UNIÓN INTERNACIONAL DE TELECOMUNICACIONES

UIT-T G.854.8

(03/99)

SECTOR DE NORMALIZACIÓN
DE LAS TELECOMUNICACIONES
DE LA UIT

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

Sistemas de transmisión digital – Redes digitales – Gestión de red de transporte

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Punto de vista computacional para la gestión de adaptación proporcionada previamente

Recomendación UIT-T G.854.8

(Anteriormente Recomendación del CCITT)

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RECOMENDACIÓN UIT-T G.854.8

PUNTO DE VISTA COMPUTACIONAL PARA LA GESTIÓN DE ADAPTACIÓN PROPORCIONADA PREVIAMENTE

Resumen

El objetivo de la comunidad de gestión de la adaptación proporcionada previamente es el de proporcionar la capacidad de enlace a la capa o capas de cliente a partir de una capa servidor. Esta comunidad se debe utilizar en el caso en que las entidades de transporte de cliente se pueden suministrar dentro del enlace durante la gestión de adaptación. Esta capacidad de disponer de entidades de transporte de cliente proporcionada previamente es posible en tecnologías tales como jerarquía digital síncrona (SDH) o multiplexación por división de longitud de onda (WDM).

Orígenes

La Recomendación UIT-T G.854.8 ha sido preparada por la Comisión de Estudio 4 (1997-2000) del UIT-T y fue aprobada por el procedimiento de la Resolución N.° 1 de la CMNT el 26 de marzo de 1999.

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.° 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 *empresa de explotación reconocida (EER)* designa a toda persona, compañía, empresa u organización gubernamental que explote un servicio de correspondencia pública. Los términos *Administración, EER* y *correspondencia pública* están definidos en la *Constitución de la UIT (Ginebra, 1992).*

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Recomendación G.854.8

PUNTO DE VISTA COMPUTACIONAL PARA LA GESTIÓN DE ADAPTACIÓN PROPORCIONADA PREVIAMENTE

(Ginebra, 1999)

1 Alcance

Esta especificación desde el punto de vista computacional se relaciona con la especificación del punto de vista de la empresa para la gestión de adaptación proporcionada previamente, definida en la Recomendación G.852.8, así como la especificación del punto de vista de la información para la gestión de adaptación proporcionada previamente definida en la Recomendación G.853.8.

El diseño informático de la presente especificación provisional del punto de vista computacional que figura en la cláusula 2 abarca las siguientes comunidades de empresas y acciones asociadas:

COMUNIDAD pam "gestión de la adaptación proporcionada previamente"

pam "asignación de entidad de transporte de servidor a entidad enlazante de cliente"
pam "desasignación de entidad de transporte de servidor de entidad enlazante de cliente"
pam "informe de asignación de entidad de transporte de servidor"
pam "informe de desasignación de entidad de transporte de servidor"
pam "suministro de capacidad a entidad enlazante de cliente"
pam "eliminación de capacidad de entidad enlazante de cliente"
pam "informe de suministro de capacidad de entidad enlazante de cliente"
pam "informe de eliminación de capacidad de entidad enlazante de cliente"

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 G.851.1 (1996), *Gestión de la red de transporte – Aplicación del marco del modelo de referencia de procesamiento distribuido abierto.*

[2] Recomendación UIT-T G.853.1 (1999), *Elementos comunes del punto de vista de la información para la gestión de una red de transporte.*

[3] Recomendación UIT-T G.852.8 (1999), *Punto de vista de la empresa para la gestión de adaptación proporcionada previamente.*

[4] Recomendación UIT-T G.853.8 (1999), *Punto de vista de la información para la gestión de adaptación proporcionada previamente*.

3 Definiciones

Ninguna.

4 Abreviaturas

En esta Recomendación se utilizan las siguientes siglas.

ASN.1 Notación de sintaxis abstracta uno (*abstract syntax notation one*)

CTP Punto de terminación de conexión (*connection termination point*)

Id Identificador

Ifce Interfaz (*interface*)

inv invariante

layerND Dominio de capa de red (*layerNetwork domain*)

LC Conexión de enlace (*link connection*)

ND Dominio de red (*network domain*)

RM-ODP Modelo de referencia para procesamiento distribuido abierto (*reference model for open distributed processing*)

5 Convenios

Para hacer más legible el comportamiento en las operaciones:

- los parámetros figuran en **negritas**;
- los elementos definidos en la especificación de información figuran en *cursivas*.

En la presente Recomendación, cuando se utiliza una interfaz en una producción ASN.1, se empleará la misma etiqueta que comenzará con inicial mayúscula. La producción ASN.1 completa para esta interfaz de indagación [por ejemplo, utilización de IDENTIFICADOR DE OBJETO (OBJECT IDENTIFIER), ENTERO (INTEGER) etc.], será desarrollada como parte del punto de vista de la ingeniería con la tecnología correspondiente.

6 Referencias de etiquetas

Cuadro 1/G.854.8 – Referencias de etiquetas

Referencia de etiqueta completa	Referencia de etiqueta local
<"Rec. G.854.3", INTERFACE: commonReportResourceIfce>	commonReportResourceIfce
<"Rec. G.854.3", INTERFACE: commonResourceIfce>	commonResourceIfce
<"Rec. G.853.8", ATTRIBUTE: pamAvailableLinkCapacity>	pamAvailableLinkCapacity
<"Rec. G.853.8", INFORMATION_OBJECT: pamClientLayerNetworkDomain>	pamClientLayerNetworkDomain
<"Rec. G.853.8", INFORMATION_OBJECT: pamLinkConnection>	pamLinkConnection
<"Rec. G.853.8", INFORMATION_OBJECT: pamLinkEnd>	pamLinkEnd
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: PamLinkEndHasNetworkCTPs>	pamLinkEndHasNetworkCTPs
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamLinkIsTerminatedByLinkEnd>	pamLinkIsTerminatedByLinkEnd
<"Rec. G.853.8", ATTRIBUTE: pamMaxProvisionableCapacity>	pamMaxProvisionableCapacity

Cuadro 1/G.854.8 – Referencias de etiquetas *(fin)*

Referencia de etiqueta completa	Referencia de etiqueta local
<"Rec. G.853.8", INFORMATION_OBJECT: pamNetworkCTP>	pamNetworkCTP
<"Rec. G.853.8", INFORMATION_OBJECT: pamNetworkTTP>	pamNetworkTTP
<"Rec. G.853.8", ATTRIBUTE: pamPotentialLinkCapacity>	pamPotentialLinkCapacity
<"Rec. G.853.8", ATTRIBUTE: pamProvisionedLinkCapacity>	pamProvisionedLinkCapacity
<"Rec. G.853.8-xx", INFORMATION_OBJECT: pamServerLayerNetworkDomain>	pamServerLayerNetworkDomain
<"Rec. G.853.8", INFORMATION_OBJECT: pamSubnetwork>	pamSubnetwork
"Rec. G.853.8", INFORMATION_OBJECT: pamSubnetworkTP	pamSubnetworkTP
<"Rec. G.853.8", INFORMATION_OBJECT: pamTopologicalLink>	pamTopologicalLink
<"Rec. G.853.8", INFORMATION_OBJECT: pamTopologicalLinkEnd>	pamTopologicalLinkEnd
<"Rec. G.853.8", INFORMATION_OBJECT: pamTrail>	pamTrail
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamTopologicalLinkIsSupportedByTrail>	pamTopologicalLinkIsSupportedByTrail
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamTopologicalLinkEndIsSupportedByNetworkTTP>	pamTopologicalLinkEndIsSupportedByNetworkTTP
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamLayerNetworkDomainIsMadeOf>	pamLayerNetworkDomainIsMadeOf
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamLinkHasLinkConnections>	pamLinkHasLinkConnections
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamLinkEndHasNetworkCTPs>	pamLinkEndHasNetworkCTPs
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamNetworkTTPAdaptsNetworkCTP>	pamNetworkTTPAdaptsNetworkCTP
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamSubnetworkIsDelimitedBy>	pamSubnetworkIsDelimitedBy
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamSubnetworkTPIsRelatedToExtremity>	pamSubnetworkTPIsRelatedToExtremity
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamLinkConnectionIsSupportedByTrail>	pamLinkConnectionIsSupportedByTrail
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamLinkBinds>	pamLinkBinds
<"Rec. G.853.8", INFORMATION_RELATIONSHIP: pamLayerNetworkDomainCanServeLnds>	pamLayerNetworkDomainCanServeLnds

Referencia de producción ASN.1 completa	Referencia de etiqueta local
<"Rec. X.721: 1992: Attribute-ASN1Module": SimpleNameType>	SimpleNameType

7 Interfaces

7.1 Interfaces de indagación

En esta Recomendación se hace referencia a las interfaces que permiten tener acceso a la identificación y a las propiedades de recursos relativos a la "comunidad de gestión de adaptación proporcionada previamente". Como la invocación de operaciones contenidas no modifica ningún estado, no interesa desarrollarlas explícitamente. Su firma exacta será desarrollada como parte del punto de vista de la ingeniería, con la tecnología correspondiente. Estas interfaces se enumeran en el cuadro 2 con la información a la que permiten acceder.

Cuadro 2/G.854.8 – Correspodencia entre nombres de interfaces, objetos de información, atributos y relaciones

Nombre de interfaz	Objeto de información	Atributos y relaciones
pamLayerNetworkDomainQueryIfce	<pamlayerNetworkDomain>	<resourceId> <signalIdentification> <pamLayerNetworkDomainIsMadeOf, ROLE : element> <pamLayerNetworkDomainCanServeLnds, ROLE : Client> <pamLayerNetworkDomainCanServeLnds, ROLE : Server>
pamLinkConnectionQueryIfce	<pamLinkConnection>	<resourceId> <signalIdentification> <pamLayerNetworkDomainIsMadeOf, ROLE : containerND> <linkHasLinkConnections, ROLE : containerLink> <linkConnectionIsSupportedByTrail, ROLE : serverTrail>
pamLinkEndlQueryIfce	<pamLinkEnd>	<resourceId> <signalIdentification> <pamLinkEndHasNetworkCTPs, ROLE : elementCTP> <pamLinkIsTerminatedByLinkEnd, ROLE : transferCapacityLink> <pamTopologicalLinkEndIsSupportedByNetworkTTP, ROLE : server> <pamLayerNetworkDomainIsMadeOf, ROLE : containerND> <pamAvailableLinkCapacity> <pamMaxProvisionableCapacity> <pamPotentialLinkCapacity> <pamProvisionedLinkCapacity>
pamNetworkCTPQueryIfce	<pamNetworkCTP>	<resourceId> <signalIdentification> <pamLinkEndHasNetworkCTPs, ROLE : containerLE> <networkTTPAdaptsNetworkCTP, ROLE : serverTP>
pamNetworkTTPQueryfce	<pamNetworkTTP>	<resourceId> <signalIdentification> <pamTopologicalLinkEndIsSupportedByNetworkTTP, ROLE : client> <pamLayerNetworkDomainIsMadeOf, ROLE : containerND> <networkTTPAdaptsNetworkCTP, ROLE : clientTP >

Cuadro 2/G.854.8 – Correspodencia entre nombres de interfaces, objetos de información, atributos y relaciones *(fin)*

Nombre de interfaz	Objeto de información	Atributos y relaciones
pamSubnetworkQueryIfce	<pamSubnetwork>	<resourceId> <signalIdentification> <pamSubnetworkIsDelimitedBy, ROLE : elementSNTP>
pamSubnetworkTPQueryIfce	<pamSubnetworkTP>	<resourceId> <signalIdentification> <pamSubnetworkIsDelimitedBy, ROLE : containerSN> <subnetworkTPIsRelatedToExtremity, ROLE : extremity>
pamTopologicalLinkQueryIfce	<pamTopologicalLink>	<resourceId> <signalIdentification> <pamTopologicalLinkIsSupportedByTrail, ROLE : serverTrail> <pamLayerNetworkDomainIsMadeOf, ROLE : element> <linkHasLinkConnections, ROLE : elementLC> <linkBinds, ROLE : a_endTopological> <linkBinds, ROLE : z_endTopological> <pamAvailableLinkCapacity> <pamMaxProvisionableCapacity> <pamPotentialLinkCapacity> <pamProvisionedLinkCapacity>
pamTrailQueryIfce	<pamTrail>	<resourceId> <signalIdentification> <pamTopologicalLinkIsSupportedByTrail,ROLE : clientTL> <pamLayerNetworkDomainIsMadeOf, ROLE : element> <linkConnectionIsSupportedByTrail, ROLE : clientLC>

7.2 Interfaces operativas

COMPUTATIONAL_INTERFACE <commonResourceIfce>

COMPUTATIONAL_INTERFACE preProvisionedAdaptationManagementArcIfce

OPERATION {
associateTrailWithTopologicalLink;
disassociateTrailFromTopologicalLink;
addCapacityToLink;
removeCapacityFromLink
}

COMPUTATIONAL_INTERFACE preProvisionedAdaptationManagementPointIfce

OPERATION {
associateNetworkTTPWithTopologicalLinkEnd;
disassociateNetworkTTPFromTopologicalLinkEnd;
addCapacityToLinkEnd;
removeCapacityFromLinkEnd
}

7.2.1 Asociación de camino con enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: assign server transport entity to client linking entity>

OPERATION associateTrailWithTopologicalLink {

INPUT_PARAMETERS
link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId
trail: TrailId;

OUTPUT_PARAMETERS
potentialCapacity: Capacity;
resultingLinkConnections: LinkConnectionList;
-- *The resultingLinkConnections parameter value is provided when the*
-- *<PERMISSION:returnClientTransportEntities> is supported.*

RAISED_EXCEPTIONS
incorrectLink: LinkId
incorrectTrail: TrailId
linkAndTrailsNotCompatible: NULL;
initialCapacitiesFailure: SEQUENCE {
availableLinkCapacity Capacity;
maxProvisionableCapacity Capacity;
potentialLinkCapacity Capacity;
ProvisionedLinkCapacity Capacity};
trailAlreadyAssociated: NULL;
finalCapacitiesFailure: SEQUENCE {
availableLinkCapacity Capacity;
maxProvisionableCapacity Capacity;
potentialLinkCapacity Capacity;
ProvisionedLinkCapacity Capacity};
consistencyFailure: NULL;
failureToAssociate: NULL;

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:pamTopologicalLink>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
trail: <INFORMATION OBJECT:pamTrail>;
potentialCapacity: <ATTRIBUTE:pamPotentialLinkCapacity>;
resultingLinkConnections ELEMENTS: <INFORMATION OBJECT:pamLinkConnection>
incorrectLink: <INFORMATION OBJECT:pamTopologicalLink>;
incorrectTrail: <INFORMATION OBJECT:pamTrail>;
availableLinkCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkCapacity: <ATTRIBUTE:pamPotentialLinkCapacity>;
ProvisionedLinkCapacity: <ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkExists
"The **link** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**."

inv_TrailExists
"The **trail** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is <pamServerLayerNetworkDomain>."

inv_LNDConsistency
"The **trail** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is server regarding a <layerNetworkDomainIsServedByLayerNetworkDomain> relationship. The client of this latter relationship is referred by **Link**."

inv_nullCapacityValues
"The attributes of <*pamTopologicalLink*> referred by **link** have the following values:

- *pamAvailableLinkCapacity* equal to 0;
- *pamMaxProvisionableCapacity* equal to 0;
- *pamPotentialLinkCapacity* equal to 0;
- *pamProvisionedLinkCapacity* equal to 0."

inv_trailNotAssociated
"The **trail** shall not refer to any *server* in any <*pamTopologicalLinkIsSupportedByTrail*> relationship where **link** refers to *client*."

POST_CONDITIONS

inv_finalCapacityValues
"The attributes of <*pamTopologicalLink*> referred by **link** have the following values:

- pamPotentialLinkCapacity is equal to pamMaxProvisionableCapacity of the <pamTopologicalLink> minus pamProvisionedLinkCapacity of each other client in the <pamTopologicalLinkIsSupportedByTrail> relationship where **trail** refers to server;
- pamMaxProvisionableCapacity is updated to its nominal value in accordance to the **trail**;
- pamAvailableLinkCapacity equal to 0;
- pamProvisionedLinkCapacity equal to 0."

inv_potentialCapacity
"The **potentialCapacity** value is equal to the <*pamPotentialLinkCapacity*> attribute value of the <*pamTopologicalLink*> referred by **link**."

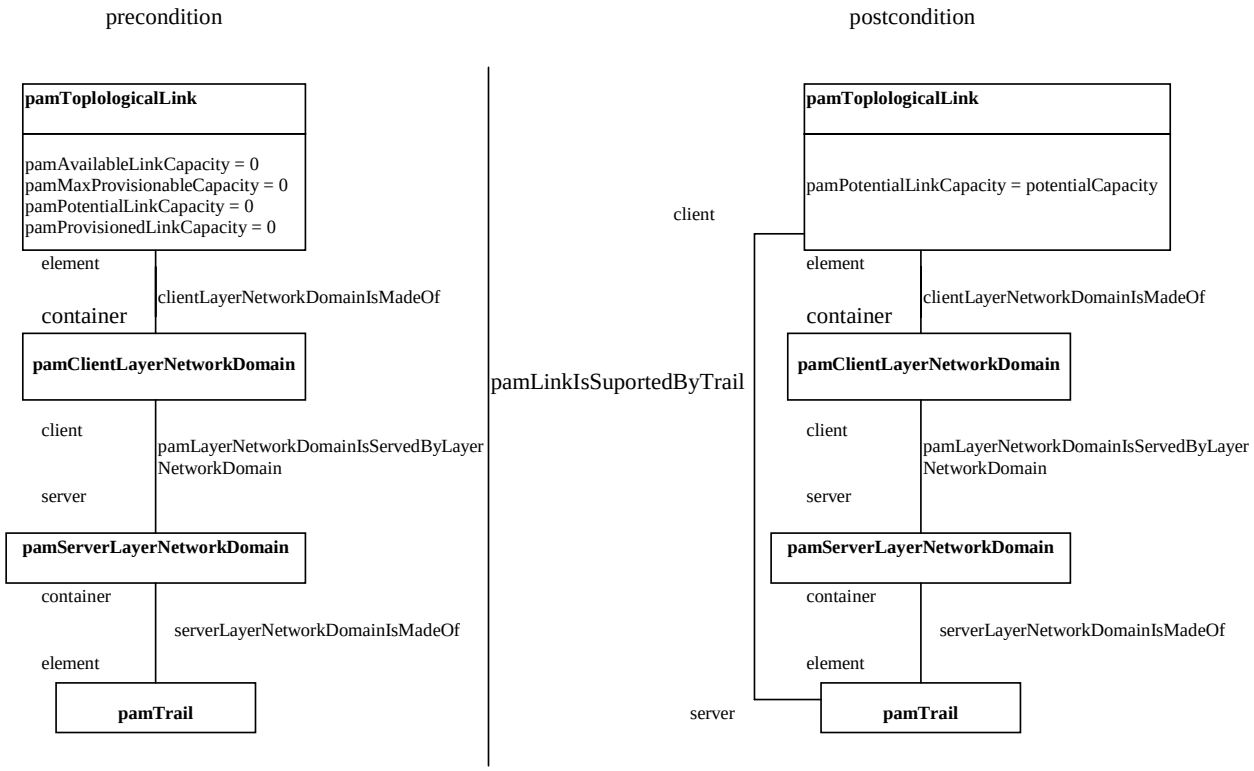
inv_LNDConsistency
"The **trail** refers to *element* of a <*pamServerlayerNetworkDomainIsMadeOf*> where the *container* is *server* regarding a <*layerNetworkDomainIsServedByLayerNetworkDomain*> relationship. The *client* of this latter relationship is also *container* of a <*pamClientlayerNetworkDomainIsMadeOf*> relationship where **link** refers to *element*."

inv_trailAssociated
"The **trail** shall refer to a *server* in a <*pamTopologicalLinkIsSupportedByTrail*> relationship where **link** refers to *client*.";

EXCEPTIONS

IF PRE_CONDITION inv_LinkExists NOT_VERIFIED RAISE_EXCEPTION incorrectLink;
IF PRE_CONDITION inv_TrailExists NOT_VERIFIED RAISE_EXCEPTION incorrectTrail;
IF PRE_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION linkAndTrailsNotCompatible;
IF PRE_CONDITION inv_trailNotAssociated NOT_VERIFIED RAISE_EXCEPTION trailAlreadyAssociated;
IF PRE_CONDITION inv_nullCapacityValues NOT_VERIFIED RAISE_EXCEPTION initialCapacitiesFailure;
IF POST_CONDITION inv_finalCapacityValues NOT_VERIFIED RAISE_EXCEPTION finalCapacitiesFailure;
IF POST_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION consistencyFailure;
IF POST_CONDITION inv_trailAssociated NOT_VERIFIED RAISE_EXCEPTION failureToAssociate;

}



7.2.2 Desasociación de camino de enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: deassign server transport entity from client linking entity>

OPERATION disassociateTrailFromTopologicalLink {

INPUT_PARAMETERS
link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId;
trail: TrailId;

OUTPUT_PARAMETERS
-- *none*

RAISED_EXCEPTIONS
incorrectLink: LinkId
incorrectTrail: TrailId
trailNotAssociated: NULL;
capacityProvisioned: Capacity;
finalCapacitiesFailure: SEQUENCE {
availableLinkCapacity Capacity;
maxProvisionableCapacity Capacity;
potentialLinkCapacity Capacity;
provisionedLinkCapacity Capacity};
failureToDisassociate: NULL;

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:pamTopologicalLink>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
trail: <INFORMATION OBJECT:pamTrail>;
incorrectLink: <INFORMATION OBJECT:pamTopologicalLink>;
incorrectTrail: <INFORMATION OBJECT:pamTrail>;
capacityProvisioned: <ATTRIBUTE:pamProvisionedLinkCapacity>;

availableLinkCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;,
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkCapacity:<ATTRIBUTE:pamPotentialLinkCapacity>;
provisionedLinkCapacity:<ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkExists
"The **link** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**."

inv_TrailExists
"The **trail** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is <pamServerLayerNetworkDomain>."

inv_LNDConsistency
"The **trail** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is server regarding a <layerNetworkDomainIsServedByLayerNetworkDomain> relationship. The client of this latter relationship is referred by **Link**."

inv_trailAssociated
"The **trail** shall refer to a *server* in a <*pamTopologicalLinkIsSupportedByTrail*> relationship where **link** refers to *client*."

inv_pamProvisionedLinkCapacity
"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLink*> referred by **link** is equal to 0.";

POST_CONDITIONS

inv_nullCapacityValues
The attributes of <*pamTopologicalLink*> referred by **link** have the following values:

- *pamAvailableLinkCapacity* equal to 0;
- *pamMaxProvisionableCapacity* equal to 0;
- *pamPotentialLinkCapacity* equal to 0;
- *pamProvisionedLinkCapacity* equal to 0."

inv_LNDConsistency
"The **trail** shall refer to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is server regarding a <layerNetworkDomainIsServedByLayerNetworkDomain>. The client of this latter relationship is also container of a <pamClientlayerNetworkDomainIsMadeOf> where **link** refers to element."

inv_trailNotAssociated
"The **trail** shall not refer to any *server* in any <*pamTopologicalLinkIsSupportedByTrail*> where **link** refers to ***client***.";

EXCEPTIONS

IF PRE_CONDITION inv_LinkExists NOT_VERIFIED RAISE_EXCEPTION incorrectLink;
IF PRE_CONDITION inv_TrailExists NOT_VERIFIED RAISE_EXCEPTION incorrectTrail;
IF PRE_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION linkAndTrailsNotCompatible;
IF PRE_CONDITION inv_trailAssociated NOT_VERIFIED RAISE_EXCEPTION trailAlreadyAssociated;
IF PRE_CONDITION inv_pamProvisionedLinkCapacity NOT_VERIFIED RAISE_EXCEPTION capacityProvisioned;
IF POST_CONDITION inv_trailNotAssociated NOT_VERIFIED RAISE_EXCEPTION failureToDissociate;
IF POST_CONDITION inv_nullCapacityValues NOT_VERIFIED RAISE_EXCEPTION finalCapacitiesFailure;
IF POST_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION failureToDissociate;

7.2.3 Adición de capacidad a enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: provision capacity to client linking entity>

OPERATION addCapacityToLink {

INPUT_PARAMETERS
link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId
capacity: RequestedCapacity::= CHOICE{
requestedChannels SEQUENCE OF {Channel};
requestedNumberOfLinkConnections Capacity}
-- *The requestedChannels sub-parameter value is provided when the*
-- *<PERMISSION: selectClientTransportEntities> is supported.*
-- *Channel indicates the channel number such as timeslot in SDH*

OUTPUT_PARAMETERS
numberOfLinkConnections: Capacity;
resultingLinkConnections: LinkConnectionList;

RAISED_EXCEPTIONS
incorrectLink: LinkId
insufficientCapacity: Capacity;
invalidChannelsNumber: SEQUENCE OF {Channel};
channelsAlreadyProvisioned: SEQUENCE OF {Channel};
failureToCreateLCs: NULL;
failureToAssociateLCs: NULL;
failureToSupportLCs: NULL;
failureToIncreaseCapacity: SEQUENCE {
availableLinkCapacity Capacity;
maxProvisionableCapacity Capacity;
potentialLinkCapacity Capacity;
provisionedLinkCapacity Capacity};

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:pamTopologicalLink>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
numberOfLinkConnections: <ATTRIBUTE:pamProvisionedLinkCapacity>;
resultingLinkConnections ELEMENTS: <INFORMATION OBJECT:pamLinkConnection>;
Channel: <INFORMATION OBJECT:pamLinkConnection>;
incorrectLink: <INFORMATION OBJECT:pamTopologicalLink>;
insufficientCapacity: <ATTRIBUTE:pamPotentialLinkCapacity>;
availableLinkCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkCapacity:<ATTRIBUTE:pamPotentialLinkCapacity>;
provisionedLinkCapacity:<ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkExists
"The **link** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**".

inv ChannelsNumber
"The **Channel** shall refer to a valid value with regard to the *server* of the *client* **link**."

inv_ChannelsDoNotExist
"The **Channel** shall not refer to any *element* in any <*linkHasLinkConnections*> where **link** refers to *container*."

inv_capacityExists
"The *pamPotentialLinkCapacity* attribute value of the <*pamTopologicalLink*> referred by **link** shall be greater or equal to the **requestedNumberOfLinkConnections**."

POST_CONDITIONS

inv_provisionedLinkCapacityIncrease

"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLink*> referred by **link** is increased by the value of **requestedNumberOfLinkConnections.**"

inv_availableLinkCapacityIncrease

"The *pamAvailableLinkCapacity* value of the <*pamTopologicalLink*> referred by **link** is increased by the value of **requestedNumberOfLinkConnections**."

inv_PotentialLinkCapacityDecrease

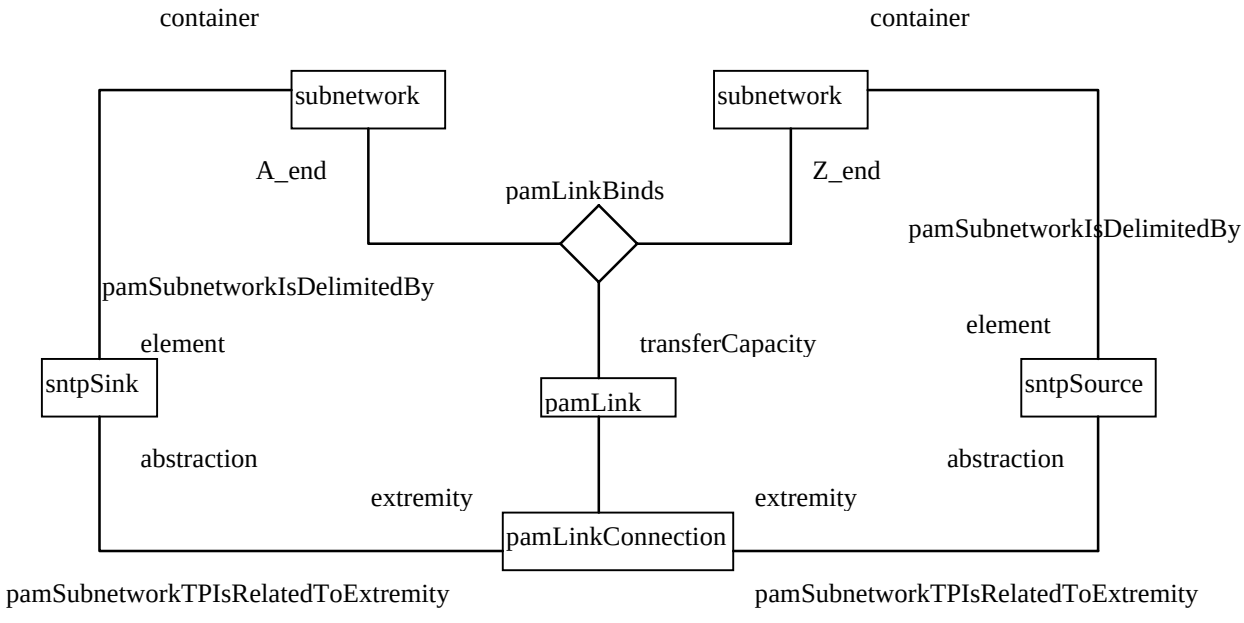
"The *pamPotentialLinkCapacity* value of all <*pamTopologicalLink*> involved in the same <*pamTopologicalLinkIsSupportedByTrail*> as the **link** is decreased by the value of **requestedNumberOfLinkConnections** (down to each associated characteristic information)."

inv_createdLC

"The **resultingLinkConnections** refer to *element* of the <*linkHasLinkConnections*> relationship where **link** refers to *container*."

inv_LCAssociated

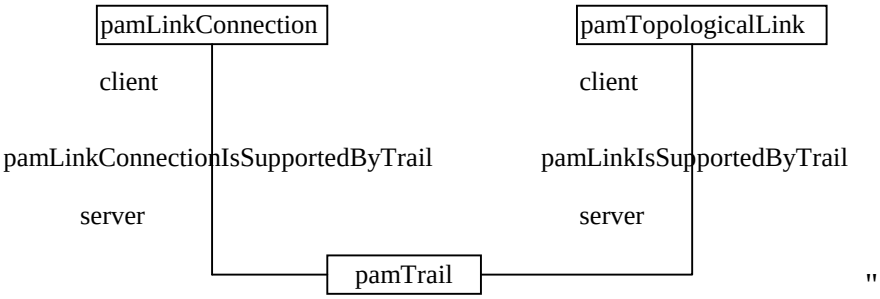
"The **resultingLinkConnections** shall refer to *extremity* in two <*subnetworkTPIsRelatedToExtremity*> relationships. The associated *abstraction* are participating in two <*subnetworkIsDelimitedBy*> relationships where each *container* is the *A_end* and *Z_end* of a <*linkBinds*> relationship for which **link** refers to *transferCapacity*.



"

inv_LCSupported

"The **resultingLinkConnections** refer to *client* in a <*linkConnectionIsSupportedByTrail*> relationship where the **trail** refers to the *server*. This **trail** refers also to a *server* in a <*TopologicalLinkIsSupportedByTrail*> relationship where the **link** refers to *client*.



"

inv_mapping_requestedCapacityToCapacity
"The **numberOfLinkConnections** value is equal to the *pamProvisionedLinkCapacity* value of the <*pamTopologicalLink*> referred by **link**.";

EXCEPTIONS

IF PRE_CONDITION inv_LinkExists NOT_VERIFIED RAISE_EXCEPTION incorrectLink;IF PRE_CONDITION inv_capacityExists NOT_VERIFIED RAISE_EXCEPTION insufficientCapacity;
IF PRE_CONDITION inv ChannelNumber NOT_VERIFIED RAISE_EXCEPTION invalidChannelNumber;
IF PRE_CONDITION inv_ChannelsDoNotExist NOT_VERIFIED RAISE_EXCEPTION channelAlreadyProvisioned;
IF POST_CONDITION inv_createdLC NOT_VERIFIED RAISE_EXCEPTION failureToCreateLCs;
IF POST_CONDITION inv_LCAssociated NOT_VERIFIED RAISE_EXCEPTION failureToAssociateLCs;
IF POST_CONDITION inv_LCSupported NOT_VERIFIED RAISE_EXCEPTION failureToSupportLCs;
IF POST_CONDITION inv_provisonnedLinkCapacityIncrease NOT_VERIFIED RAISE_EXCEPTION failureToIncreaseCapacity;
IF POST_CONDITION inv_availableLinkCapacityIncrease NOT_VERIFIED RAISE_EXCEPTION failureToIncreaseCapacity;
IF POST_CONDITION inv_PotentialLinkCapacityDecrease NOT_VERIFIED RAISE_EXCEPTION failureToIncreaseCapacity;

}

7.2.4 Eliminación de capacidad de enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: remove capacity from client linking entity>

OPERATION removeCapacityFromLink {

INPUT_PARAMETERS
link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId
capacity: RequestedCapacity::= CHOICE{
requestedChannels SEQUENCE OF {Channel};requestedNumberOfLinkConnections Capacity}
-- *The requestedChannels sub-parameter value is provided when the*
-- *<PERMISSION: selectClientTransportEntities> is supported.*
-- *Channel indicates the channel number such as timeslot in SDH*

OUTPUT_PARAMETERS
provisionedLinkConnections: Capacity;

RAISED_EXCEPTIONS
incorrectLink: LinkId
insufficientCapacity: Capacity;
invalidChannelsNumber: SEQUENCE OF {channel};

failureToDecreaseCapacity: SEQUENCE {
availableLinkCapacity Capacity,
maxProvisionableCapacity Capacity,
potentialLinkCapacity Capacity,
ProvisionedLinkCapacity Capacity};
failureToRemoveLC: NULL;

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:*pamTopologicalLink*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
Channel: <INFORMATION OBJECT:pamLinkConnection>;
incorrectLink: <INFORMATION OBJECT:pamTopologicalLink>;
provisionedLinkConnections: <ATTRIBUTE:*pamProvisionedLinkCapacity*>;
insufficientCapacity: <ATTRIBUTE:pamProvisionedLinkCapacity>;
availableLinkCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkCapacity:<ATTRIBUTE:pamPotentialLinkCapacity>;
provisionedLinkCapacity:<ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkExists
"The **link** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**."

inv_capacityExists
"The *pamAvailableLinkCapacity* attribute value of the <*pamTopologicalLink*> referred by **link** is greater or equal to the **requestedNumberOfLinkConnections** value."

inv_linkConnectionPartOfLink
"Each **Channel** refers to *element* of <*linkHasLinkConnections*> where the *container* is referred by **link**."

POST_CONDITIONS

inv_LCRemoved
"The **Channel** shall not refer to any *element* in a <*linkHasLinkConnections*> relationship where the **link** refers to *container*."

inv_PotentialLinkCapacityIncrease
"The *pamPotentialLinkCapacity* value of all <*pamTopologicalLink*> involved in the same <*pamTopologicalLinkIsSupportedByTrail*> as the **link** are increased by the value of **requestedNumberOfLinkConnections** (down to each associated characteristic information)."

inv_provCapacityDecrease
"The *pamProvisionedLinkCapacity* attribute value of the <*topologicalLink*> referred by **link** has been decreased by the **requestedNumberOfLinkConnections** value."

inv_availCapacityDecrease
"The *pamAvailableLinkCapacity* attribute value of the <*topologicalLink*> referred by **link** has been decreased by the **requestedNumberOfLinkConnections** value."

inv_mappingToReturnedCapacity
"The **provisionedLinkConnections** value is equal to the new *pamProvisionedLinkCapacity* attribute value of the <*topologicalLink*> referred by **link**."

EXCEPTIONS

IF PRE_CONDITION inv_LinkExists NOT_VERIFIED RAISE_EXCEPTION incorrectLink;
IF PRE_CONDITION inv_capacityExists NOT_VERIFIED RAISE_EXCEPTION insufficientCapacity;
IF PRE_CONDITION inv_linkConnectionPartOfLink NOT_VERIFIED RAISE_EXCEPTION invalidChannelsNumber;
IF PRE_CONDITION inv_LCRemoved NOT_VERIFIED RAISE_EXCEPTION failureToRemoveLC;
IF POST_CONDITION inv_PotentialLinkCapacityIncrease NOT_VERIFIED RAISE_EXCEPTION failureToDecreaseCapacity;

IF POST_CONDITION inv_provCapacityDecrease NOT_VERIFIED RAISE_EXCEPTION
failureToDecreaseCapacity;
IF POST_CONDITION inv_availCapacityDecrease NOT_VERIFIED RAISE_EXCEPTION
failureToDecreaseCapacity;

}

7.2.5 Asociación de TTP de red con extremo de enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: assign server transport entity to client linking entity>

OPERATION associatenetworkTTPWithTopologicalLinkEnd {

INPUT_PARAMETERS

link: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId;
networkTTP: NetworkTTPId;

OUTPUT_PARAMETERS
potentialCapacity: Capacity;
resultingNetworkCTPs: networkCTPList;

RAISED_EXCEPTIONS
incorrectLinkEnd: LinkEndId
incorrectNetworkTTP: NetworkTTPId
linkEndAndNetworkTTPsNotCompatible: NULL;
initialCapacitiesFailure: SEQUENCE {
availableLinkEndCapacity Capacity,
maxProvisionableCapacity Capacity,
potentialLinkEndCapacity:Capacity,
provisionedLinkEndCapacity Capacity};
networkTTPAlreadyAssociated: NULL;
finalCapacitiesFailure: SEQUENCE {
availableLinkEndCapacity Capacity,
maxProvisionableCapacity Capacity,
potentialLinkEndCapacity Capacity,
provisionedLinkEndCapacity Capacity};
consistencyFailure: NULL;
failureToAssociate: NULL;

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:pamTopologicalLinkEnd>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
networkTTP: <INFORMATION OBJECT:pamNetworkTTP>;
potentialCapacity: <ATTRIBUTE:pamPotentialLinkCapacity>;
resultingNetworkCTPs ELEMENTS: <INFORMATION OBJECT:pamNetworkCTP>
incorrectLinkEnd: <INFORMATION OBJECT:pamTopologicalLinkEnd>;
incorrectNetworkTTP: <INFORMATION OBJECT:pamNetworkTTP>;
availableLinkEndCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkEndCapacity: <ATTRIBUTE:pamPotentialLinkCapacity>;
ProvisionedLinkEndCapacity:<ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkEndExists
"The **linkEnd** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**."

inv_NetworkTTPExists
"The **networkTTP** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is <pamServerLayerNetworkDomain>."

inv_LNDConsistency
"The **networkTTP** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is server regarding a <layerNetworkDomainIsServedByLayerNetworkDomain> relationship. The client of this latter relationship is referred by **LinkEnd**."

inv_nullCapacityValues
"The attributes of <*pamTopologicalLinkEnd*> referred by **linkEnd** have the following values:

- *pamAvailableLinkCapacity* equal to 0;
- *pamMaxProvisionableCapacity* equal to 0;
- *pamPotentialLinkCapacity* equal to 0;
- *pamProvisionedLinkCapacity* equal to 0."

inv_networkTTPNotAssociated
"The **networkTTP** shall not refer to any *server* in any <*pamTopologicalLinkEndIsSupportedByNetworkTTP*> relationship where **linkEnd** refers to *client*."

POST_CONDITIONS

inv_finalCapacityValues
"The attributes of <*pamTopologicalLinkEnd*> referred by **linkEnd** have the following values:

- *pamPotentialLinkCapacity* is equal to *pamMaxProvisionableCapacity* of the <*pamTopologicalLinkEnd*> minus *pamProvisionedLinkCapacity* of each other *client* in the <*pamTopologicalLinkEndIsSupportedByNetworkTTP*> relationship where **networkTTP** refers to *server*;
- *pamMaxProvisionableCapacity* is updated to its nominal value in accordance to the **networkTTP**;
- *pamAvailableLinkCapacity* equal to 0;
- *pamProvisionedLinkCapacity* equal to 0."

inv_potentialCapacity
"The **potentialCapacity** value is equal to the <*pamPotentialLinkCapacity*> attribute value of the <*pamTopologicalLinkEnd*> referred by **linkEnd**."

inv_LNDConsistency
"The **networkTTP** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is server regarding a <layerNetworkDomainIsServedByLayerNetworkDomain> relationship. The client of this latter relationship is also container of a <pamClientlayerNetworkDomainIsMadeOf> relationship where **linkEnd** refers to element."

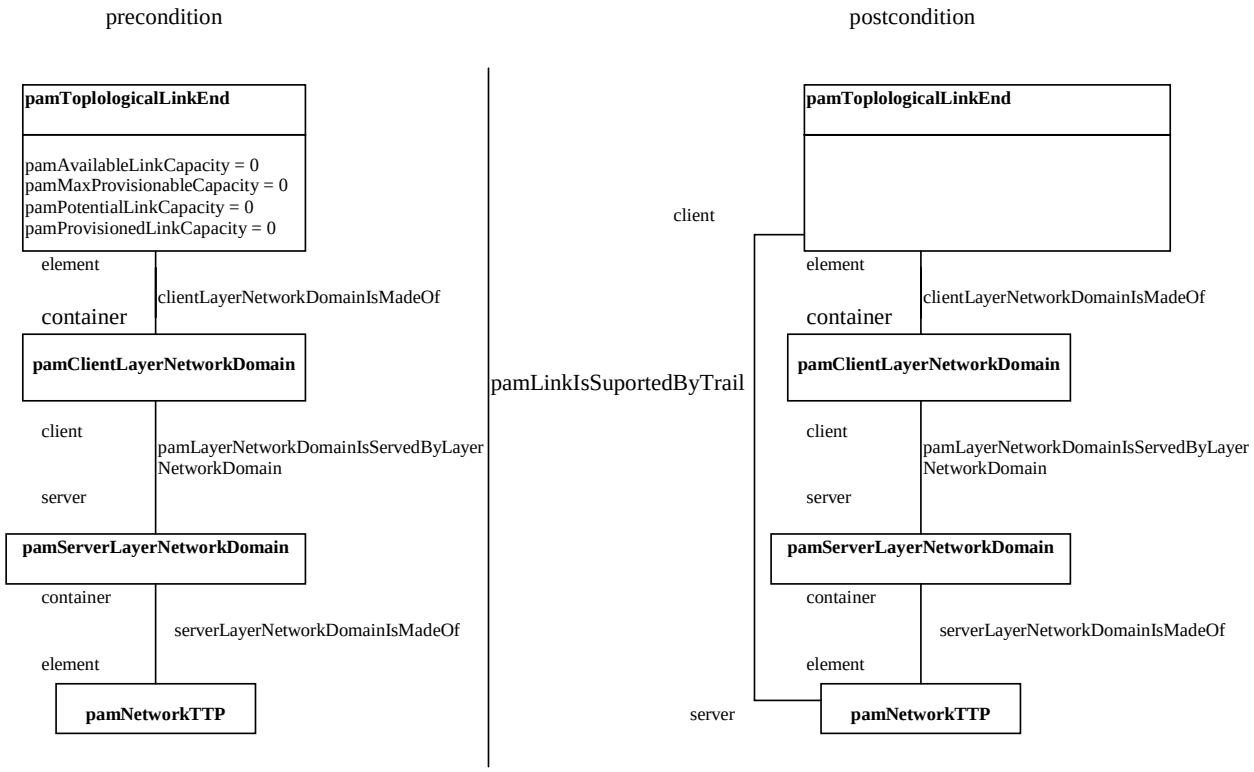
inv_networkTTPAssociated
"The **networkTTP** shall refer to a *server* in a <*pamTopologicalLinkEndIsSupportedByNetworkTTP*> relationship where **linkEnd** refers to *client*."

EXCEPTIONS

IF PRE_CONDITION inv_LinkEndExists NOT_VERIFIED RAISE_EXCEPTION incorrectLinkEnd;
IF PRE_CONDITION inv_NetworkTTPExists NOT_VERIFIED RAISE_EXCEPTION incorrectNetworkTTP;
IF PRE_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION linkAndNetworkTTPsNotCompatible;
IF PRE_CONDITION inv_networkTTPNotAssociated NOT_VERIFIED RAISE_EXCEPTION networkTTPAlreadyAssociated;
IF PRE_CONDITION inv_nullCapacityValues NOT_VERIFIED RAISE_EXCEPTION initialCapacitiesFailure;
IF POST_CONDITION inv_finalCapacityValue> NOT_VERIFIED RAISE_EXCEPTION finalCapacitiesFailure;

IF POST_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION consistencyFailure;
IF POST_CONDITION inv_networkTTPAssociated NOT_VERIFIED RAISE_EXCEPTION failureToAssociate;

}



7.2.6 Desasociación de TTP de red de extremo de enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: deassign server transport entity from client linking entity>

OPERATION disassociateNetworkTTPFromTopologicalLinkEnd {

INPUT_PARAMETERS
linkEnd: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId;
networkTTP: NetworkTTPId;

OUTPUT_PARAMETERS
-- *none*

RAISED_EXCEPTIONS
incorrectLinkEnd: LinkEndId
incorrectNetworkTTP: NetworkTTPId
networkTTPNotAssociated: NULL;
capacityProvisioned: Capacity;
finalCapacitiesFailure: SEQUENCE {
availableLinkEndCapacity Capacity,
maxProvisionableCapacity Capacity,
potentialLinkEndCapacity Capacity,
provisionedLinkEndCapacity Capacity};
failureToDisassociate: NULL;

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:pamTopologicalLinkEnd>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
networkTTP: <INFORMATION OBJECT:pamNetworkTTP>;
incorrectLinkEnd: <INFORMATION OBJECT:pamTopologicalLinkEnd>;
incorrectNetworkTTP: <INFORMATION OBJECT:pamNetworkTTP>;
capacityProvisioned: <ATTRIBUTE:pamProvisionedLinkCapacity>;
availableLinkEndCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;,
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkEndCapacity:<ATTRIBUTE:pamPotentialLinkCapacity>;
provisionedLinkEndCapacity:<ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkEndExists
"The **linkEnd** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**."

inv_NetworkTTPExists
"The **networkTTP** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is <pamServerLayerNetworkDomain>."

inv_LNDConsistency
"The **networkTTP** refers to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is server regarding a <layerNetworkDomainIsServedByLayerNetworkDomain> relationship. The client of this latter relationship is referred by **LinkEnd**."

inv_networkTTPAssociated
"The **networkTTP** shall refer to a *server* in a <*pamTopologicalLinkEndIsSupportedByNetworkTTP*> relationship where **linkEnd** refers to *client*."

inv_ pamProvisionedLinkCapacity
"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLinkEnd*> referred by **linkEnd** is equal to 0."

POST_CONDITIONS

inv_nullCapacityValues
"The attributes of <*pamTopologicalLinkEnd*> referred by **linkEnd** have the following values:

- *pamAvailableLinkCapacity* equal to 0;
- *pamMaxProvisionableCapacity* equal to 0;
- *pamPotentialLinkCapacity* equal to 0;
- *pamProvisionedLinkCapacity* equal to 0."

inv_LNDConsistency
"The **networkTTP** shall refer to element of a <pamServerlayerNetworkDomainIsMadeOf> where the container is server regarding a <layerNetworkDomainIsServedByLayerNetworkDomain>. The client of this latter relationship is also container of a <pamClientlayerNetworkDomainIsMadeOf> where **linkEnd** refers to element."

inv_networkTTPNotAssociated
"The **networkTTP** shall not refer to any *server* in any <*pamTopologicalLinkEndIsSupportedByNetworkTTP*> where **linkEnd** refers to ***client***.";

EXCEPTIONS

IF PRE_CONDITION inv_LinkEndExists NOT_VERIFIED RAISE_EXCEPTION incorrectLinkEnd;
IF PRE_CONDITION inv_NetworkTTPExists NOT_VERIFIED RAISE_EXCEPTION incorrectNetworkTTP;
IF PRE_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION linkAndNetworkTTPsNotCompatible;
IF PRE_CONDITION inv_networkTTPAssociated NOT_VERIFIED RAISE_EXCEPTION networkTTPAlreadyAssociated;
IF PRE_CONDITION inv_pamProvisionedLinkCapacity NOT_VERIFIED RAISE_EXCEPTION capacityProvisioned;
IF POST_CONDITION inv_networkTTPNotAssociated NOT_VERIFIED RAISE_EXCEPTION failureToDissociate;
IF POST_CONDITION inv_nullCapacityValues NOT_VERIFIED RAISE_EXCEPTION finalCapacitiesFailure;
IF POST_CONDITION inv_LNDConsistency NOT_VERIFIED RAISE_EXCEPTION failureToDissociate;

}

7.2.7 Adición de capacidad a extremo de enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: provision capacity to client linking entity>

OPERATION addCapacityToLinkEnd {

INPUT_PARAMETERS
linkEnd: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId
capacity: ResquestedCapacity::= CHOICE{
requestedChannels SEQUENCE OF {Channel};
requestedNumberOfNetworkCTPs Capacity}
-- *The requestedChannels sub-parameter value is provided when the*
-- *<PERMISSION: selectClientTransportEntities> is supported.*
-- *Channel indicates the channel number such as timeslot in SDH*

OUTPUT_PARAMETERS
numberOfnetworkCTPs: Capacity;
resultingnetworkCTPs: networkCTPList

RAISED_EXCEPTIONS
incorrectLinkEnd: LinkEndId
insufficientCapacity: Capacity;
invalidChannelsNumber: SEQUENCE OF {Channel};
channelsAlreadyProvisioned: SEQUENCE OF {Channel};
failureToCreateLCs: NULL;
failureToAssociateLCs: NULL;
failureToSupportLCs: NULL;
failureToIncreaseCapacity: SEQUENCE {
availableLinkEndCapacity Capacity,
maxProvisionableCapacity Capacity,
potentialLinkEndCapacity Capacity,
ProvisionedLinkEndCapacity Capacity};

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:pamTopologicalLinkEnd>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
numberOfNetworkCTP: <ATTRIBUTE:pamProvisionedLinkCapacity>;
resultingNetworkCTPs ELEMENTS: <INFORMATION OBJECT:pamLinkEndConnection>;
Channel: <INFORMATION OBJECT:pamLinkEndConnection>;
incorrectLinkEnd: <INFORMATION OBJECT:pamTopologicalLinkEnd>;
insufficientCapacity: <ATTRIBUTE:pamPotentialLinkCapacity>;

availableLinkEndCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkEndCapacity:<ATTRIBUTE:pamPotentialLinkCapacity>;
provisionedLinkEndCapacity:<ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkEndExists
"The **linkEnd** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**."

inv ChannelsNumber
"The **Channel** shall refer to a valid value with regard to the *server* of the *client* **linkEnd**."

inv_ChannelsDoNotExist
"The **Channel** shall not refer to any *element* in any <*linkHasNetworkCTP*> where **linkEnd** refers to *container*."

inv_capacityExists
"The *pamPotentialLinkCapacity* attribute value of the <*pamTopologicalLinkEnd*> referred by **linkEnd** shall be greater or equal to the **requestedNumberOfNetworkCTPs**."

POST_CONDITIONS

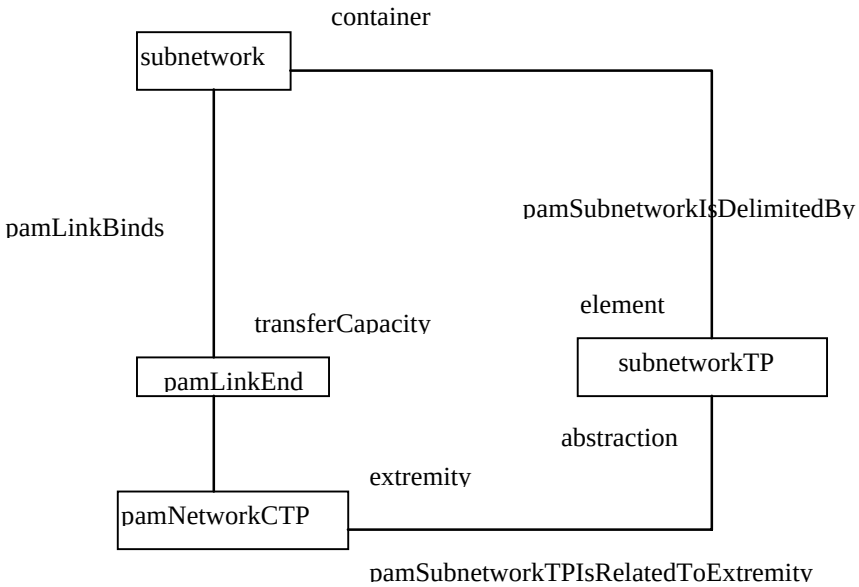
inv_provisionedLinkEndCapacityIncrease
"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLinkEnd*> referred by **linkEnd** is increased by the value of **requestedNumberOfNetworkCTPs.**"

inv_availableLinkEndCapacityIncrease
"The pamAvailableLinkCapacity value of the <pamTopologicalLinkEnd> referred by **linkEnd** is increased by the value of **requestedNumberOfNetworkCTsP.**"

inv_PotentialLinkEndCapacityDecrease
"The *pamPotentialLinkCapacity* value of all <*pamTopologicalLinkEnd*> involved in the same <*pamLinkEndIsSupportedByTrail* > as the **linkEnd** is decreased by the value of **requestedNumberOfNetworkCTPs** (down to each associated characteristic information)."

inv_createdLC
"The **resultingNetworkCTPs** refers to *element* of the <*linkHasNetworkCTP*> relationship where **linkEnd** refers to *container*."

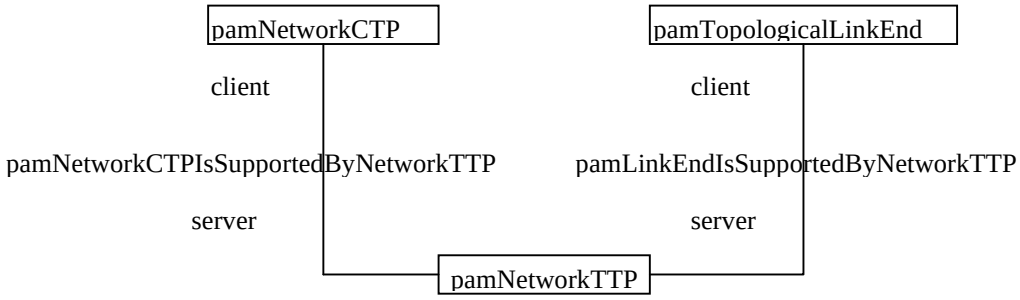
inv_LCAssociated
"The **resultingNetworkCTPs** shall refer to *extremity* in two <*subnetworkTPIsRelatedToExtremity*> relationships. The associated *abstraction* are participating in two <*subnetworkIsDelimitedBy*> relationships where each *container* is the *A_end* and *Z_end* of a <*linkBinds*> relationship for which **linkEnd** refers to *transferCapacity*.



"

inv_LCSupported

"The **resultingNetworkCTPs** refer to *client* in a *<networkCTPIsSupportedByNetworkTTP>* relationship where the **networkTTP** refers to the *server*. This **networkTTP** refers also to a *server* in a *<linkIsSupportedByNetworkTTP>* relationship where the **linkEnd** refers to *client*.



"

inv_mapping_requestedCapacityToCapacity

"The **numberOfNetworkCTP** value is equal to the *pamProvisionedLinkCapacity* value of the *<pamTopologicalLinkEnd>* referred by **linkEnd**."

EXCEPTIONS

IF PRE_CONDITION inv_LinkEndExists NOT_VERIFIED RAISE_EXCEPTION incorrectLinkEnd;
IF PRE_CONDITION inv_capacityExists NOT_VERIFIED RAISE_EXCEPTION insufficientCapacity;
IF PRE_CONDITION inv_ChannelNumber NOT_VERIFIED RAISE_EXCEPTION invalidChannelNumber;
IF PRE_CONDITION inv_ChannelsDoNotExist NOT_VERIFIED RAISE_EXCEPTION channelAlreadyProvisioned;
IF POST_CONDITION inv_createdLC NOT_VERIFIED RAISE_EXCEPTION failureToCreateLCs;
IF POST_CONDITION inv_LCAssociated NOT_VERIFIED RAISE_EXCEPTION failureToAssociateLCs;
IF POST_CONDITION inv_LCSupported NOT_VERIFIED RAISE_EXCEPTION failureToSupportLCs;
IF POST_CONDITION inv_provisonnedLinkEndCapacityIncrease NOT_VERIFIED RAISE_EXCEPTION failureToIncreaseCapacity;
IF POST_CONDITION inv_availableLinkEndCapacityIncrease NOT_VERIFIED RAISE_EXCEPTION failureToIncreaseCapacity;

IF POST_CONDITION inv_PotentialLinkEndCapacityDecrease NOT_VERIFIED
RAISE_EXCEPTION failureToIncreaseCapacity;
}

7.2.8 Eliminación de capacidad de extremo de enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: remove capacity from client linking entity>

OPERATION removeCapacityFromLinkEnd {

INPUT_PARAMETERS
linkEnd: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId
capacity: RequestedCapacity::= CHOICE{
requestedChannels SEQUENCE OF {Channel};
requestedNumberOfNetworkCTP Capacity}
-- *The requestedChannels sub-parameter value is provided when the*
-- *<PERMISSION: selectClientTransportEntities> is supported.*
-- *Channel indicates the channel number such as timeslot in SDH*

OUTPUT_PARAMETERS
provisionedNetworkCTPs: Capacity;

RAISED_EXCEPTIONS
incorrectLinkEnd: LinkEndId
insufficientCapacity: Capacity;
invalidChannelsNumber: SEQUENCE OF {Channel};
failureToDecreaseCapacity: SEQUENCE {
availableLinkEndCapacity Capacity,
maxProvisionableCapacity Capacity,
potentialLinkEndCapacity Capacity,
provisionedLinkEndCapacity Capacity};
failureToRemoveLC: NULL;

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:*pamTopologicalLinkEnd*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
Channel: <INFORMATION OBJECT:pamNetworkCTP>;
provisionedNetworkCTPs: <ATTRIBUTE:*pamProvisionedLinkCapacity*>;
incorrectLinkEnd: <INFORMATION OBJECT:pamTopologicalLinkEnd>;
insufficientCapacity: <ATTRIBUTE:pamProvisionedLinkCapacity>;
availableLinkEndCapacity: <ATTRIBUTE:pamAvailableLinkCapacity>;
maxProvisionableCapacity: <ATTRIBUTE:pamMaxProvisionableCapacity>;
potentialLinkEndCapacity:<ATTRIBUTE:pamPotentialLinkCapacity>;
provisionedLinkEndCapacity:<ATTRIBUTE:pamProvisionedLinkCapacity>;

PRE_CONDITIONS

inv_LinkEndExists
"The **linkEnd** refers to element of a <pamClientlayerNetworkDomainIsMadeOf> where the container refers to **clientLayerNetworkDomain**."

inv_capacityExists
"The *pamAvailableLinkCapacity* attribute value of the <*pamTopologicalLinkEnd*> referred by **linkEnd** is greater or equal to the **requestedNumberOfNetworkCTPs** value."

inv_networkCTPPartOfLinkEnd
"Each **Channel** refers to *element* of <*linkHasNetworkCTP*> where the *container* is referred by **linkEnd**."

POST_CONDITIONS

inv_LCRemoved
"The **Channel** shall not refer to any *element* in a <*linkHasNetworkCTP*> relationship where the **linkEnd** refers to *container*."

inv_PotentialLinkEndCapacityIncrease
"The *pamPotentialLinkCapacity* value of all <*pamTopologicalLinkEnd*> involved in the same <*pamTopologicalLinkEndIsSupportedByNetworkTTP*> as the **linkEnd** is increased by the value of **requestedNumberOfNetworkCTPs** (down to each associated characteristic information)."

inv_provCapacityDecrease
"The *pamProvisionedLinkCapacity* attribute value of the <*topologicalLinkEnd*> referred by **linkEnd** has been decreased by the **requestedNumberOfNetworkCTPs** value."

inv_availCapacityDecrease
"The *pamAvailableLinkCapacity* attribute value of the <*topologicalLinkEnd*> referred by **linkEnd** has been decreased by the **requestedNumberOfNetworkCTPs** value."

inv_mappingToReturnedCapacity
"The **provisionedNetworkCTPs** value is equal to the new *pamProvisionedLinkCapacity* attribute value of the <*topologicalLinkEnd*> referred by **linkEnd**."

EXCEPTIONS

IF PRE_CONDITION inv_LinkEndExists NOT_VERIFIED RAISE_EXCEPTION incorrectLinkEnd;
IF PRE_CONDITION inv_capacityExists NOT_VERIFIED RAISE_EXCEPTION insufficientCapacity;
IF PRE_CONDITION inv_networkCTPPartOfLinkEnd NOT_VERIFIED RAISE_EXCEPTION invalidChannelsNumber;
IF PRE_CONDITION inv_LCRemoved NOT_VERIFIED RAISE_EXCEPTION failureToRemoveLC;
IF POST_CONDITION inv_PotentialLinkEndCapacityIncrease NOT_VERIFIED RAISE_EXCEPTION failureToDecreaseCapacity;
IF POST_CONDITION inv_provCapacityDecrease NOT_VERIFIED RAISE_EXCEPTION failureToDecreaseCapacity;
IF POST_CONDITION inv_availCapacityDecrease NOT_VERIFIED RAISE_EXCEPTION failureToDecreaseCapacity;

}

7.3 Interfaces de informes

COMPUTATIONAL_INTERFACE <commonReportResourceIfce>

COMPUTATIONAL_INTERFACE preProvisionedAdaptationManagementArcReportIfce

OPERATION {
ReportAssociateTrailWithTopologicalLink;
reportDisassociateTrailFromTopologicalLink;
reportAddCapacityToLink;
reportRemoveCapacityFromLink
}

COMPUTATIONAL_INTERFACE preProvisionedAdaptationManagementPointReportIfce

OPERATION {
ReportAssociateNetworkTTPWithTopologicalLinkEnd;
ReportDisassociateNetworkTTPFromTopologicalLinkEnd;
ReportAddCapacityToLinkEnd;
reportRemoveCapacityFromLinkEnd
}

7.3.1 Informe de asociación de camino con enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: report assignment of server transport entity>

OPERATION reportAssociateTrailWithTopologicalLink {

INPUT_PARAMETERS

link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId;
trail: TrailId;

OUTPUT_PARAMETERS

-- *none*

RAISED EXCEPTIONS

-- *none*

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:*pamTopologicalLink*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
trail: <INFORMATION OBJECT:*pamTrail*>;

TRIGGER CONDITION

PRE_CONDITIONS

inv_trailNotAssociated
"The **trail** shall not refer to *server* in any <*pamTopologicalLinkIsSupportedByTrail*> where **link** refers to *client*."

POST_CONDITIONS

inv_trailAssociated
"The **trail** refers to *server* in a <*pamTopologicalLinkIsSupportedByTrail*> relationship where **link** refers to *client*."

}

7.3.2 Informe de desasociación de camino con enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: report deassignment of server transport entity>

OPERATION reportDisassociateTrailWithTopologicalLink {

INPUT_PARAMETERS

link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId;
trail: TrailId;

OUTPUT_PARAMETERS

-- *none*

RAISED EXCEPTIONS

-- *none*

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:*pamTopologicalLink*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
trail: <INFORMATION OBJECT:*pamTrail*>;

TRIGGER CONDITION

PRE_CONDITIONS

inv_trailAssociated
"The **trail** refers a *server* in a <*pamTopologicalLinkIsSupportedByTrail*> relationship where **link** refers to *client*."

POST_CONDITIONS

inv_trailNotAssociated
"The **trail** shall not refer to *server* in any <*pamTopologicalLinkIsSupportedByTrail*> where **link** refers to *client*."

}

7.3.3 Informe de adición de capacidad a enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: report client linking entity capacity provisioning>

OPERATION reportAddCapacityToLink {

INPUT_PARAMETERS
link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId;
numberOfLinkConnections: Capacity;
resultingLinkConnections: LinkConnectionList;

OUTPUT_PARAMETERS
-- *none*

RAISED EXCEPTIONS
-- *none*

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:*pamTopologicalLink*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
numberOfLinkConnections: <ATTRIBUTE:*pamProvisionedLinkCapacity*>;
resultingLinkConnections ELEMENTS: <INFORMATION OBJECT:pamLinkConnection>;

TRIGGERING CONDITION

PRE_CONDITIONS

inv_provisionedLinkCapacity
"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLink*> referred by **involvedLink** is a valid value>."

POST_CONDITIONS

inv_provisionedLinkCapacityIncrease
"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLink*> referred by **involvedLink** has increased comparing to its value in the PRE_CONDITION>."

}

7.3.4 Informe de eliminación de capacidad de enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: report client linking entity capacity removal>

OPERATION reportRemoveCapacityFromLink {

INPUT_PARAMETERS
link: LinkId;
clientLayerNetworkDomain: LayerNetworkDomainId;
capacity: RequestedCapacity::= CHOICE{
requestedChannels SEQUENCE OF {Channel};
-- *channel indicates the channel number such as timeslot in SDH*
requestedNumberOfLinkConnections Capacity}

OUTPUT_PARAMETERS
-- *none*

RAISED EXCEPTIONS
-- *none*

BEHAVIOUR

PARAMETER_MATCHING

link: <INFORMATION OBJECT:*pamTopologicalLink*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
requestedChannels ELEMENTS: <INFORMATION OBJECT:pamLinkConnection>;
requestedNumberOfLinkConnections: <ATTRIBUTE:*pamProvisionedLinkCapacity*>;

TRIGGERING CONDITION

PRE_CONDITIONS

-- *none*

POST_CONDITIONS

inv_provisionedLinkCapacityDecrease
"The *pamProvisionedLinkCapacity* attribute value of the *pamTopologicalLink* referred by **link** has decreased."

}

7.3.5 Informe de asociación de TTP de red con extremo de enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: report assignment of server transport entity>

OPERATION reportAssociatenetworkTTPWithTopologicalLinkEnd {

INPUT_PARAMETERS
linkEnd: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId;
networkTTP: NetworkTTPId;

OUTPUT_PARAMETERS
-- *none*

RAISED EXCEPTIONS
-- *none*

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:*pamTopologicalLinkEnd*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
networkTTP: <INFORMATION OBJECT:*pamNetworkTTP*>;

TRIGGER CONDITION

PRE_CONDITIONS

inv_networkTTPNotAssociated
"The **networkTTP** shall not refer to *server* in any *<pamTopologicalLinkEndIsSupportedByNetworkTTP>* where **linkEnd** refers to *client*."

POST_CONDITIONS

inv_networkTTPAssociated
"The **networkTTP** refers to *server* in a *<pamTopologicalLinkEndIsSupportedByNetworkTTP>* relationship where **linkEnd** refers to *client*."

}

7.3.6 Informe de desasociación de TTP de red con extremo de enlace topológico

<COMMUNITY: pre-provisioned adaptation management, ACTION: report deassignment of server transport entity>

OPERATION reportDisassociatenetworkTTPWithTopologicalLinkEnd {

INPUT_PARAMETERS
linkEnd: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId;
networkTTP: NetworkTTPId;

OUTPUT_PARAMETERS
-- *none*

RAISED EXCEPTIONS
-- *none*

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:*pamTopologicalLinkEnd*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
networkTTP: <INFORMATION OBJECT:*pamNetworkTTP*>;

TRIGGER CONDITION

PRE_CONDITIONS

inv_networkTTPAssociated
"The **networkTTP** refers a *server* in a *<pamTopologicalLinkEndIsSupportedByNetworkTTP>* relationship where **linkEnd** refers to *client*."

POST_CONDITIONS

inv_networkTTPNotAssociated
"The **networkTTP** shall not refer to *server* in any *<pamTopologicalLinkEndIsSupportedByNetworkTTP>* where **linkEnd** refers to *client*."

}

7.3.7 Informe de adición de capacidad a extremo de enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: report client linking entity capacity provisioning>

OPERATION reportAddCapacityToLinkEnd {

INPUT_PARAMETERS
linkEnd: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId
numberOfNetworkCTPs: Capacity;
resultingNetworkCTPs: NetworkCTPsList;

OUTPUT_PARAMETERS
-- *none*

RAISED EXCEPTIONS
-- *none*

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:*pamTopologicalLinkEnd*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
numberOfNetworkCTPs: <ATTRIBUTE:*pamProvisionedLinkCapacity*>;
resultingNetworkCTPs ELEMENTS: <INFORMATION OBJECT:pamNetworkCTP>;

TRIGGERING CONDITION

PRE_CONDITIONS

inv_provisionedLinkEndCapacity
"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLinkEnd*> referred by **involvedLinkEnd** is a valid value>."

POST_CONDITIONS

inv_provisionedLinkEndCapacityIncrease
"The *pamProvisionedLinkCapacity* attribute value of the <*pamTopologicalLinkEnd*> referred by **involvedLinkEnd** has increased comparing to its value in the PRE_CONDITION>."

}

7.3.8 Informe de eliminación de capacidad de extremo de enlace

<COMMUNITY: pre-provisioned adaptation management, ACTION: report client linking entity capacity removal>

OPERATION reportRemoveCapacityFromLinkEnd {

INPUT_PARAMETERS
linkEnd: LinkEndId;
clientLayerNetworkDomain: LayerNetworkDomainId
capacity: RequestedCapacity::= CHOICE{
requestedChannels SEQUENCE OF {Channel};
-- *channel indicates the channel number such as timeslot in SDH*
requestedNumberOfNetworkCTPs Capacity}

OUTPUT_PARAMETERS
-- *none*

RAISED EXCEPTIONS
-- *none*

BEHAVIOUR

PARAMETER_MATCHING

linkEnd: <INFORMATION OBJECT:*pamTopologicalLinkEnd*>;
clientLayerNetworkDomain: <INFORMATION OBJECT:pamClientLayerNetworkDomain>;
requestedChannels ELEMENTS: <INFORMATION OBJECT:pamNetworkCTP>;
requestedNumberOfNetworkCTPs: <ATTRIBUTE:*pamProvisionedLinkCapacity*>;

TRIGGERING CONDITION

PRE_CONDITIONS

-- *none*

POST_CONDITIONS

inv_provisionedLinkEndCapacityDecrease
"The *pamProvisionedLinkCapacity* attribute value of the *pamTopologicalLinkEnd* referred by **linkEnd** has decreased>."

}

7.4 Producciones que admiten ASN.1

En la presente Recomendación, cuando se utiliza un nombre de interfaz en una producción ASN.1, se empleará la misma etiqueta que comenzará con inicial mayúscula. La definición de tipo ASN.1 completa para esta interfaz de indagación (por ejemplo, utilización de IDENTIFICADOR DE OBJETO (OBJECT IDENTIFIER), ENTERO (INTEGER, ...) será desarrollada como parte del punto de vista de la ingeniería, con la tecnología correspondiente.

```
Capacity::= INTEGER;
Channel::= SimpleNameType
LayerNetworkDomain::= CHOICE {
        layerNetworkDomainIfce LayerNetworkDomainIfce,
        userIdentifier SimpleNameType };
LinkConnectionList::= CHOICE {
        linkConnectionQueryIfceList          SEQUENCE OF {LinkConnectionQueryIfce},
        channelList                          SEQUENCE OF {Channel}};
LinkEndId::= CHOICE {
        linkEndQueryIfce LinkEndQueryIfce,
        userIdentifier SimpleNameType };
LinkId::= CHOICE {
        linkQueryIfce LinkQueryIfce,
        userIdentifier SimpleNameType };
networkCTPList::= CHOICE {
        networkCTPQueryIfceList      SEQUENCE OF{NetworkCTPQueryIfce};
        channelList                  SEQUENCE OF{Channel}
NetworkTTPId::= CHOICE {
        networkTTPQueryIfce NetworkTTPQueryIfce,
        userIdentifier SimpleNameType };
TrailId::= CHOICE {
        trailQueryIfce TrailQueryIfce,
        userIdentifier SimpleNameType };
```

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