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

Digital transmission systems – Digital networks –
Management of transport network

Enterprise viewpoint for topology management

ITU-T Recommendation G.852.3

(Previously CCITT Recommendation)

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ENTERPRISE VIEWPOINT FOR TOPOLOGY MANAGEMENT

Summary

The topology management community is used to manage the topology of a layer network domain and the relationships between the resources of the layer network domain being managed. The service provided by the community allows for the creation and deletion of the following resources inside a layer network domain: subnetwork, link, topological link, link end, topological link end and access group. The service also provides a set of reporting actions to advise potential notification receivers of creation and deletion of resources in the community. The service is available between one single caller and one single provider.

The partitioning of subnetworks and links is not addressed in this community.

Source

ITU-T Recommendation G.852.3 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.

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

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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.

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Recommendation G.852.3

ENTERPRISE VIEWPOINT FOR TOPOLOGY MANAGEMENT

(Geneva, 1999)

1 Scope

This Recommendation specifies the enterprise viewpoint for the topology management of a transport network.

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 network resource model.*

3 Definitions

None.

4 Abbreviations

This Recommendation uses the following abbreviations:

CTP	Connection Termination Point
Id	Identifier
ITU	International Telecommunication Union
RM-ODP	Reference Model for Open Distributed Processing
topman	topology management
TP	Termination Point
TTP	Trail Termination Point

5 Conventions

None.

6 Community topology management

6.1 Purpose

The purpose of this community is to manage the topology of a layer network domain and the relationships between the resources of the layer network domain being managed. The service provided by the community allows for the creation and deletion of the following resources inside a layer network domain: subnetwork, link, topological link, link end, topological link end and access group. The service also provides a set of reporting actions to advise potential notification receivers of creation and deletion of resources in the community. The service is available between one single caller and one single provider.

The association and disassociation of trail termination points and connection termination points with the related subnetworks and access groups are managed by other services.

The partitioning of subnetworks and links is not addressed in this community.

6.2 Role

topman_caller

This role represents the client invoking the actions defined within this community. One, and only one, topman_caller role occurrence shall exist in the community.

topman_provider

This role represents the server performing the actions defined in this community. One, and only one, topman_provider role occurrence shall exist in the community.

notification receiver

This role represents a receiver of the reporting actions defined within this community. Zero or more notification receiver role occurrences may exist in the community.

layer network domain

This role represents the layer network domain resource defined in Recommendation G.852.2. One or more role occurrences may exist in the community.

subnetwork

This role represents the subnetwork resource defined in Recommendation G.852.2. Zero or more subnetwork role occurrences may exist in the community.

link

This role represents the link resource as defined in Recommendation G.852.2. Zero or more link role occurrences may exist in the community.

topologicalLink

This role reflects the topological link resource as defined in Recommendation G.852.2. Zero or more topological link role occurrences may exist in the community.

link end

This role represents the link end resource as defined in Recommendation G.852.2. Zero or more link end role occurrences may exist in the community.

topologicalLinkEnd

This role reflects the topological link end resource as defined in Recommendation G.852.2. Zero or more topological link end role occurrences may exist in the community.

access group

This role represents the access group resource as defined in Recommendation G.852.2. Zero or more access group role occurrences may exist in the community.

trail termination point

This role represents the TTP resource defined in Recommendation G.852.2. Zero or more trail termination point role occurrences may exist in the community.

link connection

This role represents the link connection resource defined in Recommendation G.852.2. Zero or more link connection role occurrences may exist in the community.

subnetwork connection

This role represents the subnetwork connection resource defined in Recommendation G.852.2. Zero or more subnetwork connection role occurrences may exist in the community.

connection termination point

This role represents the connection termination point resource defined in Recommendation G.852.2. Zero or more connection termination point role occurrences may exist in the community.

6.3 Community policy

OBLIGATION scope

Only properties that are explicitly stated in this community are valid and can be accessed by both caller and provider of this community. Conformance to this service depends only on the explicit specification of this service. Any other modifications outside of this community are not relevant for conformance.

OBLIGATION serviceRejection

In this community, the provider shall identify the obligation or prohibition which is not fulfilled either by the caller or the provider. The provider shall give an indication about any execution infrastructure problem. In this case, the level of detail indicated by the provider shall be dependent on the shared knowledge of the infrastructure on which the community is running.

OBLIGATION signalId

Each resource in the community shall have the same signal identification. The community constitutes a layer network domain.

OBLIGATION viewingCapabilities

The provider shall support a view of the resource properties and relationships that have been identified or permitted in the service contract with the caller.

OBLIGATION belongingConstraints

All resources managed in the community actions shall belong to the community.

OBLIGATION architecturalConstraints

All the modifications performed on the resources in the community shall respect the architectural constraints expressed in Recommendation G.852.2.

6.4 Action

6.4.1 Create access group

This action creates an access group inside a layer network domain. The caller may provide a unique user-defined identifier to identify the access group that is to be created. The caller may also provide a user-defined label; the label need not to be unique.

ACTION_POLICY

PERMISSION inputUserIdentifier

The caller may provide a user-defined identifier that the caller shall use to uniquely identify the access group when it has been created.

OBLIGATION successReturnId

The provider shall, upon success of this action, return the resource identifier of the created access group.

OBLIGATION providerUserId

If PERMISSION inputUserIdentifier is part of the contracted service, the provider shall use the user-defined identifier as the access group resource identifier when communicating with the caller.

OBLIGATION rejectUserIdNotUnique

If PERMISSION inputUserIdentifier is part of the contracted service and if the user-defined identifier is **not** unique within the layer network domain, the provider shall reject the action and return the not unique user identifier.

PERMISSION inputDirection

The caller may define constraints on the directionality of the TTPs that may be included in the requested access group.

OBLIGATION giveDirection

If PERMISSION inputDirection is **not** part of the contracted service, the provider shall not constrain the directionality.

PERMISSION inputUserLabel

The caller may provide a user-defined label for the requested access group. This user-defined label shall not be used by the caller to identify the access group in an action.

6.4.2 Delete access group

This action deletes an access group inside a layer network domain. The access group cannot be deleted if there are any trail termination points associated with it. No other resource is deleted by this action.

ACTION_POLICY

OBLIGATION inputAccessGroupId

The caller shall provide the identifier of the access group to be deleted.

OBLIGATION noExistingAccessGroup

This action will fail if the access group specified does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION noTTP

This action will fail if one or more trail termination points are still associated with the access group specified.

OBLIGATION successAccessGroupDeleted

When the action is successful, the provider shall indicate this to the caller.

6.4.3 Create link

This action creates a link between either:

- two subnetworks; or
- two access groups; or
- an access group and a subnetwork.

The caller shall specify each end of the link to be created.

The caller may provide a unique user-defined identifier to identify the link that is to be created. The caller may also provide a user-defined label; the label need not be unique.

ACTION_POLICY

OBLIGATION inputAEnd

The caller shall provide the identifier for the A_end that is a subnetwork or an access group.

OBLIGATION noExistingAEnd

This action will fail if the provided A_end does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION inputZEnd

The caller shall provide the identifier for the Z_end that is a subnetwork or an access group.

OBLIGATION notExistingZEnd

This action will fail if the provided Z_end does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

PERMISSION inputUserIdentifier

The caller may provide a user-defined identifier that the caller shall use to uniquely identify the link when it has been created.

OBLIGATION successReturnUserId

The provider shall, upon success of this action, return the resource identifier of the created link.

OBLIGATION providerUserId

If PERMISSION inputUserIdentifier is part of the contracted service, the provider shall use the user-defined identifier as the link resource identifier when communicating with the caller.

OBLIGATION rejectUserIdNotUnique

If PERMISSION inputUserIdentifier is part of the contracted service and if the user-defined identifier is **not** unique within the layer network domain, the provider shall reject the action and return the not unique user identifier.

PERMISSION inputDirectionality

The caller may define constraints on the directionality of the link connections that may be included in the requested link.

OBLIGATION giveDirectionality

If PERMISSION inputDirectionality is **not** part of the contracted service, the provider shall not constrain the directionality.

PERMISSION inputUserLabel

The caller may provide a user-defined label for the requested link. This user-defined label shall not be used by the caller to identify the link in an action.

6.4.4 Delete link

This action deletes a link inside a layer network domain. The link shall not contain any link connections. No other resource is deleted by this action.

ACTION_POLICY

OBLIGATION inputLinkId

The caller shall provide the identifier of the link to be deleted.

OBLIGATION noExistingLink

This action will fail if the link specified does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION noLinkConnection

This action will fail if one or more link connections are still contained in the link specified.

OBLIGATION successLinkDeleted

When the action is successful, the provider shall indicate this to the caller.

6.4.5 Create link end

This action creates a link end (at the edge of a network) bound to a subnetwork specified by the caller. The caller may provide a unique user-defined identifier to identify the link end to be created. The caller may also provide a user-defined label.

ACTION_POLICY

OBLIGATION inputSubnetwork

The caller shall provide the identifier of the subnetwork to which the link end shall be bound.

OBLIGATION noExistingSubnetwork

This action will fail if the provided subnetwork does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

PERMISSION inputUserIdentifier

The caller may provide a user-defined identifier that the caller will use to uniquely identify the link end when it has been created.

OBLIGATION successReturnId

The provider shall, upon success of this action, return the resource identifier for the created link end.

OBLIGATION providerUserId

If PERMISSION inputUserIdentifier is part of the contracted service, the provider shall use the user-defined identifier as the link end resource identifier when communicating with the caller.

OBLIGATION rejectUserIdNotUnique

If PERMISSION inputUserIdentifier is part of the contracted service and if the user-defined identifier is **not** unique within the layer network domain, the provider shall reject the action and return the not unique user identifier.

PERMISSION inputDirection

The caller may define constraints on the directionality of the network CTPs that may be included in the requested link end.

OBLIGATION giveDirection

If PERMISSION inputDirection is **not** part of the contracted service, the provider shall not constrain the directionality.

PERMISSION inputUserLabel

The caller may provide a user-defined label for the requested link end. This user-defined label shall not be used by the caller to identify the link end in an action.

6.4.6 Delete link end

This action deletes a link end inside a layer network domain. The link end shall not contain any connection termination points. No other resource is deleted by this action.

ACTION_POLICY

OBLIGATION inputLinkEndId

The caller shall provide the identifier of the link end to be deleted.

OBLIGATION noExistingLinkEnd

This action will fail if the link end specified does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION noCTP

This action will fail if one or more connection termination points are still associated with the link end specified.

OBLIGATION successLinkEndDeleted

When the action is successful, the provider shall indicate this to the caller.

6.4.7 Create subnetwork

This action creates a subnetwork inside a layer network domain. The caller may provide a unique user-defined identifier to identify the subnetwork that is to be created. The caller may also provide a user-defined label; the label need not be unique.

The provider, depending on its internal policy, its knowledge, and the service contract, may return a list of trail termination points associated with the newly created subnetwork. Multiple subnetworks can be created inside a layer network domain.

ACTION_POLICY

PERMISSION inputUserIdentifier

The caller may provide a user-defined identifier that the caller shall use to uniquely identify the subnetwork when it has been created.

OBLIGATION successReturnUserId

The provider shall, upon success of this action, return the resource identifier of the created subnetwork.

OBLIGATION providerUserId

If PERMISSION inputUserIdentifier is part of the contracted service, the provider shall use the user-defined identifier as the subnetwork resource identifier when communicating with the caller.

OBLIGATION rejectUserIdNotUnique

If PERMISSION inputUserIdentifier is part of the contracted service and if the user-defined identifier is **not** unique within the layer network domain, the provider shall reject the action and return the not unique user identifier.

PERMISSION inputUserLabel

The caller may provide a user-defined label for the requested subnetwork. This user-defined label shall not be used by the caller to identify the subnetwork in an action.

PERMISSION successReturnTTPs

The provider may, based on its policy, return a list of trail termination points that are associated with the created subnetwork.

6.4.8 Delete subnetwork

This action deletes a subnetwork inside a layer network domain. The subnetwork shall not be associated with any subnetwork connections, any network TPs, any links or link connections, or any link ends. No other resource is deleted by this action.

ACTION_POLICY

OBLIGATION inputSubnetworkId

The caller shall provide the identifier of the subnetwork to be deleted.

OBLIGATION noExistingSubnetwork

This action will fail if the subnetwork specified does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION noAssociatedTTPs

This action will fail if one or more trail termination points or connection termination points are still associated with the subnetwork specified.

OBLIGATION noAssociatedArcs

This action will fail if one or more links or link connections are still associated with the subnetwork specified.

OBLIGATION noAssociatedLinkEnd

This action will fail if one or more link ends or topological link ends are still associated with the subnetwork specified.

OBLIGATION noSubnetworkConnections

This action will fail if one or more subnetwork connections are contained within the subnetwork specified.

OBLIGATION successSubnetworkDeleted

When the action is successful, the provider shall indicate this to the caller.

6.4.9 Create topological link

This action creates a topological link between either:

- two subnetworks; or
- two access groups; or
- an access group and a subnetwork.

The caller shall specify each end of the topological link to be created.

The caller may provide a unique user-defined identifier to identify the topological link that is to be created. The caller may also provide a user-defined label; the label need not be unique.

ACTION_POLICY

OBLIGATION inputAEnd

The caller shall provide the identifier for the A_end that is a subnetwork or an access group.

OBLIGATION noExistingAEnd

This action will fail if the provided A_end does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION inputZEnd

The caller shall provide the identifier for the Z_end that is a subnetwork or an access group.

OBLIGATION notExistingZEnd

This action will fail if the provided Z_end does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

PERMISSION inputUserIdentifier

The caller may provide a user-defined identifier that the caller shall use to uniquely identify the topological link when it has been created.

OBLIGATION successReturnUserId

The provider shall, upon success of this action, return the resource identifier of the created topological link.

OBLIGATION providerUserId

If PERMISSION inputUserIdentifier is part of the contracted service, the provider shall use the user-defined identifier as the topological link resource identifier when communicating with the caller.

OBLIGATION rejectUserIdNotUnique

If PERMISSION inputUserIdentifier is part of the contracted service and if the user-defined identifier is **not** unique within the layer network domain, the provider shall reject the action and return the not unique user identifier.

PERMISSION inputDirectionality

The caller may define constraints on the directionality of the link connections that may be included in the requested topological link.

OBLIGATION giveDirectionality

If PERMISSION inputDirectionality is **not** part of the contracted service, the provider shall not constrain the directionality.

PERMISSION inputUserLabel

The caller may provide a user-defined label for the requested topological link. This user-defined label shall not be used by the caller to identify the topological link in an action.

6.4.10 Delete topological link

This action deletes a topological link inside a layer network domain. The topological link shall not contain any link connections. No other resource is deleted by this action.

ACTION_POLICY

OBLIGATION inputTopologicalLinkId

The caller shall provide the identifier of the topological link to be deleted.

OBLIGATION noExistingTopologicalLink

This action will fail if the topological link specified does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION noServerTrail

This action will fail if a server trail is still assigned to the topological link specified.

OBLIGATION successTopologicalLinkDeleted

When the action is successful, the provider shall indicate this to the caller.

6.4.11 Create topological link end

This action creates a topological link end (at the edge of a network) bound to a subnetwork specified by the caller. The caller may provide a unique user-defined identifier to identify the topological link end to be created. The caller may also provide a user-defined label.

ACTION_POLICY

OBLIGATION inputSubnetwork

The caller shall provide the identifier of the subnetwork to which the topological link end shall be bound.

OBLIGATION noExistingSubnetwork

This action will fail if the provided subnetwork does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

PERMISSION inputUserIdentifier

The caller may provide a user-defined identifier that the caller will use to uniquely identify the topological link end when it has been created.

OBLIGATION successReturnId

The provider shall, upon success of this action, return the resource identifier for the created topological link end.

OBLIGATION providerUserId

If PERMISSION inputUserIdentifier is part of the contracted service, the provider shall use the user-defined identifier as the topological link end resource identifier when communicating with the caller.

OBLIGATION rejectUserIdNotUnique

If PERMISSION inputUserIdentifier is part of the contracted service and if the user-defined identifier is **not** unique within the layer network domain, the provider shall reject the action and return the not unique user identifier.

PERMISSION inputDirection

The caller may define constraints on the directionality of the network CTPs that may be included in the requested topological link end.

OBLIGATION giveDirection

If PERMISSION inputDirection is **not** part of the contracted service, the provider shall not constrain the directionality.

PERMISSION inputUserLabel

The caller may provide a user-defined label for the requested topological link end. This user-defined label shall not be used by the caller to identify the topological link end in an action.

6.4.12 Delete topological link end

This action deletes a topological link end inside a layer network domain. The topological link end shall not contain any connection termination points. No other resource is deleted by this action.

ACTION_POLICY

OBLIGATION inputTopologicalLinkEndId

The caller shall provide the identifier of the topological link end to be deleted.

OBLIGATION noExistingTopologicalLinkEnd

This action will fail if the link end specified does not exist within the layer network domain. In the case of failure, the provider shall return the identifier in error.

OBLIGATION noServerTTP

This action will fail if a server networkTTP is still assigned to the topological link end specified.

OBLIGATION successTopologicalLinkEndDeleted

When the action is successful, the provider shall indicate this to the caller.

6.4.13 Report access group creation

This action is used by the provider to report on the creation of an instance of an access group inside a layer network domain.

ACTION_POLICY

OBLIGATION informAccessGroupCreation

The notification receiver shall be informed by the provider of the identifier of the access group that has been created.

6.4.14 Report access group deletion

This action is used by the provider to report on the deletion of an instance of an access group inside a layer network domain.

ACTION_POLICY

OBLIGATION informAccessGroupDeletion

The notification receiver shall be informed by the provider of the identifier of the access group that has been deleted.

6.4.15 Report link creation

This action is used by the provider to report on the creation of an instance of a link inside a layer network domain.

ACTION_POLICY

OBLIGATION informLinkCreation

The notification receiver shall be informed by the provider of the identifier of the link that has been created.

OBLIGATION informEndsOfLink

The notification receiver shall be informed by the provider of the identifiers of each end of the link (i.e. two subnetworks or two accessGroups or one subnetwork and one accessGroup) that has been created.

6.4.16 Report link deletion

This action is used by the provider to report on the deletion of an instance of a link inside a layer network domain.

ACTION_POLICY

OBLIGATION informLinkDeletion

The notification receiver shall be informed by the provider of the identifier of the link that has been deleted.

6.4.17 Report link end creation

This action is used by the provider to report on the creation of an instance of a link end inside a layer network domain.

ACTION_POLICY

OBLIGATION informLinkEndCreation

The notification receiver shall be informed by the provider of the identifier of the link end that has been created.

OBLIGATION informSubnetworkContainingLinkEnd

The notification receiver shall be informed by the provider of the identifier of the subnetwork containing the link end that has been created.

6.4.18 Report link end deletion

This action is used by the provider to report on the deletion of an instance of a link end inside a layer network domain.

ACTION_POLICY

OBLIGATION informLinkEndDeletion

The notification receiver shall be informed by the provider of the identifier of the link end that has been deleted.

6.4.19 Report subnetwork creation

This action is used by the provider to report on the creation of an instance of a subnetwork inside a layer network domain.

ACTION_POLICY

OBLIGATION informSubnetworkCreation

The notification receiver shall be informed by the provider of the identifier of the subnetwork that has been created.

PERMISSION informTTPs

The notification receiver may, based on the providers policy, be informed of the identifiers of the trail termination points that are associated with the created subnetwork.

6.4.20 Report subnetwork deletion

This action is used by the provider to report on the deletion of an instance of a subnetwork inside a layer network domain.

ACTION_POLICY

OBLIGATION informSubnetworkDeletion

The notification receiver shall be informed by the provider of the identifier of a subnetwork that has been deleted.

6.4.21 Report topological link creation

This action is used by the provider to report on the creation of an instance of a topological link inside a layer network domain.

ACTION_POLICY

OBLIGATION informTopologicalLinkCreation

The notification receiver shall be informed by the provider of the identifier of the topological link that has been created.

OBLIGATION informEndsOfLink

The notification receiver shall be informed by the provider of the identifiers of each end of the link (i.e. two subnetworks or two accessGroups or one subnetwork and one accessGroup) that has been created.

6.4.22 Report topological link deletion

This action is used by the provider to report on the deletion of an instance of a topological link inside a layer network domain.

ACTION_POLICY

OBLIGATION informTopologicalLinkDeletion

The notification receiver shall be informed by the provider of the identifier of the topological link that has been deleted.

6.4.23 Report topological link end creation

This action is used by the provider to report on the creation of an instance of a topological link end inside a layer network domain.

ACTION_POLICY

OBLIGATION informTopologicalLinkEndCreation

The notification receiver shall be informed by the provider of the identifier of the topological link end that has been created.

OBLIGATION informSubnetworkContainingLinkEnd

The notification receiver shall be informed by the provider of the identifier of the subnetwork containing the link end that has been created.

6.4.24 Report topological link end deletion

This action is used by the provider to report on the deletion of an instance of a topological link end inside a layer network domain.

ACTION_POLICY

OBLIGATION informTopologicalLinkEndDeletion

The notification receiver shall be informed by the provider of the identifier of the topological link end that has been deleted.

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- 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