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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

Next Generation Networks – Frameworks and functional
architecture models

Distributed service networking traffic optimization control functions

Recommendation ITU-T Y.2081



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Recommendation ITU-T Y.2081

Distributed service networking traffic optimization control functions

Summary

Recommendation ITU-T Y.2081 specifies the functional architecture for traffic optimization control functions (TOCFs), in support of steering traffic distribution according to certain optimization objectives in the environment of DSN described in Recommendation ITU-T Y.2080.

The main objective of this Recommendation is to specify the functional entities of the TOCF and reference points, including information flows, between these functional entities.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T Y.2081	2012-07-29	13

Keywords

Distributed service networking, DSN, functional architecture, functional entities, functions, reference points, traffic optimization control function, TOCF.

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Recommendation ITU-T Y.2081

Distributed service networking traffic optimization control functions

1 Scope

This Recommendation specifies the traffic optimization control functions (TOCFs) and reference points between TOCF functional entities in support of steering traffic distribution according to certain optimization objectives in the environment of distributed service networking (DSN) and next generation networks (NGN). The TOCF supports application traffic optimization based on network awareness features (including topology information and traffic information) and provides capabilities for service providers (SPs) and network providers to work jointly to optimize the transfer of service traffic.

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 Y.2012] Recommendation ITU-T Y.2012 (2010), *Functional requirements and architecture of next generation networks*.
- [ITU-T Y.2080] Recommendation ITU-T Y.2080 (2012), *Functional architecture for distributed service networking*.
- [ITU-T Y.2206] Recommendation ITU-T Y.2206 (2010), *Requirements for distributed service networking capabilities*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

- 3.1.1 content node** [ITU-T Y.2080]: A distributed service networking (DSN) node which can be used for media content distribution, storage and/or caching.
- 3.1.2 distributed service networking** [ITU-T Y.2206]: An overlay networking which provides distributed and manageable capabilities to support various multimedia services and applications.
- 3.1.3 DSN node** [ITU-T Y.2206]: A node used in DSN providing distributed functionalities, including distributed routing and distributed storage.
- 3.1.4 functional entity** [ITU-T Y.2012]: An entity that comprises an indivisible set of specific functions. Functional entities are logical concepts, while groupings of functional entities are used to describe practical, physical implementations.
- 3.1.5 reference point** [ITU-T Y.2012]: A conceptual point at the conjunction of two non-overlapping functional entities that can be used to identify the type of information passing between these functional entities.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 management and optimization policies: The policies used in the traffic optimization control function (TOCF) for improving the resource management efficiency or optimizing the traffic transportation. These policies can be defined according to demands of the network provider, application provider, and also can be adjusted based on static and dynamic network information.

3.2.2 point of presence (POP): A point representing one or several distributed service networking (DSN) nodes, which support DSN users to access services directly without having intermediate DSN nodes.

3.2.3 traffic optimization control function (TOCF): A function which optimizes application traffic distribution by the cooperation between network providers and application providers. The TOCF supports traffic optimization based on network awareness features (including topology information and traffic information).

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ADSL	Asymmetric Digital Subscriber Line
AF	Application Function
AS	Autonomous System
CDF	Content Delivery Function
CSAF	Content Service Application Function
DSN	Distributed Service Networking
DTIC-FE	Dynamic Traffic Information Collection Functional Entity
HTTP	Hypertext Transfer Protocol
ID	Identifier
NEF	Node Enrolment Function
NGN	Next Generation Network
OPP-FE	Optimization Policy Processing Functional Entity
OPS-FE	Optimization Policy Specification Functional Entity
P2P	Peer to Peer
PID	Partition ID
POP	Point Of Presence
QoS	Quality of Service
RF	Relay Function
RLF	Resource Location Function
STIC-FE	Static Topology Information Collection Functional Entity
TOCF	Traffic Optimization Control Function

5 Conventions

None.

6 Overview of TOCFs

Traffic optimization control functions (TOCFs) make the delivery of application traffic, especially content application traffic and real-time application traffic (such as P2P traffic and multimedia telephony traffic) more efficient and cost-effective. TOCFs also achieve efficient transportation, which improves service quality of the DSN network.

TOCFs retrieve network information such as topology-related information, traffic-related information from underlying transport network(s) and traffic optimization policy(ies) from the network operator, which help to realize traffic optimization in applications running on top of these underlying networks. TOCFs support the following aspects:

- a) They provide suitable topology related information for the DSN node located within their network. This information can be coarser or finer depending on the different traffic localization requirements. It mainly includes domains (e.g., AS domain) that the DSN nodes belong to, the IP address of those DSN nodes and the relative topological distance based on route hops or traversed number of AS domains.
- b) They provide suitable traffic-related information for the DSN node selection. This information can be provided in long-time or in real-time formats to reflect the traffic congestion situation. It mainly includes dynamic loads in links or paths between DSN nodes or POPs.
- c) They provide information about optimal routing of voice, multimedia telephony and other real-time services.
- d) They provide the geographic information and property information (e.g., ADSL, cable or other access type) of DSN nodes to help the RLF make decisions regarding which content node is a better one to cache new content or to respond to a new content request.
- e) They hide the network's topology from applications.

TOCFs support controlling traffic distribution according to certain optimization objectives in the environment of DSN.

Figure 6-1 shows the relationship between the TOCF and other DSN functions as defined in [ITU-T Y.2080].