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

Digital transmission systems – Digital networks –
Management of transport network

Computational viewpoint for trail management

ITU-T Recommendation G.854.6

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION G.854.6

COMPUTATIONAL VIEWPOINT FOR TRAIL MANAGEMENT

Summary

Enterprise community actions covered by this specification:

- set-up point-to-point trail;
- modify trail;
- release trail;
- create trail termination point;
- delete trail termination point;
- associate trail termination point with access group;
- disassociate trail termination point from access group;
- associate trail termination point with subnetwork;
- disassociate trail termination point from subnetwork;
- report trail set-up;
- report trail release;
- report trail modification;
- report trail termination point creation;
- report trail termination point deletion;
- report association of trail termination point with access group;
- report disassociation of trail termination point from access group;
- report association of trail termination point with subnetwork;
- report disassociation of trail termination point from subnetwork.

Source

ITU-T Recommendation G.854.6 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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Recommendation G.854.6**COMPUTATIONAL VIEWPOINT FOR TRAIL MANAGEMENT***(Geneva, 1999)***1 Scope**

This computational viewpoint specification is related to the trail management enterprise specification defined in Recommendation G.852.6 and the trail management information specification defined in Recommendation G.853.6.

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.852.6 (1999), *Enterprise viewpoint for trail management.*
- [4] ITU-T Recommendation G.853.6 (1999), *Information viewpoint for trail management.*

3 Definitions

None.

4 Abbreviations

This Recommendation uses the following abbreviations:

ASN.1	Abstract Syntax Notation One
Id	Identifier
Ifce	Interface
inv	invariant
ITU	International Telecommunication Union
layerND	layerNetwork Domain
LC	LinkConnection
ND	Network Domain
RM-ODP	Reference Model for Open Distributed Processing

**Documents**

Document Sharing Hub

Recommendation G.854.6 (03/99)

1

tm trail management
TTP Trail Termination Point

5 Conventions

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

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

6 Label references

Full label reference	Local label reference
<"Rec. G.853.6", INFORMATION_OBJECT: tmAccessGroup>	tmAccessGroup
<"Rec. G.853.6", INFORMATION_OBJECT: tmLayerNetworkDomain>	tmLayerNetworkDomain
<"Rec. G.853.6", INFORMATION_OBJECT: tmNetworkTTP>	tmNetworkTTP
<"Rec. G.853.6", INFORMATION_OBJECT: tmSubnetwork>	tmSubnetwork
<"Rec. G.853.6", INFORMATION_OBJECT: tmSubnetworkConnection>	tmSubnetworkConnection
<"Rec. G.853.6", INFORMATION_OBJECT: tmSubnetworkTP>	tmSubnetworkTP
<"Rec. G.853.6", INFORMATION_OBJECT: tmTrafficDescriptor>	tmTrafficDescriptor
<"Rec. G.853.6", INFORMATION_OBJECT: tmTrail>	tmTrail
<"Rec. G.853.6", INFORMATION_OBJECT: tmTrailServiceCharacteristics>	tmTrailServiceCharacteristics
<"Rec.G.853.1", INFORMATION_RELATIONSHIP: accessGroupIsMadeOfNetworkTTPs>	accessGroupIsMadeOfNetworkTTPs
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: layerNetworkDomainIsMadeOf>	layerNetworkDomainIsMadeOf
<"Rec.G.853.1", INFORMATION_RELATIONSHIP: subnetworkConnectionIsTerminatedByPointToPoint>	subnetworkConnectionIsTerminatedByPointToPoint
<"Rec.G.853.1", INFORMATION_RELATIONSHIP: subnetworkIsDelimitedBy>	subnetworkIsDelimitedBy
<"Rec.G.853.1", INFORMATION_RELATIONSHIP: subnetworkTPIsRelatedToExtremity>	subnetworkTPIsRelatedToExtremity
<"Rec. G.853.6", INFORMATION_RELATIONSHIP: tmTrailHasImmediateTrafficDescriptor>	tmTrailHasImmediateTrafficDescriptor
<"Rec.G.853.6", INFORMATION_RELATIONSHIP: tmTrailHasTSC>	tmTrailHasTSC
<"Rec.G.853.1", INFORMATION_RELATIONSHIP: trailsTerminatedByPointToPoint>	trailsTerminatedByPointToPoint
<"Rec. G.853.1", INFORMATION_ATTRIBUTE: directionality>	directionality
<"Rec. G.853.1", INFORMATION_ATTRIBUTE: resourceId>	resourceId
<"Rec.G.853.1", INFORMATION_ATTRIBUTE: signalIdentification>	signalIdentification
<"Rec.G.853.1", INFORMATION_ATTRIBUTE: userLabel>	userLabel
<"Rec. G.854.3", INTERFACE: commonReportResourceIdChangeIfce>	commonReportResourceIdChangeIfce
<"Rec. G.854.3", INTERFACE: commonResourceIfce>	commonResourceIfce

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

7 Interfaces

This specification does 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. Their 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 to identification and properties of resources involved in the "trail management" community. As the invocation of the 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 Table 1 with the information they allow access to.

Table 1/G.854.6 – Query interfaces

Interface name	Information object	Attributes and relationships
tmAccessGroupQueryIfce	<tmAccessGroup>	<resourceId> <signalIdentification> <topologicalEndDirection> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <accessGroupIsMadeOfNetworkTTPs, ROLE: elementTTP>
tmLayerNetworkDomainQueryIfce	<tmLayerNetworkDomain>	<resourceId> <signalIdentification> <layerNetworkDomainIsMadeOf, ROLE: element>
tmNetworkTTPQueryIfce	<tmNetworkTTP>	<resourceId> <signalIdentification> <userLabel> <pointDirectionality> <accessGroupIsMadeOfNetworkTTPs, ROLE: containerAG> <trailsTerminatedByPointToPoint, ROLE: transportEntityTrail> <subnetworkTPIsRelatedToExtremity, ROLE: abstractionSNTP> <layerNetworkDomainIsMadeOf, ROLE: containerLND>
tmSubnetworkConnectionQueryIfce	<tmSubnetworkConnection>	<resourceId> <signalIdentification> <directionality> <subnetworkConnectionIsTerminatedBy PointToPoint, ROLE: a_endSNTP, ROLE: z_endSNTP> <layerNetworkDomainIsMadeOf, ROLE: containerLND>
tmSubnetworkQueryIfce	<tmSubnetwork>	<resourceId> <signalIdentification> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <subnetworkIsDelimitedBy, ROLE: elementSNTP>

Table 1/G.854.6 – Query interfaces (*concluded*)

Interface name	Information object	Attributes and relationships
tmSubnetworkTPQueryIfce	<tmSubnetworkTP>	<resourceId> <signalIdentification> <pointDirectionality> <subnetworkTPIsRelatedToExtremity, ROLE: extremity> <layerNetworkDomainIsMadeOf, ROLE: ContainerLND> <subnetworkIsDelimitedBy, ROLE: containerSN> <subnetworkConnectionIsTerminatedBy PointToPoint, ROLE: transportEntitySNC>
tmTrafficDescriptorQueryIfce	<tmTrafficDescriptor>	<signalIdentification> <tmTrailHasImmediateTrafficDescriptor, ROLE: trailTD>
tmTrailQueryIfce	<tmTrail>	<resourceId> <signalIdentification> <userLabel> <directionality> <trailsTerminatedByPointToPoint, ROLE: a_endNTP, ROLE: z_endNTP> <tmTrailHasTSC, ROLE: transportQualifierTSC> <tmTrailHasImmediateTrafficDescriptor, ROLE: immediateTrafficDescriptorTrail> <layerNetworkDomainIsMadeOf, ROLE: containerLND>
tmTrailServiceCharacteristicsQueryIfce	<tmTrailServiceCharacteristics>	<resourceId> <signalIdentification> <tmTrailHasTSC, ROLE: transportQualifiedTrail>

7.2 Operational interfaces

7.2.1 Trail provisioning interface

The trail provisioning interface manages the immediate set-up, release and modification of point-to-point trails as well as the creation and deletion of network TTPs and the association and disassociation of network TTPs with/from access groups and subnetworks. The interface is required to satisfy the enterprise requirements stated in:

<"Recommendation G.852.6, "COMMUNITY trail management, ACTION: setup point-to-point trail>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: release trail>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: modify trail>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: create trail termination point>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: delete trail termination point>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: associate trail termination point with access group>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: disassociate trail termination point from access group>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: associate trail termination point with subnetwork>,
 <"Recommendation G.852.6, "COMMUNITY trail management, ACTION: disassociate trail termination point from subnetwork>

By inheriting the properties of the commonResourceIfce, the trailProvisioningIfce provides the capability to change the resource identifier of the resources involved.

```
COMPUTATIONAL INTERFACE trailProvisioning Ifce{
  DERIVED FROM <commonResourceIfce>
  OPERATION {
    <setupPointToPointTrail>;
    <releaseTrail>;
    <modifyTrail>;
    <createNetworkTTP>;
    <deleteNetworkTTP>
    <associateNetworkTTPWithAccessGroup>;
    <disassociateNetworkTTPFromAccessGroup>;
    <associateNetworkTTPWithSubnetwork>;
    <disassociateNetworkTTPFromSubnetwork>;
  }
}
```

7.2.1.1 Set-up point-to-point trail

<COMMUNITY: trail management, ACTION: setup point-to-point trail>

OPERATION setupPointToPointTrail {

INPUT_PARAMETERS

```
aEnd: AEndChoice ::= CHOICE {
    networkTTP NetworkTTPChoice,
    accessGroup AccessGroupChoice};
zEnd: ZEndChoice ::= CHOICE {
    networkTTP NetworkTTPChoice,
    accessGroup AccessGroupChoice};
layerND: LayerNetworkDomainChoice;
dir: Directionality;
suppliedUserIdentifier: UserIdentifier;
    -- zero length string or 0 implies none supplied.
serviceCharacteristics: TrailServiceCharacteristicsId;
    -- reference can be used to determine any QOS or routing characteristics;
trafficDescriptor: ImmediateTrafficDescriptorId;
suppliedUserLabel: GraphicString;
    -- zero length string implies none supplied
```

OUTPUT_PARAMETERS

```
newTrail: TrailChoice;
connectedAEndNetworkTTP: NetworkTTPChoice;
connectedZEndNetworkTTP: NetworkTTPChoice;
```

RAISED_EXCEPTIONS

```
networkTTPsNotPartOfLayerND: SequenceOf NetworkTTPChoice;
    -- the list contains one element when only one point is incorrect, i.e. is not part of the
    -- layerNetworkDomain.
aEndNetworkTTPConnected: NetworkTTPChoice;
networkTTPsInAEndAccessGroupConnected: AccessGroupChoice;
zEndNetworkTTPConnected: NetworkTTPChoice;
networkTTPsInZEndAccessGroupConnected: AccessGroupChoice;
userIdentifierNotUnique: UserIdentifier;
failureToSetUserIdentifier: NULL;
failureToCreateTrail: NULL;
invalidTransportServiceCharacteristics: NULL;
invalidTrafficDescriptor: NULL;
```