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

Next Generation Networks – Generalized mobility

Framework of mobility management in the service stratum for next generation networks

Recommendation ITU-T Y.2809



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Recommendation ITU-T Y.2809

Framework of mobility management in the service stratum for next generation networks

Summary

Recommendation ITU-T Y.2809 describes the framework of mobility management (MM) in the service stratum for next generation networks (NGNs). This Recommendation identifies the functional architecture of MM in the NGN service stratum, and specifies the procedural information flows for location management and handover control based on the IP multimedia subsystem (IMS).

History

Edition	Recommendation	Approval	Study Group
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Framework, mobility management, NGN, service stratum.

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Introduction

This Recommendation describes the framework of mobility management (MM) in the service stratum for NGNs. This work has been motivated by the observation that MM is an essential functionality to provide seamless mobility for NGN users and services. This Recommendation is a part of the MM framework for NGNs. Based on the generic framework of [ITU-T Q.1707], the two Recommendations [ITU-T Q.1708] and [ITU-T Q.1709] have addressed the MM schemes in the NGN transport stratum, whereas this Recommendation deals with the MM schemes in the NGN service stratum.

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Framework of mobility management in the service stratum for next generation networks

1 Scope

This Recommendation describes the framework of mobility management (MM) in the service stratum for next generation networks (NGNs). This Recommendation addresses the issues on terminal mobility based on the IP multimedia subsystem (IMS). This Recommendation first identifies the functional architecture of MM in the NGN service stratum, and then specifies the procedural information flows for location management and handover control based on the identified functional architecture.

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.1707] Recommendation ITU-T Q.1707/Y.2804 (2008), *Generic framework of mobility management for next generation networks*.
- [ITU-T Q.1708] Recommendation ITU-T Q.1708/Y.2805 (2008), *Framework of location management for NGN*.
- [ITU-T Q.1709] Recommendation ITU-T Q.1709/Y.2806 (2008), *Framework of handover control for NGN*.
- [ITU-T Y.2012] Recommendation ITU-T Y.2012 (2010), *Functional requirements and architecture of next generation networks*.
- [ITU-T Y.2091] Recommendation ITU-T Y.2091 (2007), *Terms and definitions for next generation networks*.
- [ITU-T Y.2701] Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.

3 Definitions

This Recommendation uses the terms and definitions given in [ITU-T Y.2012], [ITU-T Y.2091], [ITU-T Q.1707], [ITU-T Q.1708], and [ITU-T Q.1709].

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

- ABG-FE Access Border Gateway Functional Entity
- A-MMCF Access Mobility Management Control Function
- BGF Border Gateway Function
- CN Correspondent Node

CSC-FE	Call Session Control Functional Entity
EN-FE	Edge Node Functional Entity
FE	Functional Entity
GGSN	GPRS Gateway Supporting Node
HC	Handover Control
HC-FE	Handover Control Functional Entity
HSS	Home Subscriber Subsystem
IBG-FE	Interconnection Border Gateway Functional Entity
I-CSC-FE	Interrogating Call Session Control Functional Entity
IMS	Internet Protocol Multimedia Subsystem
IP	Internet Protocol
LM	Location Management
MIH	Media Independent Handover
MM	Mobility Management
MMCF	Mobility Management Control Function
MN	Mobile Node
NGN	Next Generation Network
P-CSC-FE	Proxy Call Session Control Functional Entity
RACF	Resource Admission Control Function
SAA-FE	Service Authentication Authorization Functional Entity
SCF	Service Control Function
S-CSC-FE	Serving Call Session Control Functional Entity
SDP	Session Description Protocol
S-HC-FE	Handover Control Functional Entity in the Service Stratum
SIP	Session Initiation Protocol
SUP-FE	Service User Profile Functional Entity
UE	User Equipment

5 Conventions

None.

6 Design considerations

This Recommendation considers mobility management (MM) in the service stratum of NGNs. In the network, a user or a user equipment (UE) may change its IP address by movement and thus the user may experience service disruption and session discontinuity. This Recommendation deals with the MM schemes or protocols that can be used to provide seamless services and session continuity against the movement of users. To provide seamless mobility, the link-layer information on the concerned access links might be used in the MM schemes, as shown in the IEEE 802.21 media independent handover (MIH). In this fashion, the so-called cross-layer optimization tasks may need

to be taken to provide seamless mobility. However, the details of a specific link-layer technology are outside the scope of this Recommendation.

It is noted that the IP multimedia subsystem (IMS) platform can typically be used to support a variety of multimedia services. [b-ITU-T F.700] gives a generic model of multimedia service architecture. Multimedia services are built up by combining 'communication tasks' and organizing their interaction. A communication task is considered as a functional entity of a multimedia service, which performs its communication features. Each communication task handles a set of media components in a synchronized way, in order to convey and control information types such as audio or video. Media components are individual (mono-media) components, which handle functions related to each independent medium such as capture, coding and presentation. With regard to communication tasks, [b-ITU-T F.700] mentions 'conversing', 'conferencing', 'distributing', 'sending', 'receiving' and 'collecting'. It shall be noted that this list of communication tasks can be extended by new tasks or by the refinement of given tasks. Audio, video, text, graphics and data are identified on the level of media components.

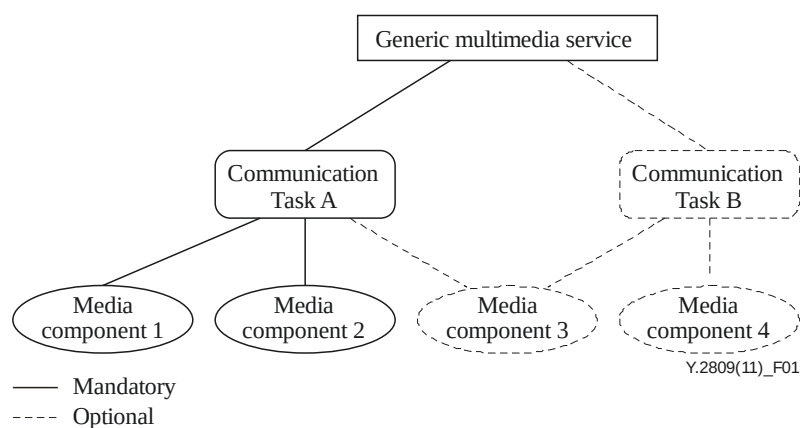


Figure 1 – Reference model of generic multimedia services [b-ITU-T F.700]

Figure 1 shows the relationship among multimedia services, communication tasks and media components. Communication tasks and media components will form the basic set of a specific multimedia service. For example, by the used media components, the multimedia conversational services can be further divided into:

- videophone service, with audio and moving pictures and optionally various types of data;
- voice and data services, with audio and various types of data;
- text telephony, with real time text, optionally combined with audio;
- total conversation service, with moving pictures, real time text and audio.

In general, the MM schemes for mobility support in NGNs can be classified into the network layer MM (in the transport stratum) and the application layer MM (in the service stratum). The MM issues in the network layer or in the transport stratum are addressed in [ITU-T Q.1708] and [ITU-T Q.1709]. This Recommendation focuses on the MM issues in the application layer or in the service stratum. In the application layer, the IP multimedia subsystem (IMS) platform will be considered and enhanced to provide seamless mobility.

This Recommendation describes the framework of MM in the NGN service stratum. For this purpose, the MM functional architecture based on the IMS platform is discussed, and the service control function (SCF) of the IMS will be investigated and further enhanced to support seamless mobility. Based on the functional architecture, the procedural information flows will be described for location management and handover control.

7 Functional architecture for MM in the service stratum

7.1 Generic architectural model

The generic architectural model for MM in the service stratum is described in Figure 2, in which the MM functionality is provided via collaborative interactions between the functional entities (FEs) in the SCF and transport function (TF).

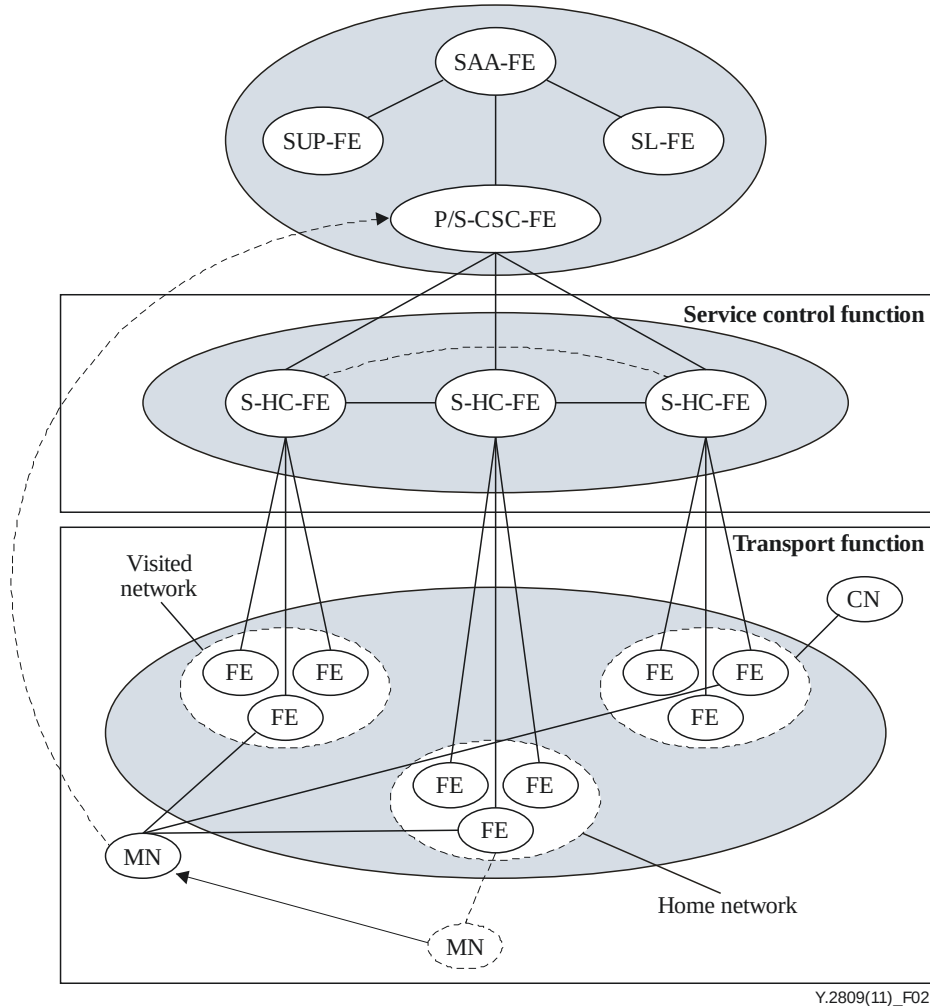


Figure 2 – Generic architecture of mobility management (MM) in the service stratum

The SCF may comprise the following components, which are described in the NGN architecture [ITU-T Y.2012]:

- call session control functional entity (CSC-FE);
- service authentication authorization functional entity (SAA-FE);
- service user profile functional entity (SUP-FE);
- subscription locator functional entity (SL-FE).

In addition, the handover control FE in the service stratum (S-HC-FE) is defined to support the handover of users in the service stratum. Such S-HC-FEs in the service stratum may be differently defined and implemented from the HC-FEs in the transport control function, which were described in [ITU-T Q.1708] and [ITU-T Q.1709].

In the service stratum, the MM functions are divided into the location management (LM) functionality and the handover control (HC) functionality. The CSC-FEs are used to provide the LM functionality (e.g., for location registration and/or update and location query from the UE or the