

I n t e r n a t i o n a l T e l e c o m m u n i c a t i o n U n i o n

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Y.2810

(03/2012)

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

Next Generation Networks – Generalized mobility

Mobility management framework for IP multicast communications in next generation networks

Recommendation ITU-T Y.2810

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Recommendation ITU-T Y.2810

Mobility management framework for IP multicast communications in next generation networks

Summary

Recommendation ITU-T Y.2810 describes the mobility management framework for Internet Protocol (IP) multicast communications in next generation networks (NGNs). Specifically, this Recommendation pursues network-based mobile multicast support wherein multicast is handled without the involvement of the user equipment during handover.

This Recommendation identifies the design considerations, functional architecture, and information flows for supporting network-based mobile multicast services in NGNs.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T Y.2810	2012-03-29	13

Keywords

Mobile, mobility management, multicast, NGN

FOREWORD

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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.

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Recommendation ITU-T Y.2810

Mobility management framework for IP multicast communications in next generation networks

1 Scope

The objective of this Recommendation is to describe the mobility management capabilities to support Internet Protocol (IP) multicast-based services in next generation networks (NGNs). Specifically, this Recommendation pursues network-based mobile multicast support wherein multicast is handled without the involvement of the user equipment during handover.

This Recommendation identifies design considerations, functional architecture, and information flows for supporting network-based mobile multicast services in NGNs.

This Recommendation builds on the general mobility management functionalities described in [ITU-T Q.1707] and multicast functionalities described in [ITU-T Y.2017].

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 Y.2012] Recommendation ITU-T Y.2012 (2010), *Functional requirements and architecture of next generation networks*.
- [ITU-T Y.2017] Recommendation ITU-T Y.2017 (2009), *Multicast functions in next generation networks*.
- [ITU-T Y.2111] Recommendation ITU-T Y.2111 (2011), *Resource and admission control functions in next generation networks*.
- [ITU-T Y.2701] Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 handover [b-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.

3.1.2 mobility [b-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.

3.1.3 mobility management [b-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.

3.1.4 multicast [b-ITU-T X.603]: A data delivery scheme where the same data unit is transmitted from a single source to multiple destinations in a single invocation of service.

3.1.5 network-based mobility management [ITU-T Q.1707]: A mobility management scheme in which the MM signalling is performed (or controlled) by the network entities, on behalf of the UE.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 mobile multicast: The ability to provide seamless multicast-based services to user equipment (UE) on the move.

3.2.2 multicast group: A set of service users that abide by appropriate group-membership criteria, or a set of rules belonging to a group that enables multicast-based services and applications.

3.2.3 multicast source mobility: A mobility scenario wherein the source equipment of a multicast session is moving.

3.2.4 multicast receiver mobility: A mobility scenario wherein the receiver equipment of a multicast session is moving.

3.2.5 separated transport model: Mobility transport architecture wherein unicast data and multicast data from/to a node are treated with different transport mechanisms.

3.2.6 unified transport model: Mobility transport architecture wherein unicast data and multicast data from/to a node are treated with the same transport mechanism.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AAA	Authentication, Authorization, Accounting
ANI	Application Network Interface
A-MMCF	Access MMCF
C-MMCF	Central MMCF
HCF	Handover Control Function
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPTV	Internet Protocol Television
LMF	Location Management Function
MGMA	Multicast Group Management Agent
MGMF	Multicast Group Management Function
MLD	Multicast Listener Discovery
MM	Mobility Management
MMCF	Mobility Management Control Functions
MR	Multicast Router
MUE	Mobile User Equipment
NACF	Network Attachment Control Functions

This Recommendation supports IP-based multimedia multicast applications with the following characteristics:

a) Multicast applications and/or services with receiver mobility

Personal broadcasting is a service wherein the mobile multicast framework is applicable. The user can act as a multicast source, and other users who want to use the multicast service get source information, including group addresses, by online or offline advertisement. To provide the mobile multicast services, MM capabilities, including Access – Mobility Management Control Functions (A-MMCFs) and Central – Mobility Management Control Functions (C-MMCFs), interwork with multicast capabilities such as multicast routers (MRs). After users join the multicast group, they can receive multicast traffic from the source. The delivery path can be changeable dynamically as handover between access networks occurs (see Figure 6-1). The mobile multicast framework can be adopted not only for a given service but for any application with multiple mobile receivers.

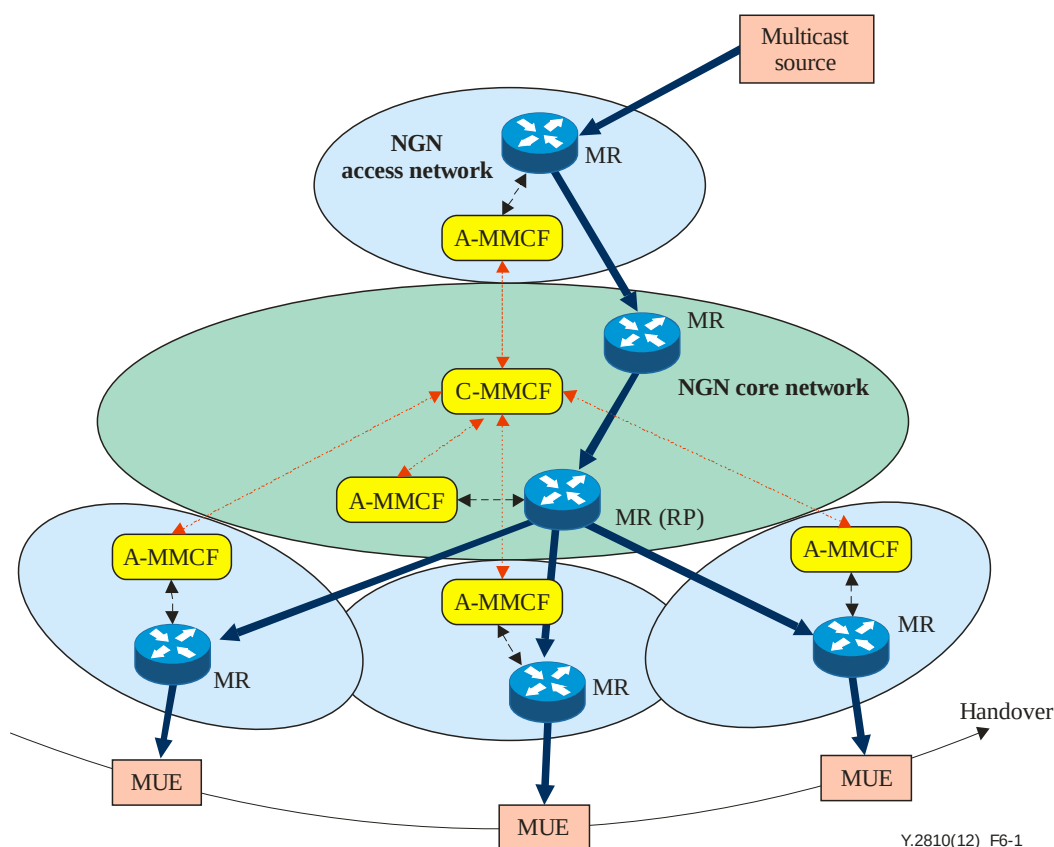


Figure 6-1 – Multicast applications and/or services for receiver mobility

b) Multicast applications and/or services with source mobility

Supporting the handover scenario is recommended in the aspect of multicast source (see Figure 6-2). In applications such as video conferencing and mobile broadcasting, a user participating in the service can be both the multicast data sender and receiver. Thus, the mobile source for multicast should also consider a framework different from what has been discussed by the mobile receiver side.

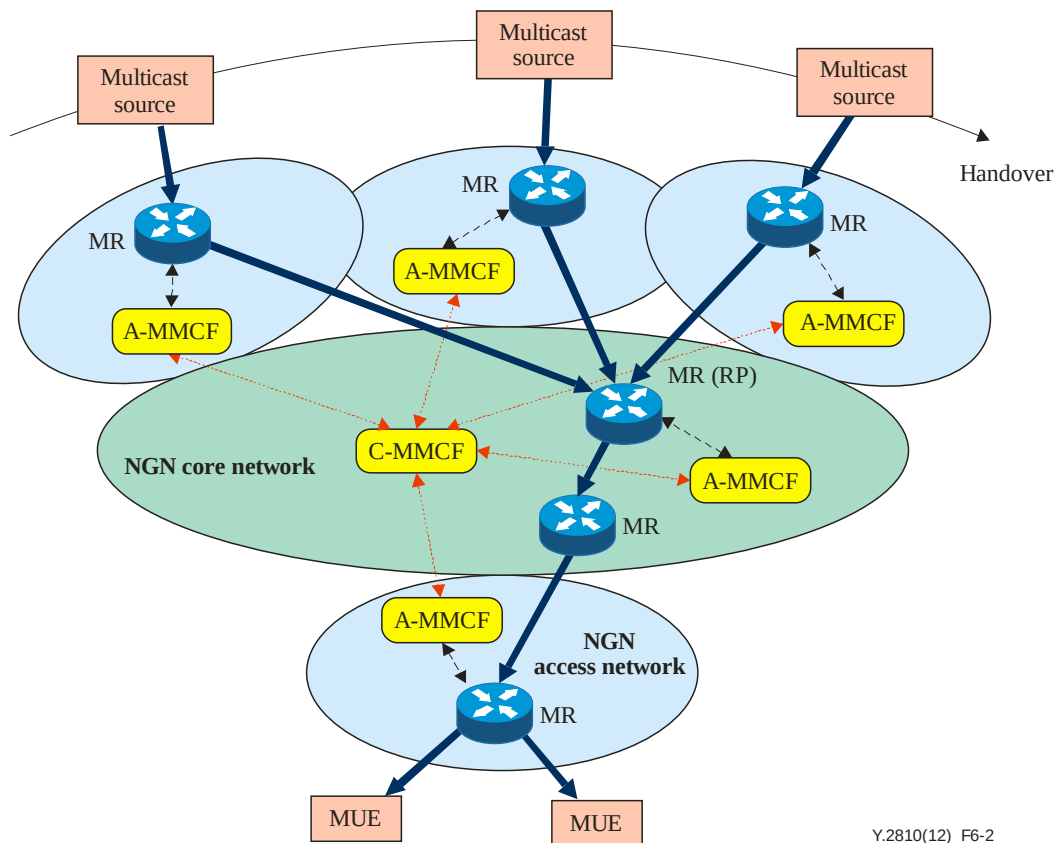


Figure 6-2 – Multicast applications and/or services for source mobility

6.2 Generic network models

6.2.1 Separated transport model for multicast and unicast flows

Figure 6-3 shows a separated transport model that delivers multicast and unicast flows to mobile user equipment (MUE). In this example of network topology, access networks are connected to a core network located at the centre, and all access and core networks are assumed to have the same mobility and multicast functionalities within a single administrative domain. In other words, one multicast function in an access network can interwork with the other multicast functions in different networks.

Figure 6-3