

Recommendation

ITU-T Y.3204 (09/2023)

SERIES Y: Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

Future networks

Fixed, mobile and satellite convergence – Service continuity for IMT-2020 networks and beyond

Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

GLOBAL INFORMATION INFRASTRUCTURE	Y.100-Y.999
General	Y.100-Y.199
Services, applications and middleware	Y.200-Y.299
Network aspects	Y.300-Y.399
Interfaces and protocols	Y.400-Y.499
Numbering, addressing and naming	Y.500-Y.599
Operation, administration and maintenance	Y.600-Y.699
Security	Y.700-Y.799
Performances	Y.800-Y.899
INTERNET PROTOCOL ASPECTS	Y.1000-Y.1999
General	Y.1000-Y.1099
Services and applications	Y.1100-Y.1199
Architecture, access, network capabilities and resource management	Y.1200-Y.1299
Transport	Y.1300-Y.1399
Interworking	Y.1400-Y.1499
Quality of service and network performance	Y.1500-Y.1599
Signalling	Y.1600-Y.1699
Operation, administration and maintenance	Y.1700-Y.1799
Charging	Y.1800-Y.1899
IPTV over NGN	Y.1900-Y.1999
NEXT GENERATION NETWORKS	Y.2000-Y.2999
Frameworks and functional architecture models	Y.2000-Y.2099
Quality of Service and performance	Y.2100-Y.2199
Service aspects: Service capabilities and service architecture	Y.2200-Y.2249
Service aspects: Interoperability of services and networks in NGN	Y.2250-Y.2299
Enhancements to NGN	Y.2300-Y.2399
Network management	Y.2400-Y.2499
Computing power networks	Y.2500-Y.2599
Packet-based Networks	Y.2600-Y.2699
Security	Y.2700-Y.2799
Generalized mobility	Y.2800-Y.2899
Carrier grade open environment	Y.2900-Y.2999
FUTURE NETWORKS	Y.3000-Y.3499
CLOUD COMPUTING	Y.3500-Y.3599
BIG DATA	Y.3600-Y.3799
QUANTUM KEY DISTRIBUTION NETWORKS	Y.3800-Y.3999
INTERNET OF THINGS AND SMART CITIES AND COMMUNITIES	Y.4000-Y.4999
General	Y.4000-Y.4049
Definitions and terminologies	Y.4050-Y.4099
Requirements and use cases	Y.4100-Y.4249
Infrastructure, connectivity and networks	Y.4250-Y.4399
Frameworks, architectures and protocols	Y.4400-Y.4549
Services, applications, computation and data processing	Y.4550-Y.4699
Management, control and performance	Y.4700-Y.4799
Identification and security	Y.4800-Y.4899
Evaluation and assessment	Y.4900-Y.4999

For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T Y.3204

Fixed, mobile and satellite convergence – Service continuity for IMT-2020 networks and beyond

Summary

The service continuity is the ability for a moving object to maintain ongoing service including maintaining current states, such as user's network environment and session for a service. Fixed, mobile and satellite convergence (FMSC) is the capability that provides services and applications to end users regardless of the fixed, mobile or satellite access technologies. Recommendation ITU-T Y.3204 specifies the scenarios, requirements, enablers, network function enhancements, procedures and security considerations of service continuity for FMSC, in the context of IMT-2020 networks and beyond.

History *

Edition	Recommendation	Approval	Study Group	Unique ID
1.0	ITU-T Y.3204	2023-09-29	13	11.1002/1000/15642

Keywords

FMSC, IMT-2020, satellite network, service continuity.

* To access the Recommendation, type the URL <https://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). 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.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents/software copyrights, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the appropriate ITU-T databases available via the ITU-T website at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2023

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

Table of Contents

	Page
1 Scope	1
2 References.....	1
3 Definitions	1
3.1 Terms defined elsewhere	1
3.2 Terms defined in this Recommendation.....	2
4 Abbreviations and acronyms	2
5 Conventions	3
6 Scenarios of service continuity	3
6.1 Overview	3
6.2 Handover between fixed access and mobile access	4
6.3 Handover between fixed access and satellite access	4
6.4 Handover between mobile access and satellite access	4
6.5 Handover between satellite accesses	4
6.6 Inter MUE transfer	4
7 Requirements of service continuity	5
7.1 Service requirements of service continuity	5
7.2 Network requirements of service continuity	6
8 Enablers for service continuity	7
8.1 Overview	7
8.2 Support of access transfer.....	8
8.3 Support of VCC.....	8
8.4 Support of data service continuity	10
8.5 Support of vertical industry service continuity	11
8.6 Support of handover policy	11
9 Network function enhancements of service continuity	11
9.1 Enhancements to access network	11
9.2 Enhancements to core network control plane.....	12
9.3 Enhancements to the core network user plane	15
9.4 Enhancements to the IMS.....	15
10 Procedures of service continuity.....	16
10.1 Procedure of access transfer	16
10.2 Procedure of VCC	16
10.3 Procedure of data service continuity	18
10.4 Procedure of vertical industry service continuity	19
11 Security considerations.....	19
Bibliography.....	21



Recommendation ITU-T Y.3204

Fixed, mobile and satellite convergence – Service continuity for IMT-2020 networks and beyond

1 Scope

This Recommendation specifies the service continuity for fixed, mobile and satellite convergence (FMSC) in IMT-2020 networks and beyond. The service continuity is the ability for a moving object to maintain ongoing service including maintaining current states, such as user's network environment and session for a service. FMSC is the capability that provides services and applications to end users regardless of the fixed, mobile or satellite access technologies.

This Recommendation addresses the following aspects of service continuity for FMSC in IMT-2020 networks and beyond:

- Scenarios of service continuity;
- Requirements of service continuity;
- Enablers for service continuity;
- Network function enhancements of service continuity;
- Procedures of service continuity;
- Security considerations.

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.3102] Recommendation ITU-T Y.3102 (2018), *Framework of the IMT-2020 network*.
- [ITU-T Y.3104] Recommendation ITU-T Y.3104 (2018), *Architecture of the IMT-2020 network*.
- [ITU-T Y.3200] Recommendation ITU-T Y.3200 (2022), *Fixed, mobile and satellite convergence – Requirements for IMT-2020 networks and beyond*.
- [ITU-T Y.3201] Recommendation ITU-T Y.3201 (2023), *Fixed, mobile and satellite convergence – Framework for IMT-2020 networks and beyond*.
- [ITU-T Y.3202] Recommendation ITU-T Y.3202 (2023), *Fixed, mobile and satellite convergence – Mobility management for IMT-2020 networks and beyond*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 fixed, mobile and satellite convergence [ITU-T Y.3200]: The capabilities that provide services and applications to end users regardless of the fixed, mobile or satellite access technologies being used independently of the users' location.

3.1.2 IMT-2020 [b-ITU-T Y.3100]: Systems, system components, and related technologies that provide far more enhanced capabilities than those described in [b-ITU-R M.1645].

3.1.3 multi-connection [b-ITU-T Y.2251]: The functionality which provides capability to the user equipment (UE) and network to maintain more than one access network connection simultaneously.

3.1.4 multi-connection user equipment (MUE) [b-ITU-T Y.2027]: A user equipment which can support two or more network connections simultaneously under the control of a network enhanced for multi-connection capability.

3.1.5 voice and video call continuity (VCC) [b-ITU-T Y.2255]: When the MUE moves between different access types, the ongoing voice and video call is not impacted and continues to serve the user. The user is not aware of the access transfer.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 service continuity: The ability for a moving object to maintain ongoing service, including maintaining current states such as the user network environment and session.

NOTE – Based on [b-ITU-T Q.1706].

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

5QI	5G Quality of service Identifier
AF	Application Function
FMSC	Fixed, Mobile and Satellite Convergence
GBR	Guaranteed Bit Rate
GEO	Geostationary Earth Orbit
IMS	Internet protocol Multimedia Subsystem
MUE	Multi-connection User Equipment
NACF	Network Access Control Function
NF	Network Function
NFR	Network Function Registry function
NGSO	Non-Geostationary Satellite Orbit
PCF	Policy Control Function
QoS	Quality of Service
SMF	Session Management Function
TA	Tracking Area
TAS	Telecommunications Application Server
UE	User Equipment
UPF	User Plane Function
VCC	Voice and video Call Continuity
XR	extended Reality

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 this Recommendation.

6 Scenarios of service continuity

6.1 Overview

Service continuity is the ability for a moving object to maintain ongoing service including maintaining current states, such as the user's network environment and session for a service [b-ITU-T Q.1706]. Taking into account the key elements for integration of satellite systems including persistent quality of service (QoS) as specified in [b-ITU-R M.2460-0], this Recommendation specifies the service continuity for FMSC in IMT-2020 networks and beyond. Figure 6-1 presents the overview of service continuity scenarios in the FMSC network, including the following scenarios:

- Scenario 1: Handover between fixed access and mobile access;
- Scenario 2: Handover between fixed access and satellite access;
- Scenario 3: Handover between mobile access and satellite access;
- Scenario 4: Handover between satellite accesses;
- Scenario 5: Inter multi-connection user equipment (MUE) transfer.

This Recommendation mainly addresses the service continuity for scenario 2, scenario 3 and scenario 4, which have been newly introduced in the FMSC network. In the FMSC network, both the service continuity for scenario 1 and scenario 5 also put forward new service requirements and network requirements, which are also specified in this Recommendation.

In the FMSC network, the services requiring service continuity include voice and video services, data services and vertical industry services.

NOTE – The vertical industry services are related to application domains including, but not limited to, smart city, industry, education, transport, health care, agriculture, finance and media [b-ITU-T Y.3114].