



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.854.10

(03/99)

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

Digital transmission systems – Digital networks –
Management of transport network

**Computational viewpoint for pre-provisioned
link connection management**

ITU-T Recommendation G.854.10

(Previously CCITT Recommendation)

ITU-T G-SERIES RECOMMENDATIONS

TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

INTERNATIONAL TELEPHONE CONNECTIONS AND CIRCUITS	G.100–G.199
INTERNATIONAL ANALOGUE CARRIER SYSTEM	
GENERAL CHARACTERISTICS COMMON TO ALL ANALOGUE CARRIER-TRANSMISSION SYSTEMS	G.200–G.299
INDIVIDUAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON METALLIC LINES	G.300–G.399
GENERAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON RADIO-RELAY OR SATELLITE LINKS AND INTERCONNECTION WITH METALLIC LINES	G.400–G.449
COORDINATION OF RADIOTELEPHONY AND LINE TELEPHONY	G.450–G.499
TESTING EQUIPMENTS	
TRANSMISSION MEDIA CHARACTERISTICS	G.600–G.699
DIGITAL TRANSMISSION SYSTEMS	
TERMINAL EQUIPMENTS	G.700–G.799
DIGITAL NETWORKS	G.800–G.899
General aspects	G.800–G.809
Design objectives for digital networks	G.810–G.819
Quality and availability targets	G.820–G.829
Network capabilities and functions	G.830–G.839
SDH network characteristics	G.840–G.849
Management of transport network	G.850–G.859
SDH radio and satellite systems integration	G.860–G.869
Optical transport networks	G.870–G.879
DIGITAL SECTIONS AND DIGITAL LINE SYSTEM	G.900–G.999

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

**COMPUTATIONAL VIEWPOINT FOR PRE-PROVISIONED LINK
CONNECTION MANAGEMENT**

Summary

The pre-provisioned link connection management community is used to assign transport entities (link connections or connection termination points) to a caller and to control and update the available capacity of the linking entity (link or link end) that contains the transport entities. The available capacity of the linking entity contains all the unassigned transport entities. This community should be used in the case where transport entities have already been provisioned inside the linking entity using the pre-provisioned adaptation management service (See Recommendation G.853.8).

The capability of having pre-provisioned transport entities is available in technologies such as SDH or WDM.

Enterprise community actions covered by this specification:

- COMMUNITY pre-provisioned linkConnection management;
- assign transport entities;
- de-assign transport entities;
- report transport entities change.

Source

ITU-T Recommendation G.854.10 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

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

The World Telecommunication Standardization 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.

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

NOTE

In this Recommendation the term *recognized operating agency (ROA)* includes any individual, company, corporation or governmental organization that operates a public correspondence service. The terms *Administration*, *ROA* and *public correspondence* are defined in the *Constitution of the ITU (Geneva, 1992)*.

INTELLECTUAL PROPERTY RIGHTS

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

As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 1999

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

		Page
1	Scope	1
2	References	1
3	Definitions	1
4	Abbreviations	1
5	Conventions.....	2
6	Label references.....	2
7	Interfaces	2
7.1	Query interfaces.....	2
7.2	Operational interfaces.....	3
	7.2.1 PLCM Link Connection Assignment Interface.....	3
	7.2.2 PLCM NetworkCTP Assignment Interface	6
7.3	Report interfaces.....	9
	7.3.1 PLCM Reporting Arcview Interface	9
	7.3.2 PLCM Reporting Pointview Interface.....	11
7.4	ASN.1 supporting productions	14

Recommendation G.854.10

COMPUTATIONAL VIEWPOINT FOR PRE-PROVISIONED LINK CONNECTION MANAGEMENT

(Geneva, 1999)

1 Scope

This computational viewpoint specification is related to the pre-provisioned linkConnection management enterprise specification defined in Recommendation G.852.10 and the pre-provisioned linkConnection management information specification defined in Recommendation G.853.10.

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.853.1 (1999), *Common elements of the information viewpoint for the management of a transport network.*
- [3] ITU-T Recommendation G.852.10 (1999), *Enterprise viewpoint for pre-provisioned link connection management.*
- [4] ITU-T Recommendation G.853.10 (1999), *Information viewpoint for pre-provisioned link connection management.*

3 Definitions

None.

4 Abbreviations

This Recommendation uses the following abbreviations:

ASN.1	Abstract Syntax Notation One
CTP	Connection Termination Point
Id	Identifier
Ifce	Interface
inv	invariant
ITU	International Telecommunication Union
layerND	layer Network Domain
LC	Link Connection

LE	Link End
LND	Layer Network Domain
pam	pre-provisioned adaptation management
plcm	pre-provisioned link connection management
RM-ODP	Reference Model for Open Distributed Processing

5 Conventions

In order to increase the readability of the behaviour in the operations:

- parameters are written in **bold**;
- elements defined in the information specification are written in *italic*.

6 Label references

Full label reference	Local label reference
<"Rec. G.853.10", INFORMATION_OBJECT:plcmLayerNetworkDomain>	plcmLayerNetworkDomain
<"Rec. G.853.10", INFORMATION_OBJECT:plcmLink>	plcmLink
<"Rec. G.853.10", INFORMATION_OBJECT:plcmLinkConnection>	plcmLinkConnection
<"Rec. G.853.10", INFORMATION_OBJECT:plcmLinkEnd>	plcmLinkEnd
<"Rec. G.853.10", INFORMATION_OBJECT:plcmNetworkCTP>	plcmNetworkCTP
<"Rec. G.853.1", INFORMATION_RELATIONSHIP:layerNetworkDomainIsMadeOf>	layerNetworkDomainIsMadeOf
<"Rec. G.853.1", INFORMATION_RELATIONSHIP:linkHasLinkConnections>	linkHasLinkConnections
<"Rec. G.853.1", INFORMATION_RELATIONSHIP:link?EndHasNetworkCTPs>	linkEndHasNetworkCTPs
<"Rec. G.853.8", ATTRIBUTE:pamAvailableLinkCapacity>	pamAvailableLinkCapacity
<"Rec. G.853.10", ATTRIBUTE:plcmCallerId>	plcmCallerId

Full ASN.1 production reference	Local label reference
<"Rec. X.721:1992:Attribute-ASN1Module": SimpleNameType>	SimpleNameType
<"Rec. X.680:1997":INTEGER>	INTEGER

7 Interfaces

This specification do not define operations which change the userLabel of the resources or report this change to the notification receiver because they do not change the state of the system. There exact signature will be developed as part of the engineering viewpoint specification with the concerned technology.

7.1 Query interfaces

This specification refers to interfaces that allow get access identification and properties of resources involved in the "pre-provisioned linkConnection management" community. As the invocation of contained operations do not modify any state, there is no interest to develop them explicitly. Their exact signature will be developed as part of the engineering viewpoint, with the concerned technology. These interfaces are listed in the following table with the information they allow access to.

Interface name	Information object	Attributes and relationships
plcmLayerNetworkDomainQueryIfce	<plcmLayerNetworkDomain>	<resourceId> <signalIdentification> <layerNetworkDomainIsMadeOf, ROLE: element>
plcmLinkQueryIfce	<plcmLink>	<resourceId> <signalIdentification> <linkDirectionality> <pamAvailableLinkCapacity> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <linkHasLinkConnections, ROLE: elementLC>
plcmLinkConnectionQueryIfce	<plcmLinkConnection>	<resourceId> <signalIdentification> <directionality> <userLabel> <plcmCallerId> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <linkHasLinkConnections, ROLE: containerLink>
plcmLinkEndQueryIfce	<plcmLinkEnd>	<resourceId> <signalIdentification> <groupDirectionality> <pamAvailableLinkCapacity> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <linkEndHasNetworkCTPs, ROLE: elementCTP>
plcmNetworkCTPQueryIfce	<plcmNetworkCTP>	<resourceId> <pointDirectionality> <userLabel> <plcmCallerId> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <linkEndHasNetworkCTPs, ROLE: containerLE>

7.2 Operational interfaces

7.2.1 PLCM Link Connection Assignment Interface

The plcm link connection assignment interface provides functionality for assigning link connections within links to callers. It satisfies the enterprise requirements stated in <"Rec. G.852.10", COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: assign transport entities and ACTION: de-assign transport entities>.

```

COMPUTATIONAL_INTERFACE plcmAssignmentIfce {
    OPERATION      <assignLinkConnectionOnLink>;
    OPERATION      <de-assignLinkConnectionOnLink>; }

```

7.2.1.1 assign Link Connection on Link

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: assign transport entities>

OPERATION assignLinkConnectionOnLink {

INPUT_PARAMETERS

layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
requestingCaller: plcmCallerId
involvedLink: PlcmLinkId
requestedLinkConnections: PlcmRequestedLinkConnectionChoice;

OUTPUT_PARAMETERS

providedLinkConnections: SetOfLinkConnections;

RAISED_EXCEPTIONS

linkAndLinkConnectionNotCompatible: involvedLink;
invalidLinkConnection: linkConnection;
notEnoughLinkConnections: numberOfLC ::= INTEGER;
linkConnectionAlreadyAssigned: linkConnection;
inconsistentSignalIdentification: NULL;
inconsistentDirectionality: NULL;
failureToSetLinkConnectionCallerId: NULL;
failureToDecreaseCapacity: NULL;

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT plcmLayerNetworkDomain>;
requestingCaller: <INFORMATION ATTRIBUTE plcmCallerId>;
involvedLink: <INFORMATION OBJECT plcmLink>;
requestedLinkConnections ELEMENTS: <INFORMATION OBJECT plcmLinkConnection>;
providedLinkConnections ELEMENTS: <INFORMATION OBJECT plcmLinkConnection>;
linkConnection: <INFORMATION OBJECT plcmLinkConnection>;

PRE_CONDITIONS

inv_linkAndLinkConnectionCompatible

"**involvedLink** and **requestedLinkConnections** shall refer to *element* of the same
<layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_existingRequestedLinkConnections

"**requestedLinkConnections** refers to *elementLC* in a <linkHasLinkConnections> relationship
where **involvedLink** refers to *containerLink*."

-- NOTE – The following invariant is only needed when the numberOfLC choice is used for the
requestedLinkConnections by the caller.

inv_requestedLinkConnectionsAvailable

"the number of available linkConnections in <pamAvailableLinkCapacity> of **involvedLink** has to
be greater than or equal to the number of requested linkConnections referred to by
requestedLinkConnections."

inv_freeLinkConnections

"<plcmCallerId> of <plcmLinkConnections> referred to by **requestedLinkConnections** must be
equal to NULL.";

POST_CONDITIONS

inv_assignedLinkConnections

"<plcmCallerId> of <plcmLinkConnections> referred to by **requestedLinkConnections** must be set to the identifier of the caller referred to by **requestingCaller**."

inv_capacityDecrease

"<plcmAvailableLinkCapacity> of <plcmLink> referred to by involvedLink has been decreased by the number (size of 'SET OF' in **requestedLinkConnections**) of <plcmLinkConnections> that have been requested to be assigned.";

EXCEPTIONS

IF PRE_CONDITION inv_linkAndLinkConnectionCompatible NOT_VERIFIED RAISE_EXCEPTION
linkAndLinkConnectionNotCompatible;

IF PRE_CONDITION inv_existingRequestedLinkConnections NOT_VERIFIED RAISE_EXCEPTION
invalidLinkConnection;

IF PRE_CONDITION inv_requestedLinkConnectionsAvailable NOT_VERIFIED RAISE_EXCEPTION
notEnoughLinkConnections;

IF PRE_CONDITION inv_freeLinkConnections NOT_VERIFIED RAISE_EXCEPTION
linkConnectionAlreadyAssigned;

IF PRE_CONDITION <INFORMATION_RELATIONSHIP: linkHasLinkConnections, INVARIANT:
inv_signalIdentification> NOT_VERIFIED RAISE_EXCEPTION inconsistentSignalIdentification;

IF PRE_CONDITION <INFORMATION_RELATIONSHIP: linkHasLinkConnections, INVARIANT:
inv_directionality> NOT_VERIFIED RAISE_EXCEPTION inconsistentDirectionality;

IF POST_CONDITION inv_assignedLinkConnections NOT_VERIFIED RAISE_EXCEPTION
failureToSetLinkConnectionCallerId;

IF POST_CONDITION inv_capacityDecrease NOT_VERIFIED RAISE_EXCEPTION
failureToDecreaseCapacity;

; }

7.2.1.2 de-assign Link Connection on Link

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: de-assign transport entities>

OPERATION de-assignLinkConnectionOnLink {

INPUT_PARAMETERS

layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
requestingCaller: plcmCallerId
involvedLink: PlcmLinkId
involvedLinkConnections: SetOfLinkConnections;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

linkAndLinkConnectionNotCompatible: involvedLink;
invalidLinkConnection: linkConnection;
notAssignedToCaller: linkConnection;
failureToDe-assignLinkConnection: NULL;
failureToIncreaseCapacity: NULL;

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT plcmLayerNetworkDomain>;
requestingCaller: <INFORMATION ATTRIBUTE plcmCallerId>;
involvedLink: <INFORMATION OBJECT plcmLink>;
involvedLinkConnections ELEMENTS: <INFORMATION OBJECT plcmLinkConnection>;
linkConnection: <INFORMATION OBJECT plcmLinkConnection>;

PRE_CONDITIONS

inv_linkAndLinkConnectionCompatible

"**involvedLink** and **involvedLinkConnections** shall refer to *element* of the same
<layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_existingDe-assignedLinkConnections

"**involvedLinkConnections** refers to *elementLC* in a <linkHasLinkConnections> relationship
where **involvedLink** refers to *containerLink*."

inv_callerAssignedLinkConnections

"<plcmCallerId> of <plcmLinkConnections> referred to by **involvedLinkConnections** must be
equal to the identifier of **requestingCaller**."

POST_CONDITIONS

inv_de-assignedLinkConnections

"<plcmCallerId> of <plcmLinkConnections> referred to by involvedLinkConnections is equal to
NULL."

inv_capacityIncrease

"<pamAvailableLinkCapacity> of <plcmLink> referred to by **involvedLink** has been increased by
the number (size of 'SET OF' **involvedLinkConnections**) of <plcmLinkConnections> that have
been requested to be de-assigned.";

EXCEPTIONS

IF PRE_CONDITION inv_linkAndLinkConnectionCompatible NOT_VERIFIED RAISE_EXCEPTION
linkAndLinkConnectionNotCompatible;

IF PRE_CONDITION inv_existingDe-assignedLinkConnections NOT_VERIFIED RAISE_EXCEPTION
invalidLinkConnection;

IF PRE_CONDITION inv_callerAssignedLinkConnections NOT_VERIFIED RAISE_EXCEPTION
notAssignedToCaller;

IF POST_CONDITION inv_de-assignedLinkConnections NOT_VERIFIED RAISE_EXCEPTION
failureToDe-assignLinkConnection;

IF POST_CONDITION inv_capacityIncrease NOT_VERIFIED RAISE_EXCEPTION
failureToIncreaseCapacity;

;

7.2.2 PLCM NetworkCTP Assignment Interface

The plcm networkCTP assignment interface provides functionality for assigning network CTPs within link ends to callers. It satisfies the enterprise requirements stated in <"Rec. G.852.10", COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: assign transport entities and ACTION: de-assign transport entities>.

COMPUTATIONAL_INTERFACE plcmNetworkCTPAssignmentIfce {
 OPERATION <assignNetworkCTPOnLinkEnd>;
 OPERATION <de-assignNetworkCTPOnLinkEnd>; }

7.2.2.1 assign NetworkCTP on LinkEnd

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: assign transport entities>

OPERATION assignNetworkCTPOnLinkEnd {

INPUT_PARAMETERS

layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
requestingCaller: plcmCallerId
involvedLinkEnd: PlcmLinkEndId
requestedNetworkCTPs: PlcmRequestedNetworkCTPChoice;

OUTPUT_PARAMETERS

providedNetworkCTPs: SetOfNetworkCTPs;

RAISED_EXCEPTIONS

linkEndAndNetworkCTPNotCompatible: involvedLinkEnd;
invalidNetworkCTP: networkCTP;
notEnoughNetworkCTPs: numberOfNetworkCTPs ::= INTEGER;
networkCTPAlreadyAssigned: networkCTP;
inconsistentSignalIdentification: NULL;
inconsistentDirectionality: NULL;
failureToSetNetworkCTPCallerId: NULL;
failureToDecreaseCapacity: NULL;

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT plcmLayerNetworkDomain>;
requestingCaller: <INFORMATION ATTRIBUTE plcmCallerId>;
involvedLinkEnd: <INFORMATION OBJECT plcmLinkEnd>;
requestedNetworkCTPs ELEMENTS: <INFORMATION OBJECT plcmNetworkCTP>;
providedNetworkCTPs ELEMENTS: <INFORMATION OBJECT plcmNetworkCTP>;
networkCTP: <INFORMATION OBJECT plcmNetworkCTP>;

PRE_CONDITIONS

inv_linkEndAndNetworkCTPCompatible

"**involvedLinkEnd** and **requestedNetworkCTPs** shall refer to *element* of the same
<layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_existingRequestedNetworkCTPs

"**requestedNetworkCTPs** refers to *elementCTP* in a <linkEndHasNetworkCTPs> relationship
where **involvedLinkEnd** refers to *containerLE*."

-- NOTE – The following invariant is only needed when the numberOfNetworkCTPs choice is used for the
requestedNetworkCTPs by the caller.

inv_requestedNetworkCTPsAvailable

"the number of available NetworkCTPs in <pamAvailableLinkCapacity> of **involvedLinkEnd** has
to be greater than or equal to the number of requested NetworkCTPs referred to by
requestedNetworkCTPs."

inv_freeNetworkCTPs

"<plcmCallerId> of <plcmNetworkCTPs> referred to by **requestedNetworkCTPs** must be equal
to NULL.";

POST_CONDITIONS

inv_assignedNetworkCTPs

"<plcmCallerId> of <plcmLinkConnection> referred to by **requestedNetworkCTPs** must be set to
the identifier of the caller referred to by **requestingCaller**."

inv_capacityDecrease

"<pamAvailableLinkCapacity> of <plcmLinkEnd> referred to by **involvedLinkEnd** has been
decreased by the number (size of 'SET OF' **inrequestedNetworkCTPs**) of plcmNetworkCTPs that
have been requested to be assigned.";

EXCEPTIONS

```
IF PRE_CONDITION inv_linkEndAndNetworkCTPCompatible NOT_VERIFIED RAISE_EXCEPTION
    linkEndAndNetworkCTPNotCompatible;
IF PRE_CONDITION inv_existingRequestedNetworkCTPs NOT_VERIFIED RAISE_EXCEPTION
    invalidNetworkCTP;
IF PRE_CONDITION inv_requestedNetworkCTPsAvailable NOT_VERIFIED RAISE_EXCEPTION
    notEnoughNetworkCTPs;
IF PRE_CONDITION inv_freeNetworkCTPs NOT_VERIFIED RAISE_EXCEPTION
    networkCTPAlreadyAssigned;
IF PRE_CONDITION <INFORMATION_RELATIONSHIP: linkEndHasNetworkCTPs, INVARIANT:
    inv_signalIdentification> NOT_VERIFIED RAISE_EXCEPTION inconsistentSignalIdentification;
IF PRE_CONDITION <INFORMATION_RELATIONSHIP: linkEndHasNetworkCTPs, INVARIANT:
    inv_directionality> NOT_VERIFIED RAISE_EXCEPTION inconsistentDirectionality;
IF POST_CONDITION inv_assignedNetworkCTPs NOT_VERIFIED RAISE_EXCEPTION
    failureToSetNetworkCTPCallerId;
IF POST_CONDITION inv_capacityDecrease NOT_VERIFIED RAISE_EXCEPTION
    failureToDecreaseCapacity;
```

; }

7.2.2.2 de-assign NetworkCTP on LinkEnd

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: de-assign transport entities>

OPERATION de-assignNetworkCTPOnLinkEnd {

INPUT_PARAMETERS

```
layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
requestingCaller: plcmCallerId
involvedLinkEnd: PlcmLinkEndId
involvedNetworkCTPs: SetOfNetworkCTPs;
```

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

```
linkEndAndNetworkCTPNotCompatible: involvedLinkEnd;
invalidNetworkCTP: networkCTP;
notAssignedToCaller: networkCTP;
failureToDe-assignNetworkCTP: NULL;
failureToIncreaseCapacity: NULL;
```

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

```
layerND: <INFORMATION OBJECT plcmLayerNetworkDomain>;
requestingCaller: <INFORMATION ATTRIBUTE plcmCallerId>;
involvedLinkEnd: <INFORMATION OBJECT plcmLinkEnd>;
involvedNetworkCTPs ELEMENTS: <INFORMATION OBJECT plcmNetworkCTP>;
networkCTP: <INFORMATION OBJECT plcmNetworkCTP>;
```

PRE_CONDITIONS

```
inv_linkEndAndNetworkCTPCompatible
    "involvedLinkEnd and involvedNetworkCTPs shall refer to element of the same
    <layerNetworkDomainIsMadeOf> relationship where layerND refers to containerLND."
```

inv_existingDe-assignedNetworkCTPs
 "involvedNetworkCTPs refers to *elementCTP* in a <linkEndHasNetworkCTPs> relationship where
 involvedLinkEnd refers to *containerLE*."

inv_callerAssignedNetworkCTPs
 "<plcmCallerId> of <plcmNetworkCTP> referred to by involvedNetworkCTPs must be equal to
 the identifier of **requestingCaller**."

POST_CONDITIONS

inv_de-assignedNetworkCTPs
 "<plcmCallerId> of <plcmNetworkCTP> referred to by involvedNetworkCTPs is equal to
 NULL."

inv_capacityIncrease
 "<plcmAvailableLinkCapacity> of <plcmLinkEnd> referred to by involvedLinkEnd has been
 increased by the number (size of 'SET OF' involvedNetworkCTPs) of plcmNetworkCTPs that
 have been requested to be de-assigned.";

EXCEPTIONS

IF PRE_CONDITION inv_linkEndAndNetworkCTPCompatible NOT_VERIFIED RAISE_EXCEPTION
 linkEndAndNetworkCTPNotCompatible;
 IF PRE_CONDITION inv_existingDe-assignedNetworkCTPs NOT_VERIFIED RAISE_EXCEPTION
 invalidNetworkCTP;
 IF PRE_CONDITION inv_callerAssignedNetworkCTPs NOT_VERIFIED RAISE_EXCEPTION
 notAssignedToCaller;
 IF POST_CONDITION inv_de-assignedNetworkCTPs NOT_VERIFIED RAISE_EXCEPTION
 failureToDe-assignNetworkCTP;
 IF POST_CONDITION inv_capacityIncrease NOT_VERIFIED RAISE_EXCEPTION
 failureToIncreaseCapacity;

;}

7.3 Report interfaces

7.3.1 PLCM Reporting Arcview Interface

The plcm reporting arcview interface provides functionality for the reporting of the assignment of link connections to callers and for the de-assignment from callers. It satisfies the enterprise requirements stated in <"Rec. G.852.10", COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: report transport entities change>.

```
COMPUTATIONAL_INTERFACE plcmReportingArcviewIfce {
  OPERATION      <reportLinkConnectionAssignedOnLink>;
  OPERATION      <reportLinkConnectionDessignOnLink>; }
```

7.3.1.1 Report Link Connection Assigned On Link

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: report transport entities change>

OPERATION reportLinkConnectionAssignedOnLink {

INPUT_PARAMETERS

layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
 involvedCaller: plcmCallerId
 involvedLink: PlcmLinkId
 assignedLinkConnections: SetOfLinkConnections;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT plcmlayerNetworkDomain>;
involvedCaller: <INFORMATION ATTRIBUTE plcmlayerId>;
involvedLink: <INFORMATION OBJECT plcmlink>;
assignedLinkConnections ELEMENTS: <INFORMATION OBJECT plcmlinkConnection>;

TRIGGERING_CONDITIONS

PRE-CONDITIONS

inv_linkAndLinkConnectionExistingAndCompatible
"involvedLink and assignedLinkConnections shall refer to *element* of the same
<layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_involvedLinkAndAssignedLinkConnectionsCompatible
"assignedLinkConnections refers to *elementLC* in a <linkHasLinkConnections> relationship
where **involvedLink** refers to *containerLink*."

inv_freeLinkConnections
"<plcmCallerId> of <plcmLinkConnection> referred to by **assignedLinkConnections** must be
equal to NULL.";

POST_CONDITIONS

inv_assignedLinkConnection
"<plcmCallerId> of <plcmLinkConnection> referred to by **assignedLinkConnections** must be set
to the identifier of the caller referred to by **involvedCaller**."

inv_capacityDecrease
"<pamAvailableLinkCapacity> of <plcmLink> referred to by **involvedLink** has been decreased by
the number of plcmlinkConnections that have been requested to be assigned.";

EXCEPTIONS

-- none

;}

7.3.1.2 Report Link Connection De-Assigned On Link

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: report transport entities change>

OPERATION reportLinkConnectionDe-assignOnLink {

INPUT_PARAMETERS

layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
involvedLink: PlcmLinkId
de-assignedLinkConnections: SetOfLinkConnections;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT plcmlayerNetworkDomain>;

involvedLink: <INFORMATION OBJECT plcmlink>;

de-assignedLinkConnections ELEMENTS: <INFORMATION OBJECT plcmlinkConnection>;

TRIGGERING_CONDITIONS

PRE-CONDITIONS

inv_linkAndLinkConnectionExistingAndCompatible

"**involvedLink** and **de-assignedLinkConnections** shall refer to *element* of the same
<layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_involvedLinkAndDe-assignedLinkConnectionsCompatible

"**de-assignedLinkConnections** refers to *elementLC* in a <linkHasLinkConnections> relationship
where **involvedLink** refers to *containerLink*."

inv_assignedLinkConnections

"<plcmCallerId> of <plcmLinkConnection> referred to by **de-assignedLinkConnections** is
different from NULL.";

POST_CONDITIONS

inv_de-assignedLinkConnections

"<plcmCallerId> of <plcmLinkConnection> referred to by **de-assignedLinkConnections** is equal
to NULL."

inv_capacityIncrease

"<pamAvailableLinkCapacity> of <plcmLink> referred to by **involvedLink** has been increased by
the number of plcmlinkConnections that have been requested to be de-assigned.";

EXCEPTIONS

-- none

;

7.3.2 PLCM Reporting Pointview Interface

The plcml reporting pointview interface provides functionality for the reporting of the assignment of network CTPs to callers and for the de-assignment from callers. It satisfies the enterprise requirements stated in <"Rec. G.852.10", COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: report transport entities change>

```
COMPUTATIONAL_INTERFACE plcmlReportingPointviewIfce {  
    OPERATION    <reportNetworkCTPAssignedOnLink>;  
    OPERATION    <reportNetworkCTPDessignOnLink>; }
```

7.3.2.1 Report Network CTP Assigned On Link End

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: report transport entities change>

OPERATION reportNetworkCTPAssignedOnLinkEnd {

INPUT_PARAMETERS

layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
involvedCaller: plcmCallerId
involvedLinkEnd: PlcmLinkEndId
assignedNetworkCTPs: SetOfNetworkCTPs;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerNDId: <INFORMATION OBJECT plcmLayerNetworkDomain>;
involvedCaller: <INFORMATION ATTRIBUTE plcmCallerId>;
involvedLinkEnd: <INFORMATION OBJECT plcmLinkEnd>;
assignedNetworkCTPs ELEMENTS: <INFORMATION OBJECT plcmNetworkCTP>;

TRIGGERING_CONDITIONS

PRE-CONDITIONS

inv_linkAndLinkConnectionExistingAndCompatible
"involvedLinkEnd and requestedNetworkCTPs shall refer to *element* of the same
<layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_involvedLinkEndAndAssignedNetworkCTPsCompatible
"**assignedNetworkCTPs** refers to *elementCTP* in a <linkEndHasNetworkCTPs> relationship where
involvedLinkEnd refers to *containerLE*."

inv_freeNetworkCTPs
"<plcmCallerId> of <plcmNetworkCTP> referred to by **assignedNetworkCTPs** must be equal to
NULL.";

POST_CONDITIONS

inv_assignedNetworkCTP
"<plcmCallerId> of <plcmNetworkCTP> referred to by **assignedNetworkCTPs** must be set to the
identifier of the caller referred to by **involvedCaller**."

inv_capacityDecrease
"<pamAvailableLinkCapacity> of <plcmLinkEnd> referred to by **involvedLinkEnd** has been
decreased by the number of plcmNetworkCTPs that have been requested to be assigned.";

EXCEPTIONS

-- none

;}

7.3.2.2 Report network CTP de-assigned on link end

<COMMUNITY: Pre-provisioned LinkConnection Management, ACTION: report transport entities change>

OPERATION reportNetworkCTPDe-assignOnLinkEnd {

INPUT_PARAMETERS

layerND: layerNetworkDomainIfce ::= PlcmLayerNetworkDomainQueryIfce
involvedLinkEnd: PlcmLinkEndId
de-assignedNetworkCTPs: SetOfNetworkCTPs;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerNDId: <INFORMATION OBJECT plcmLayerNetworkDomain>;
involvedLinkEnd: <INFORMATION OBJECT plcmLinkEnd>;
de-assignedNetworkCTPs ELEMENTS: <INFORMATION OBJECT plcmNetworkCTP>;

TRIGGERING_CONDITIONS

PRE-CONDITIONS

inv_linkAndLinkConnectionExistingAndCompatible

"**involvedLinkEnd** and **de-assignedNetworkCTPs** shall refer to *element* of the same
<layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_involvedLinkEndAndDe-assignedNetworkCTPsCompatible

"**de-assignedNetworkCTPs** refers to *elementCTP* in a <linkEndHasNetworkCTPs> relationship where
involvedLinkEnd refers to *containerLE*."

inv_assignedNetworkCTPs

"<plcmCallerId> of <plcmNetworkCTP> referred to by **de-assignedNetworkCTPs** is different from
NULL.";

POST_CONDITIONS

inv_de-assignedNetworkCTPs

"<plcmCallerId> of <plcmNetworkCTP> referred to by **de-assignedNetworkCTPs** is equal to NULL."

inv_capacityIncrease

"<pamAvailableLinkCapacity> of <plcmLinkEnd> referred to by **involvedLinkEnd** has been increased
by the number of plcmNetworkCTPs that have been requested to be de-assigned.";

EXCEPTIONS

-- none

;}

7.4 ASN.1 supporting productions

This subclause defines the ASN.1 productions which are used within other ASN.1 productions in the operations.

In this Recommendation, when an interface name is used within an ASN.1 production, the same label will be used, starting with a capital letter. The complete ASN.1 type definition for this query interface (e.g. use of ObjectIdentifier, INTEGER, ...) will be developed as part of the engineering viewpoint, with the concerned technology.

```
PlcmLinkEndId ::= CHOICE {  
    linkEndQueryInterface      PlcmLinkEndQueryInterface,  
    userIdentifier             SimpleNameType };
```

```
PlcmLinkId ::= CHOICE {  
    linkQueryInterface         PlcmLinkQueryInterface,  
    userIdentifier             SimpleNameType };
```

```
PlcmRequestedLinkConnectionChoice ::= CHOICE {  
    plcmLinkConnections        SetOfLinkConnections,  
    numberOfLC                 INTEGER };
```

```
PlcmRequestedNetworkCTPChoice ::= CHOICE {  
    plcmNetworkCTPs           SetOfNetworkCTPs,  
    numberOfNetworkCTPs       INTEGER };
```

```
SetOfLinkConnections ::= SET OF CHOICE {  
    linkConnectionId          PlcmLinkConnectionQueryIfce,  
    userIdentifier            SimpleNameType }
```

```
SetOfNetworkCTPs ::= SET OF CHOICE {  
    networkCTPId              PlcmNetworkCTPQueryIfce,  
    userIdentifier            SimpleNameType }
```

ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems