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

Digital transmission systems – Digital networks –
Management of transport network

**Information viewpoint for pre-provisioned
adaptation management**

ITU-T Recommendation G.853.8

(Previously CCITT Recommendation)

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**INFORMATION VIEWPOINT FOR PRE-PROVISIONED
ADAPTATION MANAGEMENT**

Summary

The objective of pre-provisioned adaptation management community is to provide link capacity to client-layer(s) from a server layer. This community should be used in the case where client transport entities can be provisioned inside the link during the adaptation management. This capability of having pre-provisioned client transport entities is available in technologies such as SDH or WDM.

Source

ITU-T Recommendation G.853.8 was prepared by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 26th of March 1999.

FOREWORD

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The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

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Recommendation G.853.8

INFORMATION VIEWPOINT FOR PRE-PROVISIONED ADAPTATION MANAGEMENT

(Geneva, 1999)

1 Scope

This information viewpoint specification is related to the pre-provisioned adaptation management enterprise specification defined in Recommendation G.852.8.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T Recommendation G.851.1 (1996), *Management of the transport network – Application of the RM-ODP framework.*
- [2] ITU-T Recommendation G.852.2 (1999), *Enterprise viewpoint description of transport resource model.*
- [3] ITU-T Recommendation G.852.8 (1999), *Enterprise viewpoint for pre-provisioned adaptation management.*

3 Definitions

None.

4 Abbreviations

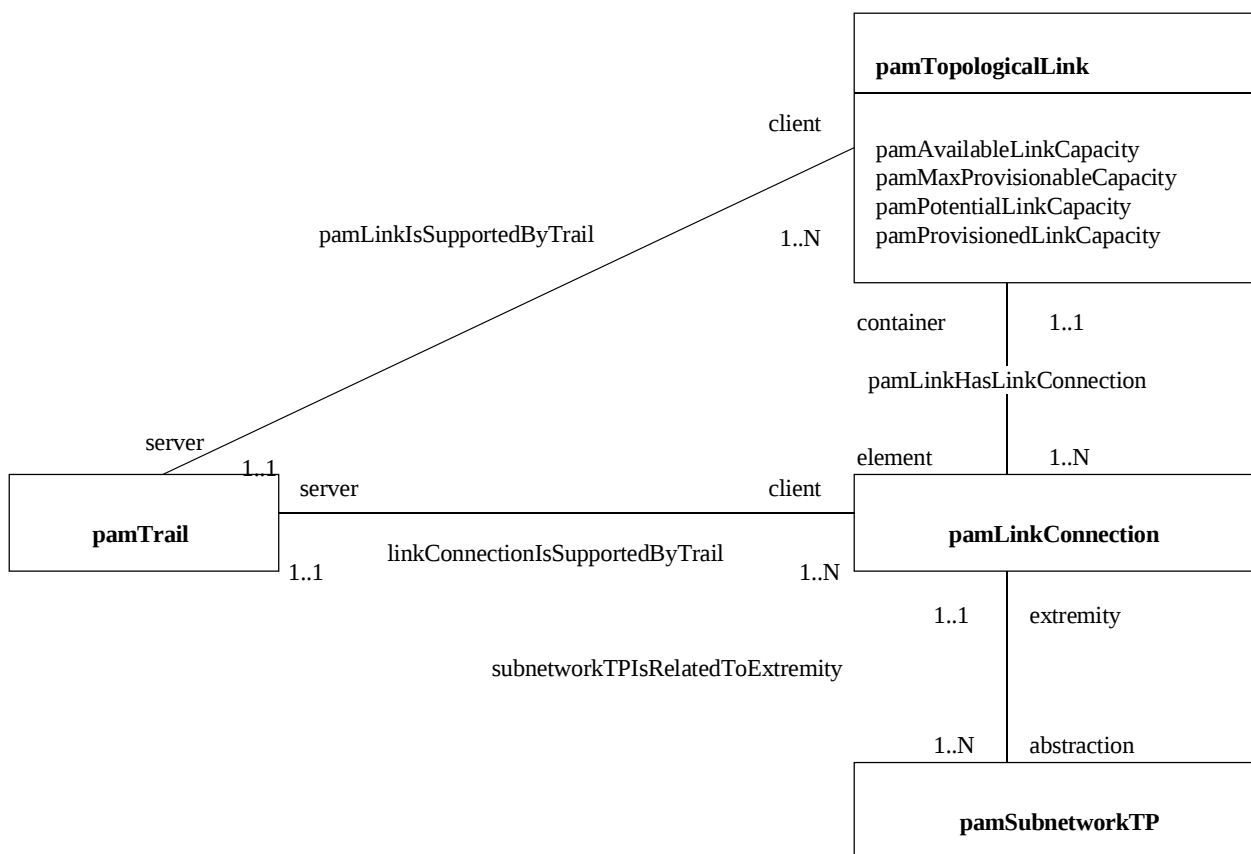
This Recommendation uses the following abbreviations:

LC	Link Connection
pam	pre-provisioned adaptation management
SDH	Synchronous Digital Hierarchy
TEM	transport enterprise model
tu	tributary unit
UML	Unified Modelling Language

5 Conventions

None.

6 UML class diagram representing relationships between classes



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Figure 1/G.853.8 – pam link, link connection, trail and subnetworkTP class diagram

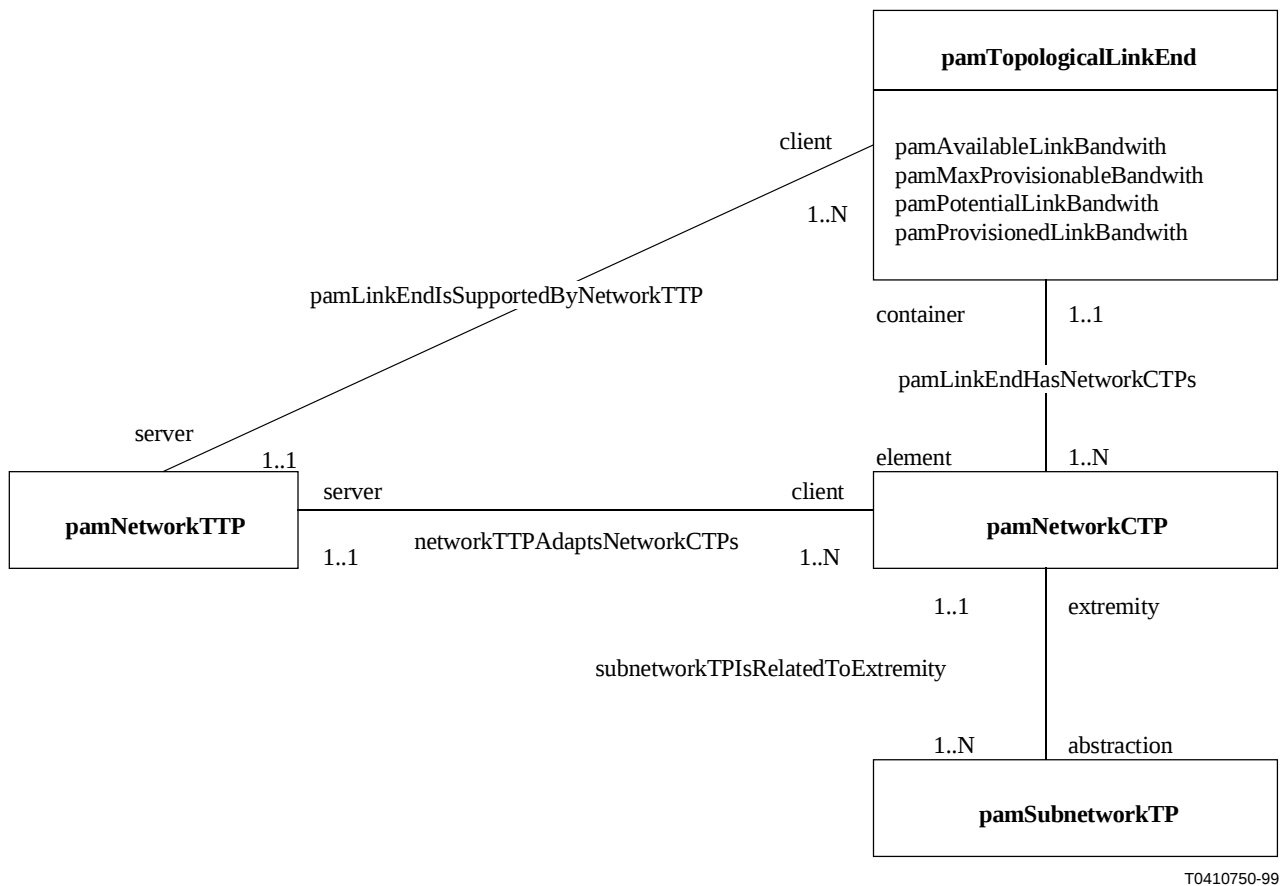
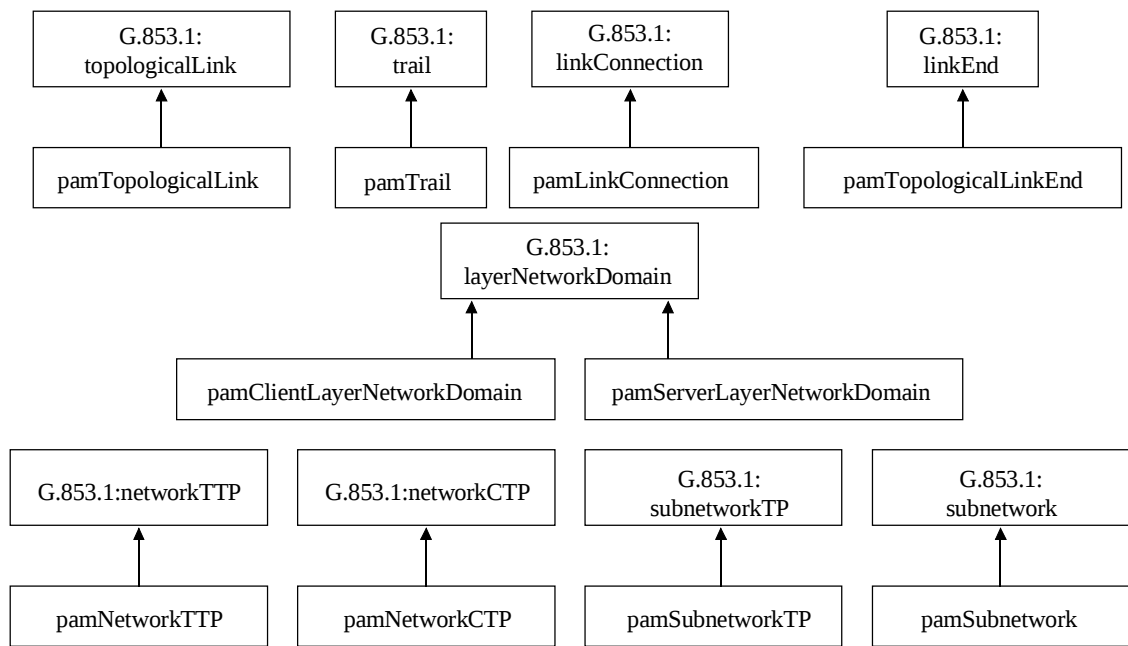
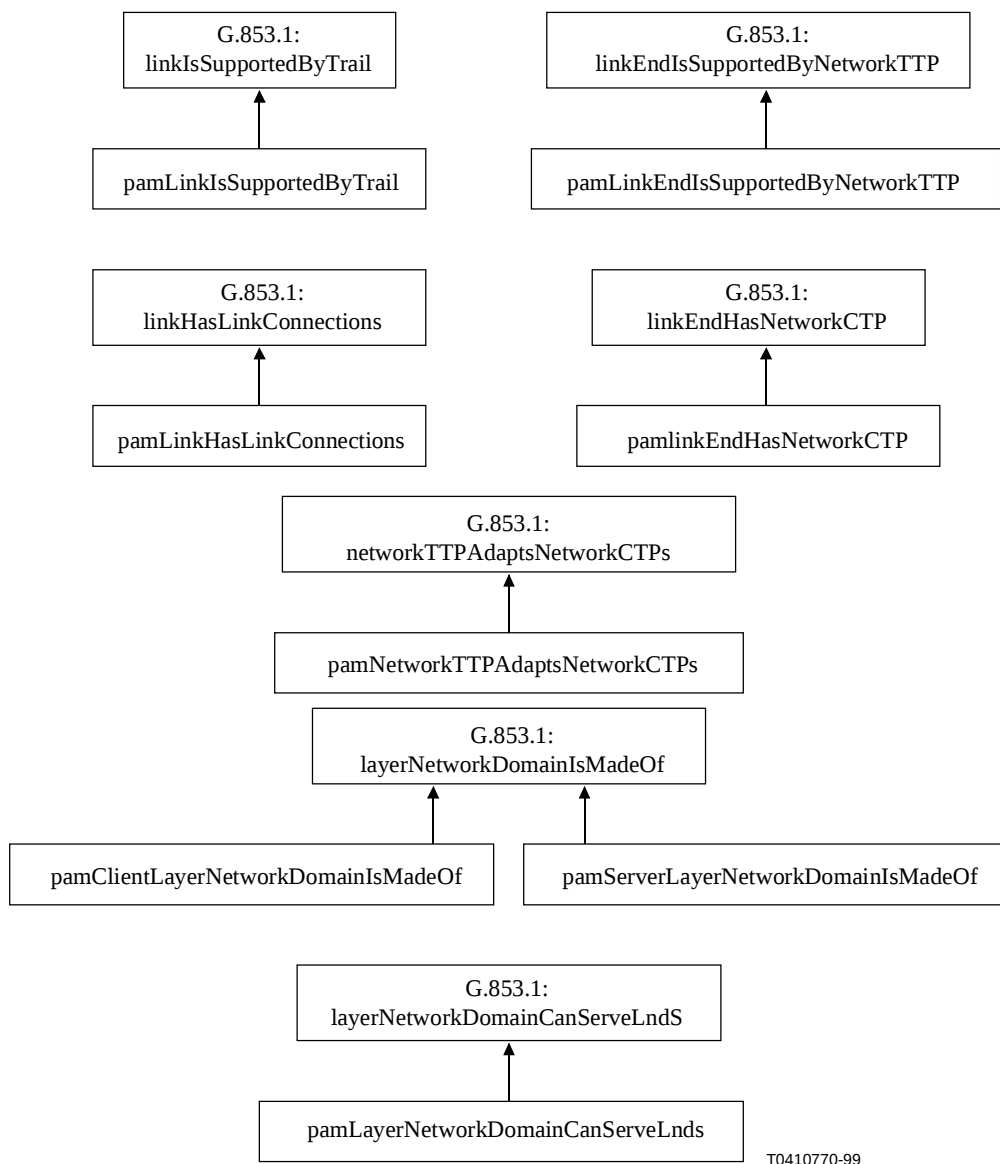


Figure 2/G.853.8 – pam networkTTP, network CTP, subnetworkTP and linkEnd class diagram



T0410760-99

Figure 3/G.853.8 – Information object class inheritance diagram



T0410770-99

Figure 4/G.853.8 – Information relationship class inheritance diagram

Table 1/G.853.8 – Correspondence between local label references and full label references

Full label reference	Local label reference
<"Rec. G.853.1", INFORMATION_OBJECT: layerNetworkDomain>	layerNetworkDomain
<"Rec. G.853.1", INFORMATION_OBJECT: linkConnection>	linkConnection
<"Rec. G.853.1", INFORMATION_OBJECT: linkEnd>	linkEnd
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkEndHasNetworkCTPs>	linkEndHasNetworkCTPs
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkIsTerminatedByLinkEnd>	linkIsTerminatedByLinkEnd
<"Rec. G.853.1", INFORMATION_OBJECT: networkCTP>	networkCTP
<"Rec. G.853.1", INFORMATION_OBJECT: networkTTP>	networkTTP
<"Rec. G.853.1", INFORMATION_OBJECT: subnetwork>	subnetwork
<"Rec. G.853.1", INFORMATION_OBJECT: subnetworkTP>	subnetworkTP
<"Rec. G.853.1", INFORMATION_OBJECT: topologicalLink>	topologicalLink
<"Rec. G.853.1", INFORMATION_OBJECT: topologicalLinkEnd>	topologicalLinkEnd
<"Rec. G.853.1", INFORMATION_OBJECT: trail>	trail
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: topologicalLinkIsSupportedByTrail>	topologicalLinkIsSupportedByTrail
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: topologicalLinkEndIsSupportedByNetworkTTP>	topologicalLinkEndIsSupportedByNetworkTTP
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: layerNetworkDomainIsMadeOf >	layerNetworkDomainIsMadeOf
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkHasLinkConnections>	linkHasLinkConnections
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkEndHasNetworkCTPs>	linkEndHasNetworkCTPs
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: networkTTPAdaptsNetworkCTP>	networkTTPAdaptsNetworkCTP
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: subnetworkIsDelimitedBy>	subnetworkIsDelimitedBy
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: subnetworkTPIsRelatedToExtremity>	subnetworkTPIsRelatedToExtremity
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkConnectionIsSupportedByTrail>	linkConnectionIsSupportedByTrail
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkBinds>	linkBinds
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkEndIsBoundTo>	linkEndIsBoundTo
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: LayerNetworkDomainCanServeLnds>	LayerNetworkDomainCanServeLnds

9 Information object class definitions

9.1 pamClientLayerNetworkDomain

<COMMUNITY:pre-provisioned adaptation management, COMMUNITY POLICY, OBLIGATION:
consistentClientAndServerSignalId>

DEFINITION

"This object class is derived from <layerNetworkDomain>."

RELATIONSHIP

< pamLayerNetworkDomainCanServeLnds >,
<pamClientLayerNetworkDomainIsMadeOf>.

9.2 pamLinkConnection

<COMMUNITY:pre-provisioned adaptation management,ROLE:client transport entity>

DEFINITION

"This object class is derived from <linkConnection>."

RELATIONSHIP

<subnetworkTPIsRelatedToExtremity>,
<linkConnectionIsSupportedByTrail>,
<linkHasLinkConnections>,
<pamClientLayerNetworkDomainIsMadeOf>.

9.3 pamNetworkCTP

<COMMUNITY:pre-provisioned adaptation management,ROLE:client transport entity>

DEFINITION

"This object class is derived from <networkCTP>."

RELATIONSHIP

<subnetworkTPIsRelatedToExtremity>,
<networkTTPAdaptsNetworkCTP>,
<linkEndHasNetworkCTPs>,
<pamClientLayerNetworkDomainIsMadeOf>.

9.4 pamServerLayerNetworkDomain

<COMMUNITY:pre-provisioned adaptation management, COMMUNITY POLICY, OBLIGATION:
consistentClientAndServerSignalId >

DEFINITION

"This object class is derived <layerNetworkDomain>."

RELATIONSHIP

< pamLayerNetworkDomainCanServeLnds>,
<pamServerLayerNetworkDomainIsMadeOf>.

9.5 pamTopologicalLink

<COMMUNITY:pre-provisioned adaptation management,ROLE:client linking entity>

DEFINITION

"This object class represents a link served by only one trail.

This object class is derived from <topologicalLink>."

ATTRIBUTE

<pamAvailableLinkCapacity>,
<pamMaxProvisionableCapacity>,
<pamPotentialLinkCapacity>,
<pamProvisionedLinkCapacity>.

INVARIANT

inv_consistentAvailableLinkCapacity

"The <pamAvailableLinkCapacity> is lower than or equal to the <pamProvisionedLinkCapacity>."

inv_consistentProvisionedLinkCapacity
 "The <pamProvisionedLinkCapacity> is lower than or equal to the <pamMaxProvisionableCapacity>."
 inv_consistentPotentialLinkCapacity
 "The <pamPotentialLinkCapacity> is lower than or equal to the <pamMaxProvisionableCapacity>."

RELATIONSHIP

<pamTopologicalLinkIsSupportedByTrail>,
 <pamLinkHasLinkConnections>,
 <pamCompoundLinkHasLinks>,
 <pamClientLayerNetworkDomainIsMadeOf>,
 <pamLinkBinds>.

9.6 pamTopologicalLinkEnd

<COMMUNITY:pre-provisioned adaptation management,ROLE:client linking entity>

DEFINITION

"This object class represents a linkEnd served by only one networkTTP."
 "This object class is derived from <topologicalLinkEnd>."

ATTRIBUTES

<pamAvailableLinkCapacity>,
 <pamMaxProvisionableCapacity>,
 <pamPotentialLinkCapacity>,
 <pamProvisionedLinkCapacity>.

INVARIANT

inv_consistentAvailableLinkCapacity
 "The <pamAvailableLinkCapacity> is lower than or equal to the <pamProvisionedLinkCapacity>."
 inv_consistentProvisionedLinkCapacity
 "The <pamProvisionedLinkCapacity> is lower than or equal to the <pamMaxProvisionableCapacity>."
 inv_consistentPotentialLinkCapacity
 "The <pamPotentialLinkCapacity> is lower than or equal to the <pamMaxProvisionableCapacity>."

RELATIONSHIP

<pamLinkEndHasNetworkCTP>,
 <pamTopologicalLinkEndIsSupportedByNetworkTTP>,
 <pamClientLayerNetworkDomainIsMadeOf>,
 <pamClientLayerNetworkDomainIsMadeOf>,
 <pamlinkEndIsBoundTo>.

9.7 pamTrail

<COMMUNITY:pre-provisioned adaptation management,ROLE:server transport entity>

DEFINITION

"This object class is derived from <trail>."

RELATIONSHIP

<pamTopologicalLinkIsSupportedByTrail>,
 <linkConnectionIsSupportedByTrail>,
 <pamServerLayerNetworkDomainIsMadeOf>.

9.8 pamNetworkTTP

<COMMUNITY:pre-provisioned adaptation management,ROLE:server transport entity>

DEFINITION

"This object class is derived from <networkTTP>."

RELATIONSHIP

<pamTopologicalLinkEndIsSupportedByNetworkTTP>,
 <networkTTPAdaptsNetworkCTP>,
 <pamServerLayerNetworkDomainIsMadeOf>.

9.9 pamSubnetwork

<COMMUNITY:pre-provisioned adaptation management, COMMUNITY POLICY, OBLIGATION: architecturalConstraint>

DEFINITION

"This object class is derived from <subnetwork>."

RELATIONSHIP

<subnetworkIsDelimitedBy>,
<LinkBinds>,
<LinkEndIsBoundTo>.

9.10 pamSubnetworkTP

<COMMUNITY:pre-provisioned adaptation management, COMMUNITY POLICY, OBLIGATION: architecturalConstraint>

DEFINITION

"This object class is derived from <subnetworkTP>."

RELATIONSHIP

<subnetworkIsDelimitedBy>,
<subnetworkTPIsRelatedToExtremity>.

10 Information relationship definitions

10.1 pamClientLayerNetworkDomainIsMadeOf

DEFINITION

"The pamClientLayerNetworkDomainIsMadeOf relationship class describes the relationship that exists between the client layer network and all its components.

This relationship type is a subtype of <layerNetworkDomainIsMadeOf>."

ROLE

container

"Played by instances of information <pamClientLayerNetworkDomain> object type or subtype."

element

"Played by instances of the following information object type or subtype:

<pamTopologicalLink>,
<pamTopologicalLinkEnd>,
<pamLinkConnection>,
<pamNetworkCTP>,
<pamSubnetworkTP>."

10.2 pamLayerNetworkDomainCanServeLnds

<COMMUNITY:pre-provisioned adaptation management, COMMUNITY POLICY:consistentClientAndServerSignalId>

DEFINITION

"The pamLayerNetworkDomainCanServeLnds relationship class describes the relationship that exists between the server layer network and all its client layer network domains.

This relationship type is a subtype of <layerNetworkDomainIsServedByLayerNetworkDomain >."

ROLE

client

"Played by instances of <pamClientLayerNetworkDomain> information object type or subtype."

server

"Played by an instance of <pamServerLayerNetworkDomain> information object type or subtype."

INVARIANT

inv_clientRoleCardinality

"One and only one client per signal identification supported by the server may participate in the relationship."

10.3 pamLinkEndHasNetworkCTPs

DEFINITION

"The pamLinkEndHasNetworkCTPs relationship class describes the relationship that exists between <pamTopologicalLinkEnd> and its components.
This relationship type is a subtype of <LinkEndHasNetworkCTPs>."

ROLE

container

"Played by an instance of <pamTopologicalLinkEnd> information object type or subtype."

element

"Played by instances of <pamNetworkCTP> information object type or subtype."

INVARIANT

inv_consistentProvisionedCapacitys

"The element role cardinality is equal to the <pamProvisionedLinkCapacity> of the container."

10.4 pamTopologicalLinkEndIsSupportedByNetworkTTP

DEFINITION

"The pamTopologicalLinkEndIsSupportedByNetworkTTP relationship class describes the relationship that exists between the total capacity available from a <pamNetworkTTP> and the provisioned number of <pamNetworkCTP> of all the supported <linkEnd>.
This relationship type is a subtype of <topologicalLinkEndIsSupportedByNetworkTTP>."

ROLE

client

"Played by instances of <linkEnd> information object type or subtype."

server

"Played by an instance of <pamNetworkTTP> information object type or subtype."

INVARIANT

inv_consistentCapacity

"The <pamMaxProvisionableCapacity> is greater than or equal to the sum of the <pamProvisionedLinkCapacity> of all the clients of the considered <pamNetworkTTP>."

inv_consistentPotentialLinkCapacity

"The <pamMaxProvisionableCapacity> is greater than or equal to the sum of the <pamProvisionedLinkCapacity> of all the clients of the considered <pamNetworkTTP>."

10.5 pamLinkHasLinkConnections

DEFINITION

"The pamLinkHasLinkConnections relationship class describes the relationship that exists between <pamTopologicalLink> and its components <pamLinkConnection>.
This relationship type is a subtype of <linkHasLinkConnections>."

ROLE

container

"Played by an instance of <pamTopologicalLink> information object type or subtype."

element

"Played by instances of <pamLinkConnections> information object type or subtype."

INVARIANT

inv_consistentProvisionedCapacity

"The element role cardinality is equal to the <pamProvisionedLinkCapacity> of the container."

10.6 pamTopologicalLinkIsSupportedByTrail

DEFINITION

"The pamTopologicalLinkIsSupportedByTrail relationship class describes the relationship that exists between the total capacity available from a trail and the provisioned link capacity of all the supported links.
This relationship type is a subtype of <topologicalLinkIsSupportedByTrail>."

ROLE

client

"Played by instances of <pamTopologicalLink> information object type or subtype."

server

"Played by an instance of <pamTrail> information object type or subtype."

INVARIANT

inv_consistentCapacity

"The <pamMaxProvisionableCapacity> is greater than or equal to the sum of the <pamProvisionedLinkCapacity> of all the clients of the trail."

inv_consistentPotentialLinkCapacity

"The <pamMaxProvisionableCapacity> for each client is equal to the <pamPotentialLinkCapacity> plus the sum of the <pamProvisionedLinkCapacity> of all the clients."

10.7 pamServerLayerNetworkDomainIsMadeOf

DEFINITION

"The pamServerLayerNetworkDomainIsMadeOf relationship class describes the relationship that exists between the server layer network and all its components.

This relationship type is a subtype of <layerNetworkDomainIsMadeOf>."

ROLE

container

"Played by instances of information <pamServerLayerNetworkDomain> object type or subtype."

element

"Played by instances of the following information object type or subtype:

<pamTrail>,
<pamNetworkTTP>."

11 Static schemas

None.

12 Dynamic schemas

None.

13 Attributes

13.1 pamAvailableLinkCapacity

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

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

DEFINITION

"The pamAvailableLinkCapacity attribute represents the provisioned capacity that is not assigned¹."

INVARIANT

inv_1

"The pamAvailableLinkCapacity can never be less than zero."

¹ This state is managed in the pre-provisioned linkConnection management community (plcm).

13.2 pamMaxProvisionableCapacity

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

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

DEFINITION

"The pamMaxProvisionableCapacity attribute provides the value that represents the maximum capacity that could be provisioned for a link from the server trail of this link. However, this maximum may not be provisioned for this link if several links are supported by the same server trail: in this case, they are sharing the maximum capacity."

INVARIANT

inv_1

"The pamMaxProvisionableCapacity can never be less than zero."

13.3 pamPotentialLinkCapacity

This information concept is related to the following enterprise entities:

<"G852-02R",COMMUNITY:pre-provisioned adaptation management,ACTION:provision capacity to client linking entity>

<"G852-02R",COMMUNITY:pre-provisioned adaptation management,ACTION: remove capacity from client linking entity>

DEFINITION

"The pamPotentialLinkCapacity attribute provides a value that represents the potential capacity that could be provisioned on a link from the capacity that has not already been provisioned from the server trail of this link."

INVARIANT

inv_1

"The pamPotentialLinkCapacity can never be less than zero."

13.4 pamProvisionedLinkCapacity

This information concept is related to the following enterprise entities:

<"G852-02R",COMMUNITY:pre-provisioned adaptation management,ACTION:provision capacity to client linking entity,OBLIGATION:deduceAvailableCapacity>

<"G852-02R",COMMUNITY:pre-provisioned adaptation management,ACTION: remove capacity from client linking entity OBLIGATION:increaseAvailableCapacity>

DEFINITION

"The pamProvisionedLinkCapacity attribute provides the capacity provisioned on a link."

INVARIANT

inv_1

"The pamProvisionedLinkCapacity can never be less than zero."

APPENDIX A

Example on the use of the attributes: pamAvailableLinkCapacity, pamMaxProvisionableCapacity, pamPotentialLinkCapacity, pamProvisionedLinkCapacity

Scenario description: a SDH VC4 layer is server for a VC12 and a VC3 layer.

Initial state: VC12 and VC3 links (respectively linkEnds) exist but are not associated with trail (respectively networkTTP).

VC4 trail or networkTTP	VC12 link or link end	VC3 link or link end
not associated	pamMaxProvisionableCapacity: 0	pamMaxProvisionableCapacity: 0
	pamPotentialLinkCapacity: 0	pamPotentialLinkCapacity: 0
	pamProvisionedLinkCapacity: 0	pamProvisionedLinkCapacity: 0
	pamAvailableLinkCapacity: 0	pamAvailableLinkCapacity: 0

State 1: a VC4 trail has been associated with client links or link ends.

VC4 trail or networkTTP	VC12 link or link end	VC3 link or link end
set up	pamMaxProvisionableCapacity: 63	pamMaxProvisionableCapacity: 3
	pamPotentialLinkCapacity: 63	pamPotentialLinkCapacity: 3
	pamProvisionedLinkCapacity: 0	pamProvisionedLinkCapacity: 0
	pamAvailableLinkCapacity: 0	pamAvailableLinkCapacity: 0

State 2: a VC3 link connection has been provisioned.

VC4 trail or networkTTP	VC12 link or link end	VC3 link or link end
set up	pamMaxProvisionableCapacity: 63	pamMaxProvisionableCapacity: 3
	pamPotentialLinkCapacity: 42	pamPotentialLinkCapacity: 2
	pamProvisionedLinkCapacity: 0	pamProvisionedLinkCapacity: 1
	pamAvailableLinkCapacity: 0	pamAvailableLinkCapacity: 1

State 3: 21 VC12 link connections have been provisioned.

VC4 trail or networkTTP	VC12 link or link end	VC3 link or link end
set up	pamMaxProvisionableCapacity: 63	pamMaxProvisionableCapacity: 3
	pamPotentialLinkCapacity: 21	pamPotentialLinkCapacity: 1
	pamProvisionedLinkCapacity: 21	pamProvisionedLinkCapacity: 1
	pamAvailableLinkCapacity: 21	pamAvailableLinkCapacity: 1

State 4: 5 VC12 link connections have been assigned or involved in subnetwork connections.

VC4 trail or networkTTP	VC12 link or link end	VC3 link or link end
set up	pamMaxProvisionableCapacity: 63	pamMaxProvisionableCapacity: 3
	pamPotentialLinkCapacity: 21	pamPotentialLinkCapacity: 1
	pamProvisionedLinkCapacity: 21	pamProvisionedLinkCapacity: 1
	pamAvailableLinkCapacity: 16	pamAvailableLinkCapacity: 1

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