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

Digital networks – General aspects

Functional architecture of connectionless layer networks

ITU-T Recommendation G.809

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ITU-T Recommendation G.809

Functional architecture of connectionless layer networks

Summary

This Recommendation describes the functional architecture of a connectionless transport network from the viewpoint of its information transfer capability. The functional and structural architecture of these networks is described independently of networking technology. As such, the Recommendation should be taken as the basis for technology-specific descriptions of connectionless transport networks.

Source

ITU-T Recommendation G.809 was prepared by ITU-T Study Group 13 (2001-2004) and approved under the WTSA Resolution 1 procedure on 22 March 2003.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. 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 Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 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 expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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ITU-T Recommendation G.809

Functional architecture of connectionless layer networks

1 Scope

This Recommendation describes the functional architecture of connectionless layer networks using the methodology described in ITU-T Rec. G.805. The concept of the connection is central to the functional architecture described in ITU-T Rec. G.805 and in order to provide a common framework between the connection-oriented layer networks and a connectionless layer network, it is necessary to introduce new concepts that describe connectionless behaviour. The connectionless transport network functionality is described from a network level viewpoint, taking into account layer network structure, networking topology, client characteristic information, client/server layer associations and mapping between connectionless and connection-oriented layer networks.

This Recommendation describes the functional architecture of connectionless transport networks in a technology independent way. As such, it forms the basis for a set of Recommendations for management, performance analysis and equipment specifications related to specific connectionless technologies. The extension of the methodology defined in ITU-T Rec. G.805 for connectionless layer networks allows for the description of equipment containing both connection-oriented and connectionless technologies in a common way.

If this Recommendation is used as the basis for developing a technology-specific Recommendation to describe and model networks that use existing protocols (such as IP, Ethernet, Token Ring, etc.) it shall be used in a manner that is fully consistent with existing specifications as approved by the relevant standards organizations. The use of this Recommendation is not intended to provide a means by which existing protocols and architectures are modified.

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; 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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- ITU-T Recommendation G.803 (2000), *Architecture of transport networks based on the synchronous digital hierarchy (SDH)*.
- ITU-T Recommendation G.805 (2000), *Generic functional architecture of transport networks*.
- ITU-T Recommendation G.8080/Y.1304 (2001), *Architecture for the automatically switched optical networks (ASON)*.
- ITU-T Recommendation I.326 (2003), *Functional architecture of transport networks based on ATM*.
- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The basic model*.

3 Definitions

NOTE 1 – Where a definition contains a term which is itself defined, that term is given in quotation marks.

NOTE 2 – The terms can be further qualified by reference to a specific layer network by adding the appropriate layer network qualifier.

NOTE 3 – All architectural components are unidirectional.

NOTE 4 – The definitions only apply to connectionless layer networks. Definitions for connection-oriented networks are as described in ITU-T Rec. G.805.

This Recommendation defines the following terms:

3.1 access group: A group of colocated "flow termination" functions that are attached to the same "flow domain" or "flow point pool link".

3.2 access point: A "reference point" that represents the binding between the flow termination and adaptation functions.

3.3 adaptation: A "transport processing function". There are two types of adaptation, an adaptation sink and an adaptation source.

3.4 adaptation sink: A "transport processing function" which presents the client layer network characteristic information at its output by processing the information presented at its input by the server layer network trail.

3.5 adaptation source: A "transport processing function" which accepts client layer network characteristic information at its input and processes it to allow transfer over a trail (in the server layer network).

3.6 adapted information: A signal which is transferred on "trails" or "connectionless trails". The specific formats will be defined in the technology specific recommendations.

3.7 architectural component: Any item used in this Recommendation to generically describe transport network functionality.

3.8 binding: A direct relationship between a "transport processing function" or "transport entity" and another "transport processing function" or "transport entity" which represents static associations that cannot be directly modified by management action.

3.9 characteristic information: A signal with a specific format, which is transferred on "flows". The specific formats will be defined in the technology specific Recommendations.

3.10 client/server relationship: The association between layer networks that is performed by an "adaptation" function to allow the "flow" in the client layer network to be supported by a trail in the server layer.

3.11 connectionless trail: A "transport entity" responsible for the transfer of information from the input of a flow termination source to the output of a flow termination sink. The integrity of the information transfer may be monitored.

3.12 flow: An aggregation of one or more traffic units with an element of common routing.

3.13 flow domain: A topological component used to effect forwarding of a specific characteristic information.

3.14 flow domain flow: A "transport entity" that transfers information across a flow domain, it is formed by the association of "ports" on the boundary of the flow domain.

3.15 flow point: A "reference point" that represents a point of transfer for traffic units between topological components.

3.16 flow point pool: A group of colocated flow points that have a common routing.

- 3.17 flow point pool link:** A "topological component" which describes a fixed relationship between a "flow domain" or "access group" and another "flow domain" or "access group".
- 3.18 flow termination:** A "transport processing function". There are two types of flow termination, a flow termination sink and a flow termination source.
- 3.19 flow termination sink:** A "transport processing function" which accepts the "characteristic information" of the layer network at its input, recovers the information related to "connectionless trail" monitoring and presents the remaining information at its output.
- 3.20 flow termination source:** A "transport processing function" which accepts adapted "characteristic information" from a client layer network at its input, adds information to allow the "connectionless trail" to be monitored and presents the characteristic information of the layer network at its output(s).
- 3.21 layer network:** A "topological component" that represents the complete set of access groups of the same type which may be associated for the purpose of transferring information.
- 3.22 link flow:** A "transport entity" that transfers information between "ports" across a flow point pool link.
- 3.23 matrix:** It represents the limit to the recursive partitioning of a flow domain.
- 3.24 matrix flow:** A "transport entity" that transfers information across a matrix, it is formed by the association of ports on the boundary of the matrix.
- 3.25 network:** All of the entities (such as equipment, plant, facilities) which together provide communication services.
- 3.26 network flow:** A transport entity formed by a series of contiguous "flows" between "termination flow points".
- 3.27 port:** It represents the output of a flow termination source or flow domain or the input to a flow termination sink or flow domain.
- 3.28 reference point:** An architectural component, which is formed by the binding between inputs and outputs of transport processing functions and/or transport entities.
- 3.29 topological component:** An architectural component, used to describe the transport network in terms of the topological relationships between sets of points within the same layer network.
- 3.30 traffic unit:** An instance of characteristic information and a unit of usage.
- 3.31 transport:** The functional process of transferring information between different locations.
- 3.32 transport entity:** An architectural component which transfers information between its inputs and outputs within a layer network.
- 3.33 transport network:** The functional resources of the network which conveys user information between locations.
- 3.34 transport processing function:** An architectural component defined by the information processing which is performed between its inputs and its outputs. Either the input or the output must be inside a layer network.
- 3.35 termination flow point:** A reference point that represents the binding of a flow termination to a flow.