redes digitales –
Características de las redes con jerarquía digital síncrona

**Elementos comunes del punto de vista de
la información para la gestión de una red de
transporte**

Recomendación UIT-T G.853.1

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(Anteriormente Recomendación del CCITT)

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Para más información, véase la Lista de Recomendaciones del UIT-T.

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RECOMENDACIÓN UIT-T G.853.1

ELEMENTOS COMUNES DEL PUNTO DE VISTA DE LA INFORMACIÓN PARA LA GESTIÓN DE UNA RED DE TRANSPORTE

Resumen

Esta Recomendación proporciona la especificación del punto de vista de la información común que se utilizará como base para desarrollar los puntos de vista de la información específicos de la aplicación de gestión que soportarán la gestión de las redes de transporte, basándose en los principios de la Recomendación G.805, "Arquitectura funcional general de las redes de transporte". El punto de vista de la información es un concepto del modelo de referencia de procesamiento distribuido abierto (RM-ODP, *reference model-open distributed processing*).

Orígenes

La Recomendación UIT-T G.853.1 ha sido preparada por la Comisión de Estudio 15 (1993-1996) del UIT-T y fue aprobada por el procedimiento de la Resolución N.º 1 de la CMNT el 8 de noviembre de 1996.

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PREFACIO

La UIT (Unión Internacional de Telecomunicaciones) es el organismo especializado de las Naciones Unidas en el campo de las telecomunicaciones. El UIT-T (Sector de Normalización de las Telecomunicaciones de la UIT) es un órgano permanente de la UIT. Este órgano estudia los aspectos técnicos, de explotación y tarifarios y publica Recomendaciones sobre los mismos, con miras a la normalización de las telecomunicaciones en el plano mundial.

La Conferencia Mundial de Normalización de las Telecomunicaciones (CMNT), que se celebra cada cuatro años, establece los temas que han de estudiar las Comisiones de Estudio del UIT-T, que a su vez producen Recomendaciones sobre dichos temas.

La aprobación de Recomendaciones por los Miembros del UIT-T es el objeto del procedimiento establecido en la Resolución N.º 1 de la CMNT.

En ciertos sectores de la tecnología de la información que corresponden a la esfera de competencia del UIT-T, se preparan las normas necesarias en colaboración con la ISO y la CEI.

NOTA

En esta Recomendación, la expresión "Administración" se utiliza para designar, en forma abreviada, tanto una administración de telecomunicaciones como una empresa de explotación reconocida de telecomunicaciones.

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Recomendación G.853.1

ELEMENTOS COMUNES DEL PUNTO DE VISTA DE LA INFORMACIÓN PARA LA GESTIÓN DE UNA RED DE TRANSPORTE

(Ginebra, 1996)

1 Alcance

Esta Recomendación proporciona la especificación del punto de vista de la información común que se utilizará como base para desarrollar los puntos de vista de la información específicos de la aplicación de gestión que soportarán la gestión de las redes de transporte, basándose en los principios de la Recomendación G.805, "Arquitectura funcional general de las redes de transporte". El punto de vista de la información es un concepto del modelo de referencia de procesamiento distribuido abierto (RM-ODP, *reference model-open distributed processing*). La aplicación del marco RM-ODP en el contexto de esta Recomendación se define en la Recomendación G.851.1. La terminología y las plantillas utilizadas en esta Recomendación se definen en la Recomendación G.851.1. Se supone que las arquitecturas funcional y estructural de la red de transporte sujeta a gestión se describen mediante los conceptos y la terminología de la Recomendación G.805. En esta Recomendación se utilizan las definiciones genéricas, los símbolos y las abreviaturas definidas en la Recomendación G.805. El punto de vista de la información común contiene la definición de los objetos y relaciones de información que representan los recursos de la Recomendación G.805, independientemente de cualquier servicio de gestión particular. También se especifican los atributos y estados de la información común.

Los conceptos funcionales y de arquitectura identificados en la Recomendación G.805 permiten la subdivisión de redes de capa. La aplicación de estos conceptos en el contexto de esta Recomendación se describe en el apéndice I.

2 Referencias

Las siguientes Recomendaciones del UIT-T y otras referencias contienen disposiciones que, mediante su referencia en este texto, constituyen disposiciones de la presente Recomendación. Al efectuar esta publicación, estaban en vigor las ediciones indicadas. Todas las Recomendaciones y otras referencias son objeto de revisiones por lo que se preconiza que los usuarios de esta Recomendación investiguen la posibilidad de aplicar las ediciones más recientes de las Recomendaciones y otras referencias citadas a continuación. Se publica periódicamente una lista de las Recomendaciones UIT-T actualmente vigentes.

- [1] Recomendación UIT-T X.901¹ | ISO/CEI 10746-1¹, *Tecnología de la información – Modelo de referencia básico del procesamiento distribuido abierto – Visión de conjunto*.
- [2] Recomendación UIT-T X.902 (1995) | ISO/CEI 10746-2:1996, *Tecnología de la información – Procesamiento distribuido abierto – Modelo de referencia: Fundamentos*.
- [3] Recomendación UIT-T X.903 (1995) | ISO/CEI 10746-3:1996, *Tecnología de la información – Procesamiento distribuido abierto – Modelo de referencia: Arquitectura*.
- [4] Recomendación UIT-T X.904¹ | ISO/CEI 10746-4¹, *Tecnología de la información – Modelo de referencia básico del procesamiento distribuido abierto – Semántica arquitectural*.

¹ Actualmente en la etapa de proyecto.

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- [5] Recomendación X.722 del CCITT (1992) | ISO/CEI 10165-4:1992, *Tecnología de la información – Interconexión de sistemas abiertos – Estructura de la información de gestión: Directrices para la definición de objetos gestionados*.
- [6] Recomendación UIT-T X.725 (1995) | ISO/CEI 10165-7:1996, *Tecnología de la información – Interconexión de sistemas abiertos – Estructura de la información de gestión: Modelo de relación general*.
- [7] SPIVEY (J.M.): La notación Z – Manual de referencia, 2ª edición, *Prentice Hall International*, ISBN 0-13-978529-9, 1992.
- [8] Recomendación UIT-T G.805 (1995), *Arquitectura funcional genérica de las redes de transporte*.
- [9] Recomendación UIT-T G.851.1 (1996), *Gestión de la red de transporte – Aplicación del marco del modelo de referencia de procesamiento distribuido abierto*.

3 Definiciones

Ninguna.

4 Abreviaturas

En esta Recomendación se utilizan las siguientes siglas.

- | | |
|------|---|
| GDMO | Directrices para la definición de objetos gestionados (<i>guidelines for the definition of managed objects</i>) |
| GRM | Modelo de relación general (<i>general relationship model</i>) |

5 Usos del punto de vista de la información común

Esta Recomendación, "Elementos comunes del punto de vista de la información para la gestión de la red de transporte", o punto de vista de la información común, contiene la definición de los objetos y relaciones de información que representan recursos de la Recomendación G.805 independientemente de cualquier servicio de gestión particular. También se especifican los atributos y estados de la información comunes.

El punto de vista de la información común proporciona la base para el desarrollo de puntos de vista de la información específicos de la aplicación para aplicaciones de gestión.

Cuando se identifican los requisitos de una aplicación de gestión determinada (por ejemplo, gestión de la conexión), se los define en una comunidad de empresa y luego se desarrolla el punto de vista de la información específico de la aplicación de gestión correspondiente. Esta Recomendación proporciona la base para desarrollar ese punto de vista específico de la aplicación de gestión.

Una forma de crear objetos de información específicos de la aplicación de gestión es generar subclases a partir de los objetos del punto de vista de la información común, y luego extenderlas a esa aplicación. En este caso, la nueva subclase específica de la aplicación de gestión puede incluir otros atributos del punto de vista de la información común además de los definidos en su superclase. Se pueden crear otras relaciones y atributos en la medida en que se necesiten para esta aplicación de gestión. También se pueden añadir nuevos objetos heredados de parte superior de la primera información de red.

Si las definiciones de los atributos son compatibles con los atributos de modelos de objetos gestionados GDMO existentes (por ejemplo, los de la Recomendación G.774), entonces se

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proporcionará referencias informales a esos atributos. En este caso, la especificación del punto de vista de la información importa la semántica del atributo, pero no su sintaxis (que puede ser importada en el punto de vista computacional correspondiente).

En esta especificación se utilizan plantillas del modelo de relación general (GRM, *general relationship model*) modificadas para indicar la manera en que los objetos se relacionan entre sí. Cada plantilla GRM identifica los roles de la relación, e identifica los objetos de información que pueden desempeñar cada uno de esos roles. En la especificación del punto de vista de la información común, las relaciones definidas inicialmente en las que un objeto de información puede tomar parte se enumeran en la parte de relaciones potenciales de la descripción del objeto. Cuando, a efectos del punto de vista de la información específico de la aplicación de gestión, se crean subclases de objeto de punto de vista de la información común, las relaciones necesarias para esa aplicación son obligatorias.

Esta Recomendación también contiene atributos comunes que se pueden incorporar al crear subclases específicas de la aplicación de gestión; Estado operacional (*operationalState*) y Etiqueta de usuario (*userLabel*) son ejemplos de esos atributos.

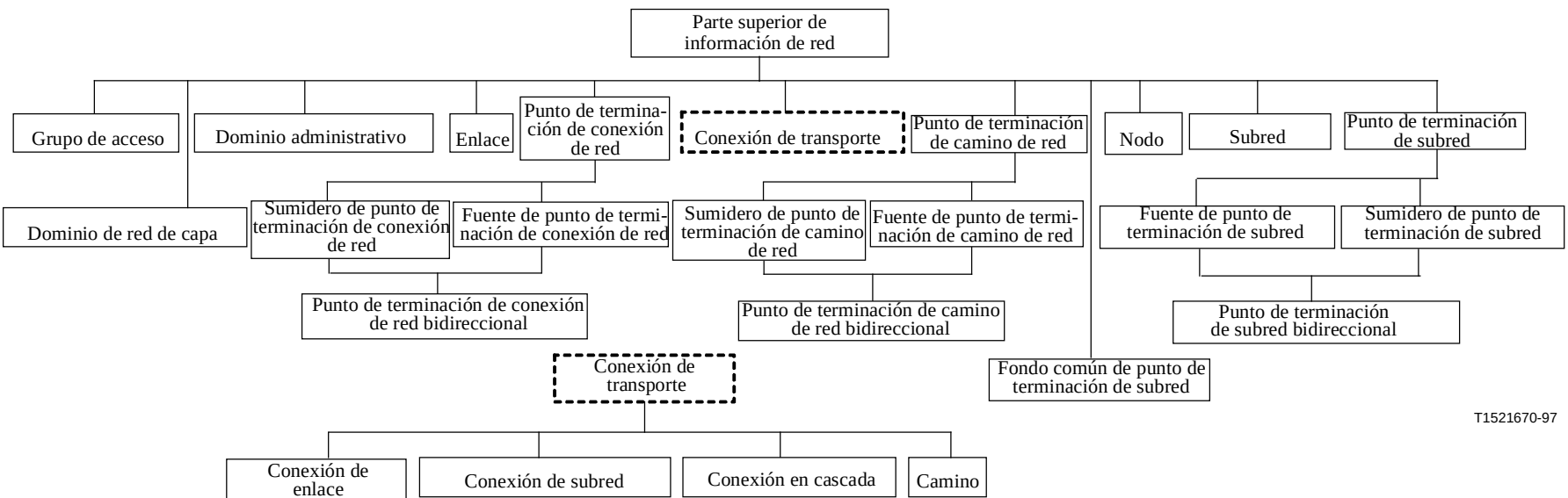
ANEXO A

A.1 Referencias

Ninguna.

A.2 Definición de clases de objeto de información

A.2.1 Diagrama de herencia



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A.2.2 Clases de objeto

A.2.2.1 Grupo de acceso (accessGroup)

A.2.2.1.1 Descripción informal

DEFINITION

"An accessGroup information object represents a G.805:1995 accessGroup (see G.805:1995 definition)."

ATTRIBUTE

signalIdentification

"An access group has a characteristic information which represents the specific format of signal that the resource carries. The specific format values will be defined in the technology specific extensions."

A.2.2.1.2 Descripción semiformal

accessGroup INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

accessGroupPackage PACKAGE

BEHAVIOUR

accessGroupPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ATTRIBUTES

signalIdentification;;;

A.2.2.1.3 Descripción formal

_____accessGroup_Static_____

accessGroup : **F** OBJECT
networkInformationTop_Static
signalIdentification_Static

accessGroup $\subseteq$ *networkInformationTop*

accessGroup $\subseteq$ **dom** *signalIdentification*

_____accessGroup_Dynamic_____

Δ *accessGroup_Static*
networkInformationTop_Dynamic
signalIdentification_Dynamic

A.2.2.1.4 Relaciones potenciales

<accessGroupIsMadeOfNetworkTTPs>

<linkBinds>

A.2.2.2 Dominio administrativo (administrativeDomain)

A.2.2.2.1 Descripción informal

DEFINITION

"An administrativeDomain information object represents a set of information objects and relationships reflecting resources grouped for management purposes."

A.2.2.2.2 Descripción semiformal

administrativeDomain INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

administrativeDomainPackage PACKAGE

BEHAVIOUR

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administrativeDomainPackageBehaviour BEHAVIOUR
DEFINED AS
"<DEFINITION>";;;

A.2.2.2.3 Descripción formal

<i>administrativeDomain_Static</i>
<i>administrativeDomain : F OBJECT</i> <i>networkInformationTop_Static</i>
<i>administrativeDomain</i> $\subseteq$ <i>networkInformationTop</i>

<i>administrativeDomain_Dynamic</i>
Δ <i>administrativeDomain_Static</i> <i>networkInformationTop_Dynamic</i>

A.2.2.2.4 Relaciones potenciales

<administrativeDomainIsMadeOf>

A.2.2.3 Dominio de red de capa (layerNetworkDomain)

A.2.2.3.1 Descripción informal

DEFINITION

"A layerNetworkDomain information object represents the part of a layer network which is managed by a management system."

ATTRIBUTE

signalIdentification

"The signalIdentification describes the signal that is transferred across the layer network domain."

A.2.2.3.2 Descripción semiformal

layerNetworkDomain INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

layerNetworkDomainPackage PACKAGE

BEHAVIOUR

layerNetworkDomainPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";

ATTRIBUTES

signalIdentification;;

A.2.2.3.3 Descripción formal

<i>layerNetworkDomain_Static</i>
<i>layerNetworkDomain : F OBJECT</i> <i>networkInformationTop_Static</i> <i>signalIdentification_Static</i>
<i>layerNetworkDomain</i> $\subseteq$ <i>networkInformationTop</i>
<i>layerNetworkDomain</i> $\subseteq$ dom <i>signalIdentification</i>

<i>layerNetworkDomain_Dynamic</i>
Δ <i>layerNetworkDomain_Static</i> <i>networkInformationTop_Dynamic</i> <i>signalIdentification_Dynamic</i>

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A.2.2.3.4 Relaciones potenciales

<layerNetworkDomainIsDelimitedBy>

A.2.2.4 Enlace (link)

A.2.2.4.1 Descripción informal

DEFINITION

"A link information object represents the capacity between two subnetworks or a subnetwork and an accessGroup. It also represents a set of linkConnections."

ATTRIBUTE

signalIdentification

"The signalIdentification describes the signal that is transferred across the link."

directionality

"The directionality characterises the ability of a link to carry traffic in one or two directions."

A.2.2.4.2 Descripción semiformal

link INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

linkPackage PACKAGE

BEHAVIOUR

linkPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ATTRIBUTES

signalIdentification,

directionality;;;

A.2.2.4.3 Descripción formal

link_Static

link : **F** OBJECT

networkInformationTop_Static

signalIdentification_Static

directionality_Static

link $\subseteq$ *networkInformationTop*

link $\subseteq$ **dom** *signalIdentification*

link $\subseteq$ **dom** *directionality*

link_Dynamic

Δ *link_Static*

networkInformationTop_Dynamic

signalIdentification_Dynamic

directionality_Dynamic

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A.2.2.4.4 Relaciones potenciales

<compoundLinkHasLinks>
<linkBinds>
<concatenatedLinkHasLinks>
<linkHasLinkConnections>

A.2.2.5 Conexión de enlace (linkConnection)

A.2.2.5.1 Descripción informal

DEFINITION

"A linkConnection information object represents the atomic, fixed and transparent capacity of transfer of an information characterized by a given signalIdentification.

The linkConnection information object type is a sub-type of the transportConnection information object type."

A.2.2.5.2 Descripción semiformal

linkConnection INFORMATION OBJECT CLASS

DERIVED FROM transportConnection;

CHARACTERIZED BY

linkConnectionPackage PACKAGE

BEHAVIOUR

linkConnectionPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

A.2.2.5.3 Descripción formal

linkConnection_Static

linkConnection : F OBJECT

transportConnection_Static

linkConnection $\subseteq$ transportConnection

linkConnection_Dynamic

Δ linkConnection_Static

transportConnection_Dynamic

A.2.2.5.4 Relaciones potenciales

<clientServer
<extremitiesTerminateLinkConnection>
<linkConnectionIsBundleOfLinkConnections>
<linkConnectionIsSupportedByTrail>
<linkConnectionIsMadeOfTransportEntities>
<linkConnectionIsTerminatedBySubnetworks>
<linkHasLinkConnections>
<subnetworkConnectionIsMadeOfTransportEntities>
<subnetworkTPIsRelatedToExtremity>
<tandemConnectionIsMadeOfTransportEntities>
<traillsIsMadeOfTransportEntities>

A.2.2.6 Punto de terminación de conexión de red (networkCTP)

A.2.2.6.1 Descripción informal

DEFINITION

"The networkCTP information object represents an extremity of a linkConnection."

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A.2.2.6.2 Descripción semiformal

networkCTP INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

networkCTPPackage PACKAGE

BEHAVIOUR

networkCTPPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;

A.2.2.6.3 Descripción formal

networkCTP_Static
networkCTP : F OBJECT
networkInformationTop_Static
networkCTP $\subseteq$ networkInformationTop

networkCTP_Dynamic
Δ networkCTP_Static
networkInformationTop_Dynamic

A.2.2.6.4 Relaciones potenciales

<clientServer>

<extremitiesTerminateTransportEntity>

<networkTTPAdaptsNetworkCTP>

<subnetworkTPIsRelatedToExtremity>

A.2.2.7 Punto de terminación de conexión bidireccional de red (networkCTPBidirectional)

A.2.2.7.1 Descripción informal

DEFINITION

"A networkCTPBidirectional information object is intended to be bound to *the output of a unidirectional link connection or the input to a unidirectional link connection*.

The networkCTPBidirectional information object type is a sub-type of the networkCTPSink and networkCTPSource information object types."

A.2.2.7.2 Descripción semiformal

networkCTPBidirectional INFORMATION OBJECT CLASS

DERIVED FROM networkCTPSink, networkCTPSource;

CHARACTERIZED BY

networkCTPBidirectionalPackage PACKAGE

BEHAVIOUR

networkCTPBidirectionalPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;

A.2.2.7.3 Descripción formal

networkCTPBidirectional_Static
networkCTPBidirectional : F OBJECT
networkCTPSink_Static
networkCTPSource_Static
networkCTPBidirectional $\subseteq$ networkCTPSink $\cap$ networkCTPSource

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networkCTPBidirectional_Dynamic

Δ networkCTPBidirectional_Static
networkCTPSink_Dynamic
networkCTPSource_Dynamic

A.2.2.7.4 Relaciones potenciales

Ninguna relación adicional.

A.2.2.8 Sumidero de punto de terminación de conexión de red (networkCTPSink)

A.2.2.8.1 Descripción informal

DEFINITION

"A networkCTPSink information object is intended to be bound to the output of a unidirectional link connection.

The networkCTPSink information object type is a sub-type of the networkCTP information object type."

A.2.2.8.2 Descripción semiformal

networkCTPSink INFORMATION OBJECT CLASS

DERIVED FROM networkCTP;

CHARACTERIZED BY

networkCTPSink Package PACKAGE

BEHAVIOUR

networkCTPSinkPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.8.3 Descripción formal

networkCTPSink_Static

networkCTPSink : F OBJECT
networkCTP_Static

networkCTPSink $\subseteq$ networkCTP

networkCTPSink_Dynamic

Δ networkCTPSink_Static
networkCTP_Dynamic

A.2.2.8.4 Relaciones potenciales

<extremitiesTerminateLinkConnection>

A.2.2.9 Fuente de punto de terminación de conexión de red (networkCTPSource)

A.2.2.9.1 Descripción informal

DEFINITION

"A networkCTPSource information object is intended to be bound to the input to a unidirectional link connection.

The networkCTPSource information object type is a sub-type of the networkCTP information object type."

A.2.2.9.2 Descripción semiformal

networkCTPSource INFORMATION OBJECT CLASS

DERIVED FROM networkCTP;

CHARACTERIZED BY

networkCTPSourcePackage PACKAGE

BEHAVIOUR

Reemplazada por una versión más reciente

networkCTPSourcePackageBehaviour BEHAVIOUR
DEFINED AS
"<DEFINITION>";;;;

A.2.2.9.3 Descripción formal

<u>networkCTPSource_Static</u>
<i>networkCTPSource : F OBJECT</i> <i>networkCTP_Static</i>
<i>networkCTPSource $\subseteq$ networkCTP</i>

<u>networkCTPSource_Dynamic</u>
Δ <i>networkCTPSource_Static</i> <i>networkCTP_Dynamic</i>

A.2.2.9.4 Relaciones potenciales

<extremitiesTerminateLinkConnection>

A.2.2.10 Parte superior de información de red (networkInformationTop)

A.2.2.10.1 Descripción informal

DEFINITION

"The networkInformationTop information object type is the root of the inheritance diagram of CIVS. All the other information object types are subtypes of networkInformationTop, either directly or indirectly."

A.2.2.10.2 Descripción semiformal

networkInformationTop INFORMATION OBJECT CLASS

CHARACTERIZED BY

networkInformationTopPackage PACKAGE
BEHAVIOUR
networkInformationTopPackageBehaviour BEHAVIOUR
DEFINED AS
"<DEFINITION>";;;;

A.2.2.10.3 Descripción formal

<u>networkInformationTop_Static</u>
<i>networkInformationTop : F OBJECT</i>

<u>networkInformationTop_Dynamic</u>
Δ <i>networkInformationTop_Invariant</i>

A.2.2.10.4 Relaciones potenciales

<administrativeDomainIsMadeOf>
<nodeIsMadeOf>
<oneToOneRelationship>
<setOf>

A.2.2.11 Punto de terminación de camino de red (networkTTP)

A.2.2.11.1 Descripción informal

DEFINITION

"The networkTTP information object represents an extremity of a trail".

Reemplazada por una versión más reciente

A.2.2.11.2 Descripción semiformal

networkTTP INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

networkTTPPackage PACKAGE

BEHAVIOUR

networkTTPPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.11.3 Descripción formal

<u>networkTTP_Static</u>
<i>networkTTP : F OBJECT</i> <i>networkInformationTop_Static</i>
<i>networkTTP $\subseteq$ networkInformationTop</i>

<u>networkTTP_Dynamic</u>
Δ <i>networkTTP_Static</i> <i>networkInformationTop_Dynamic</i>

A.2.2.11.4 Relaciones potenciales

<accessGroupIsMadeOfNetworkTTPs>

<clientServer>

<extremitiesTerminateTransportEntity>

<layerNetworkDomainIsDelimitedBy>

<networkTTPAdaptsNetworkCTP>

<subnetworkTTPsRelatedToExtremity>

A.2.2.12 Punto de terminación de camino bidireccional de red (networkTTPBidirectional)

A.2.2.12.1 Descripción informal

DEFINITION

"The networkTTPBidirectional information object type is a sub-type of the information object types networkTTPSink and networkTTPSource."

A.2.2.12.2 Descripción semiformal

networkTTPBidirectional INFORMATION OBJECT CLASS

DERIVED FROM networkTTPSink, networkTTPSource;

CHARACTERIZED BY

networkTTPBidirectionalPackage PACKAGE

BEHAVIOUR

networkTTPBidirectionalPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.12.3 Descripción formal

<u>networkTTPBidirectional_Static</u>
<i>networkTTPBidirectional : F OBJECT</i> <i>networkTTPSink_Static</i> <i>networkTTPSource_Static</i>
<i>networkTTPBidirectional $\subseteq$ networkTTPSink $\cap$ networkTTPSource</i>

Reemplazada por una versión más reciente

networkTTPBidirectional_Dynamic

Δ networkTTPBidirectional_Static

networkTTPSink_Dynamic

networkTTPSource_Dynamic

A.2.2.12.4 Relaciones potenciales

No additional relationship.

A.2.2.13 Sumidero de punto de terminación de camino de red (networkTTPSink)

A.2.2.13.1 Descripción informal

DEFINITION

"A networkTTPSink class is a class of information objects that terminates trails.

The networkTTPSink information object type is a subtype of the networkTTP information object type."

A.2.2.13.2 Descripción semiformal

networkTTPSink INFORMATION OBJECT CLASS

DERIVED FROM networkTTP;

CHARACTERIZED BY

networkTTPSinkPackage PACKAGE

BEHAVIOUR

networkTTPSinkPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.13.3 Descripción formal

networkTTPSink_Static

networkTTPSink : F OBJECT

networkTTP_Static

networkTTPSink $\subseteq$ networkTTP

networkTTPSink_Dynamic

Δ networkTTPSink_Static

networkTTP_Dynamic

A.2.2.13.4 Relaciones potenciales

<extremitiesTerminateTrail>

A.2.2.14 Fuente de punto de terminación de camino de red (networkTTPSource)

A.2.2.14.1 Descripción informal

DEFINITION

"A networkTTPSource information object class is a class of information objects that originates trails.

The networkTTPSource information object type is a subtype of the networkTTP information object type."

A.2.2.14.2 Descripción semiformal

networkTTPSource INFORMATION OBJECT CLASS

DERIVED FROM networkTTP;

CHARACTERIZED BY

networkTTPSourcePackage PACKAGE

BEHAVIOUR

networkTTPSourcePackageBehaviour BEHAVIOUR

Reemplazada por una versión más reciente

DEFINED AS

"<DEFINITION>";;;

A.2.2.14.3 Descripción formal

<i>networkTTPSource_Static</i>
<i>networkTTPSource : F OBJECT</i> <i>networkTTP_Static</i>
<i>networkTTPSource</i> $\subseteq$ <i>networkTTP</i>

<i>networkTTPSource_Dynamic</i>
Δ <i>networkTTPSource_Static</i> <i>networkTTP_Dynamic</i>

A.2.2.14.4 Relaciones potenciales

<extremitiesTerminateTrail>

A.2.2.15 Nodo (node)

A.2.2.15.1 Descripción informal

DEFINITION

"A node information object represents a collection of information objects and relationships reflecting resources grouped in a single geographical location."

A.2.2.15.2 Descripción semiformal

node INFORMATION OBJECT CLASS

DERIVED FROM *networkInformationTop*;

CHARACTERIZED BY

nodePackage PACKAGE

BEHAVIOUR

nodePackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;

A.2.2.15.3 Descripción formal

<i>node_Static</i>
<i>node : F OBJECT</i> <i>networkInformationTop_Static</i>
<i>node</i> $\subseteq$ <i>networkInformationTop</i>

<i>node_Dynamic</i>
Δ <i>node_Static</i> <i>networkInformationTop_Dynamic</i>

A.2.2.15.4 Relaciones potenciales

<nodeIsMadeOf>

A.2.2.16 Subred (subnetwork)

A.2.2.16.1 Descripción informal

DEFINITION

"A subnetwork information object represents a G.805:1995 sub-network (see G.805:1995 definition)."

Reemplazada por una versión más reciente

ATTRIBUTE

signalIdentification

"A sub-network carries a specific format. The specific formats will be defined in the technology specific extensions."

A.2.2.16.2 Descripción semiformal

subnetwork INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

subnetworkPackage PACKAGE

BEHAVIOUR

subnetworkPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ATTRIBUTES

signalIdentification;;;

A.2.2.16.3 Descripción formal

subnetwork_Static

subnetwork : *F* OBJECT

networkInformationTop_Static

signalIdentification_Static

subnetwork $\subseteq$ networkInformationTop

subnetwork $\subseteq$ **dom** signalIdentification

subnetwork_Dynamic

Δ subnetwork_Static

networkInformationTop_Dynamic

signalIdentification_Dynamic

A.2.2.16.4 Relaciones potenciales

<linkBinds>

<linkConnectionIsTerminatedBySubnetworks>

<sNIsPartitionedBySn>

<subnetworkHasSubnetworkConnections>

<subnetworkIsDelimitedBy>

<topologicalComponentIsDelimitedBy>

A.2.2.17 Conexión de subred (subnetworkConnection)

A.2.2.17.1 Descripción informal

DEFINITION

"A subnetworkConnection information object represents a G.805:1995 sub-network connection (see G.805:1995 definition).

The subnetworkConnection information object type is a sub-type of the transportConnection information object type."

A.2.2.17.2 Descripción semiformal

subnetworkConnection INFORMATION OBJECT CLASS

DERIVED FROM transportConnection ;

CHARACTERIZED BY

subnetworkConnectionPackage PACKAGE

BEHAVIOUR

subnetworkConnectionPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

Reemplazada por una versión más reciente

A.2.2.17.3 Descripción formal

<u>subnetworkConnection_Static</u>
<i>subnetworkConnection</i> : F OBJECT <i>transportConnection_Static</i>
<i>subnetworkConnection</i> $\subseteq$ <i>transportConnection</i>
<u>subnetworkConnection_Dynamic</u>
Δ <i>subnetworkConnection_Static</i> <i>transportConnection_Dynamic</i>

A.2.2.17.4 Relaciones potenciales

<extremitiesTerminateLinkConnection>
<extremitiesTerminateSubnetworkConnection>
<snCBidIsSupportedByUnis>
<subnetworkConnectionIsMadeOfTransportEntities>
<subnetworkHasSubnetworkConnections>
<tandemConnectionIsMadeOfTransportEntities>
<trailIsMadeOfTransportEntities>

A.2.2.18 Punto de terminación de subred (subnetworkTP)

A.2.2.18.1 Descripción informal

DEFINITION

"The subnetworkTP information object class is an abstraction that represents the potential termination of a transport entity and the associated port (see G.805:1995 definition).
It also represents the potential for connection across sub-networks."

A.2.2.18.2 Descripción semiformal

subnetworkTP INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

subnetworkTPPackage PACKAGE

BEHAVIOUR

subnetworkTPPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.18.3 Descripción formal

<u>subnetworkTP_Static</u>
<i>subnetworkTP</i> : F OBJECT <i>networkInformationTop_Static</i>
<i>subnetworkTP</i> $\subseteq$ <i>networkInformationTop</i>
<u>subnetworkTP_Dynamic</u>
Δ <i>subnetworkTP_Static</i> <i>networkInformationTop_Dynamic</i>

A.2.2.18.4 Relaciones potenciales

<extremitiesTerminateTransportEntity>
<isConnectedTo>
<subnetworkTPIsBundleOfSubnetworkTPs>

Reemplazada por una versión más reciente

<subnetworkTPIsRelatedToExtremity>
<subnetworkTPPoolIsMadeOfSubnetworkTP>
<topologicalComponentIsDelimitedBy>

A.2.2.19 Punto de terminación bidireccional de subred (subnetworkTPBidirectional)

A.2.2.19.1 Descripción informal

DEFINITION

"The subnetworkTPBidirectional information object type is a sub-type of the subnetworkTPSink and subnetworkTPSource information object types."

A.2.2.19.2 Descripción semiformal

subnetworkTPBidirectional INFORMATION OBJECT CLASS

DERIVED FROM subnetworkTPSink, subnetworkTPSource;

CHARACTERIZED BY

subnetworkTPBidirectionalPackage PACKAGE

BEHAVIOUR

subnetworkTPBidirectionalPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.19.3 Descripción formal

$\text{subnetworkTPBidirectional_Static}$
$\text{subnetworkTPBidirectional} : F \text{ OBJECT}$
$\text{subnetworkTPSink_Static}$
$\text{subnetworkTPSource_Static}$
$\text{subnetworkTPBidirectional} \subseteq \text{subnetworkTPSink} \cap \text{subnetworkTPSource}$

$\text{subnetworkTPBidirectional_Dynamic}$
$\Delta \text{subnetworkTPBidirectional_Static}$
$\text{subnetworkTPSink_Dynamic}$
$\text{subnetworkTPSource_Dynamic}$

A.2.2.19.4 Relaciones potenciales

Ninguna relación adicional.

A.2.2.20 Fondo común de punto de terminación de subred (subnetworkTPPool)

A.2.2.20.1 Descripción informal

DEFINITION

"A subnetworkTPPool information object represents a set (possibly empty) of subnetworkTPs at the frontier of a given sub-network."

ATTRIBUTE

signalIdentification

"A sub-network carries a specific format. The specific formats will be defined in the technology specific extensions."

A.2.2.20.2 Descripción semiformal

subnetworkTPPool INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

subnetworkTPPoolPackage PACKAGE

BEHAVIOUR

subnetworkTPPoolPackageBehaviour BEHAVIOUR

Reemplazada por una versión más reciente

DEFINED AS
"<DEFINITION>";;

A.2.2.20.3 Descripción formal

<u>subnetworkTPPool_Static</u>
<i>subnetworkTPPool : F OBJECT</i> <i>networkInformationTop_Static</i>
<i>subnetworkTPPool $\subseteq$ networkInformationTop</i>
<u>subnetworkTPPool_Dynamic</u>
Δ <i>subnetworkTPPool_Static</i> <i>networkInformationTop_Dynamic</i>

A.2.2.20.4 Relaciones potenciales

<subnetworkTPPoolIsMadeOfSubnetworkTP>

A.2.2.21 Sumidero de punto de terminación de subred (subnetworkTPSink)

A.2.2.21.1 Descripción informal

DEFINITION

"The subnetworkTPSink information object class is an abstraction that represents the potential termination of a transport entity and the associated unidirectional port (see G.805:1995 definition). It also represents the potential for connection across sub-networks. The subnetworkTPSink information object type is a subtype of the subnetworkTPinformation object type."

A.2.2.21.2 Descripción semiformal

subnetworkTPSink INFORMATION OBJECT CLASS

DERIVED FROM subnetworkTP;

CHARACTERIZED BY

subnetworkTPSinkPackage PACKAGE

BEHAVIOUR

subnetworkTPSinkPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;

A.2.2.21.3 Descripción formal

<u>subnetworkTPSink_Static</u>
<i>subnetworkTPSink : F OBJECT</i> <i>subnetworkTP_Static</i>
<i>subnetworkTPSink $\subseteq$ subnetworkTP</i>
<u>subnetworkTPSink_Dynamic</u>
Δ <i>subnetworkTPSink_Static</i> <i>subnetworkTP_Dynamic</i>

A.2.2.21.4 Relaciones potenciales

<extremitiesTerminateSubnetworkConnection>

Reemplazada por una versión más reciente

A.2.2.22 Fuente de punto de terminación de subred (subnetworkTPSource)

A.2.2.22.1 Descripción informal

DEFINITION

"The subnetworkTPSource information object class is an abstraction that represents the potential origin of a transport entity and the associated unidirectional port (see G.805:1995 definition). It also represents the potential for connection across sub-networks. The subnetworkTPSource information object type is a subtype of the subnetworkTPinformation object type."

A.2.2.22.2 Descripción semiformal

subnetworkTPSource INFORMATION OBJECT CLASS

DERIVED FROM subnetworkTP;

CHARACTERIZED BY

subnetworkTPSourcePackage PACKAGE

BEHAVIOUR

subnetworkTPSourcePackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.22.3 Descripción formal

subnetworkTPSource_Static
subnetworkTPSource : F OBJECT subnetworkTP_Static
subnetworkTPSource $\subseteq$ subnetworkTP

subnetworkTPSource_Dynamic
Δ subnetworkTPSource_Static subnetworkTP_Dynamic

A.2.2.22.4 Relaciones potenciales

<extremitiesTerminateSubnetworkConnection>

A.2.2.23 Conexión en cascada (tandemConnection)

A.2.2.23.1 Descripción informal

DEFINITION

"A tandemConnection information object represents a G.805:1995 tandem connection, i.e. *an arbitrary series of contiguous link connections and/or sub-network connections*.

The tandemConnection information object type is a sub-type of the transportConnection information object type."

A.2.2.23.2 Descripción semiformal

tandemConnection INFORMATION OBJECT CLASS

DERIVED FROM transportConnection ;

CHARACTERIZED BY

tandemConnectionPackage PACKAGE

BEHAVIOUR

tandemConnectionPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

Reemplazada por una versión más reciente

A.2.2.23.3 Descripción formal

<u>tandemConnection_Static</u>
<i>tandemConnection</i> : <i>F OBJECT</i> <i>transportConnection_Static</i>
<i>tandemConnection</i> $\subseteq$ <i>transportConnection</i>
<u>tandemConnection_Dynamic</u>
Δ <i>tandemConnection_Static</i> <i>transportConnection_Dynamic</i>

A.2.2.23.4 Relaciones potenciales

<tandemConnectionIsMadeOfTransportEntities>

A.2.2.24 Camino (trail)

A.2.2.24.1 Descripción informal

DEFINITION

"A trail information object represents a G.805:1995 trail (see G.805:1995 definition).

The trail information object type is a sub-type of the transportConnection information object type."

A.2.2.24.2 Descripción semiformal

trail INFORMATION OBJECT CLASS

DERIVED FROM transportConnection ;

CHARACTERIZED BY

trailPackage PACKAGE

BEHAVIOUR

trailPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;;;

A.2.2.24.3 Descripción formal

<u>trail_Static</u>
<i>trail</i> : <i>F OBJECT</i> <i>transportConnection_Static</i>
<i>trail</i> $\subseteq$ <i>transportConnection</i>
<u>trail_Dynamic</u>
Δ <i>trail_Static</i> <i>transportConnection_Dynamic</i>

A.2.2.24.4 Relaciones potenciales

<clientServer>

<extremitiesTerminateTrail>

<linkConnectionIsSupportedByTrail>

<trailsMadeOfTransportEntities>

Reemplazada por una versión más reciente

A.2.2.25 Conexión de transporte (transportConnection)

A.2.2.25.1 Descripción informal

DEFINITION

"A transportConnection information object represents a G.805:1995 connection (see G.805:1995 definition).

The information transfer can be uni- or bi-directional, qualifying the directionality of the transportConnection."

ATTRIBUTE

signalIdentification

"The signalIdentification describes the signal that is transferred across the transportConnection."

directionality

"The directionality characterises the ability of a transportConnection to carry traffic in one or two directions."

A.2.2.25.2 Descripción semiformal

transportConnection INFORMATION OBJECT CLASS

DERIVED FROM networkInformationTop;

CHARACTERIZED BY

transportConnectionPackage PACKAGE

BEHAVIOUR

transportConnectionPackageBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ATTRIBUTES

signalIdentification,

directionality;;;

A.2.2.25.3 Descripción formal

_____transportConnection_Static_____

transportConnection : F OBJECT

networkInformationTop_Static

signalIdentification_Static

directionality_Static

transportConnection $\subseteq$ *networkInformationTop*

transportConnection $\subseteq$ **dom** *signalIdentification*

transportConnection $\subseteq$ **dom** *directionality*

_____transportConnection_Dynamic_____

Δ *transportConnection_Static*

networkInformationTop_Dynamic

signalIdentification_Dynamic

directionality_Dynamic

A.2.2.25.4 Relaciones potenciales

<extremitiesTerminateTransportEntity>

<topologicalComponentIsDelimitedBy>

<transportEntitiesComposeTransportEntity>

Reemplazada por una versión más reciente

A.3 Definición de los tipos de relación de información

A.3.1 Diagramas de herencia

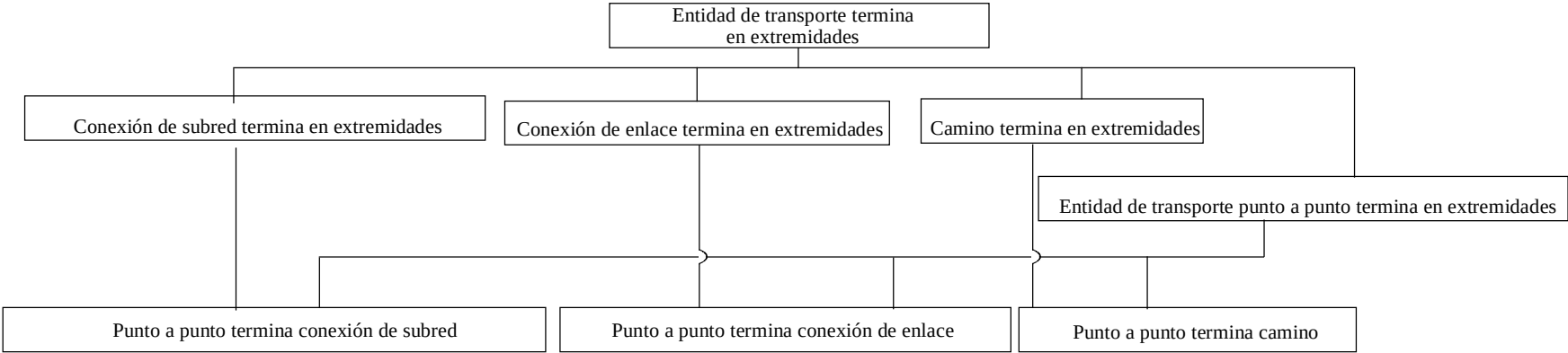
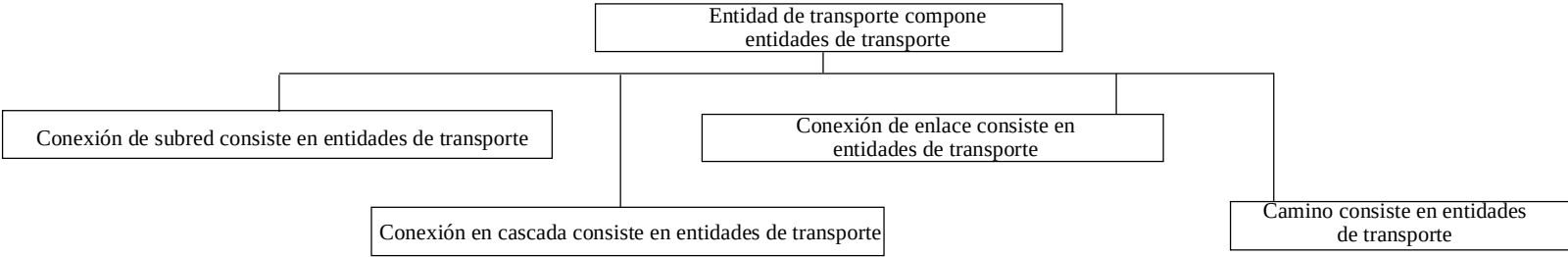


Diagrama de herencia 1



T1522010-96

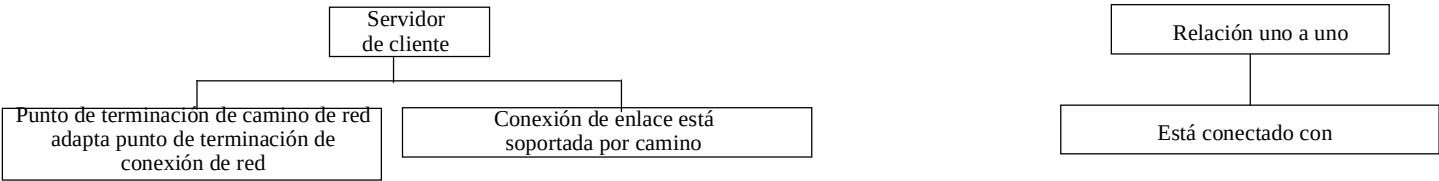


Diagrama de herencia 3

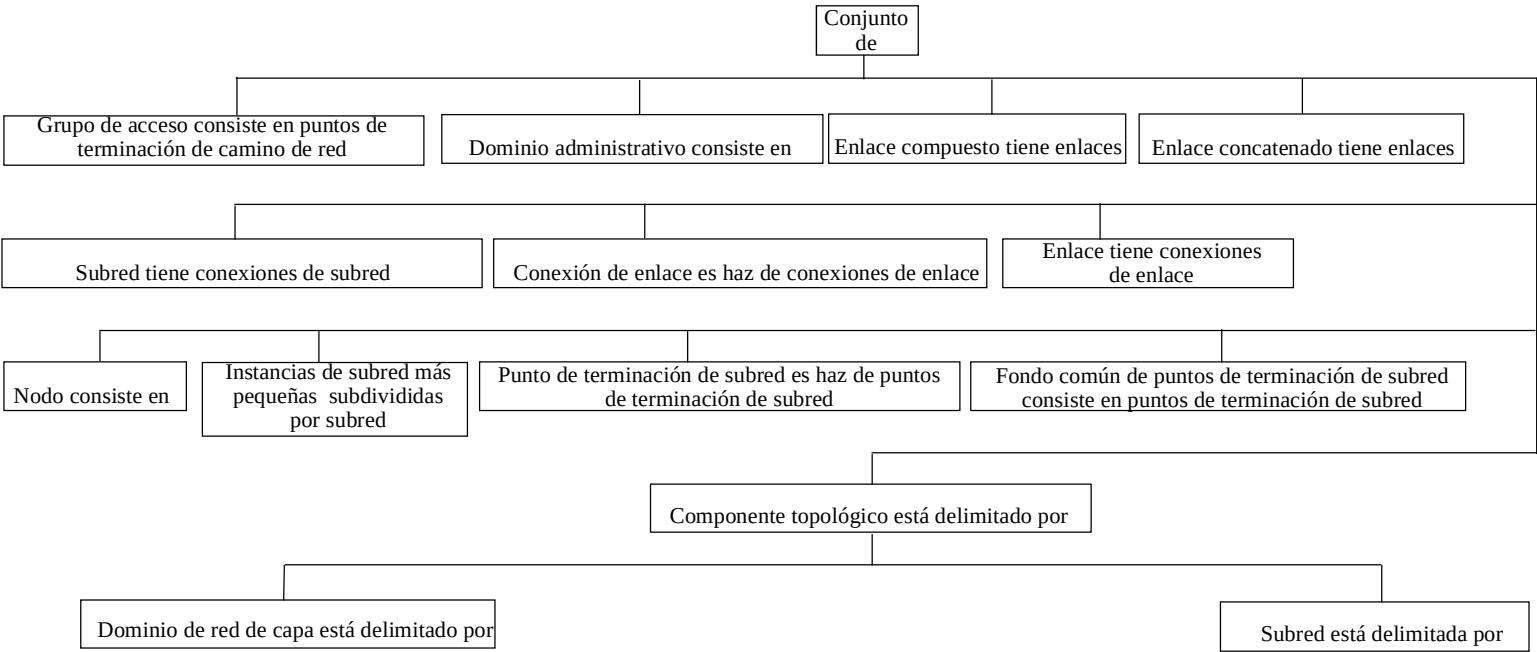


Diagrama de herencia 4

T1522020-96

Reemplazada por una versión más reciente

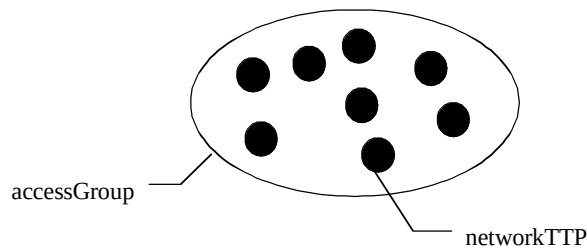
A.3.2 Relaciones

A.3.2.1 Grupo de acceso consiste en puntos de terminación de camino (accessGroupIsMadeOfNetworkTTPs)

A.3.2.1.1 Descripción informal

DEFINITION

"The accessGroupIsMadeOfNetworkTTPs relationship class describes the relationship that exists between an accessGroup and the networkTTPs that are part of it.
This relationship type is a subtype of setOf."



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ROLE

container

"Played by an instance of the accessGroup information object type."

element

"Played by an instance of a sub-type of the networkTTP information object type."

A.3.2.1.2 Descripción semiformal

accessGroupIsMadeOfNetworkTTPs RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

accessGroupIsMadeOfNetworkTTPsBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH accessGroup;

ROLE element

COMPATIBLE WITH networkTTP AND SUBCLASSES;

A.3.2.1.3 Descripción formal

<u>accessGroupIsMadeOfNetworkTTPs_Static</u>
<i>accessGroupIsMadeOfNetworkTTPs : F RELATIONSHIP</i>
<i>setOf_Static</i>
<i>accessGroup_Static</i>
<i>networkTTP_Static</i>
<i>accessGroupIsMadeOfNetworkTTPs $\subseteq$ setOf</i>
$\forall R: accessGroupIsMadeOfNetworkTTPs \bullet container(R) \in accessGroup \wedge elementSet(R) \subseteq networkTTP$
<u>accessGroupIsMadeOfNetworkTTPs_Dynamic</u>
$\Delta accessGroupIsMadeOfNetworkTTPs_Static$
<i>setOf_Dynamic</i>
<i>accessGroup_Dynamic</i>
<i>networkTTP_Dynamic</i>

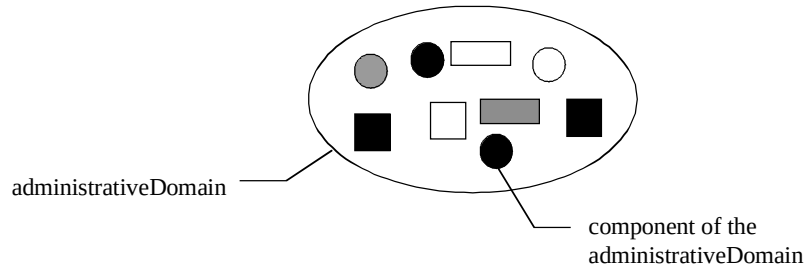
Reemplazada por una versión más reciente

A.3.2.2 Dominio administrativo consiste en (administrativeDomainIsMadeOf)

A.3.2.2.1 Descripción informal

DEFINITION

"The administrativeDomainIsMadeOf relationship class describes the relationship that exists between an administrativeDomain and the information objects that are part of it.
This relationship type is a subtype of setOf."



T1521690-96

ROLE

container

"Played by an instance of the administrativeDomain information object type."

element

"Played by an instance of a subtype of the information object type : networkInformationTop."

A.3.2.2.2 Descripción semiformal

administrativeDomainIsMadeOf RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

administrativeDomainIsMadeOf Behaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH administrativeDomain AND SUBCLASSES;

ROLE element

COMPATIBLE WITH networkInformationTop AND SUBCLASSES;

A.3.2.2.3 Descripción formal

administrativeDomainIsMadeOf_Static

administrativeDomainIsMadeOf : F RELATIONSHIP

setOf_Static

administrativeDomain_Static

networkInformationTop_Static

administrativeDomainIsMadeOf ⊆ setOf

$\forall R: \text{administrativeDomainIsMadeOf} \bullet$

$\text{container}(R) \in \text{administrativeDomain} \wedge \text{elementSet}(R) \subseteq \text{networkInformationTop}$

administrativeDomainIsMadeOf_Dynamic

$\Delta \text{administrativeDomainIsMadeOf_Static}$

setOf_Dynamic

administrativeDomain_Dynamic

networkInformationTop_Dynamic

Reemplazada por una versión más reciente

A.3.2.3 Servidor de cliente (clientServer)

A.3.2.3.1 Descripción informal

DEFINITION

"The clientServer relationship class describes the relationship that exists between clients of a given layer network (known as the client layer network) and the server that supports them in a server layer network."

Explaining figure in the subclasses.

ROLE

client

"Played by instances of the linkConnection information object type, or instances of a subtype of the networkCTP information object type."

server

"Played by an instance of the trail information object type, or an instance of the networkTTP information object type."

INVARIANT

inv_1

"At least one instance of the role client must participate in the relationship."

inv_2

"One and only one instance of the role server must participate in the relationship."

TRANSITION

tr_1

"The information objects playing the role client, provided one remains, can leave the relationship without breaking it."

tr_2

"During the lifetime of the relationship, additional information objects can enter the relationship, playing the role client."

A.3.2.3.2 Descripción semiformal

clientServer RELATIONSHIP CLASS

BEHAVIOUR

clientServerBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE client

COMPATIBLE WITH linkConnection,
networkCTP AND SUBCLASSES
PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..N)
BIND-SUPPORT
UNBIND-SUPPORT;

ROLE server

COMPATIBLE WITH trail,
networkTTP AND SUBCLASSES
PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

A.3.2.3.3 Descripción formal

clientServer_Static

clientServer : F RELATIONSHIP

clientSet : RELATIONSHIP → F OBJECT

server : RELATIONSHIP → OBJECT

linkConnection_Static

networkCTP_Static

trail_Static

networkTTP_Static

Reemplazada por una versión más reciente

$$clientServer \subseteq \mathbf{dom} \, clientSet$$
$$clientServer \subseteq \mathbf{dom} \ server$$
$$\forall R: \text{clientServer} \cdot$$
$$clientSet(R) \subseteq linkConnection \cup networkCTP \wedge server(R) \in trail \cup networkTTP$$
$$\forall R: \text{clientServer} \cdot \# \text{clientSet} \geq 1$$

_clientServer_Dynamic

 $\Delta clientServer_Static$

linkConnection_Dynamic

networkCTP_Dynamic

trail_Dynamic

networkTTP_Dynamic

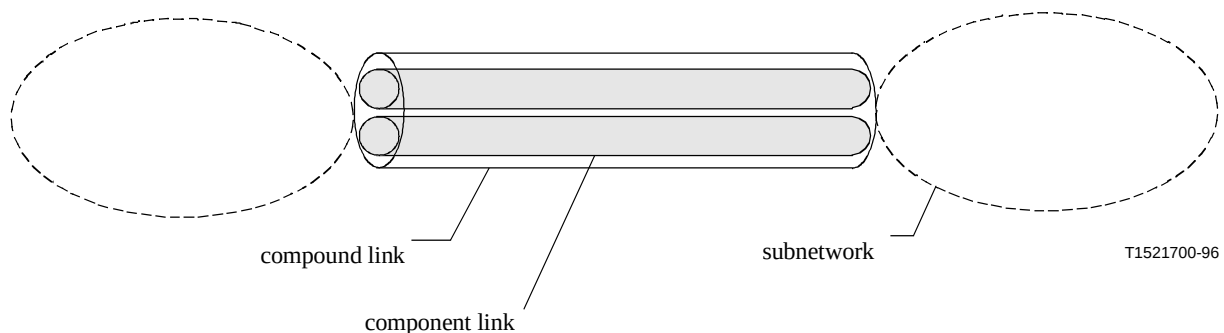
$$\forall R: \text{clientServer} \cap \text{clientServer}' \bullet \text{server}'(R) = \text{server}(R)$$

A.3.2.4 Enlace compuesto tiene enlaces (compoundLinkHasLinks)

A.3.2.4.1 Descripción informal

DEFINITION

"The compoundLinkHasLinks relationship class describes the group of links to form a compound link. The relationship is a subtype of setOf."



ROLE

container

"Played by an instance of the link information object type or subtype."

element

"Played by instances of the link information object type or subtype."

INVARIANT

inv 1

"The container and the elements must contain the same signalIdentification information."

inv_2

"The container and the elements must have the same directionality."

A.3.2.4.2 Descripción semiformal

compoundLinkHasLinks RELATIONSHIP CLASS

DERIVED FROM setOf;

DERIVED FROM BEHAVIOUR

compoundLinkHasLinksBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

```
<inv_1>, <inv_2>";;
```

Reemplazada por una versión más reciente

ROLE container

COMPATIBLE WITH link AND SUBCLASSES;

ROLE element

COMPATIBLE WITH link AND SUBCLASSES;

A.3.2.4.3 Descripción formal

<u>compoundLinkHasLinks_Static</u> <i>compoundLinkHasLinks</i> : <i>F RELATIONSHIP</i> <i>setOf_Static</i> <i>link_Static</i>
<i>compoundLinkHasLinks</i> $\subseteq$ <i>setOf</i> $\forall R: \text{compoundLinkHasLinks} \cdot \text{container}(R) \in \text{link} \wedge \text{elementSet}(R) \subseteq \text{link}$ $\forall R: \text{compoundLinkHasLinks} \cdot \text{signalIdentification}(\text{elementSet}) = \text{signalIdentification}(\{\{\text{container}\}\})$ $\forall R: \text{compoundLinkHasLinks} \cdot \text{directionality}(\text{elementSet}) = \text{directionality}(\{\{\text{container}\}\})$
<u>compoundLinkHasLinks_Dynamic</u> $\Delta \text{compoundLinkHasLinks_Static}$ <i>setOf_Dynamic</i> <i>link_Dynamic</i>

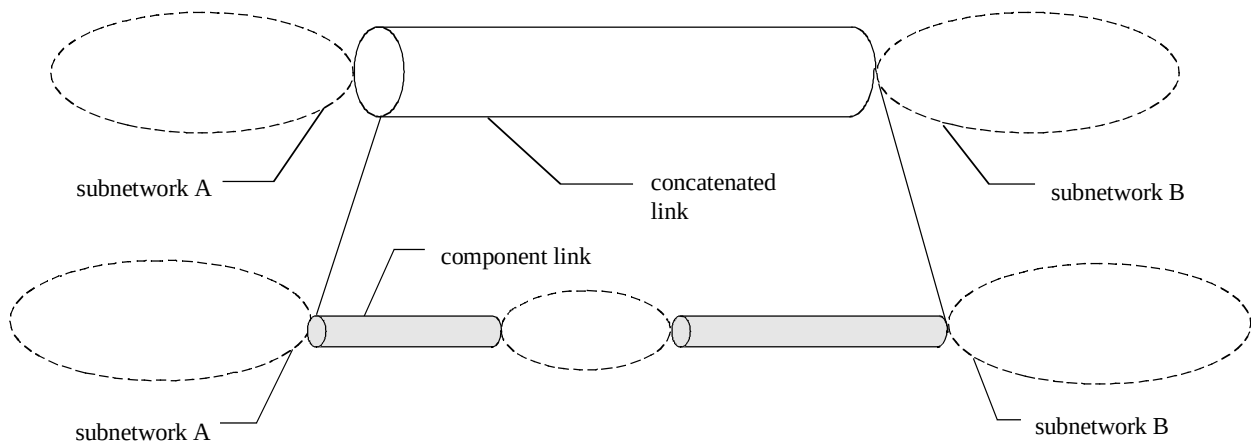
A.3.2.5 Enlace concatenado tiene enlaces (concatenatedLinkHasLinks)

A.3.2.5.1 Descripción informal

DEFINITION

"The concatenatedLinkHasLinks relationship class describes the group of links to form a concatenated link.

The relationship is a subtype of setOf."



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ROLE

container

"Played by an instance of the link information object type and subtype."

element

"Played by instances of the link information object type and subtype."

Reemplazada por una versión más reciente

INVARIANT

inv_1

"The container and the elements must contain the same signalIdentification information."

inv_2

"The container and the elements must have the same directionality."

A.3.2.5.2 Descripción semiformal

concatenatedLinkHasLinks RELATIONSHIP CLASS

BEHAVIOUR

DERIVED FROM setOf;

concatenatedLinkHasLinksBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_1>, <inv_2>";;

ROLE container

COMPATIBLE WITH link AND SUBCLASSES;

ROLE element

COMPATIBLE WITH link AND SUBCLASSES;

A.3.2.5.3 Descripción formal

concatenatedLinkHasLinks_Static

concatenatedLinkHasLinks : *F* RELATIONSHIP

setOf_Static

link_Static

concatenatedLinkHasLinks $\subseteq$ *setOf*

$\forall R: concatenatedLinkHasLinks \cdot container(R) \in link \wedge elementSet(R) \subseteq link$

$\forall R: concatenatedLinkHasLinks \cdot signalIdentification(|elementSet|) = signalIdentification(|\{container\}|)$

$\forall R: concatenatedLinkHasLinks \cdot directionality(|elementSet|) = directionality(|\{container\}|)$

concatenatedLinkHasLinks_Dynamic

Δ *concatenatedLinkHasLinks_Static*

setOf_Dynamic

link_Dynamic

A.3.2.6 Conexión de enlace termina en extremidades (extremitiesTerminateLinkConnection)

A.3.2.6.1 Descripción informal

DEFINITION

"The extremitiesTerminateLinkConnection relationship class describes the relationship that exists between a linkConnection and its extremities.

This relationship type is a subtype of extremitiesTerminateTransportEntity."

Explaining figure in the subclasses.

ROLE

transportEntity

"Played by an instance of the linkConnection information object type or subtype."

A_end

"Played by instances of subnetworkConnection object type or subtype or by instances of the following networkCTPSource information object type or subtype."

Reemplazada por una versión más reciente

Z_end

"Played by instances of subnetworkConnection object type or subtype or by instances of the following networkCTPSink information object type or subtype."

INVARIANT

inv_1

"One and only one instance of the role A_end must participate in the relationship."

inv_2

"One and only one instance of the role Z_end must participate in the relationship."

inv_3

"No information object can have the role A_end more than one time."

inv_4

"No information object can have the role Z_end more than one time."

A.3.2.6.2 Descripción semiformal

extremitiesTerminateLinkConnection RELATIONSHIP CLASS

DERIVED FROM extremitiesTerminateTransportEntity;

BEHAVIOUR

extremitiesTerminateLinkConnectionBehaviour BEHAVIOUR

DEFINED AS

" <DEFINITION>,"

<inv_3>, <inv_4>";;

ROLE transportEntity

COMPATIBLE WITH linkConnection AND SUBCLASSES;

ROLE A_end

COMPATIBLE WITH networkCTPSource AND SUBCLASSES,

subnetworkConnection AND SUBCLASSES

PERMITTED-RELATIONSHIP-CARDINALITY-CONSTRAINT (1..1);

ROLE Z_end

COMPATIBLE WITH networkCTPSink AND SUBCLASSES,

subnetworkConnection AND SUBCLASSES

PERMITTED-RELATIONSHIP-CARDINALITY-CONSTRAINT (1..1);

A.3.2.6.3 Descripción formal

extremitiesTerminateLinkConnection_Static

extremitiesTerminateLinkConnection : *F* RELATIONSHIP

extremitiesTerminateTransportEntity_Static

linkConnection_Static

subnetworkConnection_Static

networkCTPSource_Static

networkCTPSink_Static

$extremitiesTerminateLinkConnection \subseteq extremitiesTerminateTransportEntity$

$\forall R: extremitiesTerminateLinkConnection \bullet$

$transportEntity(R) \in linkConnection \wedge$

$A_endSet(R) \subseteq subnetworkConnection \cup networkCTPSource \wedge$

$Z_endSet(R) \subseteq subnetworkConnection \cup networkCTPSink$

$\forall R: extremitiesTerminateLinkConnection \bullet \#(A_endSet(R)) = 1 \wedge \#(Z_endSet(R)) = 1$

$\forall R1, R2: extremitiesTerminateLinkConnection \bullet$

$R1 \neq R2 \Rightarrow disjoint \langle A_endSet(R1), A_endSet(R2) \rangle$

$\forall R1, R2: extremitiesTerminateLinkConnection \bullet$

$R1 \neq R2 \Rightarrow disjoint \langle Z_endSet(R1), Z_endSet(R2) \rangle$

Reemplazada por una versión más reciente

_____extremitiesTerminateLinkConnection_Dynamic_____

Δ extremitiesTerminateLinkConnection_Static
extremitiesTerminateTransportEntity_Dynamic
linkConnection_Dynamic
subnetworkConnection_Dynamic
networkCTPSource_Dynamic
networkCTPSink_Dynamic

A.3.2.7 Conexión de subred termina en extremidades (extremitiesTerminateSubnetworkConnection)

A.3.2.7.1 Descripción informal

DEFINITION

"The extremitiesTerminateSubnetworkConnection relationship class describes the relationship that exists between a subnetworkConnection and its extremities.

This relationship type is a subtype of extremitiesTerminateTransportEntity."

Explaining figure in the subclasses.

ROLE

transportEntity

"Played by an instance of the subnetworkConnection information object type or subtype."

A_end

"Played by an instance of the following information object types and subtypes:
subnetworkTPSource, subnetworkTPBidirectional."

Z_end

"Played by an instance of the following information object types and subtypes : subnetworkTPSink,
subnetworkTPBidirectional."

INVARIANT

inv_1

"One and only one instance of the role A_end must participate in the relationship."

inv_2

"One and only one instance of the role Z_end must participate in the relationship."

inv_3

"No information object can have the role A_end more than one time."

inv_4

"No information object can have the role Z_end more than one time."

A.3.2.7.2 Descripción semiformal

extremitiesTerminateSubnetworkConnection RELATIONSHIP CLASS

DERIVED FROM extremitiesTerminateTransportEntity;

BEHAVIOUR

extremitiesTerminateSubnetworkConnectionBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_3>, <inv_4>";;

ROLE transportEntity

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES;

ROLE A_end

COMPATIBLE WITH subnetworkTPSource AND SUBCLASSES

PERMITTED-RELATIONSHIP-CARDINALITY-CONSTRAINT (1..1);

ROLE Z_end

COMPATIBLE WITH subnetworkTPSink AND SUBCLASSES

PERMITTED-RELATIONSHIP-CARDINALITY-CONSTRAINT (1..1);

Reemplazada por una versión más reciente

A.3.2.7.3 Descripción formal

<u>extremitiesTerminateSubNetworkConnection_Static</u>
<i>extremitiesTerminateSubNetworkConnection</i> : <i>F RELATIONSHIP</i>
<i>extremitiesTerminateTransportEntity_Static</i>
<i>subnetworkConnection_Static</i>
<i>subnetworkTPSource_Static</i>
<i>subnetworkTPBidirectional</i>
<i>subnetworkTPSink_Static</i>
<i>extremitiesTerminateSubNetworkConnection</i> $\subseteq$ <i>extremitiesTerminateTransportEntity</i>
$\forall R: \text{extremitiesTerminateSubNetworkConnection} \bullet$ $\text{transportEntity}(R) \in \text{subnetworkConnection} \wedge$ $A_endSet(R) \subseteq \text{subnetworkTPSource} \cup \text{subnetworkTPBidirectional} \wedge$ $Z_endSet(R) \subseteq \text{subnetworkTPSink} \cup \text{subnetworkTPBidirectional}$
$\forall R: \text{extremitiesTerminateSubNetworkConnection} \bullet \#(A_endSet(R)) = 1 \wedge \#(Z_endSet(R)) = 1$
$\forall R1, R2: \text{extremitiesTerminateSubNetworkConnection} \bullet$ $R1 \neq R2 \Rightarrow \text{disjoint} \langle A_endSet(R1), A_endSet(R2) \rangle$
$\forall R1, R2: \text{extremitiesTerminateSubNetworkConnection} \bullet$ $R1 \neq R2 \Rightarrow \text{disjoint} \langle Z_endSet(R1), Z_endSet(R2) \rangle$
<u>extremitiesTerminateSubNetworkConnection_Dynamic</u>
Δ <i>extremitiesTerminateSubNetworkConnection_Static</i>
<i>extremitiesTerminateTransportEntity_Dynamic</i>
<i>subnetworkConnection_Dynamic</i>
<i>subnetworkTPSource_Dynamic</i>
<i>subnetworkTPBidirectional</i>
<i>subnetworkTPSink_Dynamic</i>

A.3.2.8 Camino termina en extremidades (extremitiesTerminateTrail)

A.3.2.8.1 Descripción informal

DEFINITION

"The *extremitiesTerminateTrail* relationship class describes the relationship that exists between a trail and its extremities.

This relationship type is a subtype of *extremitiesTerminateTransportEntity*."

Explaining figure in the subclasses.

ROLE

transportEntity

"Played by an instance of the trail information object type or subtype."

A_end

"Played by instances of *networkTTPSource* or a subtype."

Z_end

"Played by instances of *networkTTPSink* or a subtype."

INVARIANT

inv_1

"One and only one instance of the role *A_end* must participate in the relationship."

inv_2

"One and only one instance of the role *Z_end* must participate in the relationship."

Reemplazada por una versión más reciente

inv_3

"No information object can have the role A_end more than one time."

inv_4

"No information object can have the role Z_end more than one time."

A.3.2.8.2 Descripción semiformal

extremitiesTerminateTrail RELATIONSHIP CLASS

DERIVED FROM extremitiesTerminateTransportEntity;

BEHAVIOUR

extremitiesTerminateTrailBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_3>, <inv_4>";;

ROLE transportEntity

COMPATIBLE WITH trail AND SUBCLASSES;

ROLE A_end

COMPATIBLE WITH networkTTPSource AND SUBCLASSES

PERMITTED-RELATIONSHIP-CARDINALITY-CONSTRAINT (1..1);

ROLE Z_end

COMPATIBLE WITH networkTTPSink AND SUBCLASSES

PERMITTED-RELATIONSHIP-CARDINALITY-CONSTRAINT (1..1);

A.3.2.8.3 Descripción formal

extremitiesTerminateTrail_Static

extremitiesTerminateTrail : **F** RELATIONSHIP

extremitiesTerminateTransportEntity_Static

trail_Static

networkTTPSource_Static

networkTTPSink_Static

$extremitiesTerminateTrail \subseteq extremitiesTerminateTransportEntity$

$\forall R: extremitiesTerminateTrail \bullet$

$transportEntity(R) \in trail \wedge$

$A_endSet(R) \subseteq networkTTPSource \wedge$

$Z_endSet(R) \subseteq networkTTPSink$

$\forall R: extremitiesTerminateTrail \bullet \#(A_endSet(R)) = 1 \wedge \#(Z_endSet(R)) = 1$

$\forall R1, R2 : extremitiesTerminateTrail \bullet$

$R1 \neq R2 \Rightarrow disjoint \langle A_endSet(R1), A_endSet(R2) \rangle$

$\forall R1, R2 : extremitiesTerminateTrail \bullet$

$R1 \neq R2 \Rightarrow disjoint \langle Z_endSet(R1), Z_endSet(R2) \rangle$

extremitiesTerminateTrail_Dynamic

$\Delta extremitiesTerminateTrail_Static$

extremitiesTerminateTransportEntity_Dynamic

trail_Dynamic

networkTTPSource_Dynamic

networkTTPSink_Dynamic

Reemplazada por una versión más reciente

A.3.2.9 Entidad de transporte termina en extremidades (extremitiesTerminateTransportEntity)

A.3.2.9.1 Descripción informal

DEFINITION

"The extremitiesTerminateTransportEntity relationship class describes the relationship that exists between a transport entity and its extremities. Through this transport entity, the signal goes from the A_end(s) to the Z_end(s) if it is uni-directional and in both ways if it is bi-directional."

Explaining figure in the subclasses.

ROLE

transportEntity

"Played by an instance of a subtype of the transportConnection information object type or subtype."

A_end

"Played by instance of the following information object types or subtypes : networkCTP, networkTTP, subnetworkTP or transportConnection."

Z_end

"Played by instances of the following information object types or subtypes : networkCTP, networkTTP, subnetworkTP or transportConnection."

INVARIANT

inv_1

"One and only one instance of the role transportEntity must participate in the relationship."

inv_2

"Zero or more instances of the role A_end may participate in the relationship."

inv_3

"Zero or more instances of the role Z_end may participate in the relationship."

inv_4

"If the information object playing the role transportEntity is bi-directional, then all the information objects playing the ROLE A_end and Z_end must be bi-directional."

A.3.2.9.2 Descripción semiformal

extremitiesTerminateTransportEntity RELATIONSHIP CLASS

BEHAVIOUR

extremitiesTerminateTransportEntityBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_4>";;

ROLE transportEntity

COMPATIBLE WITH transportConnection AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1) ;

ROLE A_end

COMPATIBLE WITH transportConnection AND SUBCLASSES,

networkCTP AND SUBCLASSES,

networkTTP AND SUBCLASSES,

subnetworkTP AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (0..N);

ROLE Z_end

COMPATIBLE WITH transportConnection AND SUBCLASSES,

networkCTP AND SUBCLASSES,

networkTTP AND SUBCLASSES,

subnetworkTP AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (0..N);

Reemplazada por una versión más reciente

A.3.2.9.3 Descripción formal

<i>extremitiesTerminateTransportEntity_Static</i>
<i>extremitiesTerminateTransportEntity</i> : F RELATIONSHIP
<i>transportEntity</i> : RELATIONSHIP → OBJECT
<i>A_endSet</i> : RELATIONSHIP → F OBJECT
<i>Z_endSet</i> : RELATIONSHIP → F OBJECT
<i>transportConnection_Static</i>
<i>networkCTP_Static</i>
<i>networkTTP_Static</i>
<i>subnetworkTP_Static</i>
<i>networkCTPBidirectional_Static</i>
<i>networkTTPBidirectional_Static</i>
<i>subnetworkTPBidirectional_Static</i>
<i>extremitiesTerminateTransportEntity</i> ⊆ dom <i>transportEntity</i>
<i>extremitiesTerminateTransportEntity</i> ⊆ dom <i>A_endSet</i>
<i>extremitiesTerminateTransportEntity</i> ⊆ dom <i>Z_endSet</i>
∀ <i>R</i> : <i>extremitiesTerminateTransportEntity</i> • <i>transportEntity</i> (<i>R</i>) ∈ <i>transportConnection</i> ∧ <i>A_endSet</i> (<i>R</i>) ⊆ <i>transportConnection</i> ∪ <i>networkCTP</i> ∪ <i>networkTTP</i> ∪ <i>subnetworkTP</i> ∧ <i>Z_endSet</i> (<i>R</i>) ⊆ <i>transportConnection</i> ∪ <i>networkCTP</i> ∪ <i>networkTTP</i> ∪ <i>subnetworkTP</i>
∀ <i>R</i> : <i>extremitiesTerminateTransportEntity</i> • ∀ <i>extremity</i> : <i>A_endSet</i> (<i>R</i>) ∪ <i>Z_endSet</i> (<i>R</i>) • <i>directionality</i> (<i>transportEntity</i> (<i>R</i>)) = <i>bidirectional</i> ⇒ ((<i>extremity</i> ∈ <i>networkCTPBidirectional</i> ∪ <i>networkTTPBidirectional</i> ∪ <i>subnetworkTPBidirectional</i>) ∨ (<i>extremity</i> ∈ <i>transportConnection</i> ∧ <i>directionality</i> (<i>extremity</i>) = <i>bidirectional</i>))
<i>extremitiesTerminateTransportEntity_Dynamic</i>
Δ <i>extremitiesTerminateTransportEntity_Static</i>
<i>transportConnection_Dynamic</i>
<i>networkCTP_Dynamic</i>
<i>networkTTP_Dynamic</i>
<i>subnetworkTP_Dynamic</i>
<i>networkCTPBidirectional_Dynamic</i>
<i>networkTTPBidirectional_Dynamic</i>
<i>subnetworkTPBidirectional_Dynamic</i>
∀ <i>R</i> : <i>extremitiesTerminateTransportEntity</i> ∪ <i>extremitiesTerminateTransportEntity'</i> • <i>transportEntity'</i> (<i>R</i>) = <i>transportEntity</i> (<i>R</i>) ∧ <i>A_endSet'</i> (<i>R</i>) = <i>A_endSet</i> (<i>R</i>) ∧ <i>Z_endSet'</i> (<i>R</i>) = <i>Z_endSet</i> (<i>R</i>)

Reemplazada por una versión más reciente

A.3.2.10 Entidad de transporte punto a punto termina en extremidades (*extremitiesTerminateTransportEntityPointToPoint*)

A.3.2.10.1 Descripción informal

DEFINITION

"The *extremitiesTerminateTransportEntityPointToPoint* relationship class describes the relationship that exists between a transport entity and its two extremities. Through this transport entity, the signal goes from the A_end to the Z_end if it is uni-directional and in both ways if it is bi-directional. This relationship type is a subtype of *extremitiesTerminateTransportEntity*."

Explaining figure in the subclasses.

INVARIANT

inv_1

"One and only one instance of the role A_end must participate in the relationship."

inv_2

"One and only one instance of the role Z_end must participate in the relationship."

A.3.2.10.2 Descripción semiformal

extremitiesTerminateTransportEntityPointToPoint RELATIONSHIP CLASS

DERIVED FROM *extremitiesTerminateTransportEntity*;

BEHAVIOUR

extremitiesTerminateTransportPointToPointBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";

ROLE A_end

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1) ;

ROLE Z_end

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1) ;

A.3.2.10.3 Descripción formal

extremitiesTerminateTransportEntityPointToPoint_Static

extremitiesTerminateTransportEntityPointToPoint : F RELATIONSHIP
extremitiesTerminateTransportEntity_Static

extremitiesTerminateTransportEntityPointToPoint $\subseteq$ *extremitiesTerminateTransportEntity*

$\forall R : \text{extremitiesTerminateTransportEntityPointToPoint} \bullet \#(A_endSet(R)) = 1 \wedge \#(Z_endSet(R)) = 1$

extremitiesTerminateTransportEntityPointToPoint_Dynamic

Δ *extremitiesTerminateTransportEntityPointToPoint_Static*
extremitiesTerminateTransportEntity_Dynamic

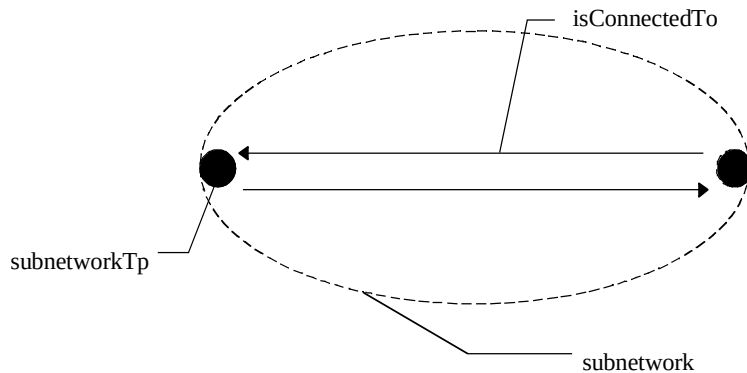
A.3.2.11 Está conectado con (*isConnectedTo*)

A.3.2.11.1 Descripción informal

DEFINITION

"The *isConnectedTo* relationship class describes the relationship that exists between subnetworkTPs through which the signal transfers. This relationship type is a subtype of *oneToOneRelationship*."

Reemplazada por una versión más reciente



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ROLE

peer

"Played by two instances of a subtype of the subnetworkTP information object type."

INVARIANT

inv_1

"One instance must be of the subnetworkTPSink object type or subtype and the other must be of the subnetworkTPSource object type or subtype."

A.3.2.11.2 Descripción semiformal

isConnectedTo RELATIONSHIP CLASS

DERIVED FROM oneToOneRelationship;

BEHAVIOUR

isConnectedToBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_1>";;

ROLE peer

COMPATIBLE WITH subnetworkTP AND SUBCLASSES;

A.3.2.11.3 Descripción formal

isConnectedTo_Static

isConnectedTo : F RELATIONSHIP

oneToOneRelationship_Static

subnetworkTP_Static

subnetworkTPSink_Static

subnetworkTPSource_Static

isConnectedTo $\subseteq$ oneToOneRelationship

$\forall R : isConnectedTo \bullet first(peer(R)) \in subnetworkTP \wedge second(peer(R)) \in subnetworkTP$

$\forall R : isConnectedTo \bullet$

$(first(peer(R)) \in subnetworkTPSink \wedge second(peer(R)) \in subnetworkTPSource) \vee$

$(first(peer(R)) \in subnetworkTPSource \wedge second(peer(R)) \in subnetworkTPSink)$

isConnectedTo_Dynamic

$\Delta isConnectedTo_Static$

oneToOneRelationship_Dynamic

subnetworkTP_Dynamic

subnetworkTPSink_Dynamic

subnetworkTPSource_Dynamic

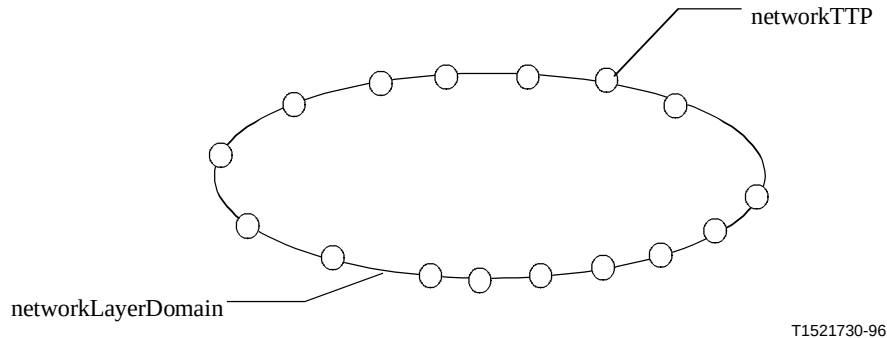
Reemplazada por una versión más reciente

A.3.2.12 Dominio de red de capa está delimitado por (layerNetworkDomainIsDelimitedBy)

A.3.2.12.1 Descripción informal

DEFINITION

"The layerNetworkDomainIsDelimitedBy relationship class describes the relationship that exists between a layerNetworkDomain and the networkTTPs that delimit it. This relationship type is a subtype of topologicalComponentIsDelimitedBy."



ROLE

container

"Played by an instance of the layerNetworkDomain information object type or subtype."

element

"Played by an instance of a subtype of the networkTTP information object type."

A.3.2.12.2 Descripción semiformal

layerNetworkDomainIsDelimitedBy RELATIONSHIP CLASS

DERIVED FROM topologicalComponentIsDelimitedBy;

BEHAVIOUR

layerNetworkDomainIsDelimitedByBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH layerNetworkDomain AND SUBCLASSES;

ROLE element

COMPATIBLE WITH networkTTP AND SUBCLASSES;

A.3.2.12.3 Descripción formal

layerNetworkDomainIsDelimitedBy_Static

layerNetworkDomainIsDelimitedBy : F RELATIONSHIP

topologicalComponentIsDelimitedBy_Static

layerNetworkDomain_Static

networkTTP_Static

layerNetworkDomainIsDelimitedBy $\subseteq$ topologicalComponentIsDelimitedBy

$\forall R : \text{layerNetworkDomainIsDelimitedBy} \bullet$

$\text{container}(R) \in \text{layerNetworkDomain} \wedge \text{elementSet}(R) \subseteq \text{networkTTP}$

layerNetworkDomainIsDelimitedBy_Dynamic

$\Delta \text{layerNetworkDomainIsDelimitedBy_Static}$

topologicalComponentIsDelimitedBy_Dynamic

layerNetworkDomain_Dynamic

networkTTP_Dynamic

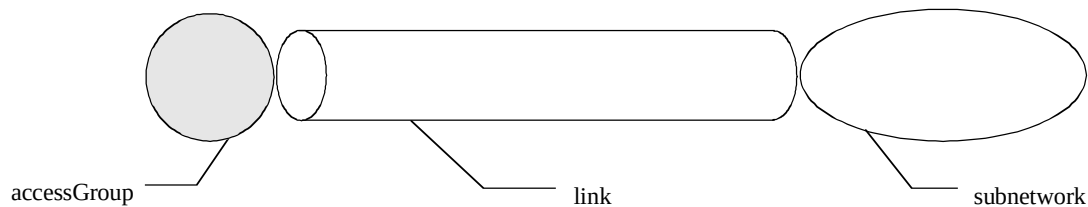
Reemplazada por una versión más reciente

A.3.2.13 Enlace vincula (linkBinds)

A.3.2.13.1 Descripción informal

DEFINITION

"The linkBinds relationship class describes the relationship that exists between a link and its two extremities. These can be any of the following: subnetwork / accessGroup / networkTPPool. The two associated extremities are referred to as the A_end and the Z_end."



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ROLE

transferCapacity

"Played by an instance of the link information object type or subtype."

A_end

"Played by an instance of the subnetwork information object type or subtype or by an instance of the accessGroup information object type or subtype or by an instance of the networkTPPool information object type or subtype."

Z_end

"Played by an instance of the subnetwork information object type or subtype or by an instance of the accessGroup information object type or subtype or by an instance of the networkTPPool information object type or subtype."

INVARIANT

inv_1

"One and only one instance of the role transferCapacity must participate in the relationship."

inv_2

"One and only one instance of the role A_end must participate in the relationship."

inv_3

"One and only one instance of the role Z_end must participate in the relationship."

A.3.2.13.2 Descripción semiformal

linkBinds RELATIONSHIP CLASS

BEHAVIOUR

linkBindsBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE transferCapacity

COMPATIBLE WITH link AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

ROLE A_end

COMPATIBLE WITH subnetwork AND SUBCLASSES,

accessGroup AND SUBCLASSES,

networkTPPool AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

ROLE Z_end

COMPATIBLE WITH subnetwork AND SUBCLASSES,

accessGroup AND SUBCLASSES,

networkTPPool AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

Reemplazada por una versión más reciente

A.3.2.13.3 Descripción formal

linkBinds_Static
$\text{linkBinds} : F \text{ RELATIONSHIP}$ $\text{transferCapacity} : \text{RELATIONSHIP} \rightarrow \text{OBJECT}$ $A_end : \text{RELATIONSHIP} \rightarrow \text{OBJECT}$ $Z_end : \text{RELATIONSHIP} \rightarrow \text{OBJECT}$ link_Static subnetwork_Static $\text{accessGroup_Static}$ $\text{subnetworkTPPool_Static}$
$\text{linkBinds} \subseteq \text{dom } \text{transferCapacity}$ $\text{linkBinds} \subseteq \text{dom } A_end$ $\text{linkBinds} \subseteq \text{dom } Z_end$ $\forall R : \text{linkBinds} \bullet$ $\text{transferCapacity}(R) \in \text{link} \wedge$ $A_end(R) \in \text{subnetwork} \cup \text{accessGroup} \cup \text{subnetworkTPPool} \wedge$ $Z_end(R) \in \text{subnetwork} \cup \text{accessGroup} \cup \text{subnetworkTPPool}$

linkBinds_Dynamic
$\Delta \text{linkBinds_Static}$ link_Dynamic $\text{subnetwork_Dynamic}$ $\text{accessGroup_Dynamic}$ $\text{subnetworkTPPool_Dynamic}$
$\forall R : \text{linkBinds} \cup \text{linkBinds}' \bullet$ $\text{transferCapacity}'(R) = \text{transferCapacity}(R) \wedge$ $A_end'(R) = A_end(R) \wedge$ $Z_end'(R) = Z_end(R)$

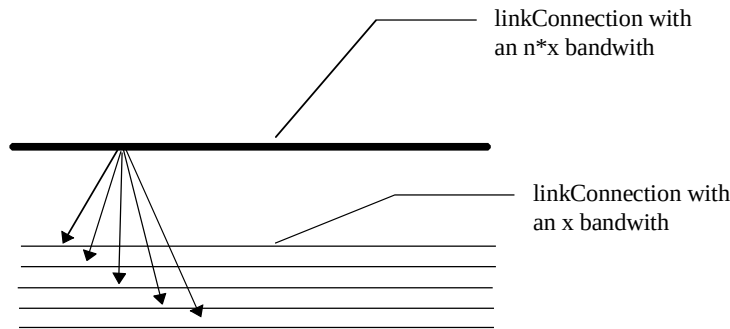
A.3.2.14 Conexión de enlace es haz de conexiones de enlace (linkConnectionIsBundleOfLinkConnections)

A.3.2.14.1 Descripción informal

DEFINITION

"The **linkConnectionIsBundleOfLinkConnections** relationship class describes the relationship that exists between a **linkConnection** and the **linkConnections** that are part of it.
This relationship type is a subtype of **setOf**."

Reemplazada por una versión más reciente



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ROLE

container

"Played by an instance of the `linkConnection` information object type or subtype."

element

"Played by an instance of a sub-type of the `linkConnection` information object type or subtype."

A.3.2.14.2 Descripción semiformal

`linkConnectionIsBundleOfLinkConnections` RELATIONSHIP CLASS

DERIVED FROM `setOf`;

BEHAVIOUR

`linkConnectionIsBundleOfLinkConnectionsBehaviour` BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH `linkConnection` AND SUBCLASSES;

ROLE element

COMPATIBLE WITH `linkConnection` AND SUBCLASSES;

A.3.2.14.3 Descripción formal

`linkConnectionIsBundleOfLinkConnections_Static`

linkConnectionIsBundleOfLinkConnections : **F** RELATIONSHIP

setOf_Static

linkConnection_Static

linkConnectionIsBundleOfLinkConnections $\subseteq$ *setOf*

$\forall R : \text{linkConnectionIsBundleOfLinkConnections} \bullet$
 $\text{container}(R) \in \text{linkConnection} \wedge \text{elementSet}(R) \subseteq \text{linkConnection}$

`linkConnectionIsBundleOfLinkConnections_Dynamic`

Δ *linkConnectionIsBundleOfLinkConnections_Static*

setOf_Dynamic

linkConnection_Dynamic

A.3.2.15 Conexión de enlace está soportada por camino (`linkConnectionIsSupportedByTrail`)

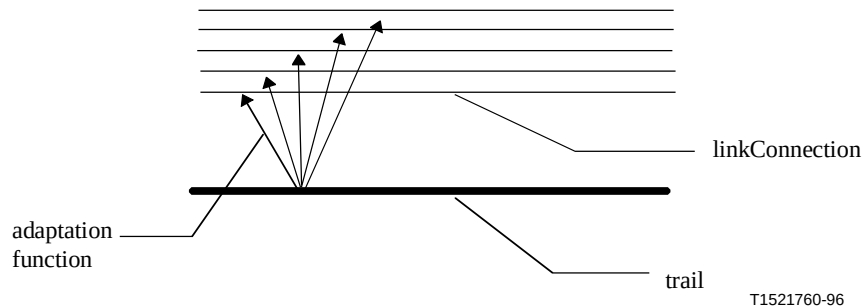
A.3.2.15.1 Descripción informal

DEFINITION

"The `linkConnectionIsSupportedByTrail` relationship class describes the relationship that exists between `linkConnections` of a given layer network (known as the client layer network) and the trail that supports them in a server layer network.

This relationship type is a subtype of `clientServer`."

Reemplazada por una versión más reciente



ROLE

client

"Played by instances of the linkConnection information object type or subtype."

server

"Played by an instance of the trail information object type or subtype."

A.3.2.15.2 Descripción semiformal

linkConnectionIsSupportedByTrail RELATIONSHIP CLASS

DERIVED FROM clientServer;

BEHAVIOUR

linkConnectionIsSupportedByTrailBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE client

COMPATIBLE WITH linkConnection AND SUBCLASSES;

ROLE server

COMPATIBLE WITH trail AND SUBCLASSES;

A.3.2.15.3 Descripción formal

linkConnectionIsSupportedByTrail_Static

linkConnectionIsSupportedByTrail : F RELATIONSHIP

clientServer_Static

linkConnection_Static

trail_Static

$linkConnectionIsSupportedByTrail \subseteq clientServer$

$\forall R : linkConnectionIsSupportedByTrail \bullet clientSet(R) \subseteq linkConnection \wedge server(R) \in trail$

linkConnectionIsSupportedByTrail_Dynamic

$\Delta linkConnectionIsSupportedByTrail_Static$

clientServer_Dynamic

linkConnection_Dynamic

trail_Dynamic

A.3.2.16 Conexión de enlace consiste en entidades de transporte (linkConnectionIsMadeOfTransportEntities)

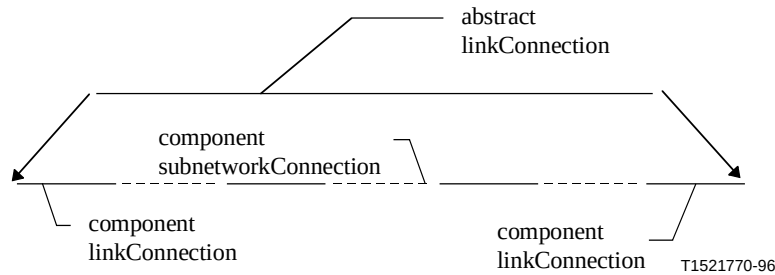
A.3.2.16.1 Descripción informal

DEFINITION

"The linkConnectionIsMadeOfTransportEntities relationship class describes the relationship that exists between a composite link connection and its component transport entities.

This relationship type is a subtype of transportEntitiesComposeTransportEntity."

Reemplazada por una versión más reciente



ROLE

composite

"Played by an instance of the linkConnection information object type or subtype."

component

"Played by an instance of the subnetworkConnection information object type or subtype, or linkConnection information object type or subtype."

INVARIANT

inv_1

"The component connections being contiguous, both the first and the last one must be instances of the linkConnection information object type or subtype."

A.3.2.16.2 Descripción semiformal

linkConnectionIsMadeOfTransportEntities RELATIONSHIP CLASS

DERIVED FROM transportEntitiesComposeTransportEntity;

BEHAVIOUR

linkConnectionIsMadeOfTransportEntitiesBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_1>;

ROLE composite

COMPATIBLE WITH linkConnection AND SUBCLASSES;

ROLE component

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES,
linkConnection AND SUBCLASSES;

A.3.2.16.3 Descripción formal

linkConnectionIsMadeOfTransportEntities_Static

linkConnectionIsMadeOfTransportEntities : F RELATIONSHIP

transportEntitiesComposeTransportEntity_Static

linkConnection_Static

subnetworkConnection_Static

linkConnectionIsMadeOfTransportEntities $\subseteq$ transportEntitiesComposeTransportEntity

$\forall R : \text{linkConnectionIsMadeOfTransportEntities} \bullet$

$\text{composite}(R) \in \text{linkConnection} \wedge$

$\text{ran}(\text{componentSeq}(R)) \subseteq \text{subnetworkConnection} \cup \text{linkConnection}$

$\forall R : \text{linkConnectionIsMadeOfTransportEntities} \bullet$

$\text{head}(\text{componentSeq}(R)) \in \text{linkConnection} \wedge$

$\text{last}(\text{componentSeq}(R)) \in \text{linkConnection}$

linkConnectionIsMadeOfTransportEntities_Dynamic

$\Delta \text{linkConnectionIsMadeOfTransportEntities_Static}$

transportEntitiesComposeTransportEntity_Dynamic

linkConnection_Dynamic

subnetworkConnection_Dynamic

Reemplazada por una versión más reciente

A.3.2.17 Punto a punto termina conexión de enlace (linkConnectionIsTerminatedByPointToPoint)

A.3.2.17.1 Descripción informal

DEFINITION

"The linkConnectionIsTermPointToPoint relationship class describes the relationship that exists between a link connection and its two extremities.
This relationship type is a subtype of extremitiesTerminateTransportEntityPointToPoint and extremitiesTerminateLinkConnection."



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A.3.2.17.2 Descripción semiformal

linkConnectionIsTerminatedByPointToPoint RELATIONSHIP CLASS

DERIVED FROM extremitiesTerminateTransportEntityPointToPoint,
extremitiesTerminateLinkConnection;

BEHAVIOUR

linkConnectionIsTerminatedByPointToPointBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

A.3.2.17.3 Descripción formal

linkConnectionIsTerminatedByPointToPoint_Static
linkConnectionIsTerminatedByPointToPoint : F RELATIONSHIP
extremitiesTerminateTransportEntityPointToPoint_Static
extremitiesTerminateLinkConnection_Static
linkConnectionIsTerminatedByPointToPoint
$\subseteq$ extremitiesTerminateTransportEntityPointToPoint $\cup$ extremitiesTerminateLinkConnection
linkConnectionIsTerminatedByPointToPoint_Dynamic
Δ linkConnectionIsTerminatedByPointToPoint
extremitiesTerminateTransportEntityPointToPoint_Dynamic
extremitiesTerminateLinkConnection_Dynamic

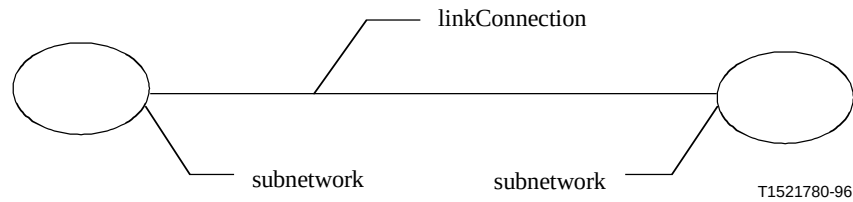
A.3.2.18 Subredes terminan conexión de enlace (linkConnectionIsTerminatedBySubnetworks)

A.3.2.18.1 Descripción informal

DEFINITION

"The linkConnectionIsTerminatedBySubnetworks relationship class describes the relationship that exists between the resources represented by a pair of sub-network objects and the link connection that may bind them. The two associated information objects are referred to as the A end and the Z end. Through a uni-directional link connection, traffic goes only from the A end to the Z end; through a bi-directional one, traffic may go from A to Z and from Z to A."

Reemplazada por una versión más reciente



ROLE

transportEntity

"Played by an instance of the linkConnection information object type or subtype."

A_end

"Played by an instance of the subnetwork information object type or subtype."

Z_end

"Played by an instance of the subnetwork information object type or subtype."

INVARIANT

inv_1

"One and only one instance playing the role transportEntity must participate in the relationship."

inv_2

"One and only one instance playing the role A_end must participate in the relationship."

inv_3

"One and only one instance playing the role Z_end must participate in the relationship."

A.3.2.18.2 Descripción semiformal

linkConnectionIsTerminatedBySubnetworks RELATIONSHIP CLASS

BEHAVIOUR

linkConnectionIsTerminatedBySubnetworksBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE transportEntity

COMPATIBLE WITH linkConnection AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

ROLE A_end

COMPATIBLE WITH subnetwork AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

ROLE Z_end

COMPATIBLE WITH subnetwork AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

A.3.2.18.3 Descripción formal

linkConnectionIsTerminatedBySubnetworks_Static

linkConnectionIsTerminatedBySubnetworks : F RELATIONSHIP

transportEntity : RELATIONSHIP → OBJECT

A_end : RELATIONSHIP → OBJECT

Z_end : RELATIONSHIP → OBJECT

linkConnection_Static

subnetwork_Static

linkConnectionIsTerminatedByPointSubnetworks $\subseteq$ **dom** *transportEntity*

linkConnectionIsTerminatedByPointSubnetworks $\subseteq$ **dom** *A_end*

linkConnectionIsTerminatedByPointSubnetworks $\subseteq$ **dom** *Z_end*

$\forall R : linkConnectionIsTerminatedByPointSubnetworks \bullet$

$transportEntity(R) \in linkConnection \wedge$

$A_end(R) \in subnetwork \wedge$

$Z_end(R) \in subnetwork$

Reemplazada por una versión más reciente

linkConnectionIsTerminatedBySubnetworks_Dynamic
Δ linkConnectionIsTerminatedBySubnetworks_Static linkConnection_Dynamic subnetwork_Dynamic
$\forall R: \text{linkConnectionIsTerminatedBySubnetworks} \cup \text{linkConnectionIsTerminatedBySubnetworks} \bullet$ $\text{transportEntity}'(R) = \text{transportEntity}(R) \wedge$ $A_end'(R) = A_end(R) \wedge$ $Z_end'(R) = Z_end(R)$

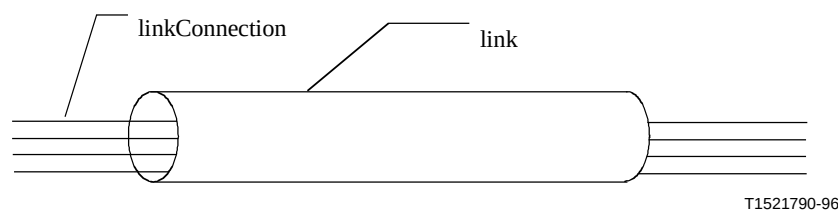
A.3.2.19 Enlace tiene conexiones de enlace (linkHasLinkConnections)

A.3.2.19.1 Descripción informal

DEFINITION

"The linkHasLinkConnections relationship class describes the relationship that exists between a link and the linkConnections that are part of it.

This relationship type is a subtype of setOf."



ROLE

container

"Played by an instance of the link information object type or subtype."

element

"Played by an instance of the linkConnection information object type or subtype."

A.3.2.19.2 Descripción formal

linkHasLinkConnections RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

linkHasLinkConnectionsBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH link AND SUBCLASSES;

ROLE element

COMPATIBLE WITH linkConnection AND SUBCLASSES;

A.3.2.19.3 Descripción formal

linkHasLinkConnections_Static
linkHasLinkConnections : F RELATIONSHIP setOf_Static link_Static linkConnection_Static
$\text{linkHasLinkConnections} \subseteq \text{setOf}$
$\forall R: \text{linkHasLinkConnections} \bullet \text{container}(R) \in \text{link} \wedge \text{elementSet}(R) \subseteq \text{linkConnection}$

Reemplazada por una versión más reciente

linkHasLinkConnections_Dynamic

Δ linkHasLinkConnections_Static

setOf_Dynamic

link_Dynamic

linkConnection_Dynamic

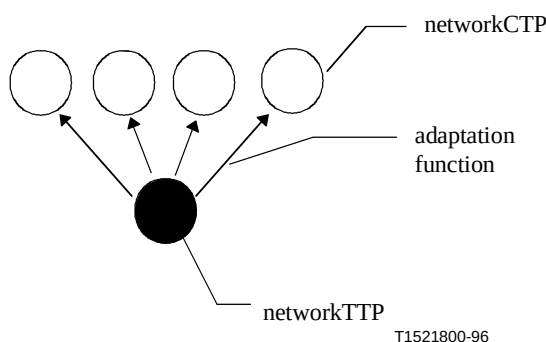
A.3.2.20 Punto de terminación de camino de red adapta punto de terminación de conexión de red (networkTTPAdaptsNetworkCTP)

A.3.2.20.1 Descripción informal

DEFINITION

"The networkTTPAdaptsNetworkCTP relationship class describes the relationship that exists between networkCTPs of a given layer network (known as the client layer network) and the networkTTP that supports them in a server layer network.

This relationship is a subtype of clientServer."



ROLE

client

"Played by instances of a subtype of the networkCTP information object type."

server

"Played by an instance of a subtype of the networkTTP information object type."

A.3.2.20.2 Descripción semiformal

networkTTPAdaptsNetworkCTP RELATIONSHIP CLASS

DERIVED FROM clientServer;

BEHAVIOUR

networkTTPAdaptsNetworkCTPBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE client

COMPATIBLE WITH networkCTP AND SUBCLASSES;

ROLE server

COMPATIBLE WITH networkTTP AND SUBCLASSES;

A.3.2.20.3 Descripción formal

networkTTPAdaptsNetworkCTP_Static

networkTTPAdaptsNetworkCTP : F RELATIONSHIP

clientServer_Static

networkCTP_Static

networkTTP_Static

$networkTTPAdaptsNetworkCTP \subseteq clientServer$

$\forall R : networkTTPAdaptsNetworkCTP \bullet clientSet(R) \subseteq networkCTP \wedge server(R) \in networkTTP$

Reemplazada por una versión más reciente

networkTTPAdaptsNetworkCTP_Dynamic

Δ networkTTPAdaptsNetworkCTP_Static
 clientServer_Dynamic
 networkCTP_Dynamic
 networkTTP_Dynamic

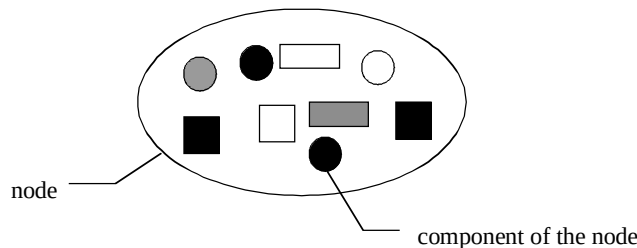
A.3.2.21 Nodo consiste en (nodeIsMadeOf)

A.3.2.21.1 Descripción informal

DEFINITION

"The nodeIsMadeOf relationship class describes the relationship that exists between a node and its components.

This relationship type is a subtype of setOf."



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ROLE

container

"Played by an instance of the node information object type or subtype."

element

"Played by instances of a sub-type of the networkInformationTop object type."

A.3.2.21.2 Descripción semiformal

nodeIsMadeOf RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

nodeIsMadeOfBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH node AND SUBCLASSES;

ROLE element

COMPATIBLE WITH networkInformationTop AND SUBCLASSES;

A.3.2.21.3 Descripción formal

nodeIsMadeOf_Static

$nodeIsMadeOf : F$ RELATIONSHIP
 setOf_Static
 node_Static
 networkInformationTop_Static

$nodeIsMadeOf \subseteq setOf$

$\forall R : nodeIsMadeOf \bullet container(R) \in node \wedge elementSet(R) \subseteq networkInformationTop$

Reemplazada por una versión más reciente

nodeIsMadeOf_Dynamic

Δ nodeIsMadeOf_Static

setOf_Dynamic

node_Dynamic

networkInformationTop_Dynamic

A.3.2.22 Relación uno a uno (oneToOne Relationship)

A.3.2.22.1 Descripción informal

DEFINITION

"The oneToOneRelationship relationship class describes the relationship that exists between two information objects."

Explaining figure in the subclasses.

ROLE

peer

"Played by an instance of a subtype of the information object type : networkInformationTop."

INVARIANT

inv_1

"Two and only two instances of the role peer must participate in the relationship."

A.3.2.22.2 Descripción semiformal

oneToOneRelationship RELATIONSHIP CLASSBEHAVIOUR oneToOneRelationshipBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE peer

COMPATIBLE WITH networkInformationTop AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (2..2) ;

A.3.2.22.3 Descripción semiformal

oneToOneRelationship_Static

oneToOneRelationship : **F** RELATIONSHIP

peer : RELATIONSHIP $\rightarrow$ (OBJECT $\times$ OBJECT)

networkInformationTop_Static

$oneToOneRelationship \subseteq \text{dom } peer$

$\forall R : oneToOneRelationship \bullet$

$first(peer(R)) \in networkInformationTop \wedge second(peer(R)) \in networkInformationTop$

oneToOneRelationship_Dynamic

$\Delta oneToOneRelationship_Static$

networkInformationTop_Dynamic

$\forall R : oneToOneRelationship \cup oneToOneRelationship' \bullet peer'(R) = peer(R)$

A.3.2.23 Conjunto de (setOf)

A.3.2.23.1 Descripción informal

DEFINITION

"The setOf relationship class describes the relationship that exists between a set and its elements."

Explaining figure in the subclasses.

ROLE

container

"Played by an instance of a subtype of the information object type : networkInformationTop."

Reemplazada por una versión más reciente

element
 "Played by instances of a subtype of the information object type : *networkInformationTop*."

INVARIANT

inv_1
 "One and only one instance of the role container must participate in the relationship."

inv_2
 "One or more instances of the role element must participate in the relationship."

inv_3
 "All the instances of the role element must belong to a unique information object type or to its subtypes."

TRANSITION

tr_1
 "The information objects having the role element can leave the relationship without breaking it."

tr_2
 "During the lifetime of the relationship, additional information objects can enter the relationship, having the role element."

A.3.2.23.2 Descripción semiformal

setOf RELATIONSHIP CLASS

BEHAVIOUR

setOfBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,
 <inv_3>";;

ROLE container

COMPATIBLE WITH *networkInformationTop* AND SUBCLASSES
 PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1) ;

ROLE element

COMPATIBLE WITH *networkInformationTop* AND SUBCLASSES
 PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..N)
 BIND-SUPPORT
 UNBIND-SUPPORT;

A.3.2.23.3 Descripción formal

<u>setOf_Static</u> <i>setOf</i> : F RELATIONSHIP <i>container</i> : RELATIONSHIP → OBJECT <i>elementSet</i> RELATIONSHIP → F OBJECT <i>networkInformationTop_Static</i> <i>setOf</i> ⊆ dom <i>container</i> <i>setOf</i> ⊆ dom <i>elementSet</i> ∀ <i>R</i> : <i>setOf</i> • <i>container</i>(<i>R</i>) ∈ <i>networkInformationTop</i> ∧ <i>elementSet</i>(<i>R</i>) ⊆ <i>networkInformationTop</i> ∀ <i>R</i> : <i>setOf</i> • #(<i>elementSet</i>(<i>R</i>)) ≥ 1
<u>setOf_Dynamic</u> Δ <i>setOf_Static</i> <i>networkInformationTop_Dynamic</i> ∀ <i>R</i> : <i>setOf</i> ∪ <i>setOf</i>' • <i>container</i>'(<i>R</i>) = <i>container</i>(<i>R</i>)

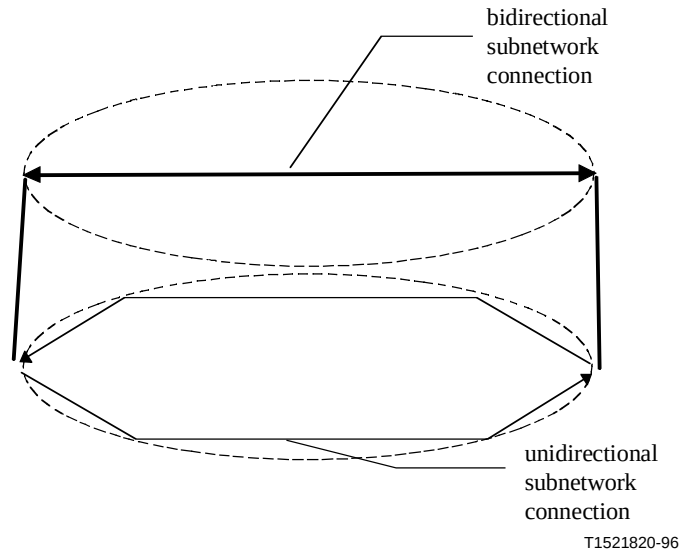
Reemplazada por una versión más reciente

A.3.2.24 Conexión de subred bidireccional está soportada por (conexión) unidireccional (snCBidIsSupportedByUnis)

A.3.2.24.1 Descripción informal

DEFINITION

"The snCBidIsSupportedByUnis relationship class describes the relationship that exists between a bi-directional subnetworkConnection instance and the two uni-directional (co- and contra-directional with regard to an orientation reference) subnetworkConnection instances that together provide bi-directionality (e.g. case of a uni-directional SDH ring)."



ROLE

bid

"Played by an instance of the subnetworkConnection information object type or subtype."

uni1

"Played by an instance of the subnetworkConnection information object type or subtype."

uni2

"Played by an instance of the subnetworkConnection information object type or subtype."

INVARIANT

inv_1

"One and only one instance of the role uni1 must participate in the relationship."

inv_2

"One and only one instance of the role uni2 must participate in the relationship."

inv_3

"One and only one instance of the role bid must participate in the relationship."

inv_4

"The instance of the role uni1 and the instance of the role uni2 must be both uni-directional, the first one co-directional and the second one contra-directional with regard to an orientation reference."

A.3.2.24.2 Descripción semiformal

snCBidIsSupportedByUnis RELATIONSHIP CLASS

BEHAVIOUR

snCBidIsSupportedByUnisBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_4>";;

ROLE bid

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

ROLE uni1

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

Reemplazada por una versión más reciente

ROLE uni2

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES
PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

A.3.2.24.3 Descripción formal

snCBidIsSupportedByUnis_Static

$snCBidIsSupportedByUnis : F \text{ RELATIONSHIP}$
 $bid : \text{RELATIONSHIP} \rightarrow \text{OBJECT}$
 $uni1 : \text{RELATIONSHIP} \rightarrow \text{OBJECT}$
 $uni2 : \text{RELATIONSHIP} \rightarrow \text{OBJECT}$
 $subnetworkConnection_Static$
 $extremitiesTerminateSubnetworkConnection_Static$

$snCBidIsSupportedByUnis \subseteq \text{dom } bid$

$snCBidIsSupportedByUnis \subseteq \text{dom } uni1$

$snCBidIsSupportedByUnis \subseteq \text{dom } uni2$

$\forall R : snCBidIsSupportedByUnis \bullet$

$bid(R) \in subnetworkConnection \wedge$
 $uni1(R) \in subnetworkConnection \wedge$
 $uni2(R) \in subnetworkConnection$

$\forall R : snCBidIsSupportedByUnis \bullet$

$directionality(uni1(R)) = unidirectional \wedge directionality(uni2(R)) = unidirectional \wedge$
 $(\exists R1, R2 : extremitiesTerminateSubnetworkConnection \bullet$
 $uni1(R) = transportEntity(R1) \wedge$
 $uni2(R) = transportEntity(R2) \wedge$
 $A_endSet(R1) = Z_endSet(R2) \wedge$
 $Z_endSet(R1) = A_endSet(R2))$

snCBidIsSupportedByUnis_Dynamic

$\Delta snCBidIsSupportedByUnis_Static$
 $subnetworkConnection_Dynamic$
 $extremitiesTerminateSubnetworkConnection_Dynamic$

$\forall R : snCBidIsSupportedByUnis \cup snCBidIsSupportedByUnis' \bullet$

$bid'(R) = bid(R) \wedge uni1'(R) = uni1(R) \wedge uni2'(R) = uni2(R)$

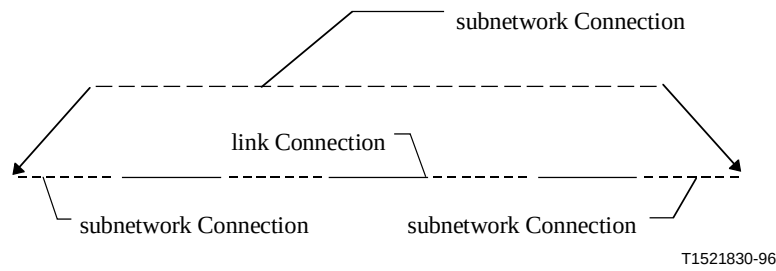
A.3.2.25 Conexión de subred consiste en entidades de transporte (subnetworkConnectionIsMadeOfTransportEntities)

A.3.2.25.1 Descripción informal

DEFINITION

"The subnetworkConnectionIsMadeOfTransportEntities relationship class describes the relationship that exists between a composite sub-network connection and its component transport entities. This relationship type is a subtype of transportEntitiesComposeTransportEntity."

Reemplazada por una versión más reciente



ROLE

composite

"Played by an instance of the subnetworkConnection information object type or subtype."

component

"Played by instances of the subnetworkConnection information object type or subtype, or linkConnection information object type or subtype."

INVARIANT

inv_1

"The component transport entities being contiguous, both the first and the last one must be instances of the subnetworkConnection information object type or of one of its subtypes."

A.3.2.25.2 Descripción semiformal

subnetworkConnectionIsMadeOfTransportEntities RELATIONSHIP CLASS

DERIVED FROM transportEntitiesComposeTransportEntity;

BEHAVIOUR

subnetworkConnectionIsMadeOfTransportEntitiesBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_1>";;

ROLE composite

COMPATIBLE WITHsubnetworkConnection AND SUBCLASSES;

ROLE component

COMPATIBLE WITHsubnetworkConnection AND SUBCLASSES,
linkConnection AND SUBCLASSES;

A.3.2.25.3 Descripción formal

subnetworkConnectionIsMadeOfTransportEntities_Static

subnetworkConnectionIsMadeOfTransportEntities : F RELATIONSHIP

transportEntitiesComposeTransportEntity_Static

subnetworkConnection_Static

linkConnection_Static

$subnetworkConnectionIsMadeOfTransportEntities \subseteq transportEntitiesComposeTransportEntity$

$\forall R : subnetworkConnectionIsMadeOfTransportEntities \bullet$
 $composite(R) \in subnetworkConnection \wedge$
 $ran(componentSeq(R)) \subseteq subnetworkConnection \cup linkConnection$

$\forall R : subnetworkConnectionIsMadeOfTransportEntities \bullet$
 $head(componentSeq(R)) \in subnetworkConnection \wedge$
 $last(componentSeq(R)) \in subnetworkConnection$

subnetworkConnectionIsMadeOfTransportEntities_Dynamic

$\Delta subnetworkConnectionIsMadeOfTransportEntities$

transportEntitiesComposeTransportEntity_Dynamic

subnetworkConnection_Dynamic

linkConnection_Dynamic

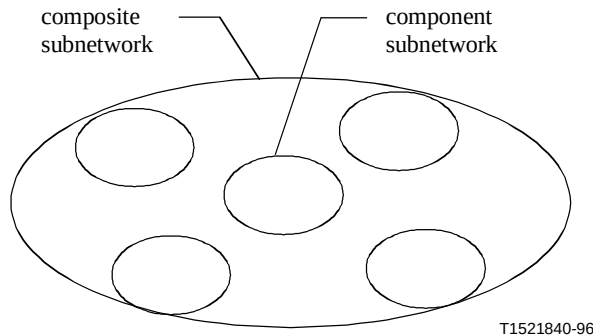
Reemplazada por una versión más reciente

A.3.2.26 Instancias de subred más pequeñas subdivididas por subred (snIsPartitionedBySn)

A.3.2.26.1 Descripción informal

DEFINITION

"The snIsPartitionedBySn relationship class describes the relationship that exists between a subnetwork and the smaller subnetwork (or subclasses) instances that are part of its decomposition due to partitioning."



ROLE

composite

"Played by an instance of the subnetwork information object type or subtype".

component

"Played by an instance of the subnetwork information object type or subtype".

INVARIANT

inv_1

"At least one instance of the role component must participate in the relationship."

inv_2

"One and only one instance of the role composite must participate in the relationship."

TRANSITION

tr_1

"The information objects playing the role component, provided one remains, can leave the relationship without breaking it."

tr_2

"During the lifetime of the relationship, additional information objects can enter the relationship, playing the role component."

A.3.2.26.2 Descripción semiformal

snIsPartitionedBySn RELATIONSHIP CLASS

BEHAVIOUR

snIsPartitionedBySnBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE composite

COMPATIBLE WITH subnetwork AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1);

ROLE component

COMPATIBLE WITH subnetwork AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..N)

BIND-SUPPORT

UNBIND-SUPPORT;

A.3.2.26.3 Descripción formal

snIsPartitionedBySn_Static

snIsPartitionedBySn : F RELATIONSHIP

composite : RELATIONSHIP → OBJECT

componentSet : RELATIONSHIP → F OBJECT

subnetwork_Static

Reemplazada por una versión más reciente

$snIsPartitionedBySn \subseteq \mathbf{dom} \text{ composite}$

$snIsPartitionedBySn \subseteq \mathbf{dom} \text{ componentSet}$

$\forall R : snIsPartitionedBySn \bullet \text{composite}(R) \in \text{subnetwork} \wedge \text{componentSet}(R) \in \text{subnetwork}$

$\forall R : snIsPartitionedBySn \bullet \#(\text{componentSet}(R)) \geq 1$

$\text{snIsPartitionedBySn_Dynamic}$

$\Delta \text{snIsPartitionedBySn_Static}$

$\text{subnetwork_Dynamic}$

$\forall R : snIsPartitionedBySn \cup snIsPartitionedBySn' \bullet$
 $\text{composite}'(R) = \text{composite}(R)$

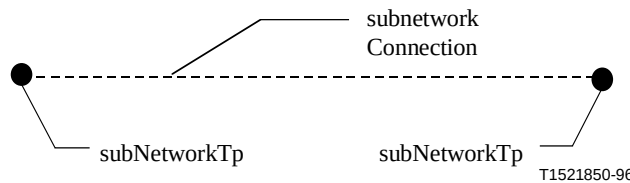
A.3.2.27 Punto a punto termina conexión de subred (subnetworkConnectionIsTerminatedByPointToPoint)

A.3.2.27.1 Descripción informal

DEFINITION

"The subnetworkConnectionIsTerminatedByPointToPoint relationship class describes the relationship that exists between a subnetwork connection and its two terminations.

This relationship type is a subtype of extremitiesTerminateTransportEntityPointToPoint and extremitiesTerminateSubnetworkConnection."



A.3.2.27.2 Descripción semiformal

subnetworkConnectionIsTerminatedByPointToPoint RELATIONSHIP CLASS

DERIVED FROM extremitiesTerminateTransportEntityPointToPoint,
 extremitiesTerminateSubnetworkConnection;

BEHAVIOUR

subnetworkConnectionIsTerminatedByPointToPointBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

A.3.2.27.3 Descripción formal

$\text{subnetworkConnectionIsTerminatedByPointToPoint_Static}$

$\text{subnetworkConnectionIsTerminatedByPointToPoint} : \mathbf{F} \text{ RELATIONSHIP}$

$\text{extremitiesTerminateTransportEntityPointToPoint_Static}$

$\text{extremitiesTerminateSubnetworkConnection_Static}$

$\text{subnetworkConnectionIsTerminatedByPointToPoint}$

$\subseteq \text{extremitiesTerminateTransportEntityPointToPoint} \cup \text{extremitiesTerminateSubnetworkConnection}$

$\text{subnetworkConnectionIsTerminatedByPointToPoint_Dynamic}$

$\Delta \text{subnetworkConnectionIsTerminatedByPointToPoint_Static}$

$\text{extremitiesTerminateTransportEntityPointToPoint_Dynamic}$

$\text{extremitiesTerminateSubnetworkConnection_Dynamic}$

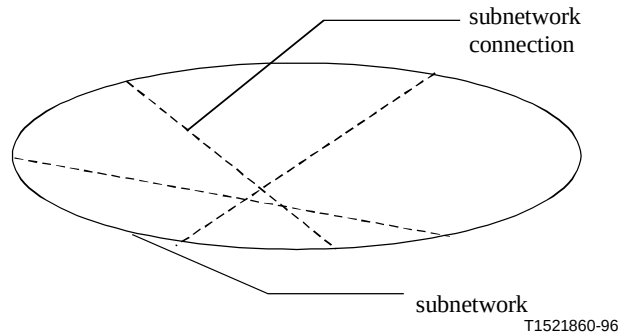
Reemplazada por una versión más reciente

A.3.2.28 Subred tiene conexiones de subred (subnetworkHasSubnetworkConnections)

A.3.2.28.1 Descripción informal

DEFINITION

"The subnetworkHasSubnetworkConnections relationship class describes the relationship that exists between a subnetwork and the subnetworkConnections that are part of it. This relationship type is a subtype of setOf."



ROLE

container

"Played by an instance of the subnetwork information object type or subtype".

element

"Played by an instance of the subnetworkConnection information object type or subtype".

A.3.2.28.2 Descripción semiformal

subnetworkHasSubnetworkConnections RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

subnetworkHasSubnetworkConnectionsBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH subnetwork AND SUBCLASSES;

ROLE element

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES;

A.3.2.28.3 Descripción formal

subnetworkHasSubnetworkConnections_Static

subnetworkHasSubnetworkConnections : F RELATIONSHIP

setOf_Static

subnetwork_Static

subnetworkConnection_Static

$subnetworkHasSubnetworkConnections \subseteq setOf$

$\forall R : subnetworkHasSubnetworkConnections \bullet$
 $container(R) \in subnetwork \wedge elementSet(R) \subseteq subnetworkConnection$

subnetworkHasSubnetworkConnections_Dynamic

$\Delta subnetworkHasSubnetworkConnections_Static$

setOf_Dynamic

subnetwork_Dynamic

subnetworkConnection_Dynamic

Reemplazada por una versión más reciente

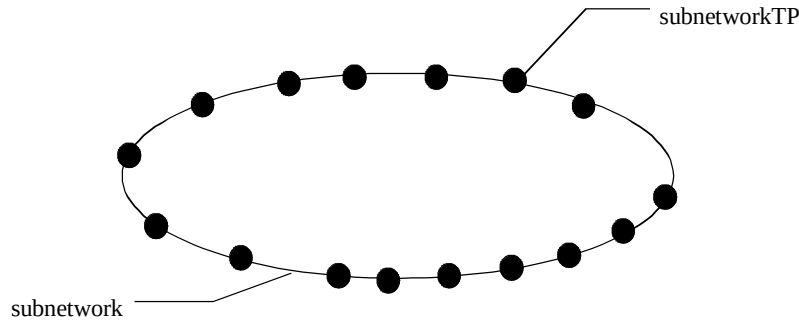
A.3.2.29 Subred está delimitada por (subnetworkIsDelimitedBy)

A.3.2.29.1 Descripción informal

DEFINITION

"The subnetworkIsDelimitedBy relationship class describes the relationship that exists between a subnetwork and the subnetworkTPs that delimit it.

This relationship type is a subtype of topologicalComponentIsDelimitedBy."



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ROLE

container

"Played by an instance of the subnetwork information object type or a subtype."

element

"Played by an instance of a subtype of the subnetworkTP information object type."

A.3.2.29.2 Descripción semiformal

subnetworkIsDelimitedBy RELATIONSHIP CLASS

DERIVED FROM topologicalComponentIsDelimitedBy;

BEHAVIOUR

subnetworkIsDelimitedByBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE container

COMPATIBLE WITH subnetwork AND SUBCLASSES;

ROLE element

COMPATIBLE WITH subnetworkTP AND SUBCLASSES;

A.3.2.29.3 Descripción formal

subnetworkIsDelimitedBy_Static

subnetworkIsDelimitedBy : F RELATIONSHIP

topologicalComponentIsDelimitedBy_Static

subnetwork_Static

subnetworkTP_Static

subnetworkIsDelimitedBy $\subseteq$ topologicalComponentIsDelimitedBy

$\forall R : \text{subnetworkIsDelimitedBy} \bullet \text{container}(R) \in \text{subnetwork} \wedge \text{elementSet} \subseteq \text{subnetworkTP}$

subnetworkIsDelimitedBy_Dynamic

$\Delta \text{subnetworkIsDelimitedBy_Static}$

topologicalComponentIsDelimitedBy_Dynamic

subnetwork_Dynamic

subnetworkTP_Dynamic

Reemplazada por una versión más reciente

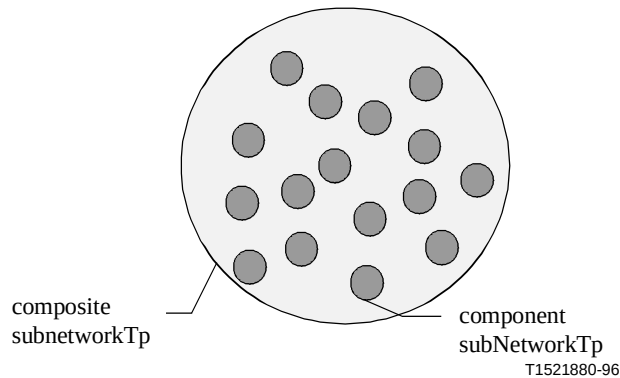
A.3.2.30 Punto de terminación de subred es haz de puntos de terminación de subred (subnetworkTPIsBundleOfSubnetworkTPs)

A.3.2.30.1 Descripción informal

DEFINITION

"The subnetworkTPIsBundleOfSubnetworkTPs relationship class describes the relationship that exists between a subnetworkTP and the subnetworkTPs that are part of it. (This relationship is similar to the information specification of the M.3100 gtp managed object class).

This relationship type is a subtype of setOf."



ROLE

container

"Played by an instance of a subtype of the subnetworkTP information object type."

element

"Played by an instance of a subtype of the subnetworkTP information object type."

INVARIANT

inv_1

"In a given relationship instance of subnetworkTPIsBundleOfNetworkTPs, the information objects having the role element must be related all to networkTTPs or all to networkCTPs."

A.3.2.30.2 Descripción semiformal

subnetworkTPIsBundleOfSubnetworkTPs RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

subnetworkTPIsBundleOfSubnetworkTPsBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_1>";;

ROLE container

COMPATIBLE WITH subnetworkTP AND SUBCLASSES;

ROLE element

COMPATIBLE WITH subnetworkTP AND SUBCLASSES;

A.3.2.30.3 Descripción formal

subnetworkTPIsBundleOfSubNetworkTPs_Static

subnetworkTPIsBundleOfSubNetworkTPs : F RELATIONSHIP

setOf_Static

subnetworkTP_Static

networkCTP_Static

networkTTP_Static

subnetworkTPIsRelatedToExtremity_Static

Reemplazada por una versión más reciente

$subnetworkTPIsBundleOfSubNetworkTPs \subseteq setOf$

$\forall R : subnetworkTPIsBundleOfSubNetworkTPs \bullet$
 $container(R) \in subnetworkTP \wedge elementSet \subseteq subnetworkTP$

$\forall R : subnetworkTPIsBundleOfSubNetworkTPs \bullet$
 $(elementSet(R) \subseteq abstraction(/SetsubnetworkTPIsRelatedToExtremity/) \wedge$
 $extremity(/abstractionSet~(/elementSet(R)/)/) \subseteq networkCTP \cup networkTTP)$

$subnetworkTPIsBundleOfSubNetworkTPs_Dynamic$

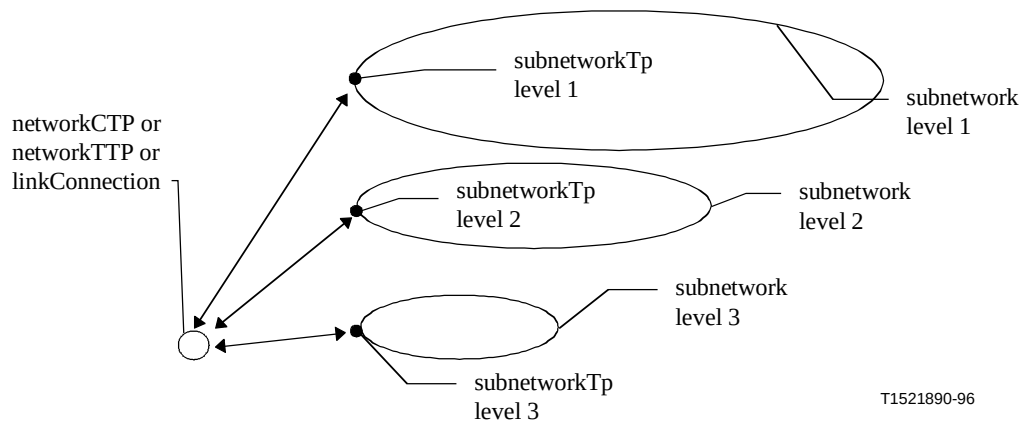
$\Delta subnetworkTPIsBundleOfSubNetworkTPs$
 $setOf_Dynamic$
 $subnetworkTP_Dynamic$
 $networkCTP_Dynamic$
 $networkTTP_Dynamic$
 $subnetworkTPIsRelatedToExtremity_Dynamic$

A.3.2.31 Punto de terminación de subred está relacionado con extremidad (subnetworkTPIsRelatedToExtremity)

A.3.2.31.1 Descripción informal

DEFINITION

"The subnetworkTPIsRelatedToExtremity relationship class describes the relationship that exists between subnetworkTPs a different level of partitioning and the extremity to which they are related."



ROLE

extremity

"Played by an instance of the networkTTP, networkCTP sub-types or linkConnection type or subtype".

abstraction

"Played by instances of the subnetworkTP sub-types."

INVARIANT

inv_1

"The following constraints on the types of related object have to be respected:

role: extremity	role: abstraction
networkCTPSink	subnetworkTPSource
networkTTPSource	subnetworkTPSource

Reemplazada por una versión más reciente

linkConnection with directionality=uni	subnetworkTPSource
networkCTPSource	subnetworkTPSink
networkTTPSink	subnetworkTPSink
linkConnection with directionality=uni	subnetworkTPSink
networkCTPBidirectional	subnetworkTPBidirectional
networkTTPBidirectional	subnetworkTPBidirectional
linkConnection with directionality=bid	subnetworkTPBidirectional

TRANSITION

tr_1

"The information objects having the role abstraction can leave the relationship without breaking it."

tr_2

"During the lifetime of the relationship, additional information objects having the role abstraction can enter the relationship."

tr_3

"The information objects having the role extremity can leave the relationship without breaking it."

A.3.2.31.2 Descripción semiformal

subnetworkTPIsRelatedToExtremity RELATIONSHIP CLASS

BEHAVIOURsubnetworkTPIsRelatedToExtremityBehaviour BEHAVIOUR

DEFINED AS "<DEFINITION>,"

<inv_1>";;

ROLE extremity

COMPATIBLE WITH networkTTP AND SUBCLASSES,

networkCTP AND SUBCLASSES, linkConnection AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1),

UNBIND;

ROLE abstraction

COMPATIBLE WITH subnetworkTP AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..N),

BIND-SUPPORT

UNBIND-SUPPORT;

A.3.2.31.3 Descripción formal

subnetworkTPIsRelatedToExtremity_Static

subnetworkTPIsRelatedToExtremity : ϕ RELATIONSHIP

extremity : RELATIONSHIP ' OBJECT

abstractionSet : RELATIONSHIP ' ϕ OBJECT

linkConnection_Static

networkCTP_Static

networkTTP_Static

subnetworkTP_Static

networkCTPSink_Static

networkCTPSource_Static

networkCTPBidirectional_Static

networkTTPSink_Static

networkTTPSource_Static

networkTTPBidirectional_Static

subnetworkTPSink_Static

subnetworkTPSource_Static

subnetworkTPBidirectional_Static

Reemplazada por una versión más reciente

subnetworkTPIsRelatedToExtremity " **dom** *extremity*

subnetworkTPIsRelatedToExtremity $\subseteq$ **dom** *abstractionSet*

$\forall R : \text{subnetworkTPIsRelatedToExtremity} \bullet$
 $\text{extremity}(R) \in \text{linkConnection} \cup \text{networkCTP} \cup \text{networkTTP} \wedge$
 $\text{abstractionSet}(R) \subseteq \text{subnetworkTP}$

$\forall R : \text{subnetworkTPIsRelatedToExtremity} \bullet \#(\text{abstractionSet}(R)) \geq 1$

$\forall R : \text{subnetworkTPIsRelatedToExtremity} \bullet \text{let } e == \text{extremity}(R); aSet == \text{abstractionSet}(R) \bullet$
 $(e \in \text{networkCTPSink} \wedge aSet(R) \subseteq \text{subnetworkTPSource}) \vee$
 $(e \in \text{networkTTPSource} \wedge aSet \subseteq \text{subnetworkTPSource}) \vee$
 $(e \in \text{linkConnection} \wedge \text{directionality}(e) = \text{unidirectional} \vee aSet \subseteq \text{subnetworkTPSource}) \vee$
 $(e \in \text{networkCTPSource} \wedge aSet \subseteq \text{subnetworkTPSink}) \vee$
 $(e \in \text{networkTTPSink} \wedge aSet \subseteq \text{subnetworkTPSink}) \vee$
 $(e \in \text{linkConnection} \wedge \text{directionality}(e) = \text{unidirectional} \vee aSet \subseteq \text{subnetworkTPSink}) \vee$
 $(e \in \text{networkCTPBidirectional} \wedge aSet \subseteq \text{subnetworkTPBidirectional}) \vee$
 $(e \in \text{networkTTPBidirectional} \wedge aSet \subseteq \text{subnetworkTPBidirectional}) \vee$
 $(e \in \text{linkConnection} \wedge \text{directionality}(e) = \text{bidirectional} \vee aSet \subseteq \text{subnetworkTPBidirectional})$

subnetworkTPIsRelatedToExtremity_Dynamic _____

Δ *subnetworkTPIsRelatedToExtremity_Static*

linkConnection_Dynamic

networkCTP_Dynamic

networkTTP_Dynamic

subnetworkTP_Dynamic

networkCTPSink_Dynamic

networkCTPSource_Dynamic

networkCTPBidirectional_Dynamic

networkTTPSink_Dynamic

networkTTPSource_Dynamic

networkTTPBidirectional_Dynamic

subnetworkTPSink_Dynamic

subnetworkTPSource_Dynamic

subnetworkTPBidirectional_Dynamic

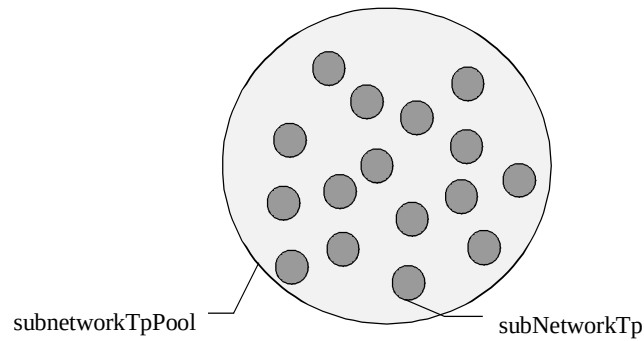
A.3.2.32 Fondo común de puntos de terminación de subred consiste en puntos de terminación de subred (*subnetworkTPPoolIsMadeOfSubnetworkTP*)

A.3.2.32.1 Descripción informal

DEFINITION

"The *subnetworkTPPoolIsMadeOfSubnetworkTP* relationship class describes the relationship that exists between a *subnetworkTPPool* and the *SubnetworkTPs* that are part of it.
This relationship is a subtype of *setOf*."

Reemplazada por una versión más reciente



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ROLE

container

"Played by an instance subnetworkTPPool the information object type or subtype".

element

"Played by instances of a subtype of the SubnetworkTP information object type:
networkInformationTop."

INVARIANT

inv_1

"In a given relationship instance of subnetworkTPPoolIsMadeOfSubnetworkTP, the information objects playing the role element must have all the same signalIdentification value."

A.3.2.32.2 Descripción semiformal

subnetworkTPPoolIsMadeOfSubnetworkTP RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

subnetworkTPPoolIsMadeOfSubnetworkTP Behaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,
<inv_1>";;

ROLE container

COMPATIBLE WITH subnetworkTPPool AND SUBCLASSES;

ROLE element

COMPATIBLE WITH SubnetworkTP AND SUBCLASSES;

A.3.2.32.3 Descripción formal

subnetworkTPPoolIsMadeOfSubNetworkTPs_Static

subnetworkTPPoolIsMadeOfSubNetworkTPs : F RELATIONSHIP

setOf_Static

subnetworkTPPool_Static

subnetworkTP_Static

subnetworkTPPoolIsMadeOfSubNetworkTPs $\subseteq$ setOf

$\forall R : \text{subnetworkTPPoolIsMadeOfSubNetworkTPs} \bullet$

$\text{container}(R) \in \text{subnetworkTPPool} \wedge \text{elementSet}(R) \subseteq \text{subnetworkTP}$

subnetworkTPPoolIsMadeOfSubNetworkTPs_Dynamic

$\Delta \text{subnetworkTPPoolIsMadeOfSubNetworkTPs_Static}$

setOf_Dynamic

subnetworkTPPool_Dynamic

subnetworkTP_Dynamic

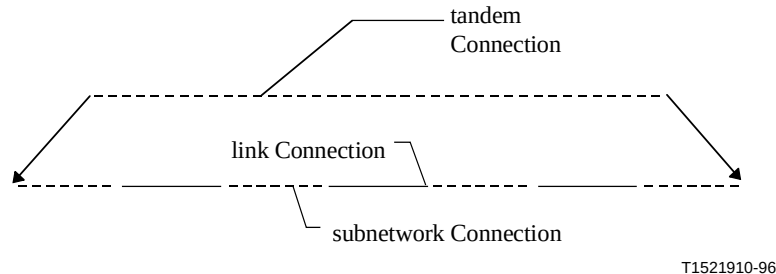
Reemplazada por una versión más reciente

A.3.2.33 Conexión en cascada consiste en entidades de transporte (tandemConnectionIsMadeOfTransportEntities)

A.3.2.33.1 Descripción informal

DEFINITION

"The tandemConnectionIsMadeOfTransportEntities relationship class describes the relationship that exists between a tandem connection and its component transport entities.
This relationship type is a subtype of transportEntitiesComposeTransportEntity."



ROLE

composite

"Played by an instance of the tandem connection information object type or subtype."

component

"Played by an instance of the subnetworkConnection information object type or subtype, or linkConnection information object type or subtype."

A.3.2.33.2 Descripción semiformal

tandemConnectionIsMadeOfTransportEntities RELATIONSHIP CLASS

DERIVED FROM transportEntitiesComposeTransportEntity;

BEHAVIOUR

tandemConnectionIsMadeOfTransportEntitiesBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE composite

COMPATIBLE WITH tandemConnection AND SUBCLASSES;

ROLE component

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES,
linkConnection AND SUBCLASSES;

A.3.2.33.3 Descripción formal

tandemConnectionIsMadeOfTransportEntities_Static <i>tandemConnectionIsMadeOfTransportEntities</i> : F RELATIONSHIP <i>transportEntitiesComposeTransportEntity_Static</i> <i>tandemConnection_Static</i> <i>linkConnection_Static</i> <i>subnetworkConnection_Static</i> <i>tandemConnectionIsMadeOfTransportEntities</i> $\subseteq$ <i>transportEntitiesComposeTransportEntity</i> $\forall R : \text{tandemConnectionIsMadeOfTransportEntities} \bullet$ $\text{composite}(R) \in \text{tandemConnection} \wedge$ $\text{ran}(\text{componentSeq}(R)) \subseteq \text{subnetworkConnection} \cup \text{linkConnection}$

Reemplazada por una versión más reciente

tandemConnectionIsMadeOfTransportEntities_Dynamic

Δ tandemConnectionIsMadeOfTransportEntities_Static

transportEntitiesComposeTransportEntity_Dynamic

tandemConnection_Dynamic

linkConnection_Dynamic

subnetworkConnection_Dynamic

A.3.2.34 Componente topológico está delimitado por (topologicalComponentIsDelimitedBy)

A.3.2.34.1 Descripción informal

DEFINITION

"The topologicalComponentIsDelimitedBy relationship class describes the relationship that exists between a topological component and the subnetworkTPs / networkConnectivities that delimit it.

This relationship type is a subtype of setOf."

Explaining figure in the subclasses.

ROLE

container

"Played by an instance of the layerNetworkDomain information object type or subtype, or the subnetwork information object type or subtype."

element

"Played by an instance of a sub-type of: subnetworkTP, networkTTP or transportConnection."

INVARIANT

inv_1

"In a given relationship instance of topologicalComponentIsDelimitedBy, the information objects having the role element must be either all subnetworkTPs subtype or all transportConnections subtype."

A.3.2.34.2 Descripción semiformal

topologicalComponentIsDelimitedBy RELATIONSHIP CLASS

DERIVED FROM setOf;

BEHAVIOUR

topologicalComponentIsDelimitedByBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_1>";;

ROLE container

**COMPATIBLE WITH subnetwork AND SUBCLASSES,
layerNetworkDomain AND SUBCLASSES;**

ROLE element

**COMPATIBLE WITH subnetworkTP AND SUBCLASSES,
transportConnection AND SUBCLASSES,
networkTTP AND SUBCLASSES;**

A.3.2.34.3 Descripción formal

topologicalComponentIsDelimitedBy_Static

topologicalComponentIsDelimitedBy : F RELATIONSHIP

setOf_Static

layerNetworkDomain_Static

subnetwork_Static

subnetworkTP_Static

networkTTP_Static

transportConnection_Static

Reemplazada por una versión más reciente

topologicalComponentIsDelimitedBy $\subseteq$ *setOf*

$\forall R : \text{topologicalComponentIsDelimitedBy} \bullet$
 $\text{container}(R) \in \text{layerNetworkDomain} \cup \text{subnetwork} \wedge$
 $\text{elementSet}(R) \subseteq \text{subnetworkTP} \cup \text{networkTTP} \cup \text{transportConnection}$

$\forall R : \text{topologicalComponentIsDelimitedBy} \bullet$
 $\text{elementSet}(R) \subseteq \text{subnetworkTP} \vee \text{elementSet}(R) \subseteq \text{transportConnection}$

topologicalComponentIsDelimitedBy_Dynamic

$\Delta \text{topologicalComponentIsDelimitedBy_Static}$

setOf_Dynamic

layerNetworkDomain_Dynamic

subnetwork_Dynamic

subnetworkTP_Dynamic

networkTTP_Dynamic

transportConnection_Dynamic

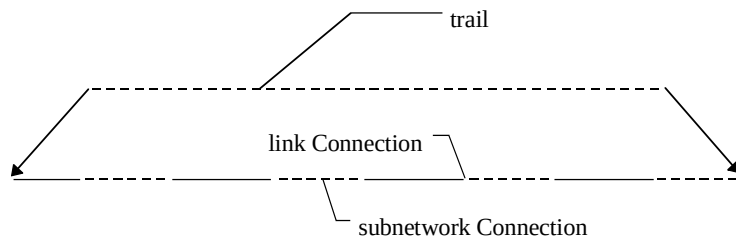
A.3.2.35 Camino consiste en entidades de transporte (trailIsMadeOfTransportEntities)

A.3.2.35.1 Descripción informal

DEFINITION

"The trailIsMadeOfTransportEntities relationship class describes the relationship that exists between a trail and its component transport entities.

This relationship type is a subtype of transportEntitiesComposeTransportEntity."



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ROLE

composite

"Played by an instance of the trail information object type or subtype."

component

"Played by an instance of the subnetworkConnection information object type or subtype, or linkConnection information object type or subtype."

A.3.2.35.2 Descripción semiformal

trailIsMadeOfTransportEntities RELATIONSHIP CLASS

DERIVED FROM transportEntitiesComposeTransportEntity;

BEHAVIOUR

trailIsMadeOfTransportEntitiesBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>";;

ROLE composite

COMPATIBLE WITH trail AND SUBCLASSES;

ROLE component

COMPATIBLE WITH subnetworkConnection AND SUBCLASSES,
linkConnection AND SUBCLASSES;

Reemplazada por una versión más reciente

A.3.2.35.3 Descripción formal

$\text{trailIsMadeOfTransportEntities_Static}$
$\text{trailIsMadeOfTransportEntities} : \mathbf{F} \text{ RELATIONSHIP}$ $\text{transportEntitiesComposeTransportEntity_Static}$ trail_Static $\text{linkConnection_Static}$ $\text{subnetworkConnection_Static}$
$\text{trailIsMadeOfTransportEntities} \subseteq \text{transportEntitiesComposeTransportEntity}$
$\forall R : \text{trailIsMadeOfTransportEntities} \bullet$ $\text{composite}(R) \in \text{trail} \wedge \mathbf{ran}(\text{componentSeq}(R)) \subseteq \text{subnetworkConnection} \cup \text{linkConnection}$
$\text{trailIsMadeOfTransportEntities_Dynamic}$
$\Delta \text{trailIsMadeOfTransportEntities_Static}$ $\text{transportEntitiesComposeTransportEntity_Dynamic}$ trail_Dynamic $\text{linkConnection_Dynamic}$ $\text{subnetworkConnection_Dynamic}$

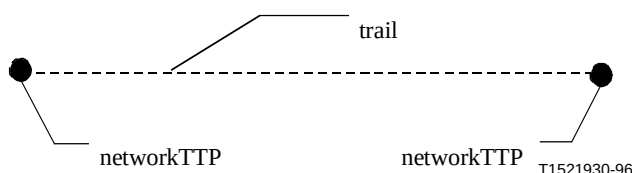
A.3.2.36 Punto a punto termina camino (trailIsTerminatedByPointToPoint)

A.3.2.36.1 Descripción informal

DEFINITION

"The **trailIsTerminatedByPointToPoint** relationship class describes the relationship that exists between a trail and its two extremities.

This relationship type is a subtype of **extremitiesTerminateTransportEntityPointToPoint** and **extremitiesTerminateTrail**."



A.3.2.36.2 Descripción semiformal

trailIsTerminatedByPointToPoint RELATIONSHIP CLASS

DERIVED FROM **extremitiesTerminateTransportEntityPointToPoint**,
extremitiesTerminateTrail;

BEHAVIOUR

trailIsTerminatedByPointToPointBehaviour **BEHAVIOUR**

DEFINED AS

"<DEFINITION>";;

A.3.2.36.3 Descripción formal

$\text{trailIsTerminatedByPointToPoint_Static}$
$\text{trailIsTerminatedByPointToPoint} : \mathbf{F} \text{ RELATIONSHIP}$ $\text{extremitiesTerminateTransportEntityPointToPoint_Static}$ $\text{extremitiesTerminateTrail_Static}$
$\text{trailIsTerminatedByPointToPoint}$ $\subseteq \text{extremitiesTerminateTransportEntityPointToPoint} \cup \text{extremitiesTerminateTrail}$

Reemplazada por una versión más reciente

trailIsTerminatedByPointToPoint_Dynamic

Δ trailIsTerminatedByPointToPoint_Static

extremitiesTerminateTransportEntityPointToPoint_Dynamic

extremitiesTerminateTrail_Dynamic

A.3.2.37 Entidad de transporte compone entidades de transporte (transportEntitiesComposeTransportEntity)

A.3.2.37.1 Descripción informal

DEFINITION

"The transportEntitiesComposeTransportEntity relationship class describes the relationship that exists between a composite transport entity and its component transport entities."

Explaining figure in the subclasses.

ROLE

composite

"Played by an instance of a subtype of the information object type : transportConnection."

component

"Played by an instance of a subtype of the information object type : transportConnection."

INVARIANT

inv_1

"One and only one instance of the role composite must participate in the relationship."

inv_2

"At least, one instance of the role component must participate in the relationship."

inv_3

"If the information object playing the role composite is bi-directional, then all the information objects playing the role component must be bi-directional."

TRANSITION

tr_1

"The information objects playing the role component, provided one remains, can leave the relationship without breaking it."

tr_2

"During the lifetime of the relationship, additional information objects can enter the relationship, playing the role component."

A.3.2.37.2 Descripción semiformal

transportEntitiesComposeTransportEntity RELATIONSHIP CLASS

BEHAVIOUR

transportEntitiesComposeTransportEntityBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

<inv_3>";;

ROLE composite

COMPATIBLE WITH transportConnection AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..1) ;

ROLE component

COMPATIBLE WITH transportConnection AND SUBCLASSES

PERMITTED-ROLE-CARDINALITY-CONSTRAINT (1..N)

BIND-SUPPORT

UNBIND-SUPPORT;

A.3.2.37.3 Descripción formal

transportEntitiesComposeTransportEntity_Static

transportEntitiesComposeTransportEntity : F RELATIONSHIP

composite : RELATIONSHIP $\rightarrow$ OBJECT

componentSeq : RELATIONSHIP $\rightarrow$ seq OBJECT

transportConnection_Static

Reemplazada por una versión más reciente

$transportEntitiesComposeTransportEntity \subseteq \mathbf{dom} \text{ composite}$

$transportEntitiesComposeTransportEntity \subseteq \mathbf{dom} \text{ componentSeq}$

$\forall R : transportEntitiesComposeTransportEntity \bullet$
 $composite(R) \in transportConnection \wedge \mathbf{ran}(componentSeq(R)) \subseteq transportConnection$

$\forall R : transportEntitiesComposeTransportEntity \bullet \#(componentSeq(R)) \geq 1$

$\forall R : transportEntitiesComposeTransportEntity \bullet$
 $directionality(composite(R)) = \mathbf{bidirectional} \Rightarrow$
 $(\forall c : \mathbf{ran} \text{ componentSeq}(R) \bullet directionality(c) = \mathbf{bidirectional})$

$__transportEntitiesComposeTransportEntity_Dynamic__$

$\Delta transportEntitiesComposeTransportEntity_Static$
 $transportConnection_Dynamic$

$\forall R : transportEntitiesComposeTransportEntity \cup transportEntitiesComposeTransportEntity' \bullet$
 $composite'(R) = composite(R)$

A.4 Definición de los tipos de atributo

A.4.1 Direccionalidad

A.4.1.1 Descripción informal

DEFINITION

"The directionality attribute characterises the ability of the associated resource to carry traffic in one or two directions. The semantic of this attribute is imported from M.3100:1994 directionality attribute."

INVARIANT

inv_1

"The directionality associated with an information object must not change during its whole lifetime."

STATE

$unidirectional$

"The resource is able to carry the signal in only one direction."

$bidirectional$

"The resource is able to carry the signal in two directions."

A.4.1.2 Descripción semiformal

$directionality\mathbf{ATTRIBUTE}$

$\mathbf{BEHAVIOUR}$

$\mathbf{DEFINED\ AS}$

"<DEFINITION>

$\mathbf{INVARIANT}$

$inv_1;$

$\mathbf{STATES}$

$unidirectional,$

$bidirectional;$

";;;

A.4.1.3 Descripción formal

$Directionality ::= unidirectional \mid bidirectional$

$__directionality_Static__$

$directionality : OBJECT \rightarrow Directionality$

Reemplazada por una versión más reciente

$\text{directionality_Dynamic}$
$\Delta \text{directionality_Static}$
$\forall \text{ object} : \text{dom directionality} \cap \text{dom directionality}' \bullet$ $\text{directionality}'(\text{object}) = \text{directionality}(\text{object})$

A.4.2 Identificación de señal

A.4.2.1 Descripción informal

DEFINITION

"The signalIdentification attribute represents the specific format of signal that the resource carries. The specific formats will be defined in the technology specific extensions."

INVARIANT

Invariants depend on transmission technology.

STATE

States depend on transmission technology.

TRANSITION

Transitions depends on transmission technology.

A.4.2.2 Descripción semiformal

signalIdentification ATTRIBUTE

BEHAVIOUR

DEFINED AS

"<DEFINITION>,"

INVARIANT

;

STATES

;

";;;

A.4.2.3 Descripción formal

[SignalIdentification]

$\text{signalIdentification_Static}$
$\text{signalIdentification} : \text{OBJECT} \rightarrow \text{SignalIdentification}$
$\text{signalIdentification_Dynamic}$
$\Delta \text{signalIdentification_Invariant}$

A.5 Definición de los esquemas estáticos

Ninguna.

A.6 Definición de los esquemas dinámicos

Ninguna.

Reemplazada por una versión más reciente

ANEXO B

Definición de los atributos

B.1 Estado operacional

B.1.1 Descripción informal

DEFINITION

"The operationalState attribute characterises the operability of the associated resource. The semantic of this attribute is imported from X.721:1992 operationalState attribute."

STATE

disabled

"The resource is totally inoperable and unable to provide service to the user(s)."

enabled

"The resource is partially or fully operable and available for use."

B.1.2 Descripción semiformal

operationalState ATTRIBUTE

BEHAVIOUR

DEFINED AS

"DEFINITION

STATES

disabled,

enabled";;

B.1.3 Descripción formal

OperationalState ::= enabled | disabled

operationalState_Static

operationalState: OBJECT → OperationalState

operationalState_Dynamic

Δ operationalState_Static

B.2 Etiqueta de usuario

B.2.1 Descripción informal

DEFINITION

"The userLabel attribute type assigns a userfriendly name to the associated resource. The semantic of this attribute is imported from M.3100:1994 userLabel attribute."

B.2.2 Descripción semiformal

userLabel ATTRIBUTE

BEHAVIOUR

DEFINED AS

"DEFINITION";

B.2.3 Descripción formal

[UserLabel]

userLabel_Static

userLabel: OBJECT → UserLabel

Reemplazada por una versión más reciente

$\text{operationalState_Dynamic}$
$\Delta \text{userLabel_Static}$
$\forall \text{object} : \text{OBJECT} \mid \text{object} \in \text{dom userLabel} \cup \text{dom userLabel}' \bullet$ $\text{userLabel}'(\text{object}) = \text{userLabel}(\text{object})$

APÉNDICE I

Utilización de los conceptos de la Recomendación G.805 en el contexto del punto de vista de la información común

Este apéndice es un resumen de los principales conceptos funcionales y de arquitectura definidos en la Recomendación G.805 para describir una red de transporte.

I.1 Conceptos de la Recomendación G.805

Una red de telecomunicaciones es una estructura compleja, que se puede describir de diversas formas según la finalidad concreta de la descripción. En la Recomendación G.805 se describe la red como una red de transporte desde el punto de vista de su capacidad de transferencia de información. Más específicamente, se describen las arquitecturas funcionales y estructurales de las redes de transporte de una forma independiente de la tecnología de las redes.

La Recomendación G.805 describe la arquitectura funcional de las redes de transporte de forma independiente de la tecnología mediante dos conceptos principales: estratificación y subdivisión.

I.2 Componentes de arquitectura

Se utiliza el término subred para representar un conjunto de puertos disponible para la transferencia de una señal. Las asociaciones entre los puertos en la frontera de una subred (conexión de subred) pueden constituirse y deshacerse mediante un proceso de gestión de red de capa.

Un enlace representa la relación topológica y la capacidad de transporte disponible entre conjuntos de puertos de un par de subredes, a efectos de transferencia de información característica. Una conexión de enlace es capaz de transferir información por un enlace.

I.3 Concepto de estratificación

Se puede descomponer la red de transporte en cierto número de redes de capa independientes, con una relación cliente/servidor entre redes de capas adyacentes. Una red de capa describe la generación, el transporte y la terminación de una información característica determinada (o sea, protocolos y velocidades de transmisión específicos).

La relación cliente/servidor entre redes de capas adyacentes es aquella en la que un camino de la red de capa servidor soporta una conexión de enlace en la red de capa cliente. Esto se ilustra en la figura I.1. La figura I.2 demuestra la correspondencia entre los conceptos de la Recomendación G.805 y los objetos del punto de vista de la información común.

El concepto de adaptación se introduce para describir la manera en que se modifica la información característica de red de capa cliente para transportarla por un camino de la red de capa servidor. Un camino tiene asociada información con integridad de extremo a extremo (es decir, que la paridad bipolar es importante).

Desde el punto de vista funcional de la red de transporte, la función de adaptación cae entre dos redes de capa. Todos los puntos de referencia que pertenecen a una sola red de capa (ya se tienen, por

Reemplazada por una versión más reciente

ejemplo, la misma velocidad y formato) se pueden visualizar como si estuvieran colocados en un único plano, como se ilustra en la figura I.3 (Ejemplo de redes de capa asociadas por grupos de acceso).

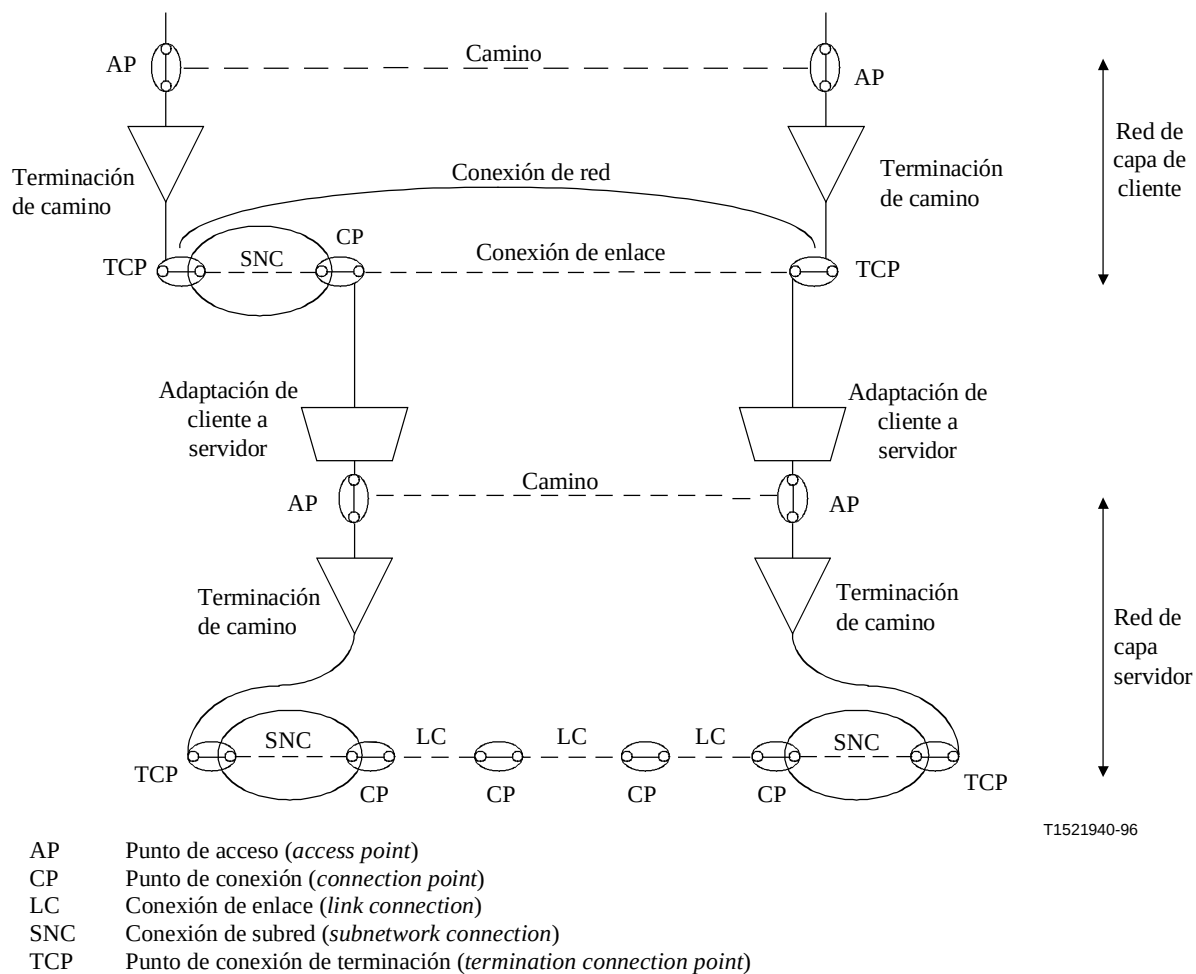
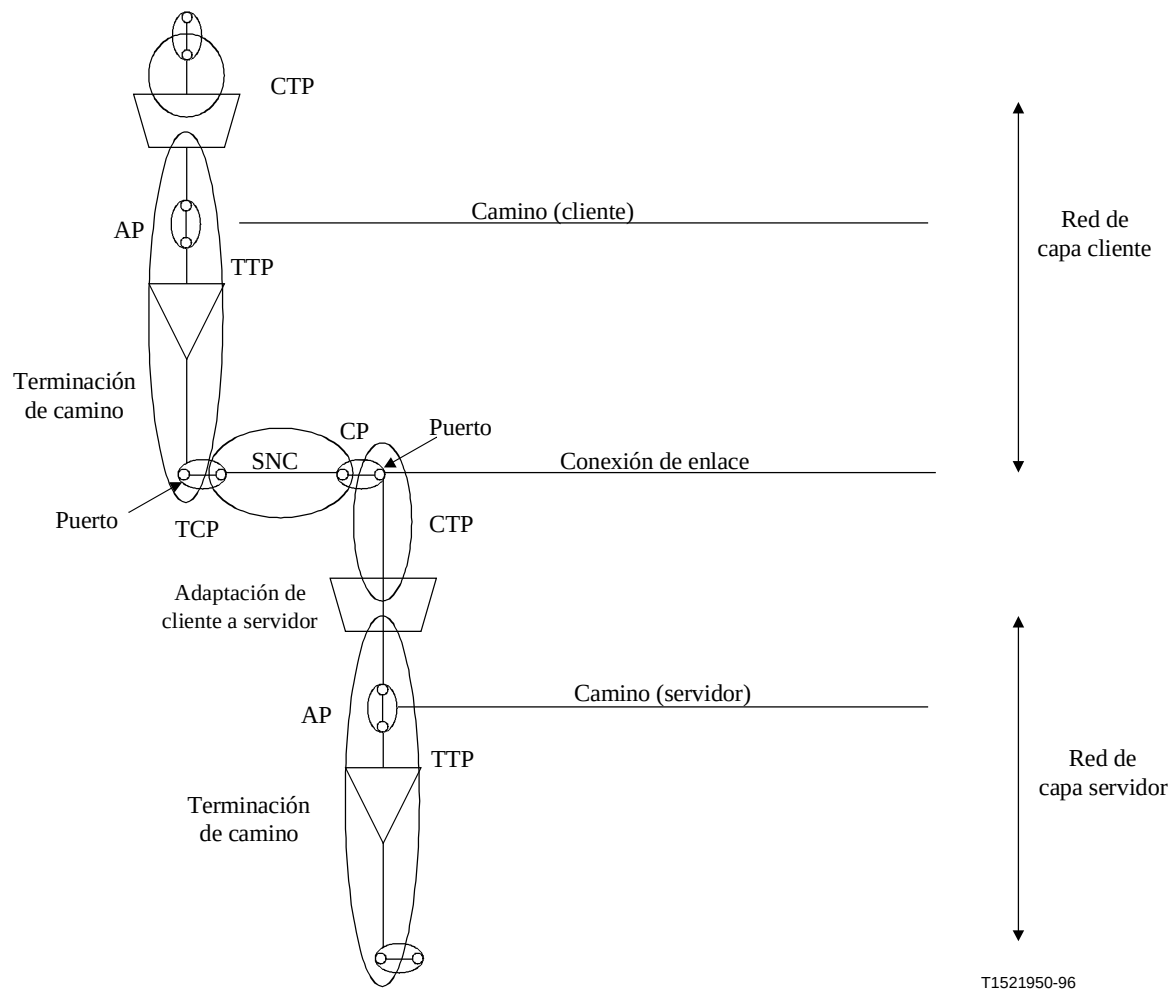


Figura I.1/G.853.1 – Red de capa

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CTP Punto de terminación de conexión de red (*networkCTP*)
TTP Punto de terminación de camino de red (*networkTTP*)

Figura I.2/G.853.1 – Correspondencia entre la Recomendación G.805 y los objetos del punto de vista de la información

Reemplazada por una versión más reciente

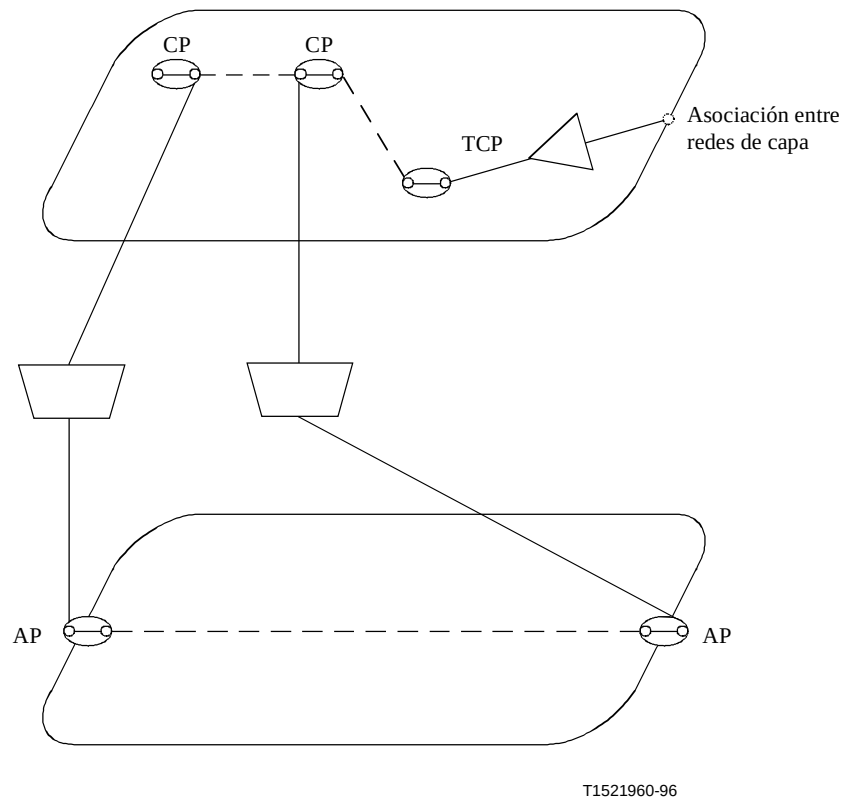


Figura I.3/G.853.1 – Relación entre redes de capa

I.4 Concepto de subdivisión

En general, una subred se construye representando la implementación física mediante enlaces y subredes, comenzando por la matriz [(que es la subred más pequeña) (indivisible)]. Se puede representar de forma abstracta un conjunto de subredes (matrices) y enlaces en forma de una subred contenedora.

La manera en que se interconectan las subredes contenidas mediante enlaces describe la topología de la subred contenedora. Los puertos situados en la frontera de la subred contenedora y la capacidad de interconexión representan la conectividad soportada por las subredes contenidas y los enlaces.

Desde la perspectiva de la gestión, la topología de una subred queda oculta para sus subredes contenedoras. Las subredes muestran únicamente los puntos de conexión de entrada y de salida de la subred en una capa determinada. Las subredes son recurrentes en el sentido de que contienen otras subredes interconectadas por enlaces. En el nivel más bajo de recurrencia dentro de la capa, una subred es una NE con puntos conectables. Este caso degenerado produce visibilidad nodal.

Las figuras I.4 (Subdivisión de una red de capa) e I.5 (Ejemplo de aplicación del concepto de subdivisión) ilustran el concepto de subdivisión.

Cuando se subdivide una subred, las conexiones de subred (a lo largo de esta subred) están representadas por la concatenación de una serie de conexiones de enlace y conexiones de subred contiguas. Una conexión de red o conexión de subred se puede descomponer en una concatenación de otras entidades de transporte (enlace o conexión de subred), que reflejan la subdivisión de una subred.

Reemplazada por una versión más reciente

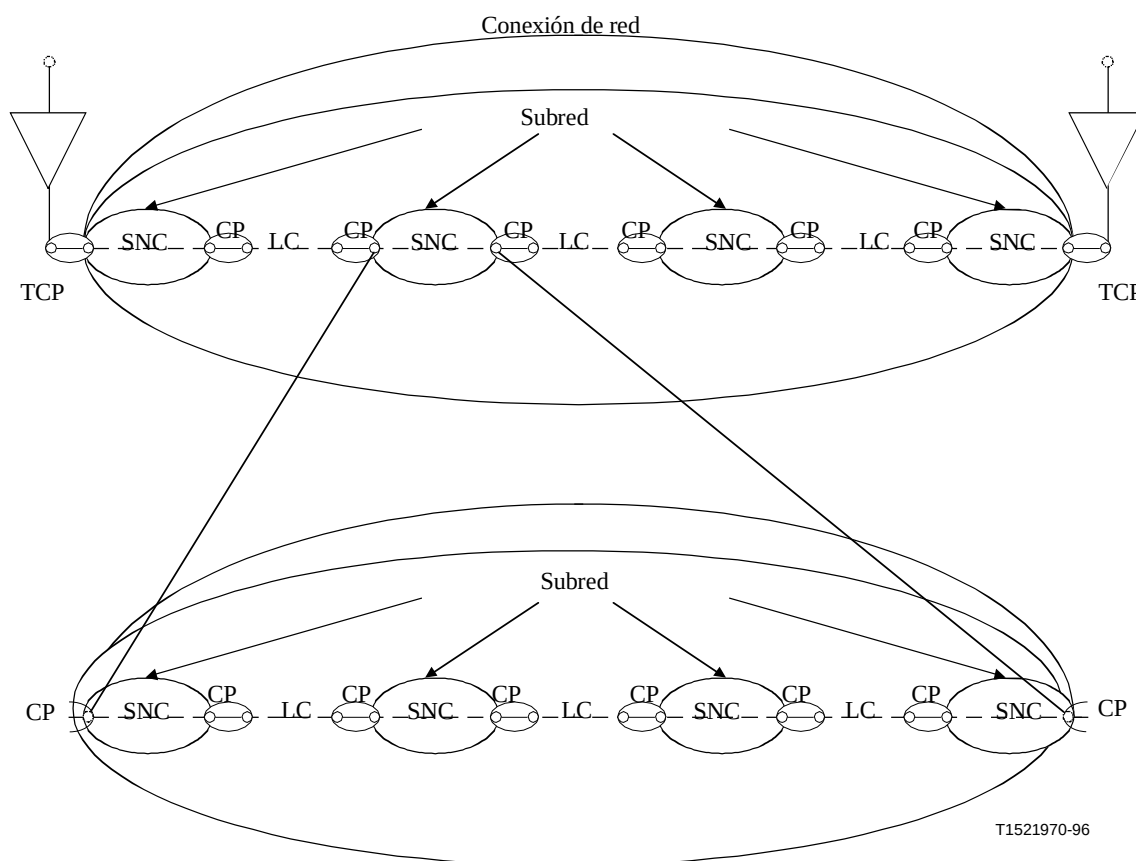
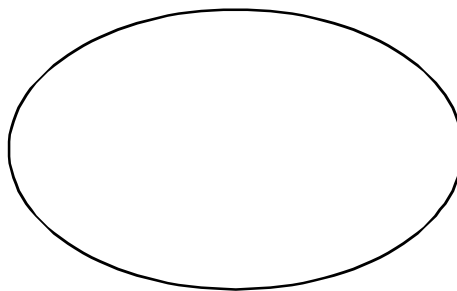


Figura I.4/G.853.1 – Subdivisión de una red de capa

Reemplazada por una versión más reciente

Subdivisión de una capa de red de telecomunicaciones determinada

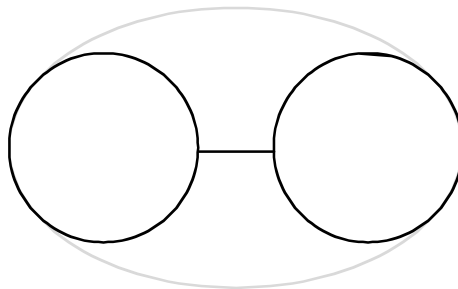
- Una red de capa se puede subdividir en subredes



Nivel 1

por ejemplo, red nacional a 2 Mbits

- Una subred se puede subdividir recurrentemente en otras subredes

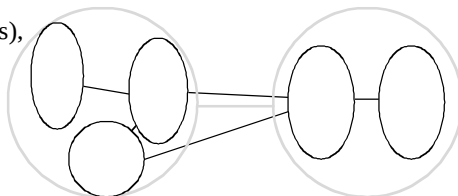


Nivel 2

por ejemplo, subredes nacionales Este y Oeste a 2 Mbits

- La subdivisión puede ser dependiente de la aplicación

- La visión más detallada se detiene en la visión del nodo (un nodo no se puede descomponer en otras subredes), denominado matriz



Nivel 3

T1521980-96

Figura I.5/Q.G.853.1 – Ejemplo de aplicación del concepto de subdivisión

I.5 Estratificación y subdivisión en una red gestionada

Utilizados conjuntamente, los conceptos de subdivisión y estratificación ortogonal proporcionan la capacidad de "dividir" las redes según una estructura múltiple, con objeto de identificar los puntos de conexión que funcionan en cada capa y vincularlos a otros puntos de la red.

La relación entre la estratificación y la subdivisión se ilustra en la figura I.6.

Reemplazada por una versión más reciente

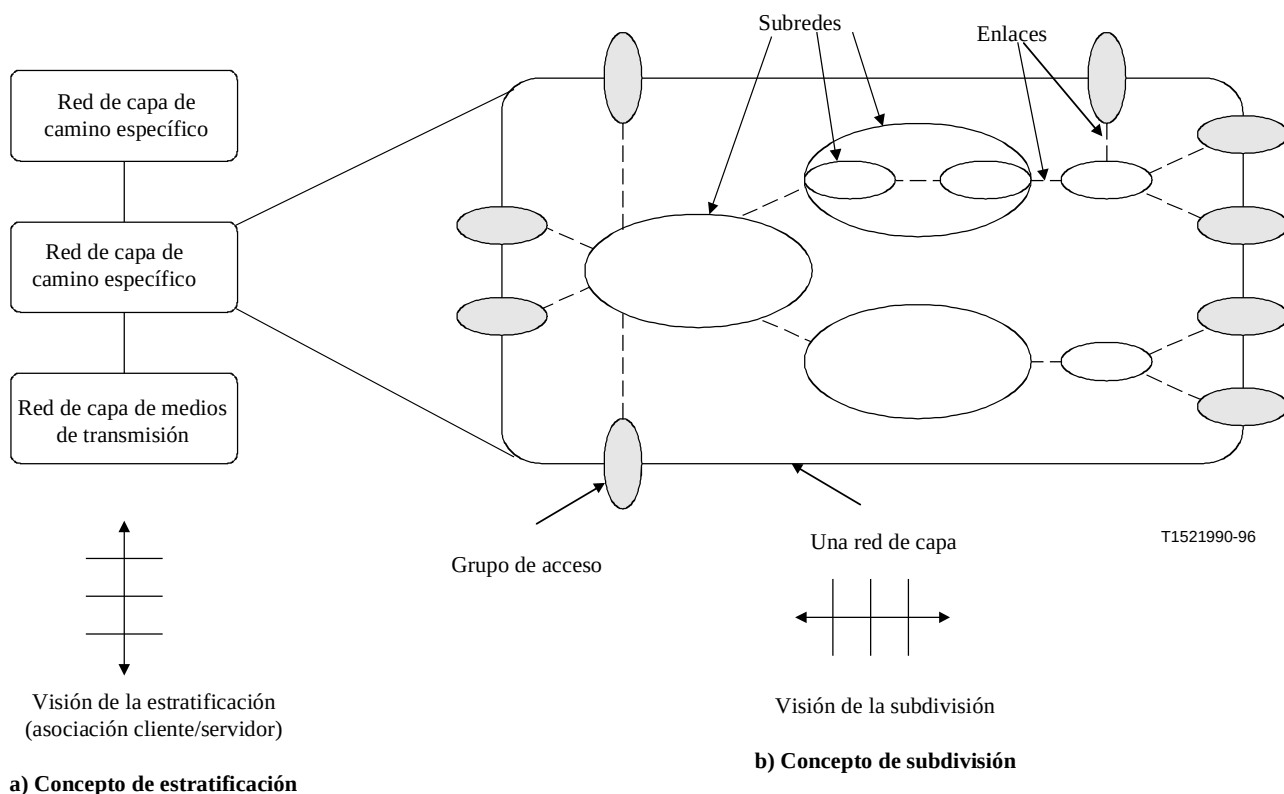
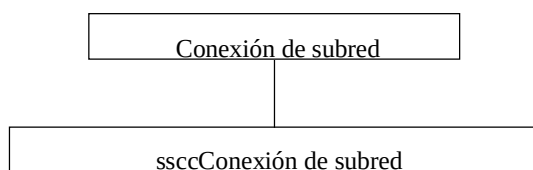


Figura I.6/G.853.1 – Relación entre la estratificación y la subdivisión

APÉNDICE II

Ejemplo de utilización del punto de vista de la información común para derivar objetos de información en un punto de vista de la información específico de la aplicación de gestión

Diagramas de clases de objetos y relaciones de información



T1522000-96

Diagrama de herencia

ssccSubnetwork

Descripción informal

DEFINITION

"This object class is derived from subnetwork."

RELATIONSHIP

"<subnetworkIsDelimitedBy>,
<subnetworkHasSubnetworkConnections>"

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Descripcion semiformal

ssccSubnetwork INFORMATION OBJECT CLASS

DERIVED FROM G.853.1: subnetworkConnection;

CHARACTERIZED BY

ssccSubnetworkConnectionPackagePACKAGE

BEHAVIOUR

ssccsubnetworkConnectionBehaviour BEHAVIOUR

DEFINED AS

"<DEFINITION>,

<subnetworkIsDelimitedBy>

<subnetworkHasSubnetworkConnections>"

;;

Reemplazada por una versión más reciente

SERIES DE RECOMENDACIONES DEL UIT-T

Serie A	Organización del trabajo del UIT-T
Serie B	Medios de expresión: definiciones, símbolos, clasificación
Serie C	Estadísticas generales de telecomunicaciones
Serie D	Principios generales de tarificación
Serie E	Explotación general de la red, servicio telefónico, explotación del servicio y factores humanos
Serie F	Servicios de telecomunicación no telefónicos
Serie G	Sistemas y medios de transmisión, sistemas y redes digitales
Serie H	Sistemas audiovisuales y multimedios
Serie I	Red digital de servicios integrados
Serie J	Transmisiones de señales radiofónicas, de televisión y de otras senales multimedios
Serie K	Protección contra las interferencias
Serie L	Construcción, instalación y protección de los cables y otros elementos de planta exterior
Serie M	Mantenimiento: sistemas de transmisión, circuitos telefónicos, telegrafía, facsímil y circuitos arrendados internacionales
Serie N	Mantenimiento: circuitos internacionales para transmisiones radiofónicas y de televisión
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