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SERIES Q: SWITCHING AND SIGNALLING

**Supplement on scenarios and requirements in
terms of services and deployments for IMT and
IMS in developing countries**

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Supplement 66 to ITU-T Q-series Recommendations

Supplement on scenarios and requirements in terms of services and deployments for IMT and IMS in developing countries

Summary

International mobile telecommunications (IMT) and IP multimedia subsystem (IMS) are some of the technologies that have been developed to adequately respond to the demand for versatile telecommunication service offerings. The current demands include; high bit rates, high quality of service (QoS) and quality of experience (QoE), mobility, international (roaming) capability for multimedia services, compatibility (backward and forward), affordability, easy to use end user terminals and security, among others. Fundamentally, these networks are ubiquitous in nature and are based on Internet protocol (IP).

Developed countries have quickly implemented IMT in almost all their networks and the majority has also implemented IMS. Developing countries are much slower in implementing IMT and IMS. In this Supplement, information on the slow of IMT and IMS in developing countries is highlighted and some suggestions are made to overcome the challenges.

Supplement 66 to ITU-T Q-series Recommendations is limited to providing advisory information, especially to developing countries, on the requirements for migration to IMT and IMS, challenges to migration and some scenarios of migration to IMT and IMS drawn from feedback from developing countries.

History

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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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1 Scope

There is a worldwide explosion in demand for increased bandwidth, mobility, multiple new applications, games, better quality of service and instant access to information. These demands are being driven by higher incomes and increased levels of computer literacy. While the explosion is most significant in developed countries, recent statistics show a growing demand among developing countries.

The most recent access technologies providing increased bandwidth for mobile networks related to international mobile telecommunications (IMT) are long term evolution (LTE) access technologies. In order to enable session based services such as voice over LTE (VoLTE) with a high level of quality, the IP multimedia subsystem (IMS) has gained significant relevancy in mobile telecommunication networks.

Many operators in developed countries have implemented these technologies. In developing countries these technologies have already been implemented by some mobile networks while others are in the process of implementing them; however the majority have yet to commence implementation. Some countries are still deploying legacy networks with architecture based on the seven layers of open system interconnection (OSI), while others have deployed state of the art networks based on next generation networks (NGN) with a simplified architecture of only two layers, the service layer and the transport layer. Reasons for slow implementation mostly relate to financing (initial capital investment) and economics (doubt as to whether the market will take up the services and recoup the investment). There is also reluctance due to insufficient understanding of the benefits of IMT and IMS.

Despite these drawbacks, it is the desire of many developing countries to evolve their networks and migrate their users enabling them to take advantage of the many services being provided by modern networks. Thus IMT and IMS systems are important to developing countries.

This Supplement has been provided in direct response to a request by developing countries for an examination of the issues relating to migration to IMT and IMS, to offer those countries guidance on migration and to present the best practices for the implementation of IMT and IMS in mobile networks.

A survey carried out in some developing countries concerning the status of IMT and IMS indicated that 76% of respondents were willing to migrate to IMT while 81% are planning to migrate to IMS. Over 64% of countries surveyed from Africa have implemented mobile networks capable of IMT and the rest are planning to implement IMT and IMS capable networks within two to five years. The survey found fourteen countries in Africa which had implemented IMS in their mobile networks. Those countries were South Africa, Uganda, Morocco, Algeria, Namibia, Liberia, Angola, Cameroon, Ghana, Botswana, Côte d'Ivoire, Gambia, Nigeria and Rwanda. However a number of countries in Africa were in advanced stages of negotiation with vendors while others were in the testing stage.

The 2014 statistics on IMS in developing countries especially in Africa are incomplete, however, going purely by availability of IP networks as a basic requirement for IMS, 64% of countries in Africa are capable of implementing IMS and it is therefore just a question of making the decision to implement.

This Supplement aims at providing information and scenarios that are expected to be useful to those developing countries which are yet to migrate to or implement IMT and IMS in their mobile networks.

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3 Definitions

3.1 Terms defined elsewhere

This Supplement uses the following terms defined elsewhere:

3.1.1 evolution [ITU R M.1308]: A process of change and development of a mobile radio system towards enhanced capabilities.

3.1.2 evolution towards IMT-2000 [ITU R M.1308]: A process of change and development of a mobile radio system towards the capabilities and functionalities of IMT-2000.

3.1.3 integrated services digital network [ITU-T I.112]: An integrated services network that provides digital connections between user-network interfaces.

3.1.4 IP-based networks [ITU-T Y.1401]: A network in which IP is used as one of the Layer 3 protocols.

3.1.5 migration to IMT-2000 [ITU R M.1308]: Movement of users and/or service delivery from existing telecommunication network to IMT-2000.

3.1.6 next generation network [ITU-T Y.2001]: A packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

3.1.7 public switched telephone network [ITU-T Q.1290]: A telecommunications network established to perform telephone services for the public subscribers.

3.1.8 ubiquitous networking [ITU-T Y.2002]: The ability for persons and/or devices to access services and communicate while minimizing technical restrictions regarding where, when and how these services are accessed, in the context of the service(s) subscribed to.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

1G	First Generation Network
2.5G	2.5 Generation Networks
2G	Second Generation Network
3G	Third Generation Network
4G	Fourth Generation Network
AMPS	Advanced Mobile Phone System
ANSI	American National Standards Institute
API	Application Programming Interface
ARPU	Average Revenue Per User
CAPEX	Capital Expenditures
CATV	Cable Television
CDMA	Code Division Multiple Access
CPE	Customer Premise Equipment
EDGE	Enhanced Data rates for GSM Evolution
EPC	Experiment Pointing Control
ETSI	European Telecommunications Standards Institute
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
HSPA	High-Speed Packet Access



ICT	Information and Communication Technologies
IEC	International Electrotechnical Commission
IMS	IP Multimedia Subsystem
IMT	International Mobile Telecommunications
IN	Intelligent Network
IP	Internet Protocol
IPX	Internetwork Packet Exchange
ISDN	Integrated Services Digital Network
ISO	International Organization for Standardization
LTE	Long Term Evolution
VoLTE	Voice over LTE
MMS	Multimedia Messaging Service
NEP	Network Equipment Provider
NGN	Next Generation Network
OCS	Outgoing Call Screening
OPEX	Operational Expenditures
OSI	Open System Interconnection
PHS	Personal Handyphone System
PSDN	Packet Switched Data Network
PSTN	Public Switched Telephone Network
QoE	Quality of Experience
QoS	Quality of Service
SG	Study Group
RA	Radiocommunication Assembly
SIGTRAN	Signalling Transport
SIP	Session Initiation Protocol
SMS	Short Message Service
SNA	Systems Network Architecture
SS7	Signalling System No. 7
TACS	Total Access Communication System
TCP	Transmission Control Protocol
TDM	Time Division Multiplexing
TDMA	Time Division Multiple Access
TIA	Telecommunications Industry Association
TS	Time Slot
TSB	Telecommunication Standardization Bureau
UMTS	Universal Mobile Telecommunications System