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

Next Generation Networks – Generalized mobility

MPLS-based mobility capabilities in NGN

Recommendation ITU-T Y.2807

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Recommendation ITU-T Y.2807

MPLS-based mobility capabilities in NGN

Summary

Recommendation ITU-T Y.2807 describes MPLS-based mobility capabilities in an NGN environment where the MPLS technology is deployed in the NGN core IP network. The MPLS-based mobility capabilities seek to provide QoS-enabled mobility support in NGN.

This Recommendation identifies service requirements, functional requirements, functional architecture and mobility scenarios for support of QoS-enabled terminal mobility in NGN using MPLS-based capabilities.

Source

Recommendation ITU-T Y.2807 was approved on 23 January 2009 by ITU-T Study Group 13 (2009-2012) under Recommendation ITU-T A.8 procedures.

Keywords

Handover, MMCF, MPLS, NGN, QoS, terminal mobility.

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Introduction

In NGN, it is expected that a variety of the existing and new wired/wireless access network technologies are supported, such as WLAN, xDSL and 2G/3G mobile technologies, etc. Various services ranging from real-time multimedia services to data transfer services to a fixed or a mobile user are expected to be supported by the NGN, and such services may be provided with different QoS commitment levels, i.e., from best-effort up to more stringent QoS levels. Multiprotocol label switching (MPLS) is a key transport technology in NGN. Deployment of the MPLS technology in the NGN core IP network can provide significant assurance in the delivery of the desired QoS for a variety of services and applications.

Given the objective of fixed-mobile convergence in NGN, this Recommendation describes the MPLS-based capabilities required to provide QoS-enabled terminal mobility in NGN. This includes the support of terminal mobility across different fixed and mobile networks as well as in different mobility scenarios including intra-access network, inter-access network and inter-core network scenarios.

Recommendation ITU-T Y.2807

MPLS-based mobility capabilities in NGN

1 Scope

The objective of this Recommendation is to describe the MPLS-based capabilities required to provide QoS-enabled terminal mobility in NGN.

More specifically, this Recommendation identifies service requirements, functional requirements, functional architecture and mobility scenarios for support of QoS-enabled terminal mobility in NGN using MPLS-based capabilities.

This Recommendation builds on general mobility management functionalities described in [ITU-T Q.1707] for support of the NGN mobility related requirements described in [b-ITU-T Y.2201].

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 Q.1706] Recommendation ITU-T Q.1706/Y.2801 (2006), *Mobility management requirements for NGN*.
- [ITU-T Q.1707] Recommendation ITU-T Q.1707/Y.2804 (2008), *Generic framework of mobility management for next generation networks*.
- [ITU-T Y.1541] Recommendation ITU-T Y.1541 (2006), *Network performance objectives for IP-based services*.
- [ITU-T Y.2012] Recommendation ITU-T Y.2012 (2006), *Functional requirements and architecture of the NGN release 1*.
- [ITU-T Y.2111] Recommendation ITU-T Y.2111 (2006), *Resource and admission control functions in Next Generation Networks*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 access network [ITU-T Q.1707]: A network that is characterized by a specific wired/wireless access technology.

3.1.2 core network [ITU-T Q.1707]: An architectural term related to the part of an NGN network, which is independent of a specific access technology.

3.1.3 handover [ITU-T Q.1706]: The ability to provide services with some impact on their service level agreements to a moving object during and after movement.

3.1.4 mobility [ITU-T Q.1706]: The ability for the user or other mobile entities to communicate and access services irrespective of changes of the location or technical environment.



3.1.5 mobility management [ITU-T Q.1706]: The set of functions used to provide mobility. These functions include authentication, authorization, location updating, paging, download of user information and more.

3.1.6 session [ITU-T Y.2091]: A temporary telecommunications relationship among a group of objects in the service stratum that are assigned to collectively fulfil a task for a period of time. A session has a state that may change during its lifetime. Session-based telecommunications may, but need not be, assisted by intermediaries. Session-based telecommunications can be one-to-one, one-to-many, many-to-one, or many-to-many.

3.1.7 terminal mobility [ITU-T Q.1706]: This is the mobility for those scenarios where the same terminal equipment is moving or is used at different locations. The ability of a terminal to access telecommunication services from different locations and while in motion, and the capability of the network to identify and locate that terminal.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 end user : The actual user of the products or services.

NOTE – The end user consumes the product or service. Further, an end user may or may not be responsible for concluding contracts for the services subscribed to and for paying for these services (i.e., an end user may or may not be a subscriber).

3.2.2 roaming: This is the ability of the users to access services according their user profile while moving outside of their subscribed home network, i.e., by using an access point of a visited network. This requires the ability of the user to get access in the visited network, the existence of an interface between home network and visited network, as well as a roaming agreement between the respective network operators.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

2G	2nd Generation
3G	3rd Generation
A-HCF	Access Handover Control Function
A-LMF	Access Location Management Function
A-MMCF	Access Mobility Management Control Function
AN	Access Network
A-RACF	Access Resource and Admission Control Function
C-HCF	Central Handover Control Function
C-LMF	Central Location Management Function
C-MMCF	Central Mobility Management Control Function
CN	Core Network
C-RACF	Core Resource and Admission Control Function
CUE	Correspondent User Equipment
FTTH	Fibre-To-The Home
GMA	Global Mobility Agent

HCF	Handover Control Function
HDSF	Handover Decision Sub-Function
ID	Identifier
IP	Internet Protocol
IS	Information Server
L2	Layer 2
LER	Label Edge Router
LID	Location Identifier
LMA	Local Mobility Agent
LMF	Location Management Function
LSP	Label Switched Path
LSR	Label Switching Router
MM	Mobility Management
MMCF	Mobility Management Control Function
MPLS	Multiprotocol Label Switching
MSCS	Mobile Service Control System
NACF	Network Attachment Control Function
NGN	Next Generation Networks
P-CSC-FE	Proxy Call Session Control Functional Entity
PoA	Point of Attachment
QoS	Quality of Service
RACF	Resource and Admission Control Function
RAN	Radio Access Network
S-CSC-FE	Serving Call Session Control Functional Entity
SCF	Service Control Function
TCF	Transport Control Function
TF	Transport Function
UE	User Equipment
UID	User Identifier
WLAN	Wireless Local Area Network
W-LAN/MAN	Wireless Local Area Network/Metropolitan Area Network
xDSL	x Digital Subscriber Line

5 Conventions

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this Recommendation is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with the specification.

The terms "terminal" and "UE" are used interchangeably in this Recommendation.

6 Requirements for MPLS-based mobility capabilities

6.1 Service requirements

This clause identifies the service requirements for the MPLS-based mobility capabilities in NGN. The MPLS-based mobility capabilities are required to:

- Support terminal mobility [ITU-T Q.1706] in order to allow the UE to maintain its ongoing services while moving around.

NOTE 1 – Mobility in NGN may impact the QoS delivered to the UE by NGN provisioning, since the various access networks connected to an NGN core may differ with respect to the QoS level they can provide to the UE. Therefore, NGN may be required to support QoS adaptation mechanisms.

- Support the IP QoS classes and associated performance requirements specified in [ITU-T Y.1541].

NOTE 2 – [ITU-T Y.1541] recommends the selection of the specific QoS classes based on the application requirements.

- Provide the UE with pertinent network-related information, inclusive of, but not limited to, available access networks, related cost and related QoS level, that may enable the selection and utilization of access networks.

NOTE 3 – It is recommended to achieve this via a request by the UE of information on accessible access networks so that one of the detected networks can be selected as appropriate, e.g., according to UE selection criteria or because of its movement into another access network.

- Monitor the temporal properties (e.g., available bandwidth, current packet loss rate) of the traffic stream against the agreed upon QoS level.

The MPLS-based mobility capabilities are recommended to:

- Provide support of network policies and user preferences for ongoing services.
- In case of QoS level degradation of the UE traffic stream and where possible, trigger UE handover to another access network in order to satisfy as much as possible the agreed upon QoS level.

6.2 Functional requirements

This clause identifies the functional requirements for the MPLS-based mobility capabilities in NGN.

- Interaction with location management
 - The MPLS-based mobility capabilities are required to recognize the UE movement and its location by interacting with the location management functions [ITU-T Q.1707].
 - The MPLS-based mobility capabilities are recommended to enable efficient resource allocation by activation of hierarchical location management [ITU-T Q.1707].