International Telecommunication Union

ITU-T

NGN FG Proceedings

Part I

2005

ITU-T
NGN FG
Proceedings

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International Telecommunication Union

Preface

By Houlin Zhao, Director of the Telecommunication Standardization Bureau, ITU

In the first half of 2004, I was asked by some ITU-T members to help progress work on global NGN standards and assist in bringing some clarity to the standardization efforts on NGN. I was told that there was an urgent need to produce globally applicable specifications in the field and coordinate global standardization; our members saw ITU as the most appropriate body to take the lead.

The timing of the request coincided with a period of intense preparation for the World Telecommunication Standardization Assembly (WTSA-04), which was held in October 2004, and which is the regular event that defines the future work of ITU-T for the coming period, in this case 2005-2008. But given its urgency ITU-T Members felt that initiative was needed to act quickly, rather than waiting for the mandate of WTSA.

There are rules and regulations that have been built and honed over a number of years, and that are an important part of keeping the organization and the creation of standards cohesive and professional to meet the needs of Member states as well as industry/Sector Members in a timely way. ITU-T is an organization with flexibility, transparency and fairness.

Operators from around the globe are implementing NGN strategies and plan to invest billions of dollars in the rollout of new Internet Protocol (IP) based networks. The operators, systems vendors and government members of ITU-T believe that international standards will facilitate a global market for systems, lowering costs and providing for mix-and-match implementation and global interoperability.

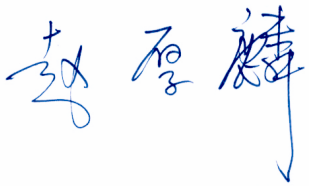
With all of this in mind, with the advice and support from Sector Members, I took the unprecedented step of setting-up, under my own name, as the Director of TSB the ITU-T Focus Group on NGN (FGNGN) to work on global standards for NGN. The work of the new group was to build on existing fixed/mobile convergence architecture to provide transparency between fixed and mobile networks. Work would progress in the areas of quality of service (QoS), authentication, security and signalling.

Since the creation of FGNGN there have been intensive meetings, more or less every two months. We have seen a growth in participation and the number of contributions.

I am very pleased with the progress and the results achieved by the FGNGN. These first results will provide the building blocks on which the world's systems vendors and service providers can start to make this monumental shift to NGN. Noting the progress we have made, and the new situation in which we are today, we decided to further strengthen our work with the NGN-Global Standards Initiative (NGN-GSI), the next phase of our NGN work, which is I believe a judicious move to lead and to enhance ITU-T efforts on NGN study.

I welcome the fact that industry and Member states entrusted this work to ITU-T. Now I am proud to present here the group's achievements. This publication represents an impressive accomplishment in such a short time. It is my pleasure to provide here this material along with information on the future direction of NGN work in ITU-T. I sincerely hope that you will find this publication useful.

November 2005



Houlin Zhao
TSB Director

Foreword

Chae-Sub Lee, Chairman, ITU-T Focus Group on Next Generation Networks (FG NGN)

It took more than one and half years to get a globally agreed definition on NGN, with the JRG (Joint Rapporteur Group) on NGN starting work in October 2003 in ITU-T SG13. This was one of the hardest jobs during my almost 20 years of international standards activity. From the beginning, work on NGN brought a lot of questions rather than visions and solutions. I believe many of these questions related to the name "Next Generation Networks". Throughout the whole of my standards career, it was the first time I have come across this strange name. How does one identify "Next Generation"? For me this may mean, for example my children or maybe my grandchildren. Furthermore, from the network point of view, what meaning is implied in this kind of generation concept?

Bearing in mind all these difficulties and issues, FGNGN was launched 23 June 2004 under the responsibility of the TSB Director, Mr. Houlin Zhao with his strong futuristic vision conveying also the ITU-T member's ambitions. As expected, the sailing at the start was not smooth and with many questions, concerns, worries and even objections, it felt like a hurricane. This situation continued until the 2nd meeting, but the positive spirit and strong ambitions of members gave us hope and confidence that we would reach our objective.

FGNGN started its work mainly with several drafts which were studied and transferred by the JRG on NGN. Now it has achieved 18 approved deliverables and on-going drafts which will be developed further through relevant Study Groups. FGNGN deliverables cover mainly seven working areas which are clearly given by the terms of reference as fundamental framework areas of NGN; services and capabilities, functional architecture and requirements, quality of service (QoS), control aspects, security issues, migration of current networks into NGN and future packet based network requirements. FGNGN was made-up of seven working groups according to each study area, with three technical leaders in each group. Its final output was a total of 30 documents. A few of them were already approved during the meetings and transferred to the relevant Study Groups for their further consideration. Deliverables are classified by release concepts with Release 1, beyond Release 1 and Release independent. This book contains the deliverables with their status indication clearly noted for example; approved (A) by the FGNGN for further consideration by relevant ITU-T SG, stable (S) and draft (D) from the FGNGN point-of-view. These deliverables cover all seven working areas. So I hope this book will help readers with answers to questions similar to those I had had before.

During the 18-month life-time of FGNGN, nine meetings (one meeting at every two months and in some case within four weeks) were organized and we received more than 1,200 input documents and also had more than 1,400 participants. We normally extended our meeting time and frequently sacrificed national holidays of many members. With all our members' efforts and sacrifices, especially with the best expertise of our technical leaders and vice chairmen, and an industrious and efficient TSB FGNGN secretariat we successfully reached our goal.

I really want to share my great thanks and appreciation with our members, especially technical leaders and vice chairmen and the TSB secretariat. And especially thanks to God for these achievements and also for giving us two babies to our members during our meetings: one to a technical leader's family and another to an editor's family in Europe and Asia respectively. I believe we all in FGNGN did good work for these next generation babies.

November 2005

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Chae Sub Lee
Chairman of FGNGN

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Part I – Next Generation Networks Framework

Part II – NGN Focus Group Deliverables*

NGN Focus Group deliverables status, as indicated by FGNGN at its 9th meeting, 14-17 November 2005

Section 1 – Release Independent Deliverables

Working Group 2 deliverables – Functional architecture and mobility

Working Group 3 deliverables – Quality of Service

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* *Legend*

P *Already passed to ITU-T Study Group 13; one already published as Q.Supplement 51*

A *Sufficiently mature to be considered by ITU-T Study Group 13 for publication*

S *Mature but would require further consideration in ITU-T Study Group 13*

D *Not yet mature, requires discussion and technical input to complete development*

Section 2 – Release 1 Deliverables

Working Group 1 deliverables – Service Requirements

A	2.1	NGN Release 1 scope
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P	2.14	Algorithms for achieving end to end performance objectives

Working Group 4 deliverables – Control and Signalling Capability

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1 ITU-T NGN Framework

Brief explanation/Definition of NGN

ITU-T recommendation Y.2001 identified a definition of NGN as explain below.

Next Generation Network (NGN): 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 offers unfettered access by users to different service providers. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

And this recommendation further specifies key features of NGN as following:

- Packet-based transfer
- Separation of control functions among bearer capabilities, call/session, and application/ service
- Decoupling of service provision from transport, and provision of open interfaces
- Support for a wide range of services, applications and mechanisms based on service building blocks (including real time/ streaming/ non-real time services and multi-media)
- Broadband capabilities with end-to-end QoS (Quality of Service).
- Interworking with legacy networks via open interfaces
- Generalized mobility
- Unfettered access by users to different service providers
- A variety of identification schemes
- Unified service characteristics for the same service as perceived by the user
- Converged services between Fixed/Mobile
- Independence of service-related functions from underlying transport technologies
- Support of multiple last mile technologies
- Compliant with all Regulatory requirements, for example concerning emergency communications, security, privacy, and etc.

2 Overview of FGNGN activities

In 2003 a Joint Rapporteur Group bringing together experts from across all Questions of Study Group 13 was formed. The main subjects studied by the Joint Rapporteur Group on NGN (JRG-NGN) were: NGN requirements, the general reference model, functional requirements and architecture of the NGN, and evolution to NGN. The JRG-NGN produced two fundamental Recommendations, viz. Y.2001, *General overview of NGN* and Y.2011, *General principles and general reference model for next generation networks*.

On 7 May 2004, the ITU-T established a new Focus Group under the ITU-T Director to address the urgent need for initial global standards for Next Generation Networks (NGN).

2.1 Terms of Reference of FGNGN

Mandate of FGNGN is identified clearly through ITU-T TSB Circular 236 (Geneva, 18 May 2004) and Addendum 1 as follows:

The Focus Group on Next Generation Networks (FGNGN) is mandated to create its deliverables within 12 months concerning the following three topics:

- *A nomadicity architecture (for example, based on 3GPP/3GPP2 IMS) that includes support for broadband xDSL access. QoS in the xDSL access, Authentication and Security issues need to be resolved*

- *Current NGN activities within SG 11 and SG 13 on QoS Signalling include IP QoS aspects and other NGN signaling related requirements*
- Other NGN-related documents that have been initiated within the JRG-NGN, but have not been CONSENTED by June 22, 2004.

Based on this, some of modification was made at the 2nd FGNGN meeting at Geneva, Switzerland, 19 - 23 July 2004. Final agreed ToR of each working areas are shown as follows:

2.1.1 NGN Functional Architecture

This study will describe the functional and structural architecture of the NGN using the generic definitions, symbols and abbreviations that are defined in related ITU-T Recommendations. This study will include xDSL and IMS Architectures.

The work will take account of the NGN work already undertaken in ITU-T and other organizations e.g.:

- Draft Rec. Y.NGN-Overview, Y.NGN-SRQ and Y.NGN-GRM from Q1/13 and Q11/13
- Draft Rec. Y.NGN-FRA : Functional Architecture of NGN from Q1/13
- IMS release 6 : 3GPP, MMD : 3GPP2
- xDSL Architecture : [Q C/16, DSL Forum TR 058 and 059]

2.1.2 Nomadicity and Mobility

This study identifies requirements about various types of mobility and its behaviors such as nomadicity as part of overall NGN Functional Architecture. This study develops an architecture model to arrange various functions for management of nomadicity-mobility and includes development of control architecture and relevant network capabilities. Examples of references on this study are:

- Draft Rec. Y.NGN-FRA: Functional Architecture of NGN (from Q.1/13)
- Draft Rec. Y.NGN-MOB: Mobility management requirements and architecture for NGN (from Q.11/13)
- TD34R1 from Q.2/SSG: Mobility management draft output
- 3GPP 23.228 (IMS.stage 2)
- 3GPP2 X.S.0013-002-0 (All IP Core Network Multimedia Domain: IP Multimedia Subsystem Stage 2)
- Draft Rec. Q.1703 (TD89) from Q.1/SSG: Vision
- 3GPP TR 23.864 (Commonality and interoperability between IMSs)
- Others: To be added

2.1.3 Quality of Service

This study defines requirements and architectures (including mechanisms and interfaces) for supporting end-to-end QoS in the NGN in a controllable and predictable way. Given the coexistence of multiple QoS technologies and operator domains in the NGN, a key aspect of the study is interworking across different technology and operator domains. Additional aspects covered by the study include, for instance:

- General terminology, QoS classes, traffic attributes and network performance metrics
- Interworking and harmonization of QoS classes
- Signalling of desired QoS end to end
- Resource control: dynamic, policy based
- Performance monitoring and measurements

The figure below illustrates the complexity of the QoS study.

References

- Y.1291: An architectural framework for support of Quality of Service (QoS) in Packet networks
- Y.1541: QoS classes quantify user application needs in terms of IP network performance
- Y.1221: "traffic contract" complements QoS class by describing flow characteristics/limits
- TS 23.207: End-to-End Quality of Service (QoS) concept and architecture (Release 6)
- TS 29.209: "Policy control over Gq interface"
- S.R0035: Quality of Service. Stage 1 Requirements
- G.1010: "End-user multimedia QoS categories"
- H.360: An Architecture for End-to-End QoS Control and Signalling
- MEF 5 traffic management, phase 1
- DSL Forum TR 59: DSL Evolution – Architecture Requirements for the Support of QoS-Enabled IP Services
- TISPAN release 1 definition (FGNGN 26June04)

2.1.4 NGN Control, Signaling and Authentication Capability

This study specifies service architecture and capabilities for "Reliable and Controllable NGN" as well as reference configurations from the transport and control plane aspects. Control and authentication mechanism with signalling requirements of NGN have been requested as one of the urgent issues for the realization of NGN. This study would cover these requirements which refer to e.g.:

- Draft Rec. Y.NGN-MAN: Manageable NGN Network (from Q.1/13)
- TRQ.NCAP1 (TD.GEN/45R1 from SG 11): High level functional requirements for Packet-based network control architecture
- Draft Rec. Q.NGN-NCA (TD.GEN/75 from SG 11): Network control architecture
- TRQ.NCAP2 (TD.GEN/25 from SG 11): Gate control protocol requirements
- TRQ.NCAPX (TD.GEN/76 from SG 11): Session control protocol requirements
- TRQ.NGN-STM (TD.GEN/26 from SG 11): Service Triggering Mechanisms in SIP environments
- TRQ.IPQOS (from SG 11)
- 3GPP 23.228 (IMS.stage 2)
- Others: To be added

2.1.5 Security

This study will define the security related aspects of a "Reliable and Controllable NGN network".

- Identify threats in the NGN network (end-user, UNI, and NNI)
- Identify and specify authentication mechanisms relevant to NGN
- NOTE: Emergency Telecommunications Services (ETS) and lawful intercept matters are specifically excluded from the scope of these terms of reference

2.1.6 Migration from TDM to NGN

Evolution to NGN is a process in which parts of the existing networks are replaced or upgraded to the corresponding NGN components providing similar or better functionality, while maintaining the services provided by the original network. In addition, evolution to NGN will provide extra capabilities to the existing networks.

Evolution principles

- separation of transport, control, management and service functions.
- reduction of cost for the network infrastructure and its maintenance
- maximum reuse of the existing resources
- achieving comparable QoS level as provided in the existing network
- optimum use of the new technologies
- rapid implementation of new services and technologies enabling introduction of new applications
- provision of mechanisms enabling user's full utilisation of the applications and network resources.

Aspects to consider

- Simplified analysis of the current networks
- Management
- Signalling
- Bearer services
- Lease line provisioning
- Security
- Emergency services
- Supplementary services
- Technical aspects of naming, numbering, addressing
- Access technology evolution

Priorities for evolution to NGN

- Evolution of the existing networks to NGN:
- PSTN
- ISDN
- FR
- ATM
- IPv4
- Mobile Network
- Other scenarios

2.2 Working Group Structure of FGNGN

Based on the above agreed ToR, FGNGN decided to organize the following working group structure at the 1st FGNGN meeting:

WG	Area and Mandates
WG 1	SR (Service Requirements) Group: Development of scope, service requirements and capabilities according to Release Plan
WG 2*	FAM (Functional Architecture and Mobility) Group: Development of Functional Architecture in general and specific instance views including Mobility aspects
WG 3	QoS Group: Development of End-End QoS related deliverables including network performance aspects
WG 4	CSC (Control and Signalling Capability) Group: Development of control related standards support QoS include Resource Admission and Control aspects
WG 5	SeC (Security Capability) Group: Development of Security Framework under NGN environment
WG 6	Evo (Evolution) Group: Evolution of PSTN/ISDN into NGN
WG7	FPBN (Future Packet-based Bearer Network) Group: Identify problem states of current packet based network and development of Future Packet Network requirements

* This group will cover "IMS based FAM (Functional Architecture Model)" and "Non-IMS based FAM".

2.3 Release Plan of FGNGN

2.3.1 Definition of "Release"

During the 1st FGNGN meeting (Geneva, Switzerland, 23 - 25 June 2004), "Release" based approach was proposed and discussed, but it was not so clear the definition of release at that moment. At the 2nd FGNGN meeting, definition of "Release" was proposed and agreed as following :

> "The ITU-T NGN-FG plans to work on a Release basis. A Release is a method of prioritizing by identifying a set of services to be addressed in a certain time frame. The ITU-T NGN-FG should progress the work to define the service requirements and capabilities needed to realize the services in addition to defining other associated capabilities as needed to facilitate a NGN in a first Release. Preparatory work may also begin on a subsequent Releases based on Members inputs. The work progressed by the FG should be submitted to the appropriate ITU-T Study Group(s) as soon as practical after WTSA2004. The adoption of a release-based approach will not prevent other work, such as the development of more generic (release independent) capabilities, and the collation of services, requirements and issues for later releases. The FG recommends that successor groups in ITU-T doing NGN work to consider the release approach with Release 1 as scoped by the FG."

2.3.2 Components of Releases

To use of this "Release" concept as a method of prioritizing the works, it could be well equipped with various components to identify features of it. Following parameters are used in ITU-T during the development of important telecommunication infrastructure such as ISDN based on ITU-T Rec. I.130.

- Timing (Release): for realization and/or producing deliverables
- Stages: Stage 1 to 3 based on Rec. I.130
- Depth: level of descriptions

Release		Stage and depth	
0	generic document; contains information that is not release specific	1	overall service description
		/1	service prose definition and description
1	release 1 document; all of the contents is applicable to ITU-T NGN release 1; implementable at the end of 2005	/2	formal service description using attributes and/or graphic means
2	release 2 document; specifies additional capabilities and interfaces that are part of ITU-T NGN release 2; implementable beyond 2005	2	overall description of the organization of the network functions to map service requirements into network capabilities
		/1	derivation of a functional model
3	etc.	/2	information flow diagrams and possibly further details e.g. SDL
		3	definition of switching and signalling/protocol capabilities needed to support services defined in stage 1.
		/-	no further depth indicator

In case a document covers multiple stages of specification this may be indicated by a comma separated label like 1/1,2/1,1.

2.3.3 Procedure of Release plan

There are different views how to use of release plan to progress the work with clear milestones. Looking at the current situation of standard development, especially ITU-T working principle such as contribution driven, it is quite difficult to finalize the specific release at the same time. In ITU-T, many of SGs could be involved to finish all the features of the each release.

Bearing in mind of this situation, following procedure could be considered for the management of NGN release.

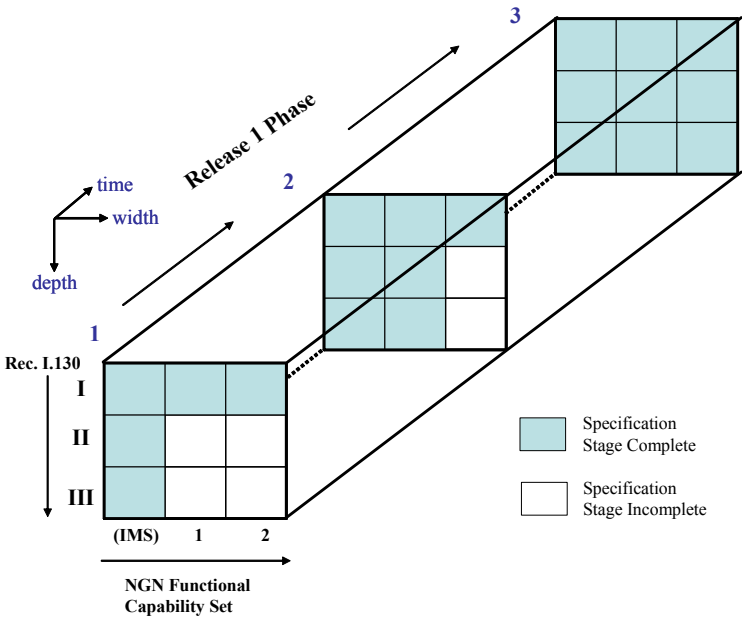


Figure 3 – Procedure for managing Release

Release plan could be included Functional Capability set and Stage 1 of this set always completed at the 1st phase of release, but releases are completed over the time. Following figure shows this case of completion process between the releases.

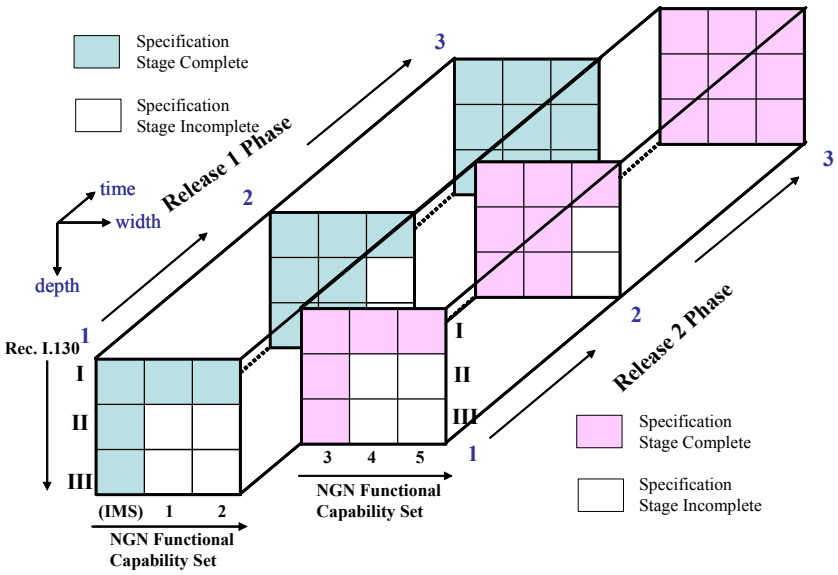


Figure 4 – Completion process between the releases

2.4 Release 1 explanation

Release 1 is developed the first step towards a comprehensive framework of services, capabilities and network functions that are considered to constitute an NGN. Release 1 could be identified with requirements in various aspects such as QoS, Mobility, Security, Control, Interworking and Migration aspects. FGNGN Release 1 identified all these aspects through various deliverables in more detail.

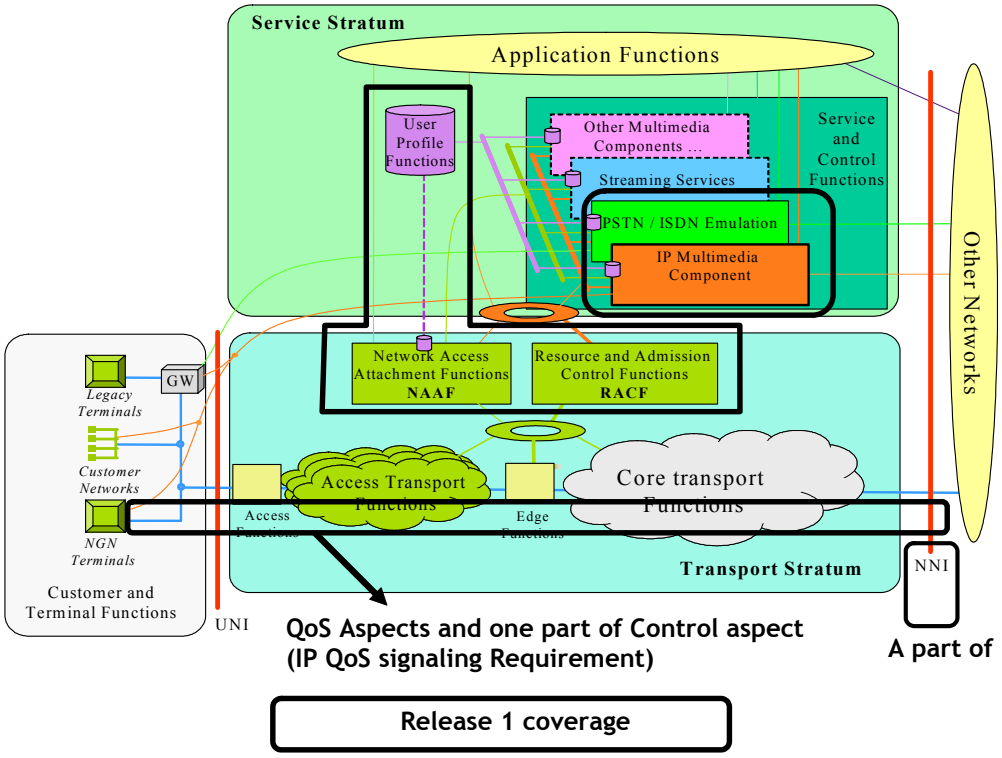


Figure 5 – Current coverage of FGNGN Release 1

The scope of the documents forming Release 1 could align with the general goals and objectives of an NGN. An NGN is expected to provide an extensible framework that provides the ability to deliver services tailored

to both users and Service Providers requirements. Specific realizations of NGN Release 1 may therefore support additional services and capabilities not described by the FGNGN. Service Provider requirements will determine which of the particular set of services and capabilities to support in a particular network.

FGNGN developed various Release 1 deliverables based on 7 working groups according to their ToR. Overview of Release 1 and service aspects has been developed in Working Group 1. This development could be the basement and overall guideline for other Working Group activities. Overall view about the Release 1 development is shown in following figure.

2.4.1 Release 1 Service and Capabilities

Release 1 Services shall be limited to the set of services that compromise a particular PSTN/ISDN (as part of a replacement scenario); the set of service capabilities, structure and access network technologies as well as taken into account public service. Following table is a summary of the Release 1 services and capabilities.

Service Types	Capabilities
• PSTN/ISDN Emulation services • PSTN/ISDN Simulation services • Multimedia services • Internet access • Other services (data services etc.) • Public service aspects (LI, ETS/TDR, etc.)	• Basic network capabilities – Service support capabilities – Open Service Environment – Service Enablers • PSTN/ISDN Emulation support • Public service support capabilities

2.4.2 Release 1 Architecture and Functional Requirements

A functional architecture has been developed by the FGNGN, taking into account mobility, to provide requirements for the NGN functional capabilities and architecture.

The functional architecture shall allow a clear distinction between definition/specification aspects of services provided by the NGN and the actual specification of network technologies used to support those services. An implementation-independent approach has been adopted. The functional and structural architecture of the NGN using the generic definitions, symbols and abbreviations that are defined in related ITU-T Recommendations shall be described. The functional architecture implications of the three modes of networking (i.e., either connection-oriented packet switched (CO-PS), connection-oriented circuit switched (CO-CS) and connectionless packet switch (CL-PS)) has been taken into account. The Mobility Management Requirements for Next Generation Networks, in support of generalised mobility, also incorporated in the developed Architecture.

Until initiation of NGN study in ITU-T, NGN related studies were going on such as 3GPP and TISPAN etc. Special notes were given to the IMS based standards work in 3GPP, 3GPP2 and TISPAN. One of important feature of NGN could be support Fixed-Mobile convergence, so FGNGN agreed to use results from these groups. The IP Multimedia Subsystem (IMS) as specified by 3GPP and 3GPP2 shall be adopted to support session and other SIP based services in the NGN core network. The FGNGN accepted IMS and as part of a detailed specification of IMS through references. Limited adaptation or modification of the IMS to support other NGN specific technologies and access shall be specified.

FGNGN provide a general QoS architectural model, consisting of a framework of elements common to specific end-to-end QoS architectures in NGN. Within this framework centralized, distributed and hybrid approaches are considered to define additional architectural needs as part of the requirements and framework for an end to end QoS architecture in NGN.

The FGNGN defines the required functions and procedures necessary for the support of Multi-Service Provider interfaces to support an IP Quality of Service (QoS). A standardized IP QOS across service provider boundaries will be needed to support different services. To ensure that IP QOS based networks will interwork with each other in supporting a set of services, the network-to-network interfaces between network operators are specified to define and facilitate interoperability between networks that can deliver

End-to-End IP QOS. The requirements for Inter-Service Provider interoperability and service provisioning at the NNI are described.

2.4.3 QoS and Performance aspects of Release 1

The General aspects of quality of service and network performance in NGN are developed by the FGNGN in order to provide descriptions of NGN Quality of Service, Network Performance and Quality of Experience. The FGNGN illustrates how these descriptions are applied in an NGN environment; describe performance aspects of NGN (including performance of service and transport stratum) and provide a basis for common understanding of performance concepts (useful to users and to the industries that compose the NGN - e.g., Fixed & mobile telecommunications, broadcasting, etc.). FGNGN defines the application QoS classes of the NGN.

The FGNGN determines the requirements to support QoS across multiple heterogeneous Service Providers. Existing standards specify several metrics and measurement methods for point to point performance. Notable are the ITU-T recommendation Y.1540 and Y.1541 standards and the IETF IP Performance Metrics (IPPM) Working Group standards. The FGNGN considers the options and parameters left unspecified, taking into account the concatenation of performance over multiple network segments, allocation of impairment budgets, mapping between IP and non-IP metrics, accuracy, and data handling.

The network performance parameters of non-homogeneous networks in NGN are developed through the description of performance aspects of the transport layer in NGN. The FGNGN identifies general performance principles and frameworks that can be applied to the development of specific performance descriptions to support continuing evolution of the NGN. FGNGN defines the relationship among individual networks' performance which may be observed at physical interfaces between a specific network and associated terminal equipment, and at physical interfaces between specific networks.

A QoS Framework for IP based access networks is also developed by FGNGN. Reference architecture for IP access networks for QoS support is provided as well as detailed QoS requirements and validation procedures. The reference model would be part of the overall NGN framework with the service and transport layers, functional entities in each layer, and interfaces between the functional entities, in particular, the functional entities to facilitate interworking with the QoS functionality in the core network as well as that specific to each type of access networks.

2.4.4 Resource and Admission control aspects of Release 1

Functional requirements and architecture for resource and admission control in NGN are developed to provide high-level requirements, scenarios and functional architecture. The decomposition to functional entities is specified to provide reference points and interfaces for the control of Quality of Service (QoS), Network Address and Port Translator (NAPT) and/or Firewall (FW) traversal are described.

A Reference Model of QoS Architecture for an Ethernet based NGN networks is developed and include requirements definitions and QoS Procedures.

2.4.5 Migration aspects of Release 1

PSTN/ISDN (public switched telephone network/Integrated Services Digital Network) are considered to be a prime candidate for evolution to NGN. The widespread deployment and use of PSTN/ISDN, requires a step-wise approach evolution to NGN. The FGNGN develops evolution paths from PSTN/ISDN to NGN through an analysis of the requirements for evolution of transport, management, signaling and control parts. Examples of possible implementation scenarios are also provided.

The evolution of networks to NGN is described as concepts based on GII (Global information infrastructure) and related recommendations Y.2001 and Y.2011. Evolution principles and areas of concern are identified, and a list of networks for evolution to NGN is described.

The NGN has the potential to provide PSTN/ISDN service capabilities and interfaces to maintain the end user experience irrespective of the changing of core network. The NGN can also provide PSTN/ISDN-like service capabilities to advanced terminals and other end-user equipment, without maintaining the end-user

experience. The FGNGN develops the general requirements and architecture to provide both capabilities in an evolving NGN.

2.4.6 Security aspects of Release 1

The security requirements for NGN Release 1 are identified, including the factors taken into account in deriving the requirements, and placing requirements according to the interfaces in the transport and service strata.

2.4.7 Management aspects of Release 1

The FGNGN shall consider network management outside its scope. The FGNGN may develop general requirements, but not detailed requirements or solutions for numbering naming and addressing issues as part of Release 1.

3 Roadmap for future steps

The NGN Focus Group was established to bridge the ITU-T study periods and to accelerate the NGN standards work. The level of participation in the FG and the results achieved has demonstrated that this was the right decision at this important stage in the work and the deliverables from the FG will be a platform for the ongoing NGN standards work.

A major consideration in the future planning has been the need to have a visible focus for the NGN work and to maintain as far as possible the co-location of the closely related NGN work performed under the umbrella of a coordinated work plan. It has therefore been agreed that, following the closure of the NGN Focus Group, further work on NGN will be progressed under the banner of the NGN Global Standards Initiative (NGN-GSI) involving all the concerned Study Groups and other organizations working with the ITU-T on NGN. A schedule of NGN-GSI activities has been developed which will maintain the pace of the work built up by the NGNFG.

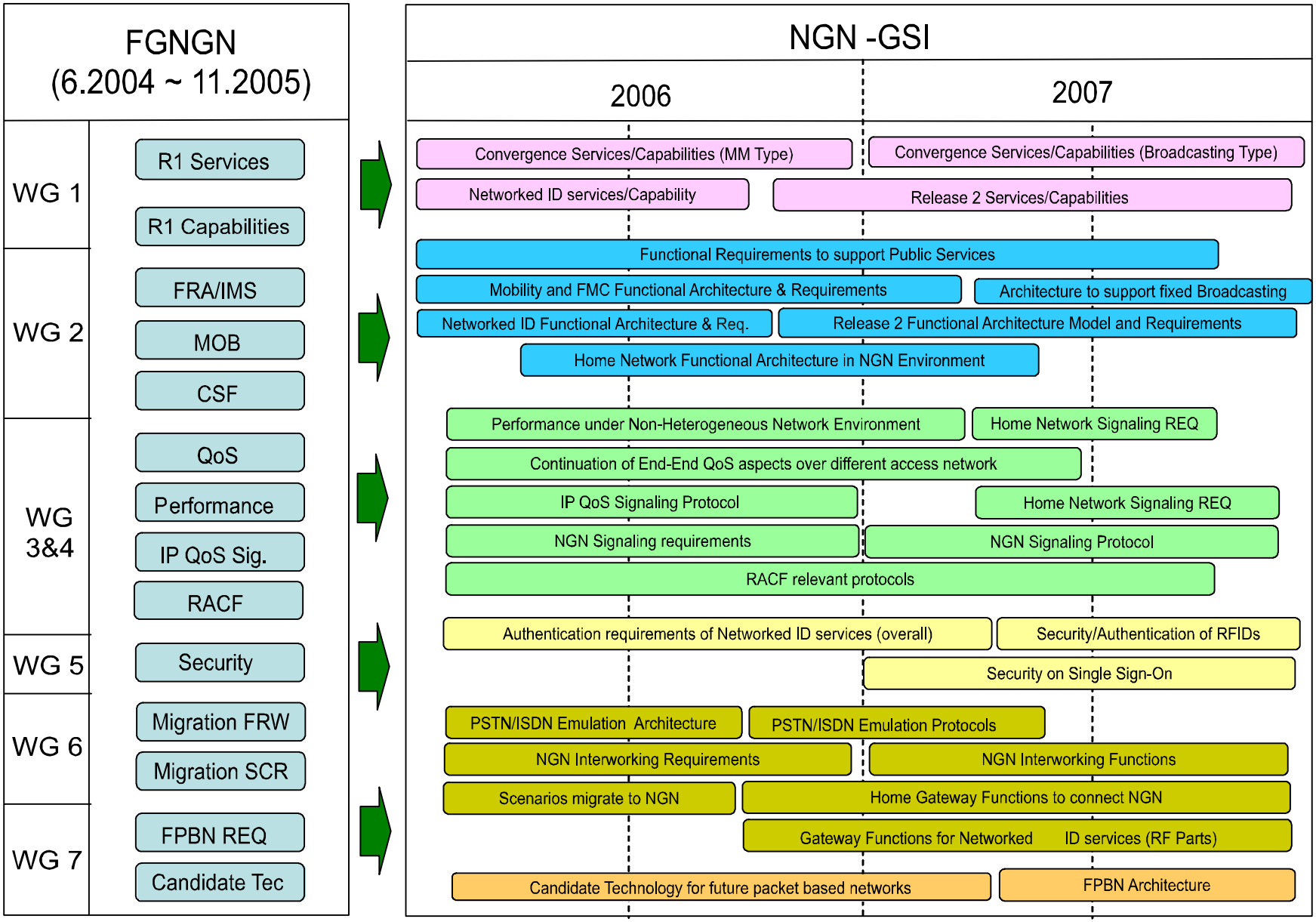
An aspect of the plans and proposals for the ongoing NGN work under the NGN-GSI has been to ensure the visibility and technical coherence of the work being undertaken. To perform this function an 'NGN-GSI Technical and Strategic Review' process (NGN-GSI TSR) has been established which will include both NGN technical coherence and strategic / coordination aspects. There will be a Technical and Strategic Review at each NGN-GSI event starting with the January 2006 Study Group 13 meeting.

The transition planning for the ongoing NGN work has also included the identification of the questions in the Study Groups under which the ongoing work stemming from the deliverables from the FGNGN and the development of any resulting draft Recommendations will be conducted.

Study Group 13 is responsible for leading the NGN work and within the study group Working Party 1 is responsible for the overall management of the NGN ‘project’ and for the support of the coordination of the NGN-GSI activities. As an aid to this the working party has been developing a project management tool aimed at providing consolidated information on NGN standardisation work in the ITU-T and in other relevant SDOs.

Actions for planned further work are detailed in TSB Circular 47 of 21

September 2005. From the work accomplished in FGNGN an indication to illustrate possible roadmap of further work is given in the diagram below.


FGNGN
(6.2004 ~ 11.2005)
WG 1
R1 Services
R1 Capabilities
WG 2
FRA/IMS
MOB
CSF
WG 3&4
QoS
Performance
IP QoS Sig.
RACF
WG 5
Security
WG 6
Migration FRW
Migration SCR
WG 7
FPBN REQ
Candidate Tec
NGN -GSI
2006
2007
Convergence Services/Capabilities (MM Type)
Convergence Services/Capabilities (Broadcasting Type)
Networked ID services/Capability
Release 2 Services/Capabilities
Functional Requirements to support Public Services
Mobility and FMC Functional Architecture & Requirements
Architecture to support fixed Broadcasting
Networked ID Functional Architecture & Req.
Release 2 Functional Architecture Model and Requirements
Home Network Functional Architecture in NGN Environment
Performance under Non-Heterogeneous Network Environment
Home Network Signaling REQ
Continuation of End-End QoS aspects over different access network
IP QoS Signaling Protocol
Home Network Signaling REQ
NGN Signaling requirements
NGN Signaling Protocol
RACF relevant protocols
Authentication requirements of Networked ID services (overall)
Security/Authentication of RFIDs
Security on Single Sign-On
PSTN/ISDN Emulation Architecture
PSTN/ISDN Emulation Protocols
NGN Interworking Requirements
NGN Interworking Functions
Scenarios migrate to NGN
Home Gateway Functions to connect NGN
Gateway Functions for Networked ID services (RF Parts)
Candidate Technology for future packet based networks
FPBN Architecture

4 Overview of the Working Group activities and achievements

Sections below give a brief description of the achievements of each Working Group (WG) of FGNGN.

Texts of Approved/or Release 1/or All deliverables) are also given below.

Status of each deliverables is shown in the table in Annex 4 (FGNGN-OD-0271r1 containing the work programme listing ALL Deliverables and STATUS of each deliverable as finalised and agreed at the final (9th) FGNGNmeeting 14-17 November 2005).

4.1 Service Requirements (SR) (WG1)

Responsibilities

The Service Requirements working group (SR) of the Focus Group on Next Generation Network (FGNGN) is the FGNGN core expertise group responsible for studying the service scope and requirements for NGN. Most of the emphasis is on identifying the services and requirements for NGN Release 1.

Accomplished tasks

- Developed a list of NGN services and examples, illustrative use cases for NGN Release 1.
- Identified service and network capabilities needed to support those services for NGN Release1.
- Identified service and network requirements needed to support those services for NGN Release 1.

Deliverables

- Release 1
  - NGN Release 1 Scope
    - Provides a high level description of NGN Release 1 and its scope in terms of supported services and capabilities.
  - NGN Release 1 Requirements
    - Provides a fundamental set of requirements for the identified NGN Release 1 capabilities – basic capabilities, service support capabilities - as well as other general requirements.
- Beyond Release 1
  - None were produced
- Release independent
  - None were produced

4.1.1 Deliverables Text of Working Group 1

Deliverables are given in ***Book-Part II***

4.2 Functional Architecture Mobility (FAM) (WG2)

Responsibilities

The Functional Architecture & Mobility working group of the Focus Group on Next Generation Network (FGNGN) is responsible for developing functional requirements and architectural frameworks for Next Generation Networks.

Accomplished tasks

- Development of Functional Architectural for Release 1.
- Development of the Mobility Management Capability Requirements for NGN for Release 1.
- Specification of the IMS architecture documents from 3rd Generation Partnership Project (3GPP) and 3rd Generation Partnership Project 2 (3GPP2) relevant to NGN Release 1.
- Development of PSTN/ISDN emulation architecture for accommodation of legacy terminals in Release 1.
- Preliminary draft of Converged Services Framework (CSF) to provide an overlay co-ordination architecture.
- Preliminary draft of Softrouter Requirements for new NGN transport architectures.
- Development of the requirements and capabilities for customers to dynamically customize their service, control and management capabilities.
- Preliminary draft for terms and definitions framework relevant to providing a general understanding of Next Generation Networks and a guide for use in NGN specification development.

Deliverables

- Release 1
  - Functional Requirements and Architecture of the NGN
    - This document outlines the functional architecture for the both Service and Transport strata blocks of functionality in a Next Generation Network.
  - Mobility Management Capability Requirements for NGN for Release 1,
    - This document specifies the basic concepts associated with the Mobility Management and the related requirements for Next Generation Networks. The mobility management functional architecture is coherent to and appropriately positioned in the more general NGN functional reference architecture.
  - IMS for Next Generation Networks (IFN)
    - This document identifies the use of the IP Multimedia Subsystem (IMS) for use within the NGN. It provides an introduction to the IMS functional architecture and operation and identifies those IMS architecture documents that are relevant in the context of NGN.
  - PSTN/ISDN emulation architecture
    - This document describes the functional architecture, interworking with other components, and interface requirement of the PSTN/ISDN emulation component including impacts of Call server-based and other implementations
- Beyond Release 1
  - Converged Services Framework Functional Requirements and Architecture
    - The main goal of the 'Converged Service Framework' (CSF) is to provide a framework that would enable application developers to create services that operate smoothly and consistently when crossing the boundaries of multiple access and control networks. Preliminary draft form only at this time.
- Release independent
  - Framework for Customer Manageable IP Network
    - This document describes a framework for the requirements and capabilities to enable customization of IP networks to meet the customer's needs. The framework includes

service requirements, functional requirements and capabilities, as well as the degree of manageability or controllability that can be exercised by the customer.

- Terms, definitions and high level terminological Framework for Next Generation Network
  - This document provides a context for the use of certain terms and definitions to provide a common basis for NGN activities. Thus, the definitions are arranged in a specific order and certain necessary relationships are illustrated (graphically where appropriate). Additionally, explanatory notes are also included where deemed appropriate. Preliminary draft form only at this time.

4.2.1 Deliverables Text of Working Group 2

Deliverables are given in ***Book-Part II***

4.3 Quality of Service (QoS) (WG3) and Control and Signalling Capability (CSC) (WG4)

WG4 (CSC) responsible for specifying protocols for Control and Signalling Capability has worked jointly with WG3 (QoS) on requirements. Control and Signalling protocol work has not yet started. Joint work done by WGs 3 and 4 is outlined below.

WG 3: Quality of Service (QoS)

Responsibilities

WG 3 is responsible for defining the requirements and architectures for supporting end-to-end QoS in the NGN in a controllable and predictable way. Specifically, the group is charged to study all aspects of QoS (such as performance classification, dynamic resource management, and performance measurement) for a heterogeneous environment encompassing varied packet transport technologies, multiple provider domains, and diverse QoS capabilities in endpoints.

Accomplished tasks

- Completed (jointly with WG 4) the requirements for IP QoS signaling (Q-Series Supplement 51)
- Completed the specification of an application-driven QoS control architecture for Ethernet-based IP access networks
- Investigated the approaches and algorithms for apportioning performance impairments in end-to-end paths and transferred the initial result and task to SG 12
- Specified the requirements for inter-provider performance measurements and for their management
- Identified the guidelines for supporting IP QoS at the inter-carrier interface
- Specified the requirements and architecture for application-driven resource and admission control to enable end-to-end QoS, taking into consideration network address and port translators and firewalls in an end-to-end path
- Investigated the general requirements and framework for supporting end-to-end QoS
- Specified a QoS control architecture for the Ethernet-based NGN
- Studied the general aspects of QoS (including network performance and quality of experience) and identified the need for technology-independent application QoS classes
- Examined network performance across different types of networks (e.g., UMTS and IP), including the mappings between different sets of network QoS classes (e.g., UMTS QoS classes and Y.1541 IP QoS classes)

Deliverables

- Release 1
  - A QoS control architecture for Ethernet-based IP access network (TR-123.qos),
  - Algorithms for Achieving End-to-End Performance Objectives (TR-apo)

- Performance measurement and management for NGN (TR-pmm)
- Multi Service Provider NNI for IP QoS (TR-msnniqos)
- Functional Requirements and Architecture for Resource and Admission Control in Next Generation Networks (TR-racf)
- Requirements and framework for end-to-end QoS in NGN (TR-e2eqos.1)
- A QoS Architecture for the Ethernet Network (TR-enet)
- A QoS Framework for IP-based access networks (TR-ipaqos)

• Beyond Release 1
  - None

• Release independent
  - General Aspects of Quality of Service and Network Performance in the Next Generation Networks (TR-NGN.QoS)
  - Network performance of non-homogeneous networks in NGN (TR-NGN.NHNperf)

4.3.1 Deliverables Text of Working Group 3 and 4

Deliverables are given in ***Book-Part II***

4.4 Security Capability (SeC) (WG5)

Responsibilities

The FGNGN Security Capabilities working group (Sec) has been responsible for studying the general aspects of NGN security and advancing standardization of the security solutions for NGN. The group has been also assisting all FGNGN working groups in developing security solutions specific to their respective work.

Accomplished tasks

- Established foundation for the security studies of NGN. Provided guidance on applying the major concepts of the ITU-T
- Recommendations on security (e.g., X.800, X.805) to NGN
- Developed general security requirements for NGN Release 1
- Developed implementation guidelines for NGN Release 1
- On a need base, advised other groups on security matters.

Deliverables

• *Security Requirements for NGN Release 1*
  - Establishes a general approach to the development of the security requirements for NGN (based on ITU-T Recommendation X.805).
  - Defines general security objectives and general security requirements for NGN.
  - Specifies security requirements related to NGN services, NGN users and various interfaces of the NGN.
  - Specifies security requirements for the Service and Transport strata.

• *Guidelines for NGN Security Release 1*
  - Provides general principles and guidelines for building a secure NGN network.
  - Establishes foundation for developing recommendations specifying end-to-end security solution for NGN (based on ITU-T Recommendation X.805).

• Beyond Release 1

- A number of items (such as key distribution, authentication schemes, applicability of SIP hop-by-hop security, etc. have been discussed)

- Release independent
  - None were produced or identified

4.4.1 Deliverables Text of Working Group 5

Deliverables are given in ***Book-Part II***

4.5 Evolution (Evo) (WG6)

Responsibilities

The Evolution working group (Evo) of the Focus Group on Next Generation Network (FGNGN) is the FGNGN core expertise group responsible for studying how best to evolve circuit-switched networks to packet-based networks. This group is also responsible for all aspects of standardisation related to the evolution of networks, including PSTN/ISDNs, to NGN, including aspects related to architecture, protocol, QoS, security, mobility, etc.

Accomplished tasks

- Examined detailed aspects related to network evolution to NGN. This included: transport, signalling and control, management, services, bearer, supplementary services, OAM, resource allocation, naming numbering and addressing, accounting, charging and billing, interworking, service requirements by national regulatory bodies, emergency services in NGN, and security aspects of evolution. The major focus of this activity was on PSTN/ISDN evolution.
- Examined existing PSTN/ISDN architecture and identified possible evolution (to NGN) scenarios.
- Defined PSTN/ISDN emulation and simulation and prepared related scenarios.
- Described a limited set of scenarios for signalling evolution.
- Prioritised study of different candidate networks, for evolution to NGN.

Deliverables

- Release 1
  - Evolution of networks to NGN
    - Presents concepts for evolution of existing networks to Next Generation Networks (NGN) based on Global information infrastructure (GII) concepts and aligned with related Recommendations Y.2001 and Y.2011.
  - PSTN/ISDN evolution to NGN
    - Describes possible ways of evolving PSTN/ISDNs to NGNs. It describes scenarios for evolution of PSTN/ISDN transport, management, signalling and control parts to NGN
  - PSTN/ISDN emulation and simulation
    - Describes PSTN/ISDN emulation and simulation. PSTN/ISDN Emulation could potentially provide PSTN/ISDN service capabilities and PSTN/ISDN Simulation could potentially provide PSTN/ISDN-like service capabilities.
- Beyond Release 1
  - None were produced or identified
- Release independent
  - None were produced or identified

4.5.1 Deliverables Text of Working Group 6

Deliverables are given in ***Book-Part II***

4.6 Future Packet-based Bearer Network (FPBN) (WG7)

Responsibilities

The FPBN working group (FPBN) of the Focus Group on Next Generation Network (FGNGN) is specifying the requirements and architecture for future packet-based networks. These are comprised of transport stratum packet based path layer networks as referred to in G.805, G.809 and Y.2011. The Architecture for FPBN addresses both connectionless packet switched (cl-ps) and connection-oriented packet-switched (co-ps) layer networks.

Accomplished tasks

- Identified the problems with current Packet Based Networks from the point of view of Network Operators and Users.
- Specified the high level requirements for a Future Packet Based Network (FPBN), including user plane, control plane and management plane requirements.
- Agreed a high level architecture for a Future Packet Based Network (FPBN), including the relationship between FPBN and NGN strata and interfaces in FPBN.
- Agreed a mechanism for evaluating candidate technologies for a Future Packet Based Network (FPBN) against the agreed requirements and architecture.

Deliverables

- All Beyond Release 1
  - Problem Statement for Packet-Based Networks
  - Requirements for FPBN
  - High Level Architecture for FPBN
  - Candidate technologies for FPBN

4.6.1 Deliverables Text of Working Group 7

Deliverables are given in ***Book-Part II***

5 Further information on ITU-T, useful web links and tutorial and presentation material

Further information on ITU-T, other useful information like web links and tutorial/presentations material is given in the Annexes.

Annex A

Structure and Management team of FGNGN

Chae-sub Lee	Chairman	**ETRI** – Korea
Dick Knight	Vice-Chairman	**BT** – UK
Ron Ryan	Vice-Chairman	**Nortel** – Canada
Neal Seitz	Vice-Chairman	**US Dept. of Commerce** – USA

WG	Area	Leader(s)	Contact
WG 1	SR (Service Requirements) Group	Marco Carugi	**Nortel Networks** – France
		Brent Hirschman	**Sprint Corporation –** USA
WG 2	FAM (Functional Architecture Mobility) Group	Keith Knightson	**Industry Canada –** Canada
		Thomas Towle	**Lucent Technologies –** USA
		Naotaka Morita	**NTT Corporation –** Japan
WG 3	QoS Group	Hui-Lan Lu	**Bell Labs/Lucent Technologies**
		Keith Mainwaring	**Cisco Systems –** Sweden
		Hyungsoo (Hans) Kim	**KT** – Korea
WG 4	CSC (Control and Signalling Capability) Group: Defer to the next meeting	Rainer Muench	**Alcatel SEL AG –** Germany
		Cagatay Buyukkoc	**Cisco Systems** – USA
		Wei Feng	**Huawei Technologies Co. Ltd** – P.R. China
WG 5	SeC (Security Capability) Group	Igor Faynberg	**Bell Laboratories, Lucent Technologies** – USA
WG 6	Evo (Evolution) Group	Ghassem Koleyni	**Nortel Networks –** Canada
		Dongyang Fan	**Siemens Communication Networks Ltd.** – P.R. China
WG7	FPBN (Future Packet-based Bearer Network) Group	Lintao Jiang	**MII of China –** P.R. China
		David Meyer	**Cisco Systems** – USA
		Keith Dickerson	**BT** – United Kingdom

FGNGN EDH coordinators

Ghassem Koleyni	**Nortel Networks** – Canada
Dick Knight	**BT** – UK

TSB Secretariat

Mr. Arshey Odedra – Counsellor	ITU-TSB – Switzerland
Ms. Alexandra Gaspari – Administrative Assistant	ITU-TSB – Switzerland

Annex B

FGNGN meetings (2004 – 2005)

FGNGN meeting	Dates	Location
1st FGNGN meeting	23 – 25 June 2004	Geneva, Switzerland, ITU Headquarter
2nd FGNGN meeting	19 – 23 July 2004	Geneva, Switzerland, ITU Headquarter
3rd FGNGN meeting	27 September – 1 October	Ottawa, Canada
4th FGNGN meeting	30 November – 3 December 2004	Geneva, Switzerland, ITU Headquarter
5th FGNGN meeting	16 – 22 March 2005	Jeju Island, Republic of Korea
6th FGNGN meeting	25 – 29 April 2005	Geneva, Switzerland, ITU Headquarter
7th FGNGN meeting	27 June – 1 July	Beijing, People's Republic of China
8th FGNGN meeting	24 August – 2 September 2005	Geneva, Switzerland, ITU Headquarter
9th FGNGN meeting	14 – 17 November 2005	Gatwick, London, United Kingdom

Annex C

List of participating companies and other entities

Aethra
Agere Systems
Alcatel
Alcatel Shanghai Bell
Artelink
AT&T
AULM
Australian Communications Authority
Bharat Sanchar Nigam Limited
Belgacom
BT
Cable & Wireless
Cambodia
Canada – Industry Canada
China
China Mobile Comm. Corp.
China Telecommunications Corp.
China Unicom
CIENA Corporation
Cisco Systems
Deutsche Telekom
Ericsson China
ETRI
France – Autorité de Régulation des Télécommunications
France – Ministère de l'Economie, des Finances et de l'Industrie
France Telecom
Freescale Semiconductor
Fujitsu
Gabon Telecom
Germany – Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway
Hitachi
HP Centre de Compétences, France
Huawei Technologies
Intel
Intelsat LLC

Israel

Italy

Japan

Juniper Networks

KDDI

Korea

KT Corporation

L.M Ericsson

Lucent Technologies

Malaysia

Marconi Communications

Mitsubishi Electric

Motorola

Namati Tech.

NEC

Nokia Corporation

Nortel Networks (Canada)

Nortel Networks (Europe)

Nortel Networks (USA)

NTT

NTT Comware Corporation

Oki Electric Industry

Operax

QUALCOMM

Reliance Infocomm

Rivertree Networks

Samsung Electronics

SBC Communications

Siemens

SITA

Sonus Networks

Sudan Telecom

Sprint Corporation

Sweden – National Post and Telecom Agency

Swisscom

Switzerland – Office fédéral de la communication (OFCOM)

Syrian Telecommunications Establishment

T-Systems International

Tandberg Telecom

Tanzania Communications Regulatory Authority (TCRA)

Telcordia Technologies

Telekom Austria

Telecom Italia

Telecom New Zealand

Telefónica

Telekomunikacja Polska

Telenor

Tellabs Oy

Tridea Works, LLC

USA – Department of Commerce/NTIA, The National Telecommunications and Information Administration, International Communications and Information Policy (CIP), Department of State

VeriSign

ZTE

Annex D

NGN Focus Group deliverables status

Status

At its 9th meeting, 14-17 November 2005, the Focus Group on NGN has provided a view on the status of the documents.

Deliverables that are marked "P" in the sixth column of tables 1, 2 or 3, have already been passed to ITU-T Study Group 13, and one has been published, as shown.

The FGNGN considers that the deliverables that have given the status "A" have been developed to a sufficiently mature state, as technical reports, to be considered by ITU-T Study Group 13 for publication.

The FGNGN considers that those deliverables that have gained the status of "S" have reached a mature state but would require further consideration in Study Group 13 before publication.

The FGNGN considers that all other deliverables shown as status "D", are not yet mature, requiring discussion and technical input to complete their development.

ITU-T FGNGN deliverables

as approved at the FGNGN Plenary meeting 17 November 2005

Table 1 - List of Release Independent Deliverables

WG	Deliverable Title	Current Draft	Target Date	Cat.	Stat	Target SG*
2	Framework for Customer Manageable IP Network	FGNGN-OD-00194	August 2005	0/2/1	P	13
2	Terms, definitions and high level terminological Framework for Next Generation Network (TR-TERM)	FGNGN-OD-00261	4Q05	N/A	D	13
					D	
3	General Aspects of Quality of Service and Network Performance in the Next Generation Networks (TR NGN.QoS)	FGNGN-OD-00166	4Q05	0/1/1	D	13/12
3	Network performance of non-homogeneous networks in NGN (TR-NGN.NHNperf.)	FGNGN-OD-00240	4Q05	0/1/1	A	13/12

Table 2 - List of Release 1 Deliverables

WG	Deliverable Title	Current Draft	Target Date	Cat.	Stat	Target SG*
1	NGN Release 1 Scope	FGNGN-OD-00253	4Q05	1/1/1	A	13
1	NGN Release 1 requirements	FGNGN-OD-00252	4Q05	1/1/1	A	13
2	Functional Requirements and Architecture of the NGN (FRA)	FGNGN-OD-00244r2	4Q05	1/2/1	A	13
2	Mobility Management Capability Requirements for NGN (FRMOB)	FGNGN-OD-00246r1	4Q05	1/2/1	A	13/19
2	IMS for Next Generation Networks (IFN)	FGNGN-OD-00245r1	4Q05	1/2/1	A	13/19
2	PSTN/ISDN emulation architecture	FGNGN-OD-00247r1	4Q05	1/2/1	A	13
3	A QoS control architecture for Ethernet-based IP access network (TF 123.qos)	FGNGN-OD-00106	Mar. 2005	1/2/1	P	13
3	Multi Service Provider NNI for IP QoS (TR msnniqos)	FGNGN-OD-00205	4Q05	1/2/1	S	13
3	Requirements and framework for end-to-end QoS in NGN (TR e2eqos.1)	FGNGN-OD-00204	4Q05	1/2/1	D	13
3	The QoS Architecture for the Ethernet Network (TR enet)	FGNGN-OD-00202	4Q05	1/2/2	D	13

WG	Deliverable Title	Current Draft	Target Date	Cat.	Stat	Target SG*
3	Functional Requirements and Architecture for Resource and Admission Control in Next Generation Networks (TR racf)	FGNGN-OD-00241	4Q05	1/2/2	D	13
3	A QoS Framework for IP-based access networks (TR ipaqos)	FGNGN-OD-00113	4Q05	1/2/1	D	13
3	Performance measurement and management for NGN (TR pmm)	FGNGN-OD-00239r1	4Q05	1/2/1	A	12
3	Algorithms for Achieving End to End Performance Objectives (TR apo) (#=From the September 2005 FGNGN meeting, this deliverable has been transferred (via parent SG13) to continue further work in SG12.)	FGNGN-OD-00200	3Q05	1/2/2	P	12
4	Signalling requirements for IP QoS (TRQ.IP.QoS. SIG.CS1)	Q Series Supplement 51	Dec. 2004	1/2/2	P	11
5	Security Requirements for NGN Release 1	FGNGN-OD-00255	4Q05	1/2/1	A	13
5	Guidelines for NGN-Security for Release 1	FGNGN-OD-00254	4Q 05	TBD	D	13
6	Evolution of Networks to NGN	FGNGN-OD-00257	4Q05	1/2/1	A	13
6	PSTN/ISDN evolution to NGN	FGNGN-OD-00258	4Q05	1/2/1	A	13
6	PSTN/ISDN emulation and simulation	FGNGN-OD-00259	4Q05	1/2/1	A	13

Table 3 - List of beyond Release1 Deliverables

WG	Deliverable Title	Current Draft	Target Date	Cat.	Stat	Target SG*
2	Softrouter Requirements	FGNGN-OD-00043	**TBD**	2/2/1	D	13
2	**Converged Services Framework Functional Requirements and Architecture (TR-CSF)**	FGNGN-OD-00248r1	4Q05	2/2/1	D	13
7	Problem Statement	FGNGN-OD-00158	Apr. 2005	2/1/1	P	13
7	FPBN Requirements	FGNGN-OD-00268	4Q05	2/1/1	A	13
7	FPBN Architecture	FGNGN-OD-00269	4Q05	2/2/1	A	13
7	FPBN Candidate Technologies	FGNGN-OD-00180	4Q05	2	D	13

Explanation of Table Columns

The columns in the table are explained in this section.

WG: Working Group responsible for progressing the deliverable.

Deliverable Title: Title of the deliverable.

Current Draft: Output Document containing the draft text of the deliverable agreed to represent the deliverable by the Working Group.

Target Date: This is the date that the working groups are using as a target for Focus Group approval.

Category (Cat.): A tuple (x/y/z) indicating the intended release, stage and depth of the deliverable. The stage and depth description are taken from Recommendation I.310 with the deletion of "from a user's perspective" from the stage 1 definition and a simplification of the depth (step) indication. The categorisation is as follow:

Release

- 0 Generic Document; Contains Information That Is Not Release Specific
- 1 Release 1 document; all of the contents is applicable to ITU-T NGN release 1; unless stated otherwise in the document it is expected that it will remain in force beyond release 1
- 2 Release 2 document; specifies additional capabilities and interfaces as part of ITU-T NGN release 2
- 3 etc.

Stage and depth

- 1 overall service description
  - /1 service prose definition and description
  - /2 formal service description using attributes and/or graphic means
- 2 overall description of the organisation of the network functions to map service requirements into network capabilities
  - /1 derivation of a functional model
  - /2 information flow diagrams and possibly further details e.g. SDL
- 3 definition of switching and signalling/protocol capabilities needed to support services defined in stage 1.
  - /- no further depth indicator

***Target Study Group (SG)**: The Focus Group's expectation of the ITU-T Study Group that will take the deliverable and further progress the work to Recommendation or other ITU-T published Document.

Annex E

Useful links to ITU-T pages

ITU-T NGN useful links

ITU-T NGN home page: http://www.itu.int/ITU-T/ngn/index.html

ITU-T SG13 Lead SG for NGN: http://www.itu.int/ITU-T/studygroups/com13/index.asp

Focus Group on NGN http://www.itu.int/ITU-T/ngn/fgngn/

NGN 2004 Project: http://www.itu.int/ITU-T/studygroups/com13/ngn2004/index.html

Open Communications Architecture Forum (OCAF) Focus Group: http://www.itu.int/ITU-T/ocaf/index.html

NGN Management focus group: http://www.itu.int/ITU-T/studygroups/com04/ngn-mfg/index.html

ITU-T NGN News channel:
http://www.itu.int/ITU-T/newslog/CategoryView,category,Next%20Generation%20Networks%20(NGN).aspx

(Note: If will be possible, should be added here the NGN-GSI link ready at the end of November)

Other useful links

ITU-T home page: http://www.itu.int/ITU-T/index.html

ITU-T Lighthouse, the ITU-T Information Centre:http://www.itu.int/ITU-T/lighthouse/index.phtml

ITU-T Technology Watch: http://www.itu.int/ITU-T/techwatch/index.phtml

ITU-T Study groups: http://www.itu.int/ITU-T/studygroups/index.html

ITU Strategy and Policy Unit NGN :http://www.itu.int/osg/spu/ngn/index.phtml

Annex F

Study Group 13 report to TSAG in November 2005 on NGN activities and future working arrangements for NGN studies

1 Introduction

Since the TSAG meeting in March 2005 there has been much activity in the area of NGN. The NGN Focus Group has held its 6th meeting in Geneva in April, its 7th meeting in Beijing in June/July and its 8th meeting in Geneva in August/September. The 6th and 8th meetings were held in association with meetings of Study Group 13. Meetings of the NGN-JCA were held during the Study Group 13 meetings and a workshop on NGN together with the Internet Engineering Task Force (IETF) was held on 1 -2 May 2005 in Geneva.

2 Future of the NGN Focus Group

2.1 A decision on the future of the NGN Focus Group was on the agenda for the April/May meeting of Study Group 13 where the following was agreed:

– The existing FGNGN will continue until the end of 2005 in order to complete, as far as possible, its current work. The existing FGNGN will be closed by end of 2005 independent of whether the current work has been finalized or not.

– The FGNGN will not take on any new work.

– The FGNGN will submit as a complete package their deliverables (finalized or not) as contributions to the Study Group 13 meeting in January 2006. As guidance, any FGNGN output document which Study Group 13 may wish to consider for an approval procedure at the January 2006 Study Group 13 meeting should be available as a contribution on the Study Group 13 web site by 23 November 2005. To support transition planning, the FGNGN should make available on the Study Group 13 web site complete and up-to-date summaries of the FGNGN work programme as follows: (1) an interim summary by 5 September 2005, reflecting FGNGN accomplishments and decisions through 2 September 2005, and (2) a further summary by 23 November 2005, reflecting FGNGN accomplishments and decisions up to that date. The FGNGN will make a more complete Closure Report available on the Study Group 13 web site within one week after the end of the final FGNGN meeting.

– The ongoing work will continue in the study groups under the concerned Questions and between study group meetings in Rapporteur and joint Rapporteur Groups.

– Study Groups will continue to operate according to the mandates as stated in Resolution 2.

– If it is felt by Study Group 13, as the lead Study Group on NGN, that additional time-critical work should be carried out on a particular item, then it could create a new FG according to Recommendation A.7 for this particular item with a strong limit in scope and time in order to allow a broad participation, including non ITU-T members.

2.2 Following the decision to close the NGN Focus Group by the end of 2005 the Study Group 13 meeting in August/September spent a considerable time considering the transition planning and working arrangements for the ongoing NGN activities. A set of proposals were developed by the Study Group 13 management team taking account of contributions received and other consultations and were approved at the Study Group 13 plenary on 5 September as a basis for consideration by the NGN-JCA on 6 September. They were approved by the NGN-JCA and endorsed by a meeting between the TSB Director and Heads of Delegation to Study Groups 11, 13 and 19 on 7 September and form the basis for the ongoing coordination, planning and management of the NGN work.

3 Future NGN working arrangements

3.1 The considerations for the future working arrangements were based on the following assumptions:

a) Work continues according to 'normal' practice, i.e. work is done by Rapporteurs and the results approved by the Study Group concerned. So during a Study Group 13 meeting the work should be done using the normal Working Party arrangements.

b) Work will be assigned according to Res. 2 and to specific Question(s).

c) No new level of approval should be introduced.

d) Need to have a focus for management and coordination of NGN work.

e) Need to have facilitation tools for technical development and harmonization

f) Need to maintain the momentum built up by the NGN Focus Group.

g) Use existing structures (e.g. the NGN-JCA, JRG etc.) where possible.

3.2 Looking at next year's meeting program there will be the possibility to progress the NGN work at meetings roughly every three months (and in between time if necessary).

– January 2006, meeting of Study Group 13 (and Study Groups 11 and 19)

– April 2006, workshop on 'NGN and Transport' followed by co-located Rapporteur meetings on NGN

– July 2006, meeting of Study Group 13 (and Study Groups 11 and 19)

– October/November 2006, co-located Rapporteur meetings on NGN (to be planned).

In the interim meetings in April and October/November Study Group 13 Rapporteur groups will meet (together with Rapporteur groups of other Study Groups as agreed) according to a coordinated plan for joint NGN activities.

During the Study Group 13 meetings in January and July the work will be planned in the normal way with joint meetings on questions as necessary. Again it would be possible for Rapporteur groups of other Study Groups (in addition to Study Groups 11 and 19) to meet at same time in order to maximise the co-location of the NGN work.

3.3 In addition an activity is required to ensure that the work continues to be progressed in a well coordinated way. The NGN-JCA will be used as the vehicle for this, enlarged to include as a basis the Study Group chairmen (and the concerned vice-chairmen) of the involved Study Groups and the concerned Working Party chairmen. In addition, representatives from other SDOs and regional organizations will be invited to join the NGN-JCA. It will be an open group but as its main aim will be to coordinate the NGN work it is expected that the participation will reflect this. It is not envisaged that technical contributions are submitted to the NGN-JCA as these should be directed to the concerned question(s) but strategic/planning issues can be brought to the attention of the NGN-JCA. Input will be provided by Working Party 1/13 as well as by any member of the NGN-JCA. The NGN-JCA can also look at work assignment when it is not clear under which question work should be done and recommend an allocation of tasks. The NGN-JCA may create a sub group to support the implementation of the coordination based on guidelines prepared by the NGN-JCA.

3.4 The interim Rapporteur meetings in April and October/November (and beyond) will be convened as an 'NGN Co-located Rapporteurs' Meeting' the planning and preparation for which will be done by the NGN-JCA.

4 Assignment of FGNGN deliverables to question of Study Groups

As part of the transition planning for the closure of the NGN Focus Group it is important to indicate which questions in the Study Groups will be responsible for the ongoing work stemming from the deliverables from the FGNGN and for the development of any resulting draft Recommendations. A provisional allocation was developed during the August/September meetings of Study Groups 11, 13 and 19 and will be the starting point for developing further agreements on the responsibilities for the Focus Group deliverables. The information will be an input to the planning of the future co-located meetings on NGN. Further updates of the allocations will be carried out through the NGN-JCA taking account of the final output of the NGN Focus Group.

5 NGN-GSI

A major consideration in the future planning has been the need to have a visible focus for the NGN work and to maintain as far as possible the co-location of the closely related NGN work performed under the umbrella of a coordinated work plan. It has therefore been agreed that, following the closure of the NGN Focus Group, further work on NGN will be progressed under the banner of the NGN Global Standards Initiative (NGN-GSI) involving, in addition to Study Groups 11, 13 and 19, NGN related Rapporteur Groups of Study Groups 12, 15, 16 and other Study Groups as appropriate. The first NGN-GSI event will be the co-located meetings of Study Groups 11, 13 and 19 scheduled in January 2006.

This and the above arrangements for the ongoing work were announced by the Director in TSB Circular 47 issued on 21 September 2005

An aspect of the plans and proposals for the ongoing NGN work under the NGN-GSI has been to ensure the visibility and technical coherence of the work being undertaken within Study Group 13 and in the other involved Study Groups. A process is needed that will reinforce the role of the NGN-JCA and which can be applied both during Study Group 13 meetings and during the co-located Rapporteurs' meetings on NGN. To perform this function an 'NGN-GSI Technical and Strategic Review' process (NGN-GSI TSR) has been established which will include both NGN technical coherence and strategic / coordination aspects. Its output will be input to the ongoing project management work of Study Group 13 and it will prepare reports to the NGN-JCA including areas for decisions / guidance. There will be a Technical and Strategic Review at each NGN-GSI event starting with the January 2006 Study Group 13 meeting.

6 NGN project management

Within Study Group 13 Working Party 1/13 is responsible for the overall management of the NGN ‘project’ and for the support of the coordination of the NGN-GSI activities through the NGN-JCA. As an aid to this the working party has been developing a project management tool aimed at providing consolidated information on NGN standardisation work in the ITU-T and in other relevant SDOs. A presentation on the tool was given by the TSB during the August/September 2005 Study Group 13 meeting and work on populating the database jointly with the TSB will start mid October.

7 OCAF Focus Group

Study Group 13 is the parent of The Open Communications Architecture Forum (OCAF) Focus Group the objective of which is to agree on specifications for a set of components for a new carrier grade open platforms that will accelerate deployment of NGN infrastructure and services. At the May 2005 meeting of Study Group 13 a presentation of the current status of the work of the OCAF Focus Group was given to the Study Group. The presentation concluded by asking a number of questions concerning the relationship of the OCAF targeted outputs with the existing and draft ITU-T Recommendations and the handling of the deliverables for comment in the ITU-T. Subsequently the first deliverable of the OCAF Focus Group, *Carrier Grade Open Environment (CGOE) Reference Model* was made available on the OCAF web page.

At the August/September meeting of Study Group 13 an ad-hoc group was established to prepare a response the questions raised by OCAF including possible transfer of their deliverable to SG 13 for further processing as an ITU-T Recommendation. In addition a further status report of the activities of the OCAF Focus Group was presented to the plenary meeting of the study group held in the morning of Monday 5 September 2005.

Further information on the work of the OCAF Focus Group can be found at http://www.itu.int/ITU-T/ocaf/index.html.

8 Relations with the IETF

8.1 ITU-T held a workshop on NGN together with the Internet Engineering Task Force (IETF) on 1-2 May 2005 in Geneva. The overall objectives of the workshop were to explore specific NGN issues that impact both the ITU-T and the IETF to better understand the work underway in the two organizations and to identify areas where actions could be taken between the ITU-T and IETF to further coordinate their work.

8.2 One of the key issues discussed was the need for good communication between the organisations. The ITU-T sees the NGN as the future direction of global network evolution leading to a multi-service, assured quality, secure, IP-based network. So it was recognised that as the ITU-T develops the NGN architecture and associated standards it is important to keep the appropriate Areas and WGs in the IETF informed of the work and of requirements potentially impacting on IETF protocols.

In order to strengthen the relationships Study Group 13 has appointed a Liaison Officer on NGN from Study Group 13 to the IETF. This will not replace but will augment the contacts and liaison activities in specific work areas.

Annex G

ITU-T NGN Industry event presentations

(London, 14-17 November 2005)

G.1 – Opening speech, Mr. Houlin Zhao, Director, TSB

G.2 – Report from the ITU-T Focus Group on Next Generation Networks (FGNGN) – Mr. Chae-Sub Lee, FGNGN Chairman

G.3 – Keynote Speech 1 – The Use of NGN Standards in BT's 21st Century Network – Mr. Mick Reeve, Group Technology Officer, BT

Session I: NGN Technical Overview

G.4 – Keynote Speech 2 – Solutions for NGN: Standards Simplify Interoperability – Dr. Ulrich Schoen, President, Systems Engineering, Siemens

G.5 – Introduction to NGN Release 1 Scope and Requirements – Mr. Marco Carugi, Leader Working Group (WG1), FGNGN

G.6 – NGN Architecture – Mr. Keith Knightson, Leader WG2, FGNGN

G.7 – NGN: Network Evolution – Mr. Ghassem Koleyni Leader WG6, FGNGN

G.8 – QoS in NGN – Ms. Hui-Lan Lu, Leader WG3, FGNGN

G.9 – Security in NGN – Mr. Igor Faynberg, Leader WG5, FGNGN

G.10 – Keynote Speech 3 – Service Control in NGN – Mr. Enrico Deluchi, Head of Marketing, Europe, Cisco Systems

Session II: The Market and Business Drivers for NGN

G.11 – Keynote Speech 4 – The business drivers and features for the NG Network – Motorola, Phil Holmes, Director of Architecture and Technology, Motorola Networks EMEA

G.12 – Interconnection in a Next Generation Network World – Mr. Philip Hargrave, Chairman of the Communications Policy Committee (CPC), Intellect

G.13 – NGN: Another Industry Initiative, But What About the End-users – Mr. Chris Lewis, Enterprise Practice Leader, Ovum

G.14 – NGN, IMS and FMC: What Service Providers Want, Why They Want It – Graham Finnie, Senior Analyst, Heavy Reading

G.15 – Keynote Speech 5 – NGN Standards: The Key to Success in Convergence – Mr. Brian McFadden, Chief Research Officer, Nortel

Session III: Future NGN Standards

G.16 – Keynote Speech 6 – Applications in NGN: New Applications for Converged Networks – Mr. Thomas W. Anderson, Director, Chief Technology Office, Lucent Technologies

G.17 – NGN-Global Standards Initiative (NGN-GSI) – The Next phase of ITU's NGN Work, Mr. Brian Moore, Chairman ITU-T, Study Group 13

G.18 – Future Direction of NGN Standards – Wrap-up of Sessions I and II

G.1 – Opening speech, Mr. Houlin Zhao, Director, TSB

Mr. Chairman,

Ladies and Gentlemen,

Good morning,

I am very pleased to be here with you this morning. I see many colleagues, many friends, some I have not seen for some years, as well as many new friends, a number of journalists and visitors. I would like to express my sincere congratulations and high appreciation to the host and the ITU-T NGN management team who bring all of us here for this special celebration of the achievements of the ITU-T NGN work.

I would like to recall some history. In 1999 at an internal ITU reform meeting, a question was asked by the Chair: "Tell me what are the major problems you find in ITU today?" A senior industry representative answered: "ITU is too slow, industry cannot have technical meetings as frequently as they wish, which is the reason why 3GPP was formed." I intervened by saying that "Yes, it is true that ITU has some rules regarding the organization of its meetings. However, if this is the reason, then 3GPP should have met the expectations of industry. But why, immediately after 3GPP was formed, 3GPP2 followed? I could not agree with the reason mentioned. I believe ITU can organize technical meetings as frequently as 3GPP." I am very pleased that the work of ITU-T NGN FG has confirmed my statement 6 years ago. ITU-T created this FG in May 2004. Over the past year, this FG has made enormous efforts including its meetings every two months to achieve its goals to meet industry needs and users' needs. The success of the FG provides an excellent example of how the ITU can be very open, very dynamic, very transparent, very quick to act and react, and among many other benefits, very low-cost for the industry and other members to work on global ICT standards.

ITU has managed to create a good environment for industry members to work with the other ITU Members. I recall a statement by the industry leaders at the Martigny meeting in 2001 that "There was a consensus that after the WTSA-2000, the ITU-T procedures are now very streamlined and efficient so that any perception of slowness can no longer be attributed to the ITU-T methods." However, the good environment will become useless if industry members do not want to work with ITU. At the Martigny meeting, I made a plea to industry members to consider the ITU as their first choice to start any new work. This can include not only framework or architecture standards, but also protocols and other areas of expertise on which ITU has worked for years. I am very pleased to share with you a high secret that the ITU-T NGN FG was established at midnight of 28 to 29 April 2004 in Beijing, by a group of industry representatives. I announced this news on 7 May. The remaining story is no secret. Please do not misunderstand my story. I am not selling the idea that we could become successful through secret starts. No, it is not true. The real secret of the success of the ITU work is the support of its members. The support we have received from Member States and Sector Members is marvelous. I would also like to bring you another fact: during its recent Council meeting, the ITU Members agreed to increase their financial contributions to support ITU.

For good reasons, we decided to end the use of the name "NGN FG". However, there has been no change in our commitment to maintain our momentum and to continue the ITU work on NGN. We will represent the ITU's leading role in the global NGN study by a new name - the NGN Global Standards Initiative (NGN-GSI). Measures have been taken to continue or even to further strengthen our efforts, with the clear goal: to provide a good environment for industry experts to work within ITU. I would like to emphasize the fact that under the current rules, ITU can do many things to satisfy its Members on the development of international standards.

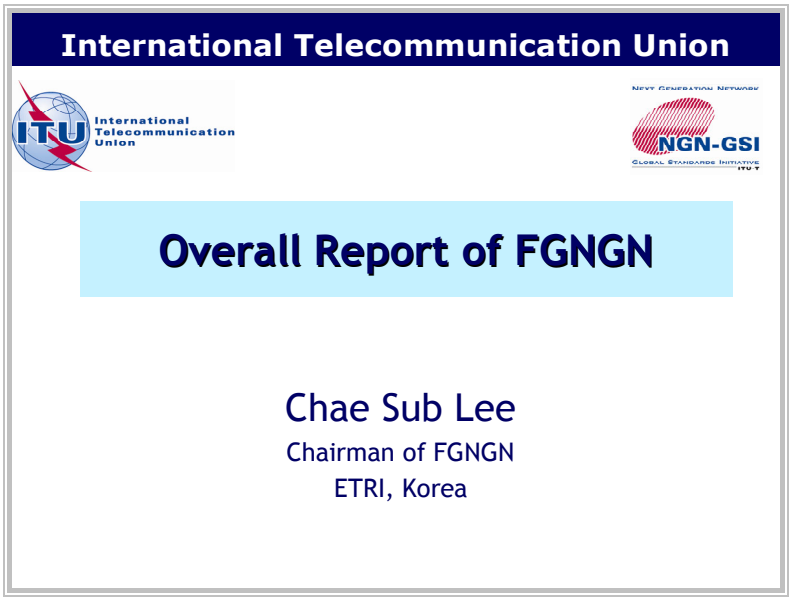
Let me show you something. I have a book which includes all NGN FG deliverables ready by 8 November. I do not give it to you, as this is not the real one I want to give you. I will have a real book by the end of 2005 or at the beginning 2006 when I will have all the latest texts agreed by this group at its final meeting, which closed yesterday, 17 November, at this hotel in London. We will be pleased to provide you with a copy of that book, in paper form, or in CD or DVD.

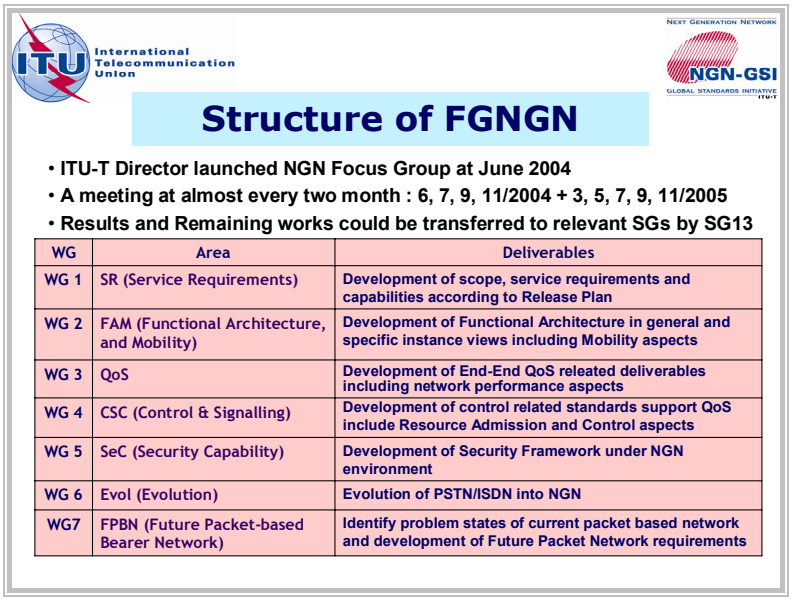
I would like to take this opportunity to express my sincere thanks to the NGN FG management team members, to the chairmen and vice chairmen of its Working Groups, to the coordinators and Editors, to the authors of contributions, and last but most importantly the ITU-T industry members and administrations who have spared no effort to support us. I would like to express my high respects and appreciations to those high-level industry leaders who join us today, despite their heavy schedule. I am looking forward to strengthening our close cooperation to work on international ICT standards which should be beneficial to both industry members as well as to ITU. I would also like to take this opportunity to express my thanks to the industry for their financial contributions to support this event.

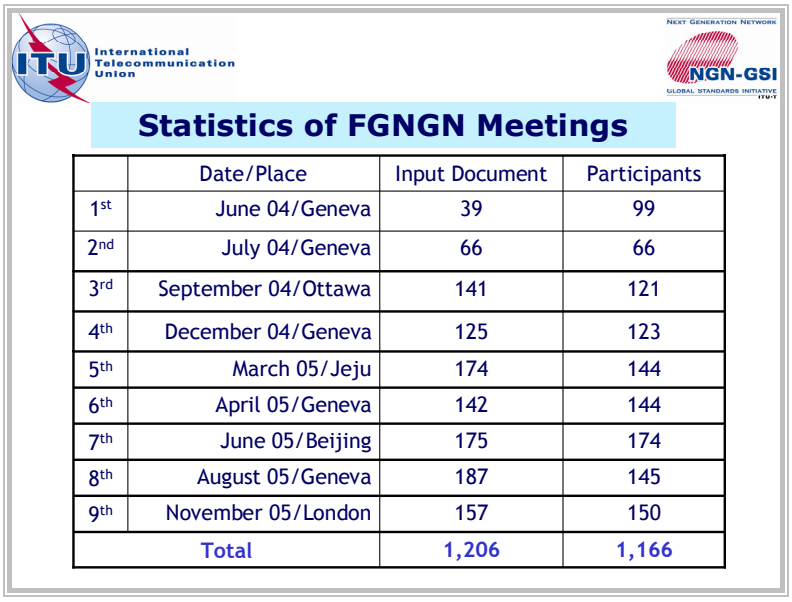
I wish you all a successful meeting.

Thank you

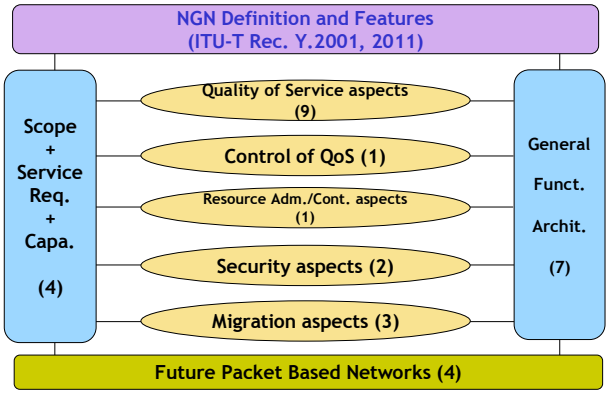
G.2 – Report from the ITU-T Focus Group on Next Generation Networks (FGNGN) – Mr. Chae-Sub Lee, FGNGN Chairman







Deliverables from FGNGN



R1 Deliverables (13) from FGNGN

WG	Title
WG 1	NGN Release 1 Scope
	NGN Release 1 Requirements
WG 2	Functional Requirements and Architecture of the NGN
	Mobility Management Capability Requirements for NGN
	IMS for Next Generation Networks
	PSTN/ISDN emulation architecture
WG 3	A QoS control architecture for Ethernet-based IP access network
	Performance measurement and management for NGN
WG 4	Signalling requirements for IP QoS
WG 5	Security Requirements for NGN Release 1
WG 6	Evolution of Networks to NGN
	PSTN/ISDN evolution to NGN
	PSTN/ISDN emulation and simulation

Other Deliverables from FGNGN

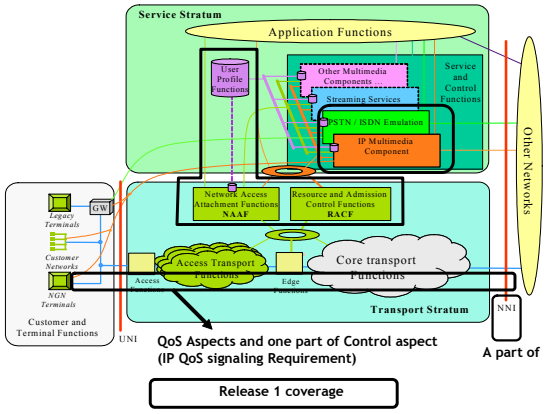
Release	WG	Title
Independent	2	Framework for Customer Manageable IP Network
	3	Network performance of non-homogeneous networks in NGN

Release	WG	Title
R2	7	Problem Statement
		FPBN Requirements
		FPBN Architecture

International Telecommunication Union

NEXT GENERATION NETWORK NGN-GSI GLOBAL STANDARDS INITIATIVE ITU-T

Key Features of NGN Release 1



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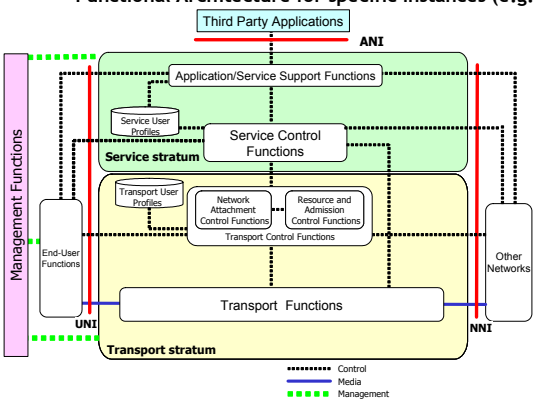
NEXT GENERATION NETWORK NGN-GSI GLOBAL STANDARDS INITIATIVE ITU-T

Overall NGN Architecture

Overall NGN Architecture { General Functional Architecture
Functional Architecture for specific instances (e.g. IMS based)



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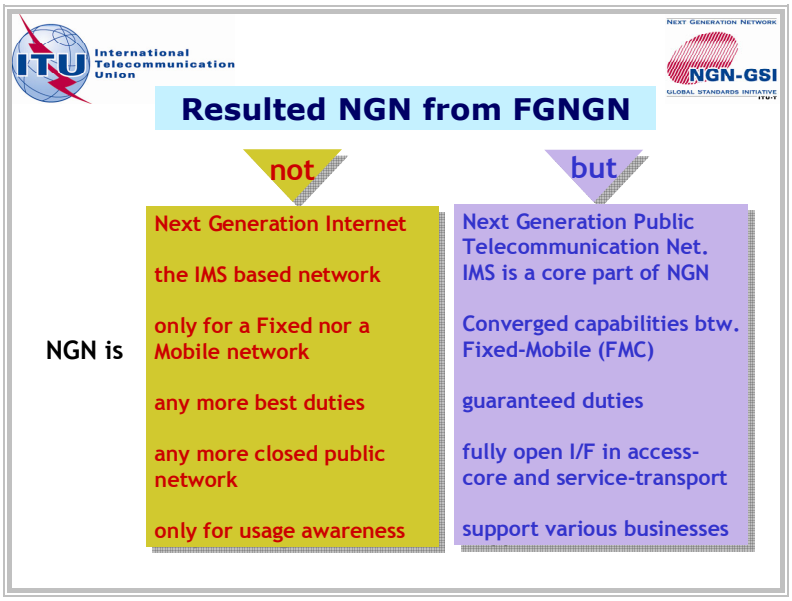
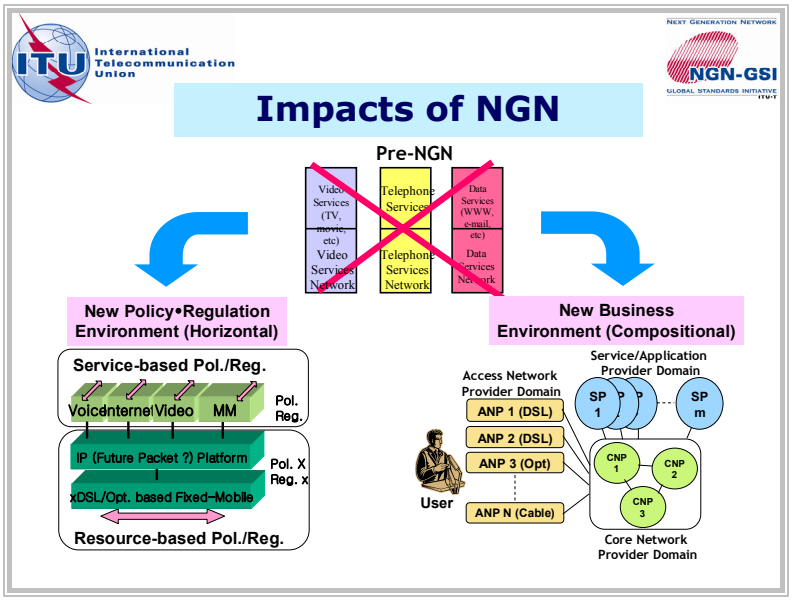
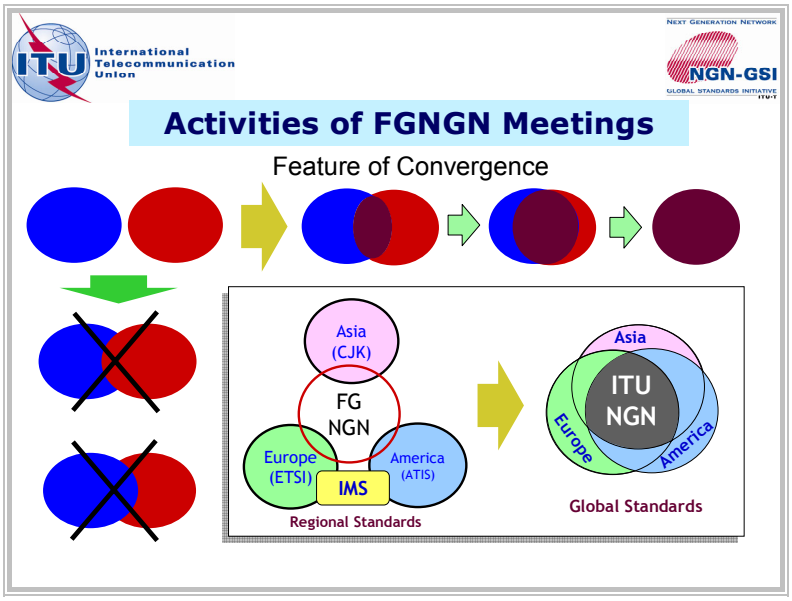
NEXT GENERATION NETWORK NGN-GSI GLOBAL STANDARDS INITIATIVE ITU-T

Key Features of NGN Release 1

- **Service Types**
  - PSTN/ISDN Emulation services
  - PSTN/ISDN Simulation services
  - Multimedia services
  - Internet access
  - Public service aspects (LI, ETS/TDR, etc.)
  - Other services (data etc.)
- **Service Capabilities**
  - Basic network capabilities
  - Service support capabilities
    - Open Service Environment
    - Service Enablers
    - PSTN/ISDN Emulation support
  - Public service support capabilities


International Telecommunication Union
NGN-GSI
Resulted NGN from FGNGN
not
but
NGN is
Next Generation Internet
the IMS based network
only for a Fixed nor a Mobile network
any more best duties
any more closed public network
only for usage awareness
Next Generation Public Telecommunication Net. IMS is a core part of NGN
Converged capabilities btw. Fixed-Mobile (FMC)
guaranteed duties
fully open I/F in access-core and service-transport
support various businesses


International Telecommunication Union
NGN-GSI
Impacts of NGN
Pre-NGN
Video Services (TV, movie, etc)
Telephone Services
Data Services (WWW, e-mail, etc)
Video Services Network
Telephone Services Network
Data Services Network
New Policy•Regulation Environment (Horizontal)
New Business Environment (Compositional)
Service-based Pol./Reg.
Voice
Internet
Video
MM
Pol. Reg.
IP (Future Packet ?) Platform
xDSL/Opt. based Fixed-Mobile
Pol. X Reg. x
Resource-based Pol./Reg.
Service/Application Provider Domain
Access Network Provider Domain
ANP 1 (DSL)
ANP 2 (DSL)
ANP 3 (Opt)
ANP N (Cable)
SP 1
SP m
CNP 1
CNP 2
CNP 3
User
Core Network Provider Domain


International Telecommunication Union
NGN-GSI
Activities of FGNGN Meetings
Feature of Convergence
Asia (CJK)
FG NGN
Europe (ETSI)
America (ATIS)
IMS
Regional Standards
Asia
ITU NGN
Europe
America
Global Standards

NGN-GSI, Future of ITU NGN

- Co-located Joint Activity : SG 11 + 13 + 19 and 2 + 12 + 16 + 17
- Coverage
  - Release 2 Services and Capabilities
  - Functional Architectures and Requirements
  - Mobility Management and FMC
  - IPv6 application into NGN
  - End-End QoS
  - NGN Signaling with Resource Admission Control
  - Migration and Interworking aspects (inc. IWF)
  - NGN Securities
  - Home Networking
  - Networked aspects of Identification services
  - Others

Appreciation

VCs: Dick Knight, Ron Ryan, Neal Seitz
TSB: Arshey Odedra, Antonella Maffi, Alexandra Gaspari




Marco Carugi
Brent Hirschman

Hui Lan Lu
Keith Mainwaring
Hyung Soo Kim

Igor Faynberg

Jiang Lintao
Keith Dickerson
David Mayer

Contributions

Keith Knightson
Thomas Towle
Naotaka Morita



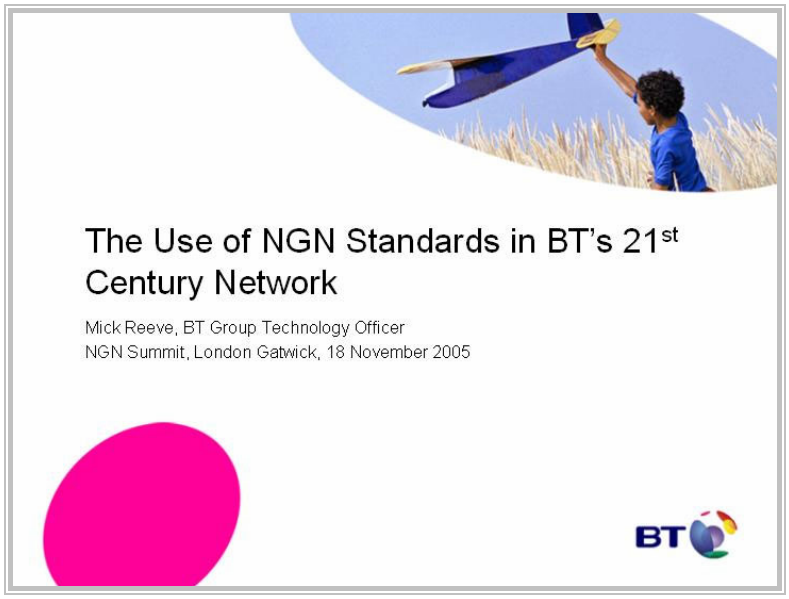
Rainer Muench
Wei Fung
Cagatay Buyukkoc

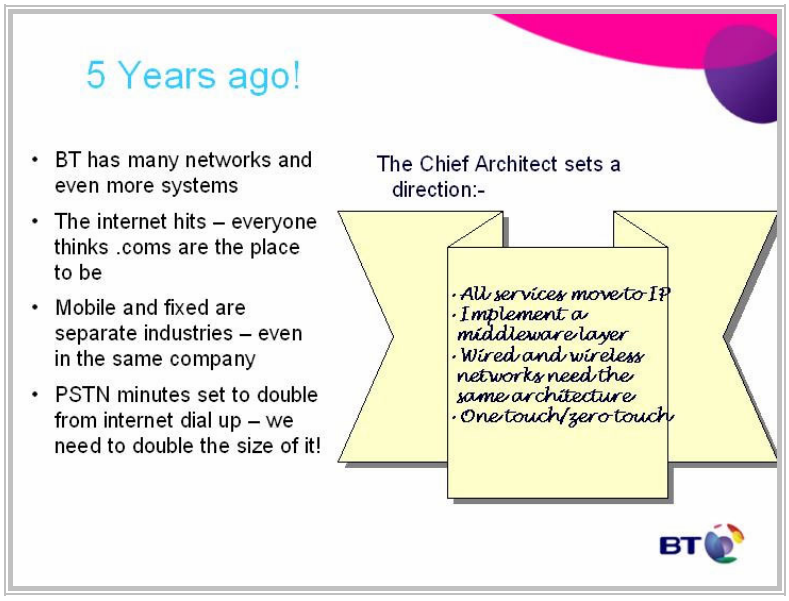
Participants

Ghassem Koleyni
Dongyang Fan


There is a lot of work behind us,
but there is still a lot ahead!

G.3 – Keynote Speech 1 – The Use of NGN Standards in BT's 21st Century Network – Mr. Mick Reeve, Group Technology Officer, BT





And There Was Light!

Progress towards NGN standards...

- ITU-T Focus Group on NGN
- ATIS Focus Group on NGN
- ETSI TISPAN working with 3GPP on intelligence and control (IMS)
- TeleManagement Forum (TMF) focusing future OSS standards on NGN
- Widespread agreement on the principles:-
  - IP services
  - IMS intelligence/fixed-mobile convergence
  - MPLS core
  - Need for multiple access technologies

High level of agreement globally

What is an NGN: The ITU/ATIS Definition

- **Packet-based transfer**
- Separation of control functions among bearer capabilities, call/session, and application/ service
- Decoupling of service provision from network, and provision of **open interfaces**
- Support for a wide range of services, applications and mechanisms based on service building blocks (including real time/ streaming/ non-real time services and multi-media)
- Broadband capabilities with **end-to-end QoS** (Quality of Service)
- Interworking with legacy networks via open interfaces
- **Generalized mobility**
- Access to different service providers, independent of any access or transport technology.
- A variety of identification schemes
- Unified service characteristics for the same service as perceived by the user
- Converged services between **Fixed/Mobile**
- Independence of service-related functions from underlying transport technologies
- Support of **multiple last mile technologies**
- Compliant with all Regulatory requirements, for example concerning emergency communications, security, privacy, and etc.

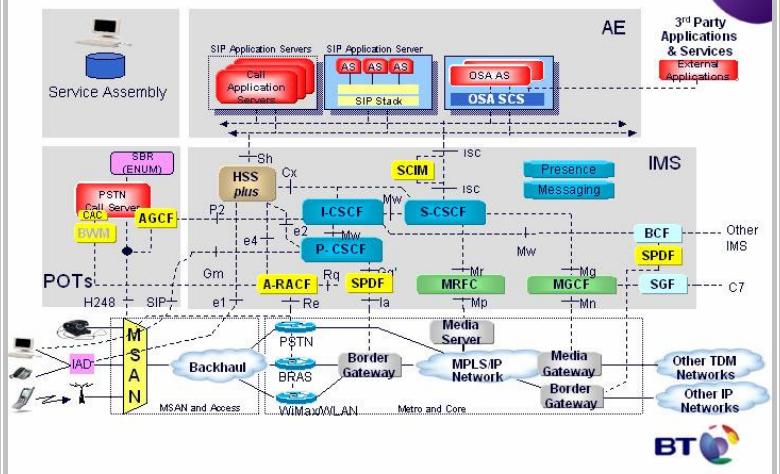
BT's 21st Century Network

- Aims to reduce cost, speed time to market for new services and give the customer more control
- Radical plan to close down legacy networks (PSTN, Private circuit, PDH, ATM FR etc)
- MPLS core over meshed optical
- Ethernet backhaul over CWDM
- 3GPP IMS intelligence
- Multi-service access nodes (MSAN) for service access.
- Provides old and new services (e.g. PSTN replacement)
- Current interconnect discussions around legacy PSTN and PSTN over IP show complexity of the new interconnect issues.

Closely aligned to the ITU and ATIS definitions

BT

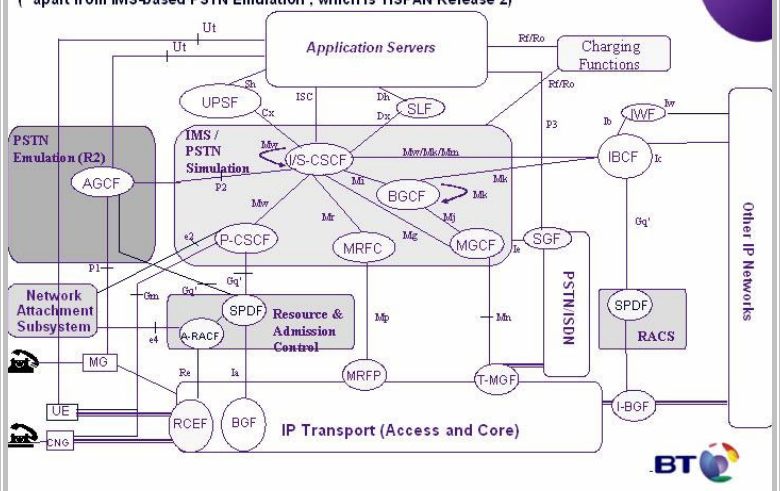
BT 21CN Architecture



BT

TISPAN NGN Architecture Release1

(* apart from IMS-based PSTN Emulation , which is TISPAN Release 2)



BT

Where next..

- Issues with the current technology (MPLS and Ethernet)
- Wireless Broadband
- Bring IPTV properly into the NGN architecture
- Deep fibre
- Need for a fundamental look at interconnect

Issues…

- Problems with MPLS
  - does not allow path to be managed end-to-end (penultimate hop popping and MP2P)
  - difficult to provide OAM
  - difficult to economically provide carrier class

FGNGN WG7 (FPBN) working on solutions

- Need much better management and control situation for Ethernet
  - Mac in Mac
  - Provider Backbone Transport
  - OAM features

Wireless Broadband...

- Beyond 3G capability – true BB to a mobile device
- Most technologists agreeing OFDMA is the technology
- Several standards routes
  - Super 3G
  - Enhanced 3G
  - WiMAX
  - Proprietary such as Flarion
- Unclear spectrum situation

IPTV...

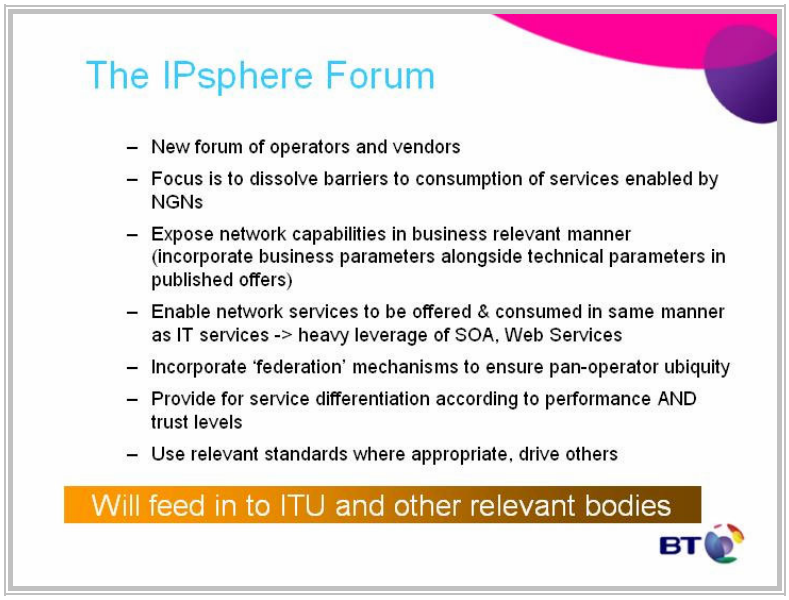
- Active in many operators
- Multiple architectures and approaches
- Formation of an IPTV group in ATIS shows promise to resolve and bring into the NGN
  - Need to include in ITU-T FGNGN

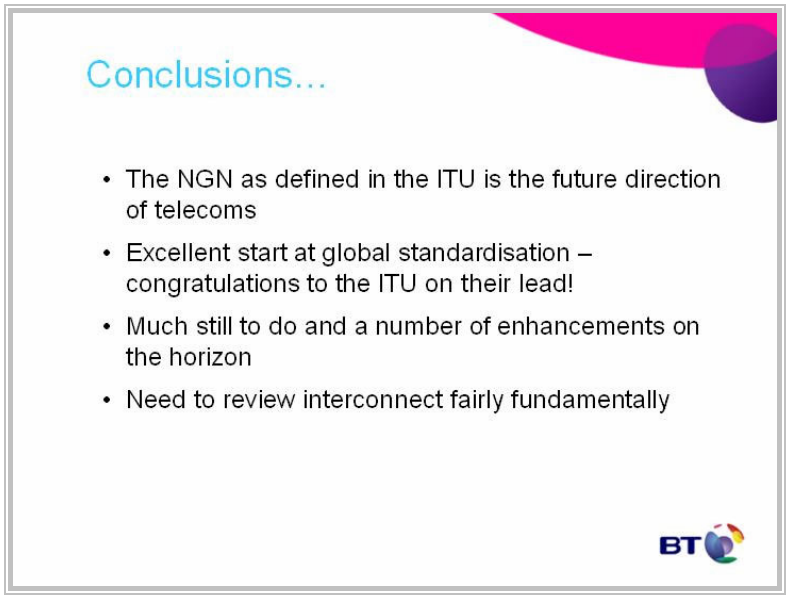
Deep fibre...

- Fibre to the cabinet/node and fibre to the premise
- Active in many parts of the world
- Essential as bandwidth demands rise
- BT trialing but a difficult economic case

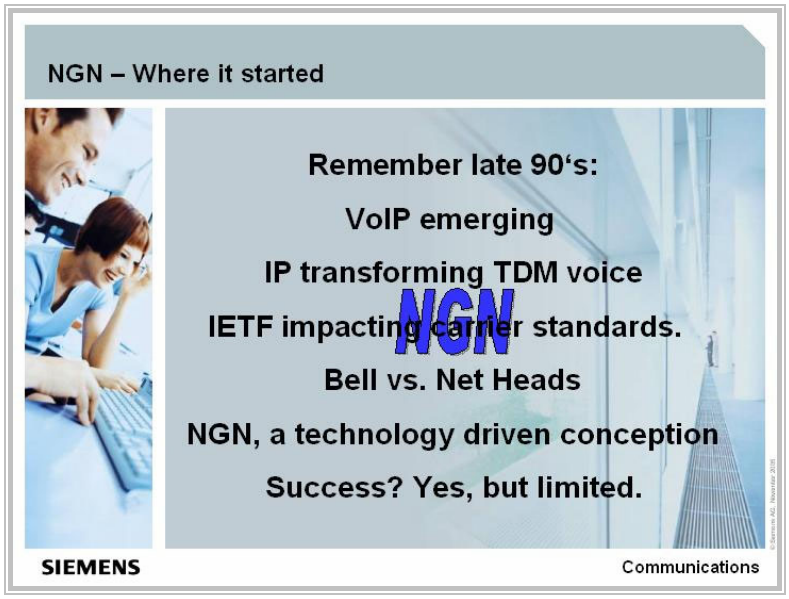
Interconnect - Current situation...

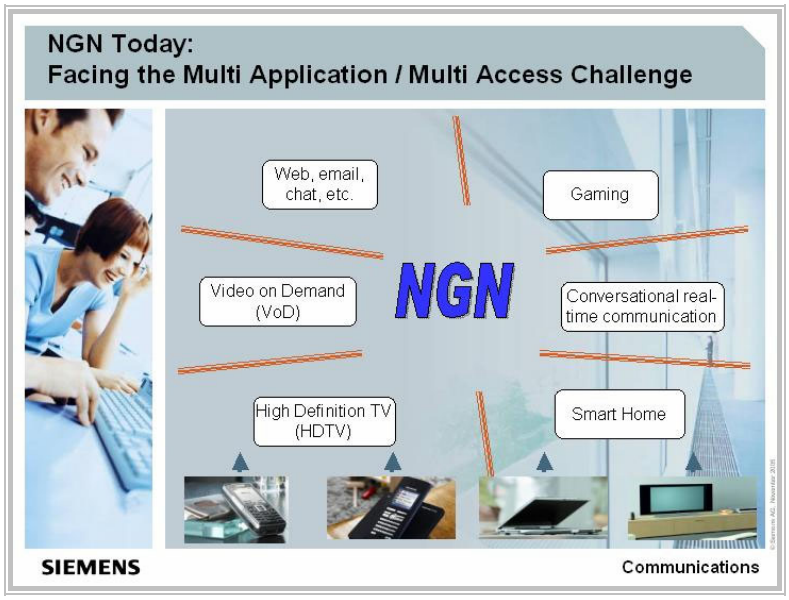
- Multiple service-specific networks
- Each interconnect thus deals with one service only
- Each service has a different interconnect model
  - Internet peering
  - Correspondent voice
  - Mobile roaming
  - Single global MPLS VPN networks
- Arbitrage or 'unfair' use abounds
  - VoIP bypass
  - Peer to peer b/w use
- Technical issues with IP interconnects
  - Inadequacy of MPLS
  - Security
  - etc
- What is the business model for future IP interconnect?

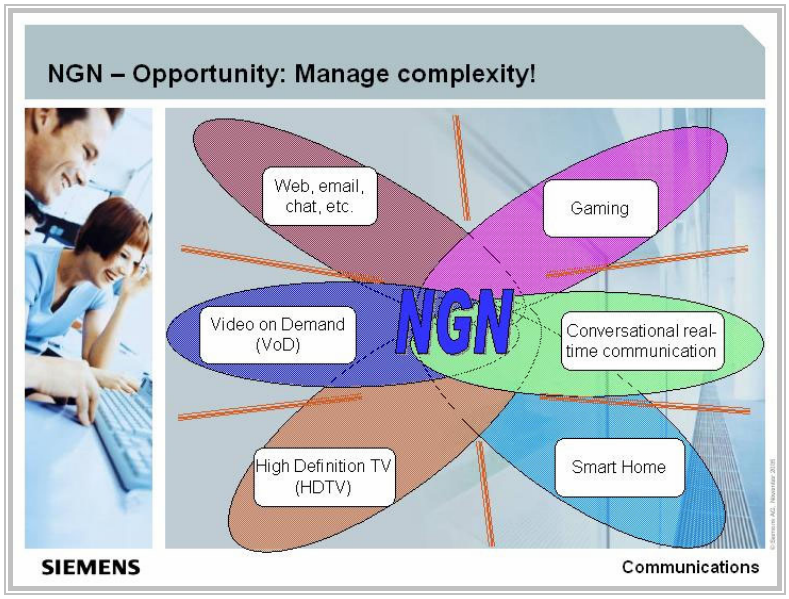

The IPsphere Forum
– New forum of operators and vendors
– Focus is to dissolve barriers to consumption of services enabled by NGNs
– Expose network capabilities in business relevant manner (incorporate business parameters alongside technical parameters in published offers)
– Enable network services to be offered & consumed in same manner as IT services -> heavy leverage of SOA, Web Services
– Incorporate 'federation' mechanisms to ensure pan-operator ubiquity
– Provide for service differentiation according to performance AND trust levels
– Use relevant standards where appropriate, drive others
Will feed in to ITU and other relevant bodies
BT

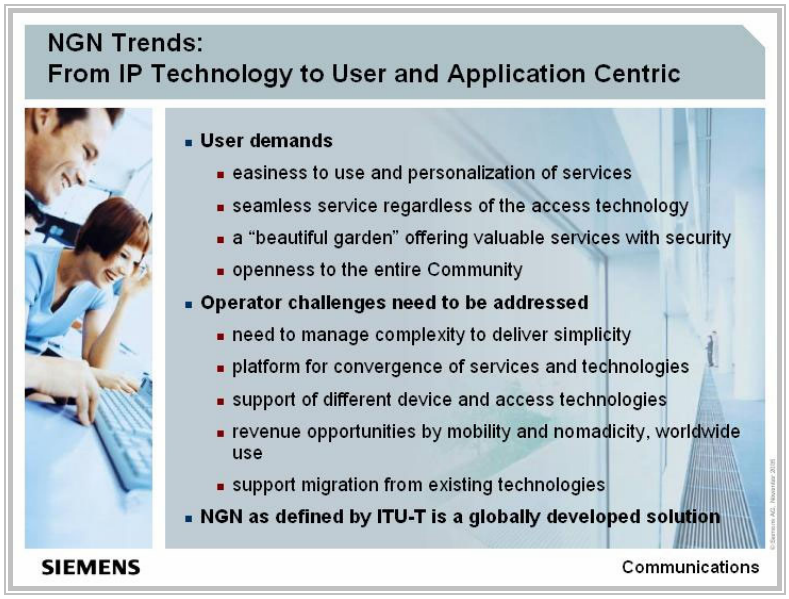

Conclusions…
• The NGN as defined in the ITU is the future direction of telecoms
• Excellent start at global standardisation – congratulations to the ITU on their lead!
• Much still to do and a number of enhancements on the horizon
• Need to review interconnect fairly fundamentally
BT

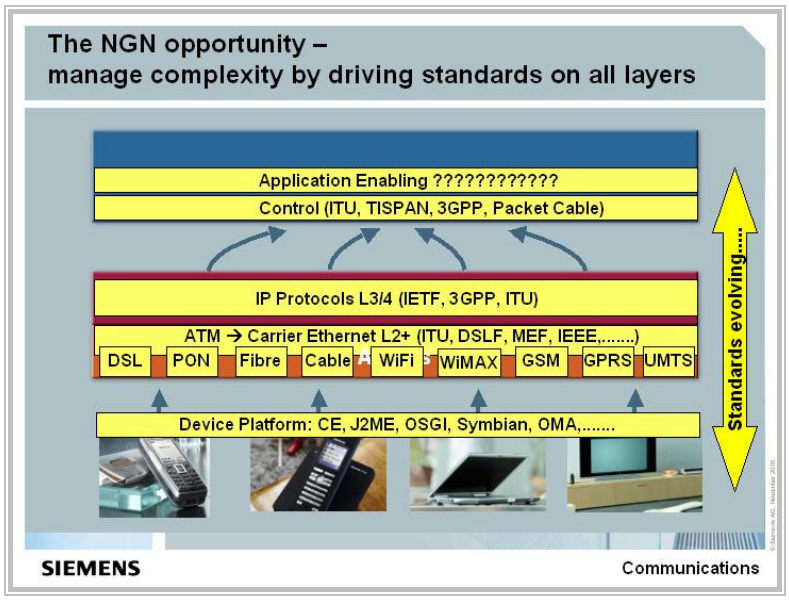
G.4 – Keynote Speech 2 – Solutions for NGN: Standards Simplify Interoperability – Dr. Ulrich Schoen, President, Systems Engineering, Siemens

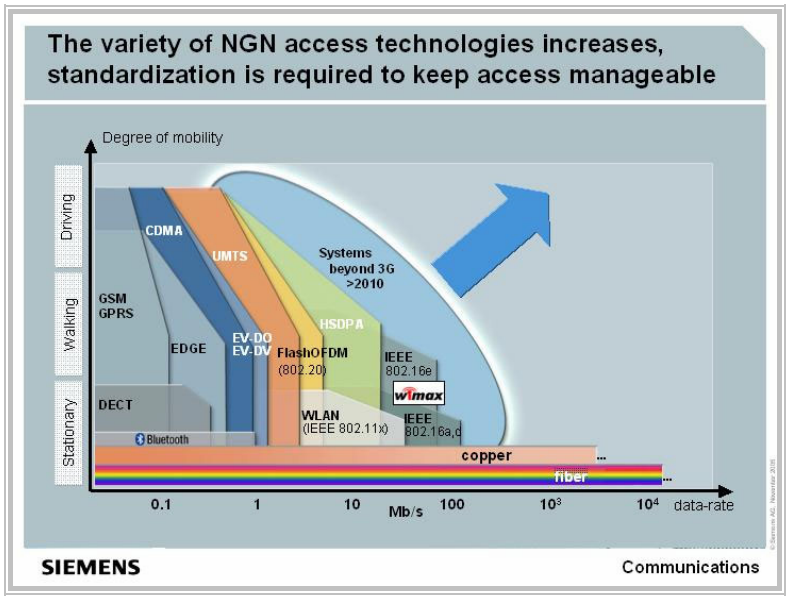


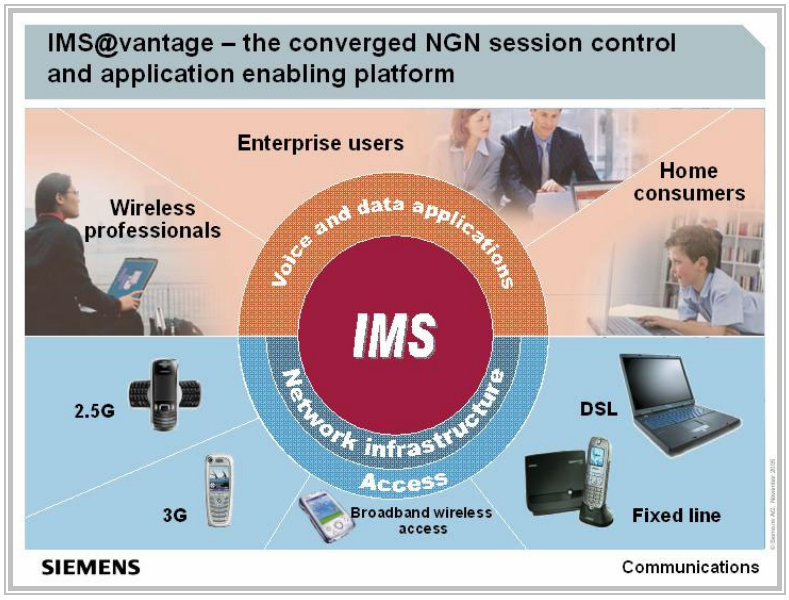


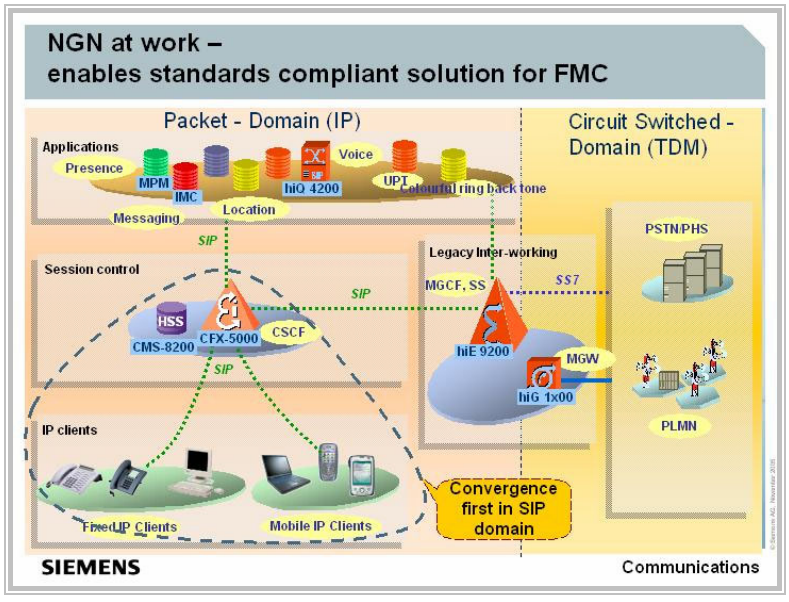

NGN – Opportunity: Manage complexity!
Web, email, chat, etc.
Gaming
Video on Demand (VoD)
NGN
Conversational real-time communication
High Definition TV (HDTV)
Smart Home
SIEMENS
Communications

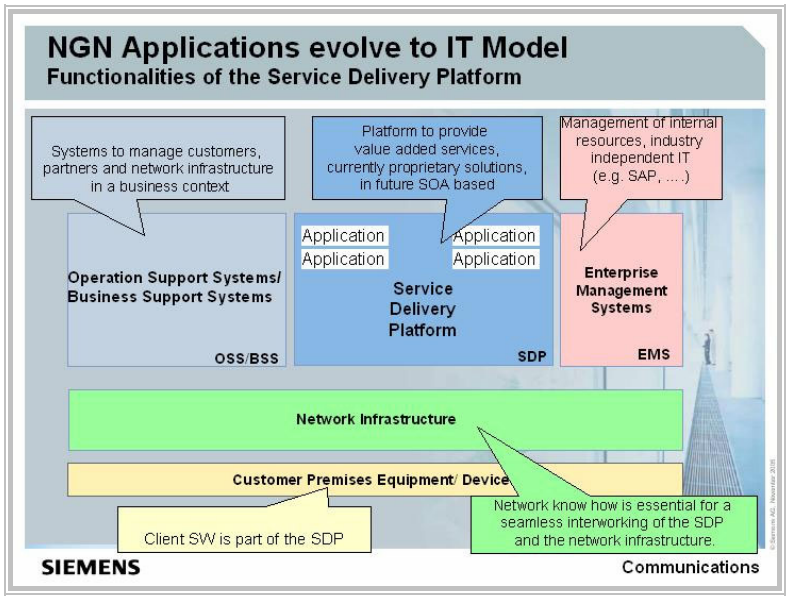

NGN Trends:
From IP Technology to User and Application Centric
User demands
easiness to use and personalization of services
seamless service regardless of the access technology
a "beautiful garden" offering valuable services with security
openness to the entire Community
Operator challenges need to be addressed
need to manage complexity to deliver simplicity
platform for convergence of services and technologies
support of different device and access technologies
revenue opportunities by mobility and nomadicity, worldwide use
support migration from existing technologies
NGN as defined by ITU-T is a globally developed solution
SIEMENS
Communications

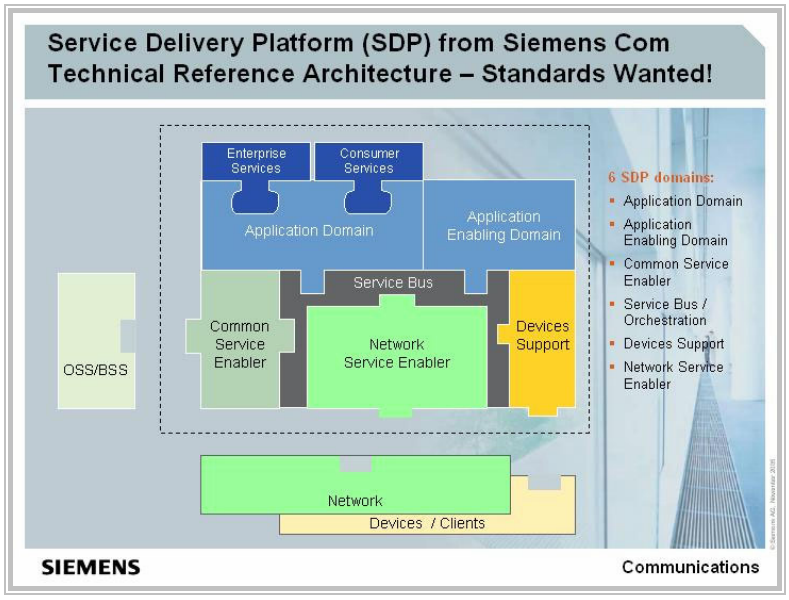

The NGN opportunity –
manage complexity by driving standards on all layers
Application Enabling ????????????
Control (ITU, TISPAN, 3GPP, Packet Cable)
IP Protocols L3/4 (IETF, 3GPP, ITU)
ATM → Carrier Ethernet L2+ (ITU, DSLF, MEF, IEEE,.....)
DSL
PON
Fibre
Cable
WiFi
WiMAX
GSM
GPRS
UMTS
Device Platform: CE, J2ME, OSGI, Symbian, OMA,.....
Standards evolving.....
SIEMENS
Communications

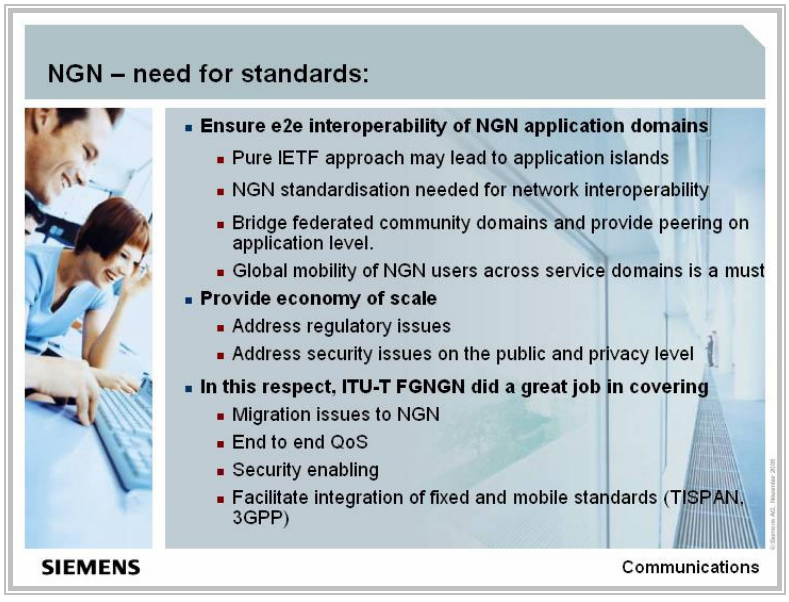

The variety of NGN access technologies increases, standardization is required to keep access manageable
Degree of mobility
Driving
Walking
Stationary
CDMA
UMTS
Systems beyond 3G >2010
GSM GPRS
HSDPA
EDGE
EV-DO EV-DV
FlashOFDM (802.20)
IEEE 802.16e
wimax
DECT
WLAN (IEEE 802.11x)
IEEE 802.16a,d
Bluetooth
copper
fiber
0.1
1
10
Mb/s
100
10³
10⁴
data-rate
SIEMENS
Communications

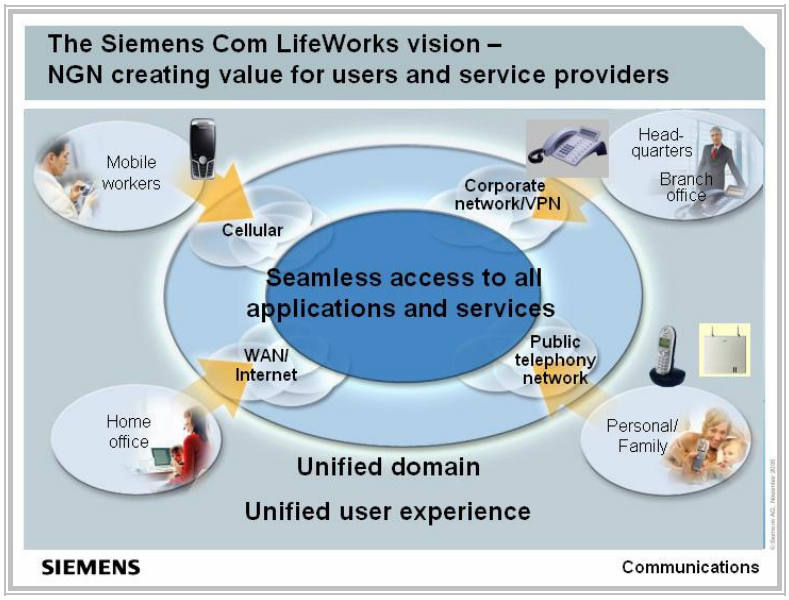

IMS@vantage – the converged NGN session control and application enabling platform
Enterprise users
Wireless professionals
Home consumers
Voice and data applications
IMS
Network infrastructure
Access
2.5G
3G
DSL
Fixed line
Broadband wireless access
SIEMENS
Communications


NGN at work – enables standards compliant solution for FMC
Packet - Domain (IP)
Circuit Switched - Domain (TDM)
Applications
Presence
MPM
IMC
Voice
hiQ 4200
UPT
Colourful ring back tone
Messaging
Location
SIP
Session control
HSS
CMS-8200
CFX-5000
CSCF
SIP
Legacy Inter-working
MGCF, SS
SS7
hiE 9200
MGW
hiG 1x00
PSTN/PHS
PLMN
IP clients
Fixed IP Clients
Mobile IP Clients
Convergence first in SIP domain
SIEMENS
Communications

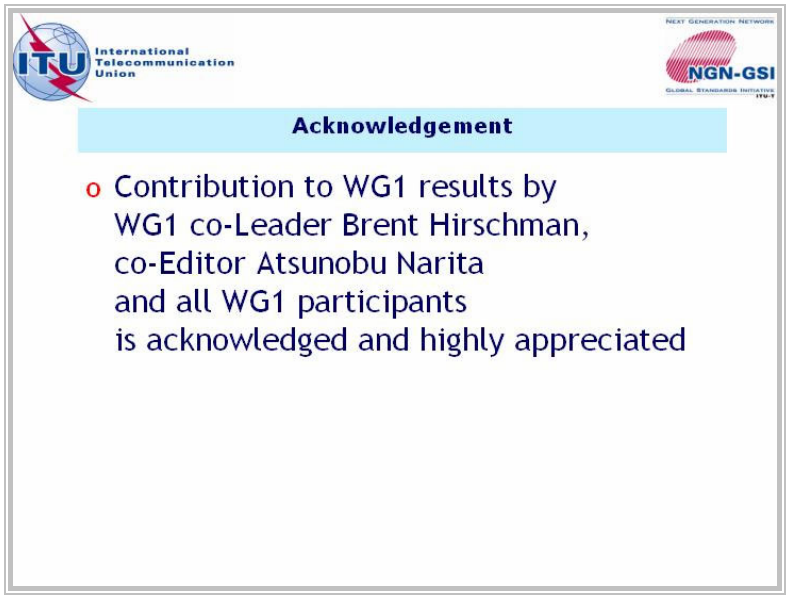

NGN Applications evolve to IT Model
Functionalities of the Service Delivery Platform
Systems to manage customers, partners and network infrastructure in a business context
Platform to provide value added services, currently proprietary solutions, in future SOA based
Management of internal resources, industry independent IT (e.g. SAP, ...)
Application
Application
Application
Application
Operation Support Systems/ Business Support Systems
OSS/BSS
Service Delivery Platform
SDP
Enterprise Management Systems
EMS
Network Infrastructure
Customer Premises Equipment/ Device
Client SW is part of the SDP
Network know how is essential for a seamless interworking of the SDP and the network infrastructure.
SIEMENS
Communications

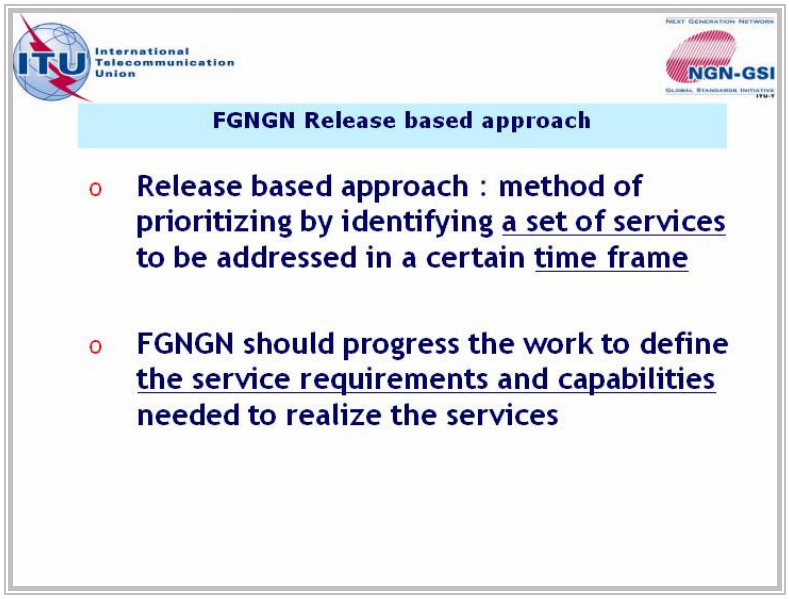

Service Delivery Platform (SDP) from Siemens Com
Technical Reference Architecture – Standards Wanted!
Enterprise Services
Consumer Services
Application Domain
Application Enabling Domain
Service Bus
Common Service Enabler
Network Service Enabler
Devices Support
OSS/BSS
Network
Devices / Clients
6 SDP domains:
Application Domain
Application Enabling Domain
Common Service Enabler
Service Bus / Orchestration
Devices Support
Network Service Enabler
SIEMENS
Communications


NGN – need for standards:
Ensure e2e interoperability of NGN application domains
Pure IETF approach may lead to application islands
NGN standardisation needed for network interoperability
Bridge federated community domains and provide peering on application level.
Global mobility of NGN users across service domains is a must
Provide economy of scale
Address regulatory issues
Address security issues on the public and privacy level
In this respect, ITU-T FGNGN did a great job in covering
Migration issues to NGN
End to end QoS
Security enabling
Facilitate integration of fixed and mobile standards (TISPAN, 3GPP)
SIEMENS
Communications


The Siemens Com LifeWorks vision –
NGN creating value for users and service providers
Mobile workers
Cellular
Corporate network/VPN
Head-quarters
Branch office
Seamless access to all applications and services
WAN/ Internet
Public telephony network
Home office
Personal/ Family
Unified domain
Unified user experience
SIEMENS
Communications

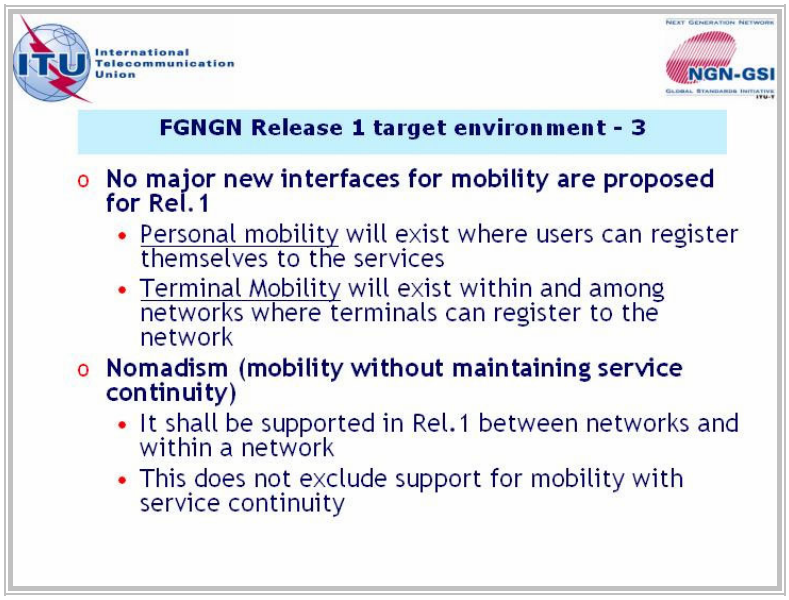
G.5 – Introduction to NGN Release 1 Scope and Requirements – Mr. Marco Carugi, Leader Working Group (WG1), FGNGN



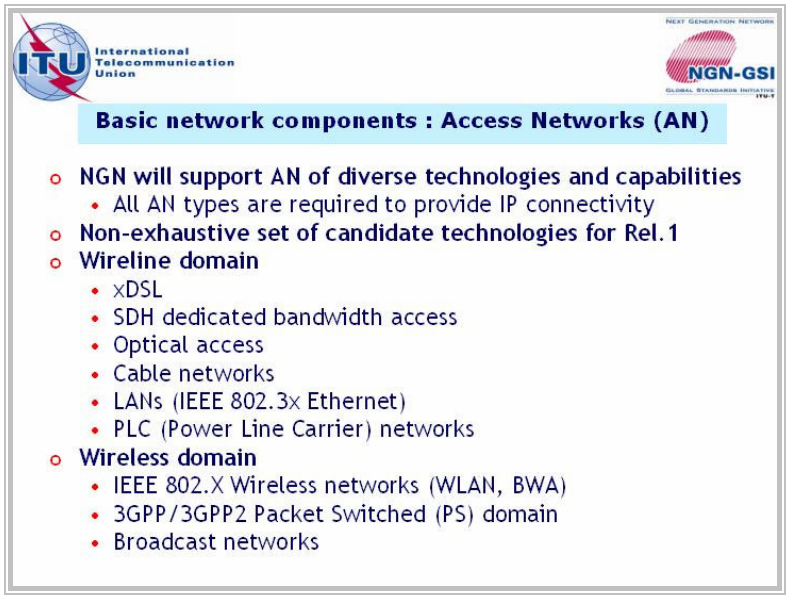

International Telecommunication Union
NGN-GSI
FGNGN Release based approach
Release based approach : method of prioritizing by identifying a set of services to be addressed in a certain time frame
FGNGN should progress the work to define the service requirements and capabilities needed to realize the services

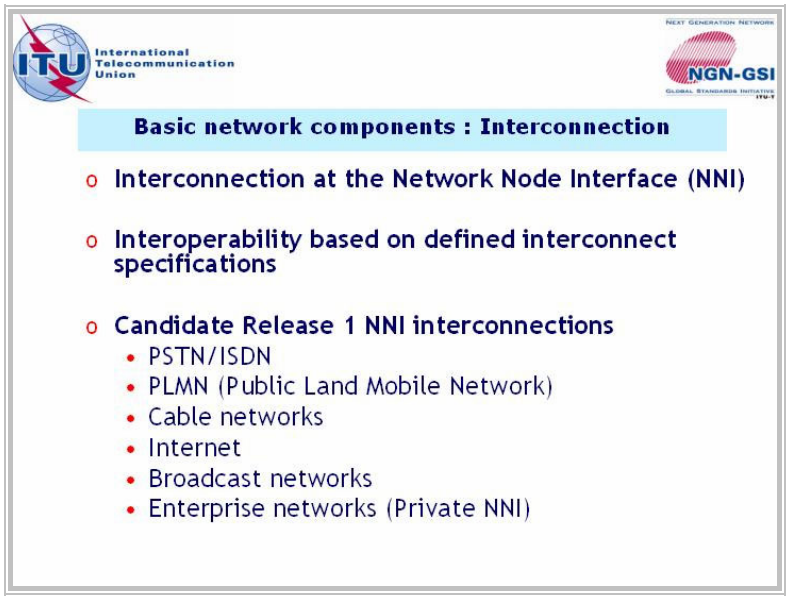

International Telecommunication Union
NGN-GSI
FGNGN Release 1 target environment - 1
Advanced architecture objectives
Comprehensive set of services over an unifying IP layer network
Services separable from the transport stratum into a service stratum
QoS objectives
End-to-end QoS environment for services via QoS coordination across the transport stratum
Focus on Resource and Admission Control

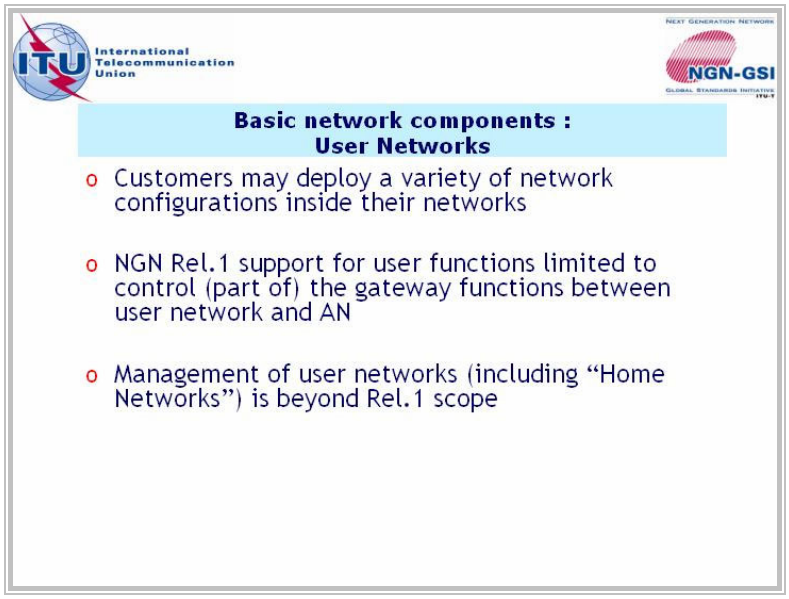

International Telecommunication Union
NGN-GSI
FGNGN Release 1 target environment - 2
Security objectives
NGN Release 1 Security Requirements specification based on ITU-T X.805 application to NGN
Addressing the various security dimensions
Management objectives
Monitoring and control of NGN services and service/transport components via communication of management information across interfaces
Release 1: ITU-T NGN Management Focus Group is working towards definition of realistic objectives and corresponding solutions

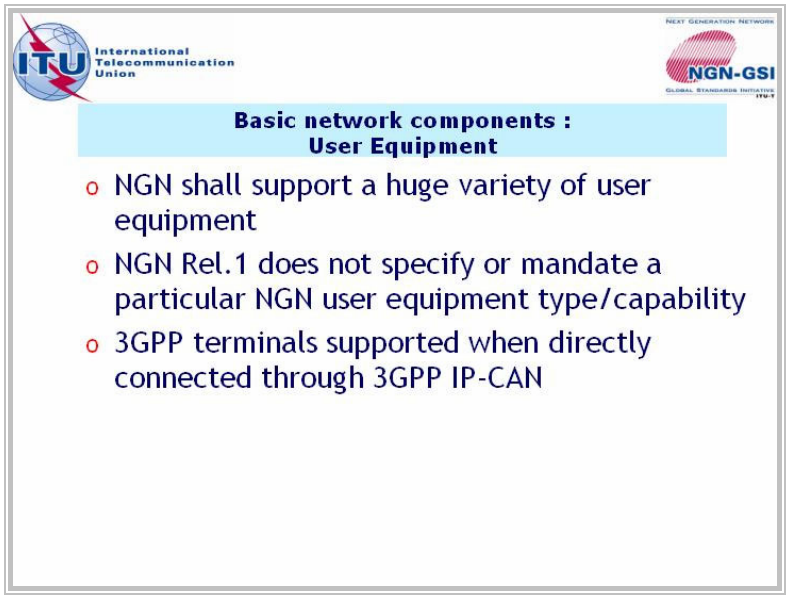

International Telecommunication Union
NGN-GSI
FGNGN Release 1 target environment - 3
No major new interfaces for mobility are proposed for Rel.1
Personal mobility will exist where users can register themselves to the services
Terminal Mobility will exist within and among networks where terminals can register to the network
Nomadism (mobility without maintaining service continuity)
It shall be supported in Rel.1 between networks and within a network
This does not exclude support for mobility with service continuity

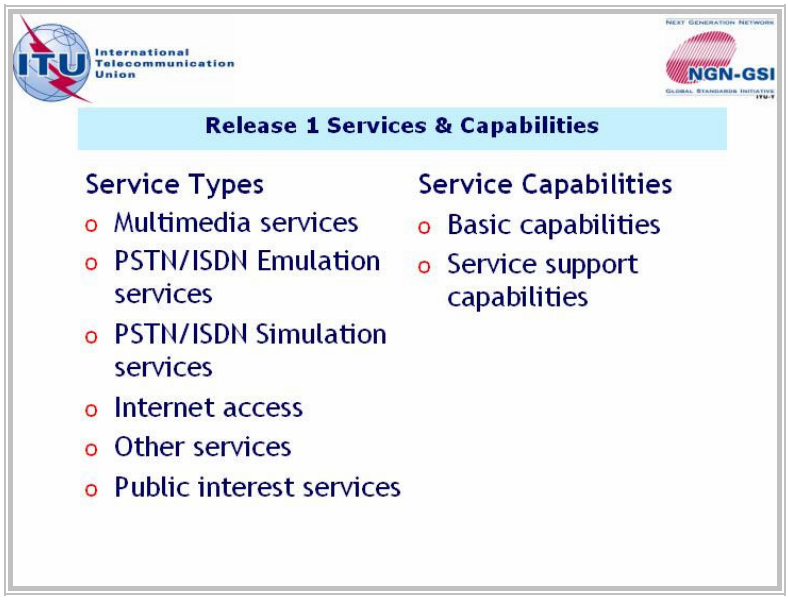

International Telecommunication Union
NGN-GSI
FGNGN Release 1 target environment - 4
Open environment for service creation and provisioning
Flexible service framework for implementation of value added services using network capabilities
Capabilities are accessed via standard application interfaces
Third Party application access via Application Network Interface
Release 1 should support the following classes of value added service environments:
IN-based service environment (INAP, CAMEL, WIN, ...)
IMS-based service environment
Open service environment (OSA/Parlay, Parlay X, OMA, ...)


International Telecommunication Union
NGN-GSI
Basic network components : Access Networks (AN)
NGN will support AN of diverse technologies and capabilities
All AN types are required to provide IP connectivity
Non-exhaustive set of candidate technologies for Rel.1
Wireline domain
xDSL
SDH dedicated bandwidth access
Optical access
Cable networks
LANs (IEEE 802.3x Ethernet)
PLC (Power Line Carrier) networks
Wireless domain
IEEE 802.X Wireless networks (WLAN, BWA)
3GPP/3GPP2 Packet Switched (PS) domain
Broadcast networks

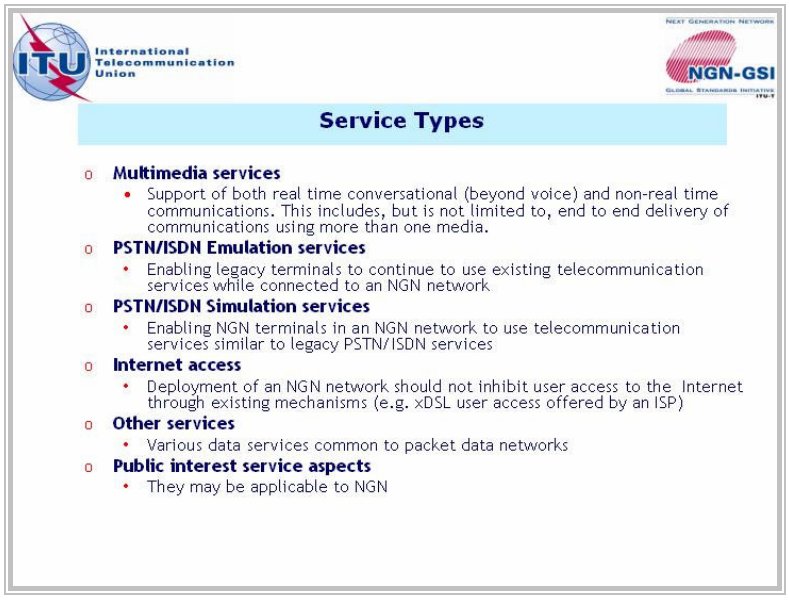

International Telecommunication Union
NGN-GSI
Basic network components : Interconnection
o Interconnection at the Network Node Interface (NNI)
o Interoperability based on defined interconnect specifications
o Candidate Release 1 NNI interconnections
• PSTN/ISDN
• PLMN (Public Land Mobile Network)
• Cable networks
• Internet
• Broadcast networks
• Enterprise networks (Private NNI)


International Telecommunication Union
NGN-GSI
Basic network components :
User Networks
o Customers may deploy a variety of network configurations inside their networks
o NGN Rel.1 support for user functions limited to control (part of) the gateway functions between user network and AN
o Management of user networks (including "Home Networks") is beyond Rel.1 scope


International Telecommunication Union
NGN-GSI
Basic network components :
User Equipment
o NGN shall support a huge variety of user equipment
o NGN Rel.1 does not specify or mandate a particular NGN user equipment type/capability
o 3GPP terminals supported when directly connected through 3GPP IP-CAN

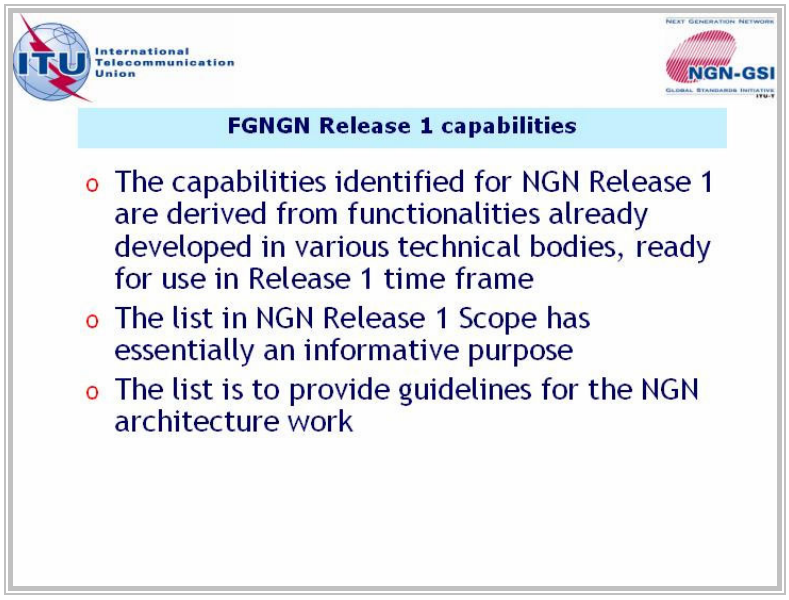

International Telecommunication Union
NGN-GSI
Release 1 Services & Capabilities
Service Types
Multimedia services
PSTN/ISDN Emulation services
PSTN/ISDN Simulation services
Internet access
Other services
Public interest services
Service Capabilities
Basic capabilities
Service support capabilities


International Telecommunication Union
NGN-GSI
Compliance to NGN Release 1 and actual realisations
Compliance to NGN Rel.1 of a given network environment does not mean support of all possible combinations of services in NGN Rel.1 Scope
Specific realisations of NGN Rel.1 may extend beyond the services and capabilities described in NGN Rel.1 Scope

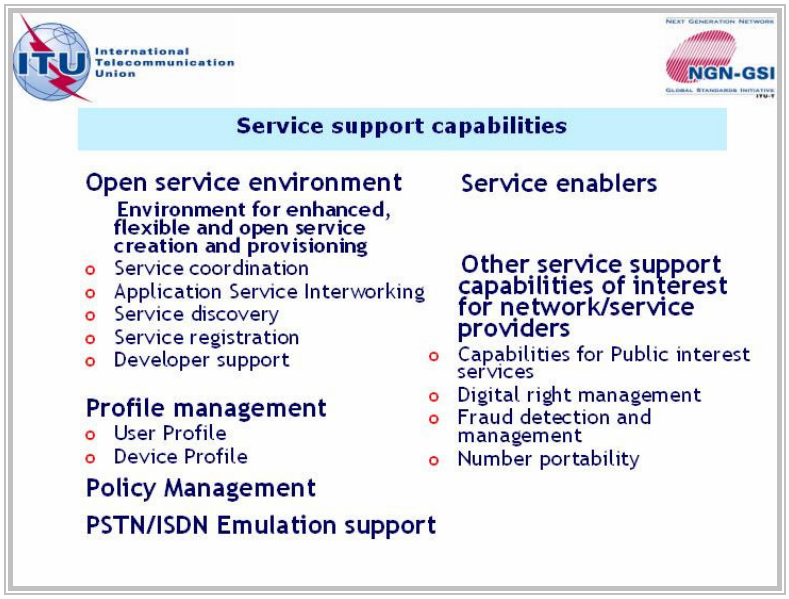

International Telecommunication Union
NGN-GSI
Service Types
Multimedia services
Support of both real time conversational (beyond voice) and non-real time communications. This includes, but is not limited to, end to end delivery of communications using more than one media.
PSTN/ISDN Emulation services
Enabling legacy terminals to continue to use existing telecommunication services while connected to an NGN network
PSTN/ISDN Simulation services
Enabling NGN terminals in an NGN network to use telecommunication services similar to legacy PSTN/ISDN services
Internet access
Deployment of an NGN network should not inhibit user access to the Internet through existing mechanisms (e.g. xDSL user access offered by an ISP)
Other services
Various data services common to packet data networks
Public interest service aspects
They may be applicable to NGN


International Telecommunication Union
NGN-GSI
Public interest service aspects
When required by regulation or law, these services are provided in compliance with national/regional administrations and international treaties
o Lawful Interception
o Emergency services
o Users with disabilities
o Network/Service Provider selection
o Consumer Assistance Protection and Privacy


International Telecommunication Union
NGN-GSI
Service shift in NGN
o Key expectation in NGN : flexible service creation and innovation
o Focus is on "service capabilities" as service enabling toolkit
• Flexible service design, creation and development
• Promotion of innovative, evolving services
• Third-party development and support


International Telecommunication Union
NGN-GSI
FGNGN Release 1 capabilities
o The capabilities identified for NGN Release 1 are derived from functionalities already developed in various technical bodies, ready for use in Release 1 time frame
o The list in NGN Release 1 Scope has essentially an informative purpose
o The list is to provide guidelines for the NGN architecture work


International Telecommunication Union
NGN-GSI
The adopted classification of Capabilities
Basic capabilities
Underlying capabilities and/or capabilities of general usage by services/applications
Service support capabilities
Capabilities generally accessed and/or used directly by services/applications
Generally combined with other capabilities or services for enhanced functionality


International Telecommunication Union
NGN-GSI
Service support capabilities
Open service environment
Environment for enhanced, flexible and open service creation and provisioning
Service coordination
Application Service Interworking
Service discovery
Service registration
Developer support
Profile management
User Profile
Device Profile
Policy Management
PSTN/ISDN Emulation support
Service enablers
Other service support capabilities of interest for network/service providers
Capabilities for Public interest services
Digital right management
Fraud detection and management
Number portability


International Telecommunication Union
NGN-GSI
Service enablers
To support more specific or advanced services
To enable access and/or handling of more specific information provided by these capabilities
Group management
Personal information support/management
Message handling
Broadcast/Multicast support
Presence
Location management
Push-based support
Device management
Session handling
Web-based application support and content processing
Data synchronization
Commerce and Charging

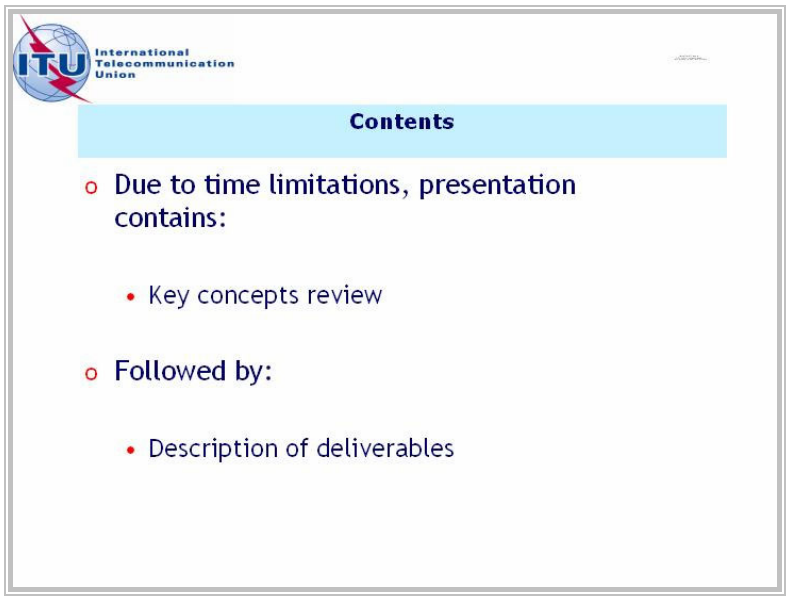
International Telecommunication Union

NGN-GSI

Services to Capabilities mapping (examples)

Services\Service Enablers	Presence	Location mgt	Group mgt	Pers. Inf. Support	Message Handling	Bcast/Mcast Support	Push-Based Support	Session Handling
Real-time Conversational Voice services								X
Messaging services	X		X		X			X
Push to talk over NGN	X		X					X
Point to Point interactive multimedia services			X					X
Collaborative interactive communication services		X	X					X
Content Delivery Services		X					X	
Push-based Services		X					X	
Broadcast/Multicast Svcs						X		
Hosted and transit services for enterprises			X					X
Information Services	X	X		X			X	
Presence, notification Svcs	X	X	X					
3GPP Rel.6/ 3GPP2 Rel. A OSA-based services	X	X	X	X	X	X	X	X
Data Retrieval	X			X			X	
Sensor Network							X	
Over the Net. Device Mgt	X			X			X	

G.6 – NGN Architecture – Mr. Keith Knightson, Leader WG2, FGNGN



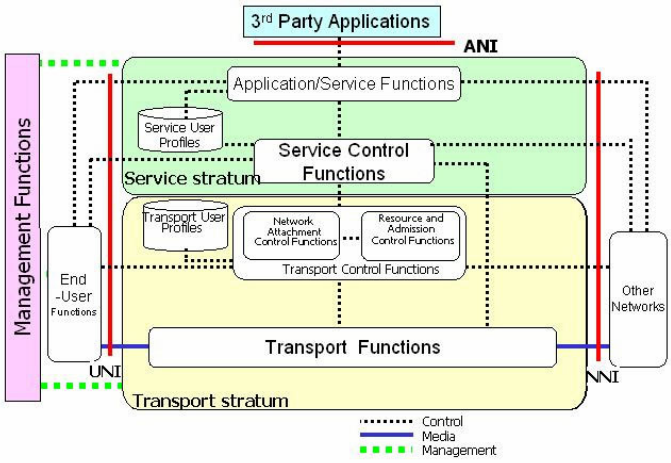
International Telecommunication Union

Key Concepts

- The deliverables are based on a few key NGN concepts:
  - Separation between service and transport
  - Personal and Terminal Mobility
  - Resource and admission control
  - QoS selection & control
  - Accommodation of legacy terminals and systems

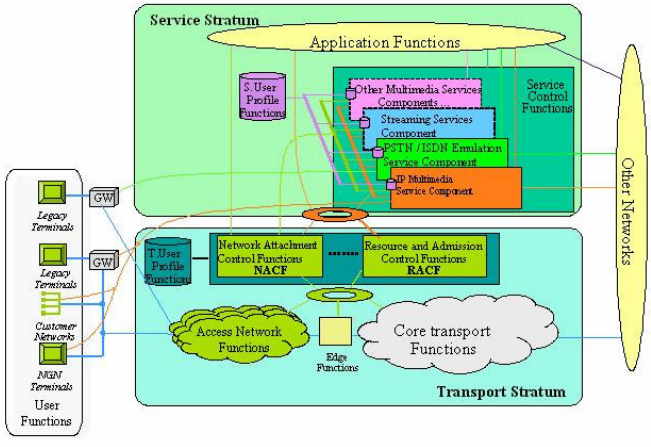
International Telecommunication Union

FRA: NGN Architecture Overview



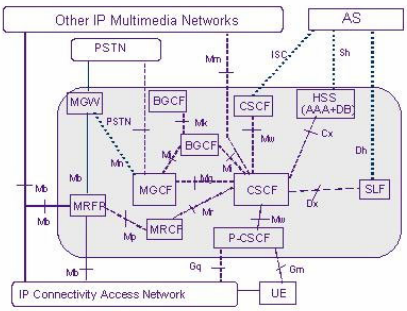
International Telecommunication Union

FRA: Component View



International Telecommunication Union

IFN: IMS for NGN



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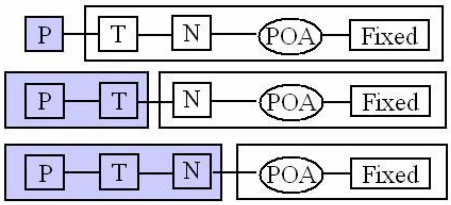
TR-MOB: Mobility Functional Requirements

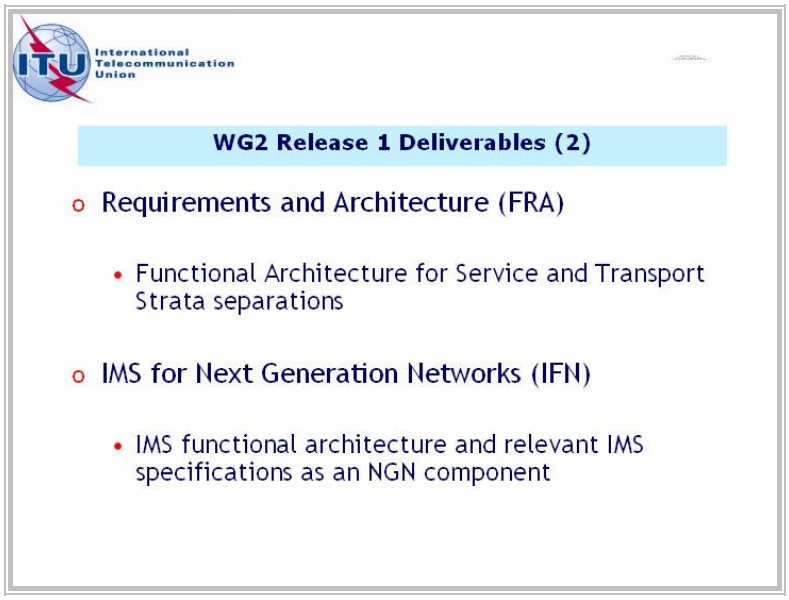
- Key NGN feature
  - Personal (P); Terminal (T);Network (N)
- Is about Binding Combinations and Scope
- Two flavors: Continuous or not (Nomadism)
- Horizontal (range)and vertical (technology stack) aspects

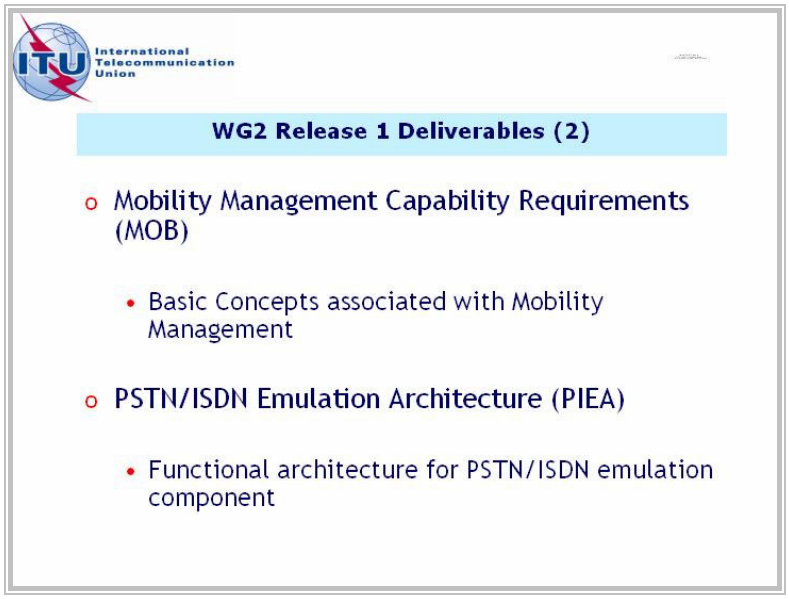


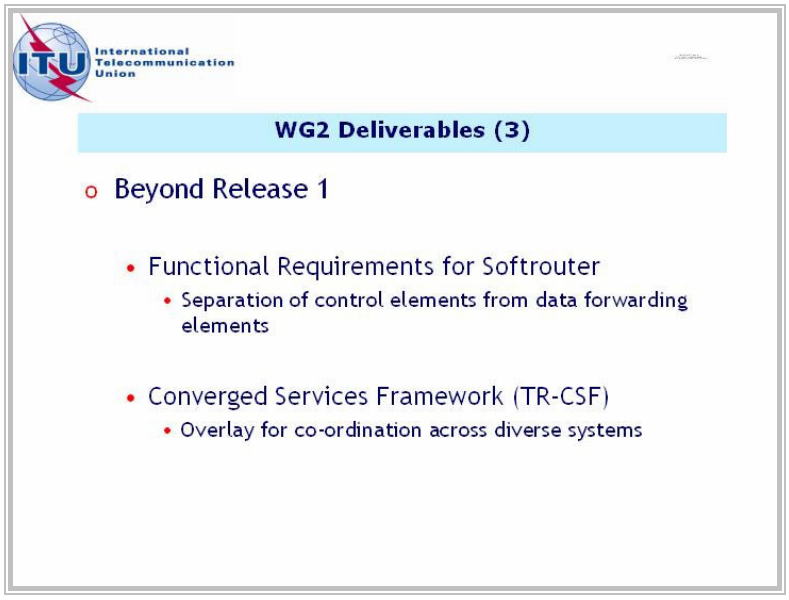
International Telecommunication Union

WG2 Release Independent Deliverables (1)

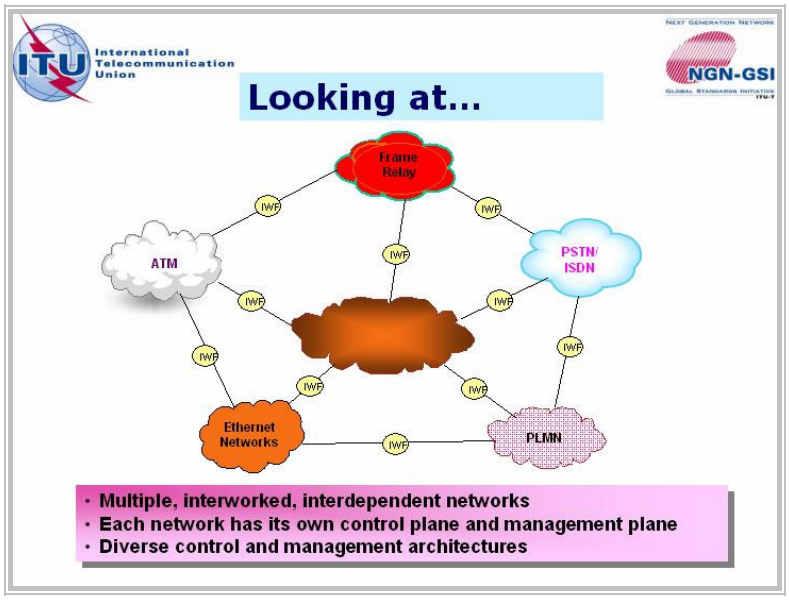
- Customer Management IP Network (CMIP)
  - A framework for customers to customize, manage and control their subscribed services and resources
    (Undergoing Approval In SG13)
- Terminological Framework (TR-TERM)
  - A common basis for concepts and associated terms and definitions


International Telecommunication Union
WG2 Release 1 Deliverables (2)
Requirements and Architecture (FRA)
Functional Architecture for Service and Transport Strata separations
IMS for Next Generation Networks (IFN)
IMS functional architecture and relevant IMS specifications as an NGN component


International Telecommunication Union
WG2 Release 1 Deliverables (2)
Mobility Management Capability Requirements (MOB)
Basic Concepts associated with Mobility Management
PSTN/ISDN Emulation Architecture (PIEA)
Functional architecture for PSTN/ISDN emulation component


International Telecommunication Union
WG2 Deliverables (3)
Beyond Release 1
Functional Requirements for Softrouter
Separation of control elements from data forwarding elements
Converged Services Framework (TR-CSF)
Overlay for co-ordination across diverse systems

G.7 – NGN: Network Evolution – Mr. Ghassem Koleyni Leader WG6, FGNGN


International Telecommunication Union
NGN-GSI
Looking at...
Frame Relay
IWF
ATM
PSTN/ ISDN
Ethernet Networks
PLMN
· Multiple, interworked, interdependent networks
· Each network has its own control plane and management plane
· Diverse control and management architectures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The end-user is looking for....
The Multimedia Experience
Security & Personalization
The Freedom of Mobility
...to enhance productivity and user experience.


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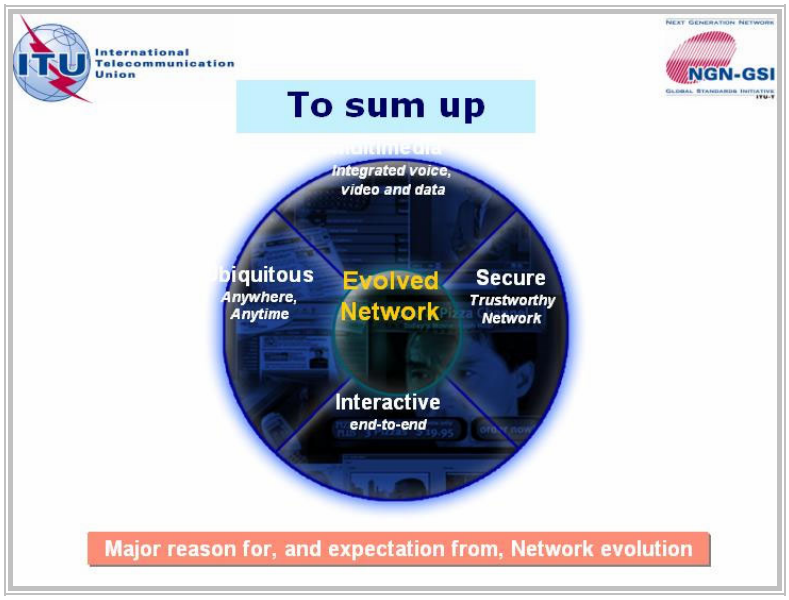
Expectations are ...
o Scalability, reliability, robustness, ...
o Security and performance
o Ubiquity
o Richness in content and application
o Common services infrastructure
o Simplified service deployment, User control
o Fixed / Mobile / Broadband
o PSTN and IP services
o Affordable
Achieving these goals for both end-user and the operator, requires .....
Globally Recognized Open Standards


International Telecommunication Union
NGN-GSI
To sum up
Integrated voice, video and data
Ubiquitous
Anywhere, Anytime
Evolved Network
Secure
Trustworthy Network
Interactive
end-to-end
Major reason for, and expectation from, Network evolution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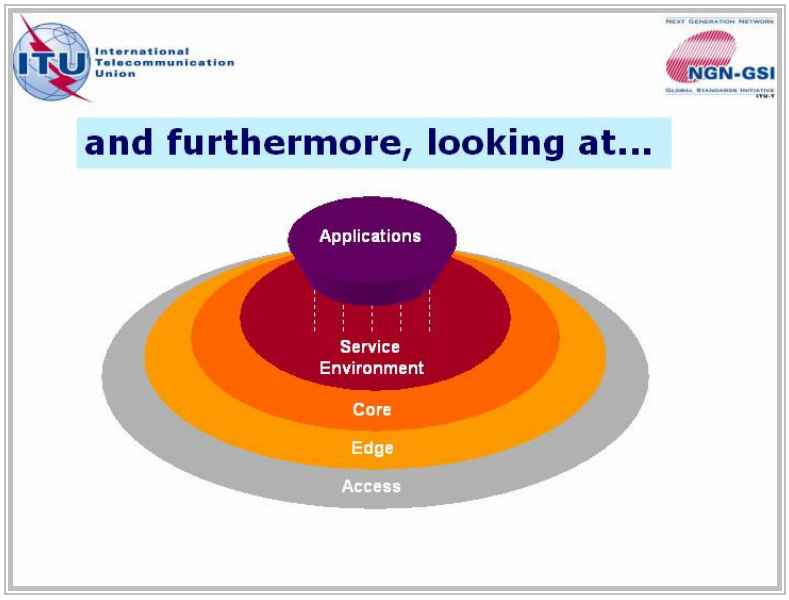
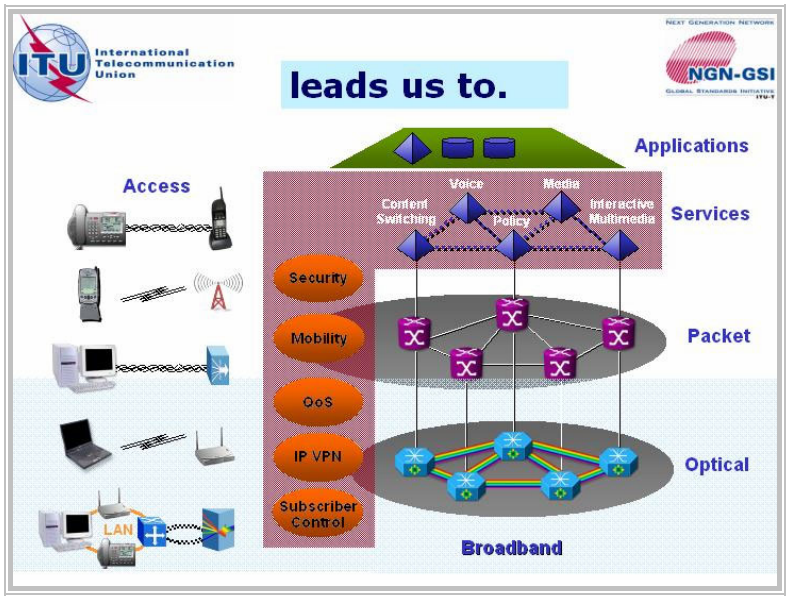
NGN-GSI
Examining and planning...
Gaming Console
PDA
Home Computer
Business Mobile
Home Office Phone
Office Phone
Office Computer
TV / PVR
Simplify
Network Profile
Existing
• Multiple networks
• Simple devices
• Disparate services
Transition
• Converged packet network
• Multimedia devices
• Linked services
Evolution
• Dynamic packet/ optical network
• Secure multimedia services
• Ubiquitous broadband
• Integrated functionality


International Telecommunication Union
NGN-GSI
and furthermore, looking at...
Applications
Service Environment
Core
Edge
Access


International Telecommunication Union
NGN-GSI
leads us to.
Applications
Access
Voice
Media
Content Switching
Policy
Interactive Multimedia
Services
Security
Mobility
QoS
IP VPN
Subscriber Control
Packet
Optical
LAN
Broadband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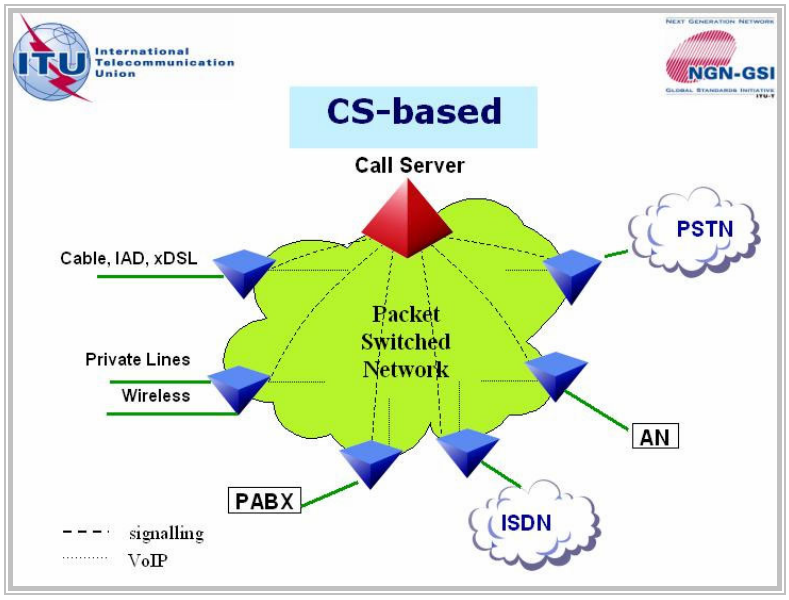
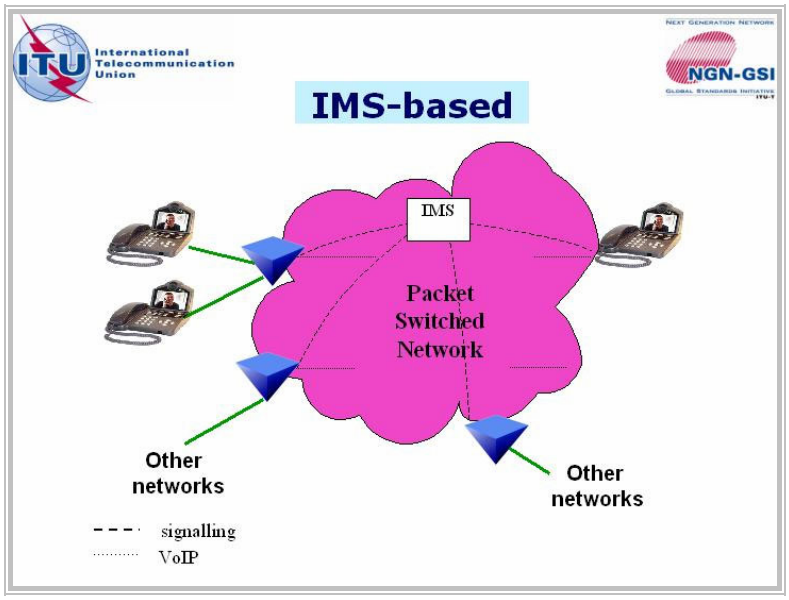
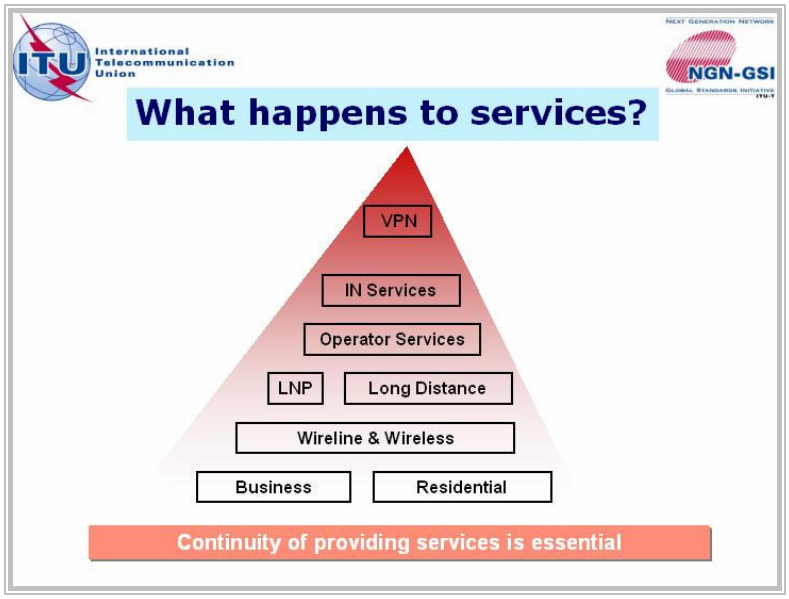
NGN-GSI
PSTN/ ISDN the first to evolve
oCall server (CS)-based
•Equipment re-use
•Service continuity
oIP multimedia sub-system (IMS)-based
•Immediate migration
•Access to new services


International Telecommunication Union
NGN-GSI
CS-based
Call Server
PSTN
Cable, IAD, xDSL
Packet Switched Network
Private Lines
Wireless
AN
PABX
ISDN
signalling
VoIP


International Telecommunication Union
NGN-GSI
IMS-based
IMS
Packet Switched Network
Other networks
Other networks
signalling
VoIP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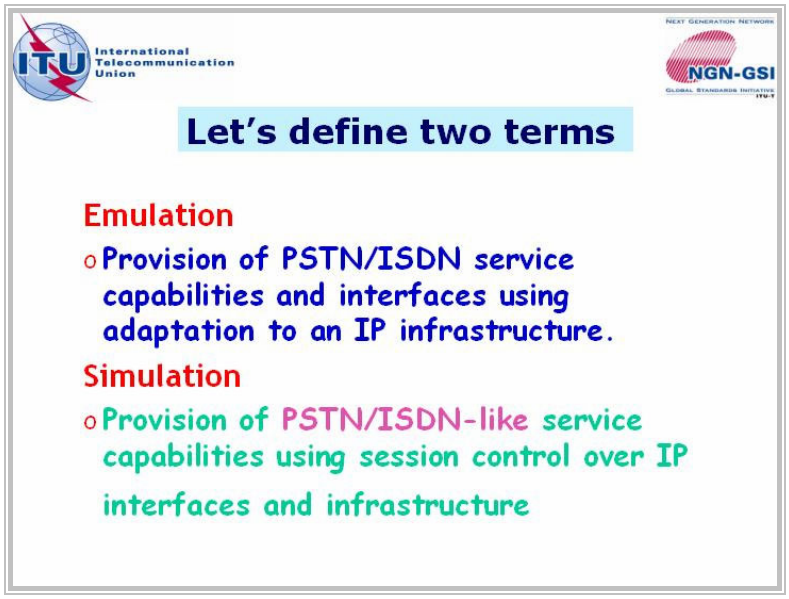
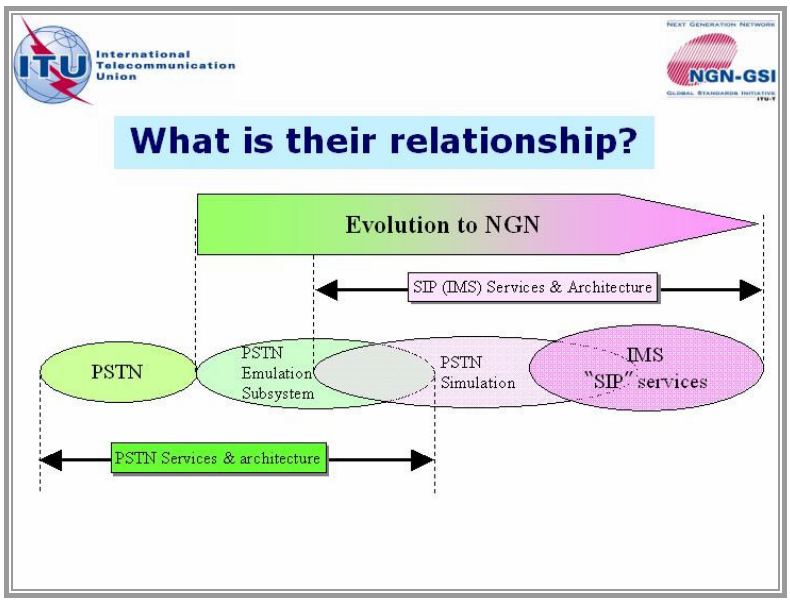
NGN-GSI
What happens to services?
VPN
IN Services
Operator Services
LNP
Long Distance
Wireline & Wireless
Business
Residential
Continuity of providing services is essential


International Telecommunication Union
NGN-GSI
Let's define two terms
Emulation
o Provision of PSTN/ISDN service capabilities and interfaces using adaptation to an IP infrastructure.
Simulation
o Provision of PSTN/ISDN-like service capabilities using session control over IP interfaces and infrastructure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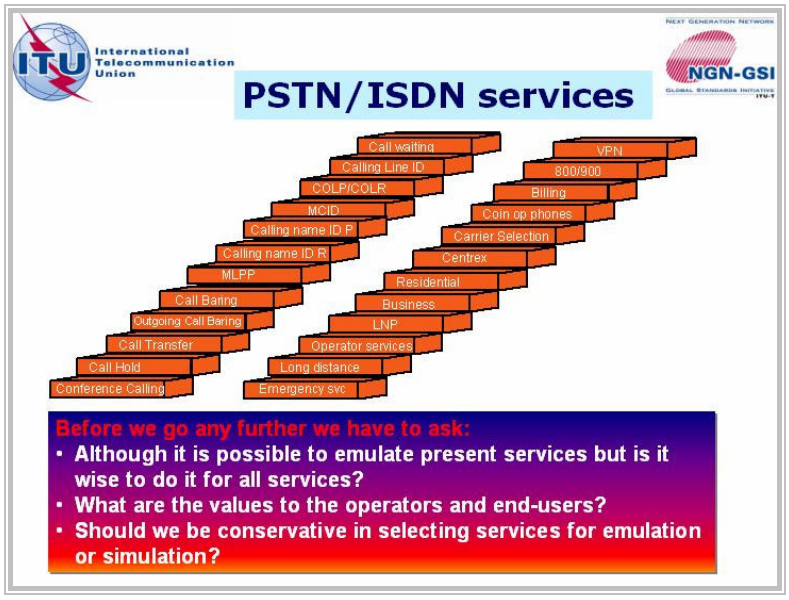
What is their relationship?
Evolution to NGN
SIP (IMS) Services & Architecture
PSTN
PSTN Emulation Subsystem
PSTN Simulation
IMS "SIP" services
PSTN Services & architecture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PSTN/ISDN services
Call waiting
Calling Line ID
COLP/COLR
MCID
Calling name ID P
Calling name ID R
MLPP
Call Baring
Outgoing Call Baring
Call Transfer
Call Hold
Conference Calling
VPN
800/900
Billing
Coin op phones
Carrier Selection
Centrex
Residential
Business
LNP
Operator services
Long distance
Emergency svc
Before we go any further we have to ask:
• Although it is possible to emulate present services but is it wise to do it for all services?
• What are the values to the operators and end-users?
• Should we be conservative in selecting services for emulation or simulation?


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Where are we now?
o Principles and requirements for evolution
o Described emulation and simulation
o Scenarios for PSTN/ISDN evolution to NGN
o Emulation and simulation scenarios
o Requirements for public interest services

Future work

- Examine existing services and select candidates for emulation and simulation
- Identify additional service capabilities
- Address OAM, management and control & signalling aspects
- Identify protocols

Conclusion

- Substantial progress has been made in the preparation of initial specifications addressing evolution of networks to NGN
- Good progress on PSTN/ISDN emulation and simulation
- More works needs to be done to complete control and signalling aspects for PSTN/ISDN evolution

Our documents

- **Evolution of networks to NGN**
  - Presents concepts for evolution of existing networks to Next Generation Networks (NGN) based on Global information infrastructure (GII) concepts and aligned with related Recommendations Y.2001 and Y.2011.
- **PSTN/ISDN evolution to NGN**
  - Describes possible ways of evolving PSTN/ISDNs to NGNs. It describes scenarios for evolution of PSTN/ISDN transport, management, signalling and control parts to NGN
- **PSTN/ISDN emulation and simulation**
  - Describes PSTN/ISDN emulation and simulation. PSTN/ISDN Emulation could potentially provide PSTN/ISDN service capabilities and PSTN/ISDN Simulation could potentially provide PSTN/ISDN-like service capabilities.
- **The PSTN emulation architecture***
  - Describes the functional architecture for PSTN/ISDN emulation

* WG2 document


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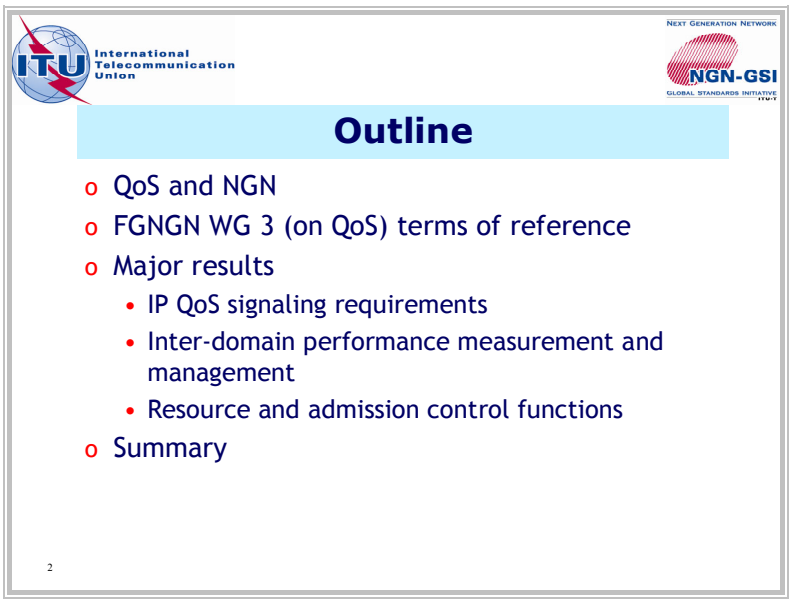
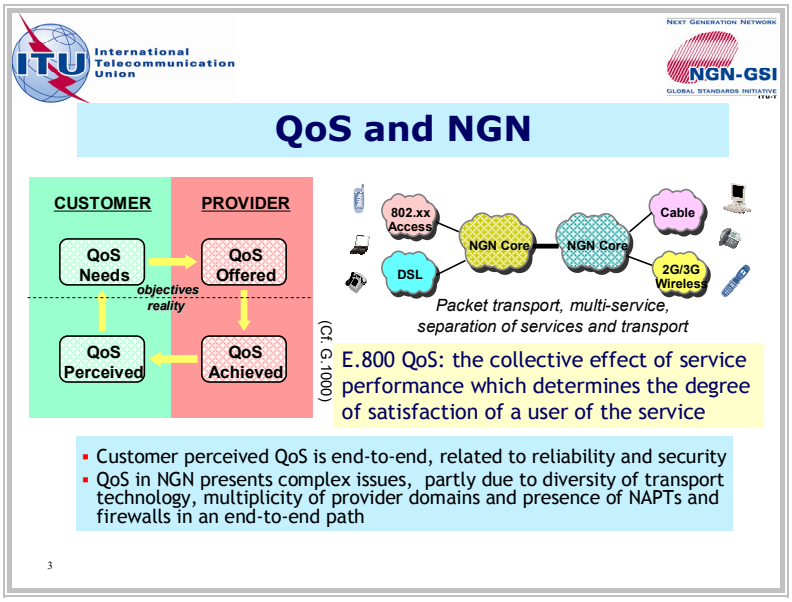
List of Acronyms
AN Access Network
ATM Asynchronous Transfer Mode
COLP Connected Line Identification Presentation
COLR Connected Line Identification Restriction
CS Call Server
DSL Digital Subscriber Line
IAD Integrated Access Device
IMS IP Multimedia Sub-system
IN Intelligent Network
IP Internet Protocol
ISDN Integrated Services Digital Network
ISUP ISDN User Part
IWF Interworking Function
IXC IntereXchange Carrier
LNP Local Number Portability
MCID Malicious Call IDentification
MLPP Multi-Level Precedence and Preemption
MSC Mobile Switching Centre
PLMN Public Land Mobile Network
PSTN Public Switched Network
QoS Quality of Service
SIP Session Initiation Protocol
SIP-I Refers to Rec. Q.1912.5
VoIP Voice over IP
VPN Virtual Private Network

G.8 – QoS in NGN – Ms. Hui-Lan Lu, Leader WG3, FGNGN





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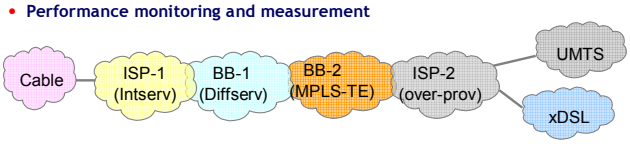
NEXT GENERATION NETWORK NGN-GSI GLOBAL STANDARDS INITIATIVE ITU-T

WG 3 (on QoS) Terms of Reference

This study defines requirements and architectures (including mechanisms and interfaces) for supporting end-to-end QoS in the NGN in a controllable and predictable way. Given the coexistence of multiple QoS technologies and operator domains in the NGN, a key aspect of the study is interworking across different technology and operator domains. Additional aspects covered by the study include, for instance:

- General terminology, QoS classes, traffic attributes and network performance metrics
- Interworking and harmonization of QoS classes
- Signalling of desired QoS end to end
- Resource control (dynamic, policy based)
- Performance monitoring and measurement



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NEXT GENERATION NETWORK NGN-GSI GLOBAL STANDARDS INITIATIVE ITU-T

QoS Deliverables

WG	Deliverable Title	Latest Draft (FGNGN-OD-)	Status	Coordinating Question/SG	Associated Question(s)
3	General aspects of QoS and network performance in NGN (TR-NGN.QoS)	00166	Draft *Rel. independent*	17/12	23/16
3	Network performance of non-homogeneous networks in NGN (TR-NGN.NHNperf)	00240	Approved *Rel. independent*	11/12, 17/12	-
3	A QoS control architecture for Ethernet-based IP access networks (TR-123.qos)	00106	Passed *SG 13 TD-97-PLEN*	4/13	-
3	Multi Service Provider NNI for IP QoS (TR-msnniqos)	00205	Stable	4/13	-
3	Requirements and framework for end-to-end QoS in NGN (TR-e2eqos.1)	00204	Draft	4/13	23/16
3	A QoS architecture for Ethernet networks (TR-enet)	00202	Draft	4/13	-
3	Resource and admission control functions (TR-racf)	00241	Draft	4/13, 3/13	5/11
3	A QoS Framework for IP-based access networks (TR-ipaqos)	00113	Draft	4/13	-
3	Performance measurement and management for NGN (TR-pmm)	00239	Approved	4/13	17/12, 3/4, 7/4
3	Algorithms for Achieving End to End Performance Objectives (TR-apo)	00200	Passed	17/12	-
4	Signalling requirements for IP QoS (TRQ.IP QoS.SIG.CS1)	00079	Passed *Q-Series Supp. 51*	5/11	-

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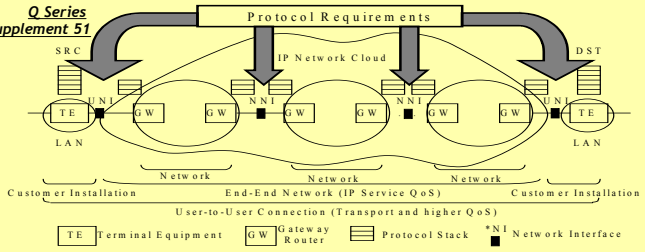
IP QoS Signalling Requirements (TRQ.IPQoS.SIG.CS1)

Q Series Supplement 51



- Performance parameters signalled, e.g.,
  - Y.1541 QoS class, reliability/priority levels, DSCP, accumulated performance
- Capabilities supported, e.g.,
  - Request-offer-answer exchanges
  - Flow control for QoS requests, congestion awareness
  - Contention resolution for resource allocation
- Performance requirements for QoS requests (e.g., max delay<1500 ms)

6

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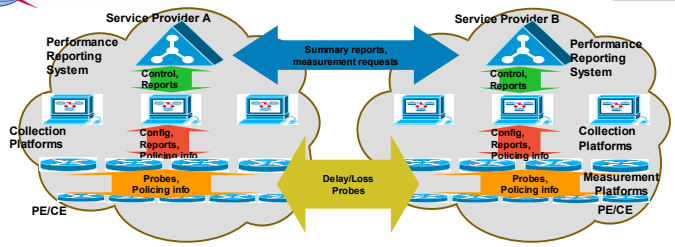
Inter-Domain Performance Measurement and Management (TR-pmm)



- Attributes to be measured
  - Mean delay, delay variation, packet loss, path unavailability
- How attributes are measured, e.g.,
  - Active or passive measurement
  - Active probes tailored to service classes (e.g., telephony, low latency data)
  - Clock synchronization to Coordinated Universal Time through GPS and the like
  - Algorithms for computing performance
- Management requirements, such as for discovery and inter-PRS communication

7

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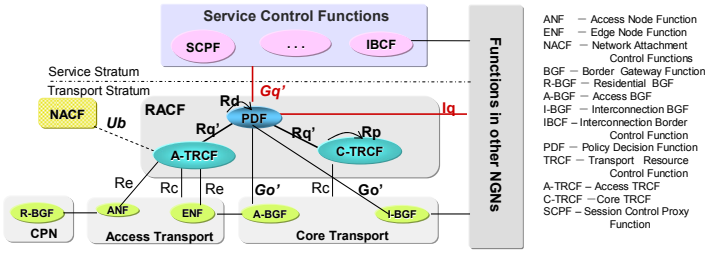
NEXT GENERATION NETWORK NGN-GSI GLOBAL STANDARDS INITIATIVE ITU-T

Resource and Admission Control Functions (RACF)



- Dynamic management of transport resources (e.g., bandwidth or IP addresses) as dictated by application needs and operator policy to achieve end-to-end QoS and border control (e.g., NAPT and packet filtering)
- Bridging service control of a variety of applications (e.g., telephony and multimedia streaming) and transport of varied technology and domains
  - ✓ Admission decision taking into consideration resource availability
  - ✓ Arbitration of *many-to-many* relationship based on policy

8

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NEXT GENERATION NETWORK NGN-GSI GLOBAL STANDARDS INITIATIVE ITU-T

Summary

- WG 3 has worked on 11 deliverables addressing different aspects of QoS, including
  - Network performance and application QoS
  - IP QoS signaling requirements
  - QoS control architectures
  - Inter-domain performance measurement and management
- Through many contributions and plenty of heated discussions, we have completed
  - TRQ.IP QoS.SIG.CS1, TR-123.qos, TR-pmm, TR-NGN.NHNperf
- Work remains
  - Complete TR-racf, TR-e2eqos.1, TR-ipaqos, etc.
  - Advance deliverables to Recommendations as appropriate

9


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NEXT GENERATION NETWORK
NGN-GSI
GLOBAL STANDARDS INITIATIVE
Acknowledgements
o Thanks to the WG 3 and WG 4 participants
o Special thanks to the editors for their hard work:
Cagatay Buyukkoc (ZTE), YoungWook Cha (ANU), Taesang Choi (ETRI), Jun Kyun Choi (ICU), Chuck Dvorak (ATT), Phil Jacobs (Cisco), Rajiv Kapoor (Cisco), Hyungsoo Kim (KT), Jungjoon Lee (ICU), Ning Li (Huawei), Enhui Liu (Huawei), Dong Sun (Lucent), Tina Tsou (Huawei)
10

G.9 – Security in NGN – Mr. Igor Faynberg, Leader WG5, FGNGN

International Telecommunication Union

Next Generation Network Security

Igor Faynberg

Bell Labs/Lucent Technologies

Leader of FGNGN Security Capability (WG 5)

Outline

- Highlights of the document *Security Requirements for NGN Release 1*
- Highlights of the document *Guidelines for NGN Security Release 1*
- Question 15 SG 13, NGN security
- Collaboration with ITU-T SG 17
- Relation to the work of other SDOs
- Open issues

Highlights of the document *Security Requirements for NGN Release 1*

- General security requirements (considerations based on the concepts of X.805)
- General security objectives
- Security requirements for the Transport Stratum
  - NGN customer network domain
  - Customer network to IP-Connectivity Access Network (IP-CAN) interface
  - Core network function
  - NGN customer network to NGN customer network interface
- Security requirements for the Service Stratum
  - IMS core network security architecture
  - IMS security architecture interface requirements
  - Transport domain to NGN core network interface
  - Applications to core network interface
  - Application domain security
  - NGN customer network to application interface
  - VoIP security requirements
  - Security requirements for Emergency Telecommunication Services and Telecommunications for Disaster Relief
  - Open service platform and valued-added service provider security

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Highlights of the document *Guidelines for NGN Security Release 1*

- Overview of relevant global security standards
- NGN threat model (based on ITU-T X.800 and X.805 Recommendations)
- Security risks in NGN
- Security Dimensions and threats that they are countering (based on ITU-T X.805)
  - Access control
  - Authentication
  - Non-repudiation
  - Data confidentiality
  - Communication security
  - Data integrity
  - Availability
  - Privacy
- NGN Security Models
  - Security associations within the NGN model
  - A four layer conceptual model for NGN security and granularity of protection
- Security of the NGN subsystems
  - IP-Connectivity Access Network
  - IMS Network domain and IMS-to-non-IMS network security
  - IMS access
  - Open Service/application framework in NGN
  - PSTN/ISDN evolution
  - Emergency Telecommunications Services
  - Overview of the existing standard solutions related to NAT and firewall traversal

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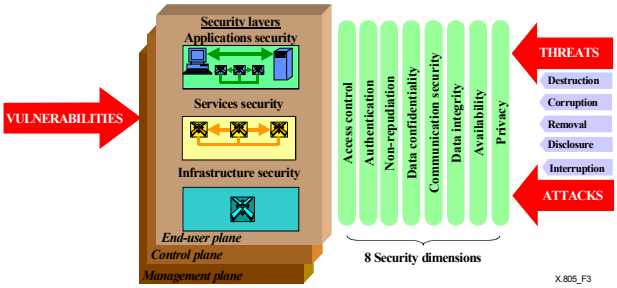
ITU-T Recommendation X.805 Security Architecture—the foundation of NGN Security studies



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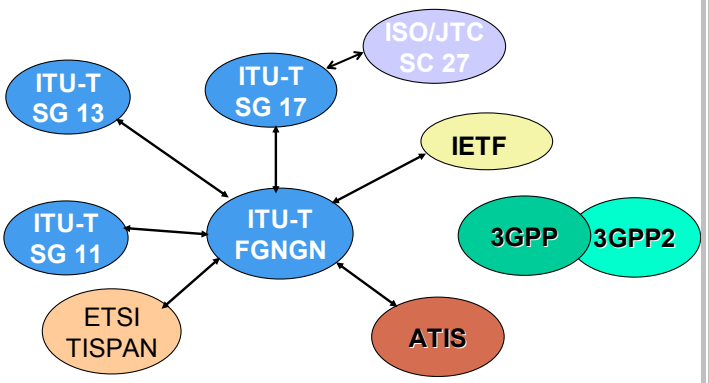
Question 15 SG 13, NGN security

- Question 15 (NGN security) of SG 13 – ITU-T lead study group for NGN and satellite matters - will continue standards work started by FGNGN WG 5.
- Q.15/13 major tasks are:
  - Lead the NGN-specific security project-level issues within SG 13 and with other Study Groups. Recognizing SG 17's overall role as the Lead Study Group for Telecommunication Security, advise and assist SG 17 on NGN security coordination issues.
  - Determine how to apply Recommendation X.805 Security architecture for systems providing end-to-end communication within the context of an NGN environment.
  - Ensure the developed NGN architecture is consistent with accepted security principles.
  - Ensure AAA principles are integrated as required throughout the NGN.

Collaboration with SG 17

- SG 17 – ITU-T Lead Study Group on security - has proposed collaboration on development of security Recommendations that are based on the documents *Guidelines for NGN Security Release 1* and *Security Requirements for NGN Release 1*.
- SG 17 Questions that are most relevant to the work of FGNGN WG 5:
  - **Security Architecture and Framework** (Question 5). Major tasks:
    - Development of a comprehensive set of Recommendations for providing standard security solutions for telecommunications in collaboration with other Standards Development Organizations and ITU-T Study Groups.
  - **Cyber Security** (Question 6). Major tasks:
    - Development of Recommendations on sharing and disclosure of vulnerability information, standard procedures for incident handling operations in cyber space, strategy for protection of critical network infrastructure.
  - **Security Management** (Question 7). Major tasks:
    - Development of Recommendations on methodology of risk management for telecommunications based on the concept of information security management that have been established by ITU-T and ISO/IEC.

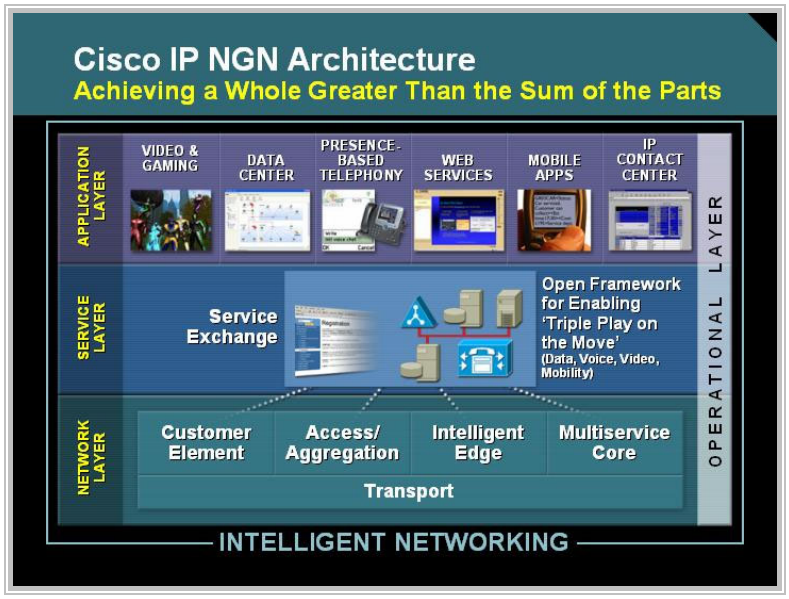
Relation to work of other SDOs

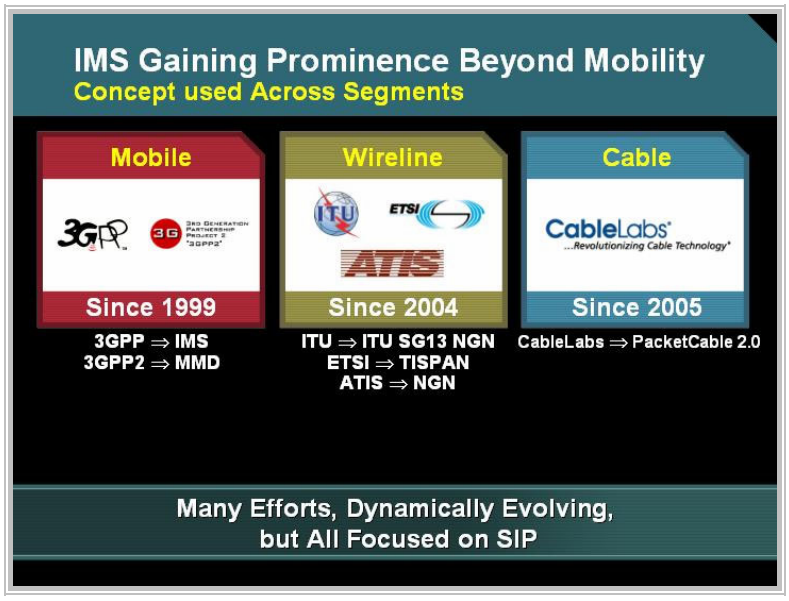


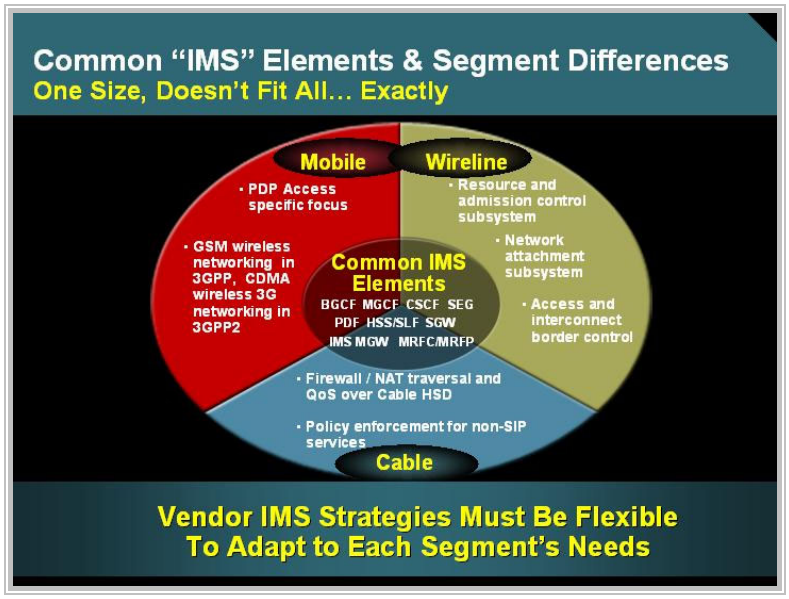
Open Issues

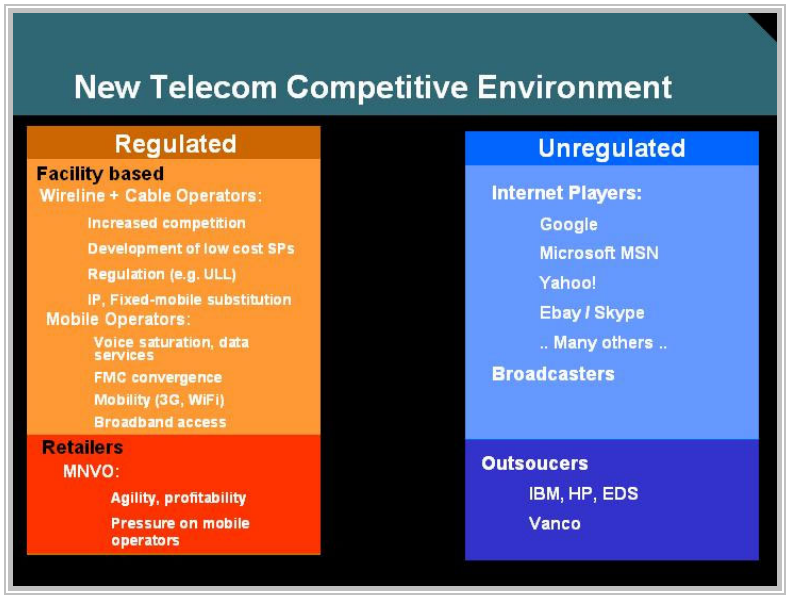
- Guidelines for handling 3GPP vs. 3GPP2 differences in IMS Security
- Key distribution (for end-users and network elements), Public Key Infrastructure
- Security considerations for all NGN interfaces (similarly to RACF security considerations)
- Hop-by-hop vs. end-to-end SIP security
- NAT/Firewall traversal for real-time applications
- Convergence with IT security
- Management of security functions (e.g., policy)
- Guidelines on the implementation of the IETF protocols

G.10 – Keynote Speech 3 – Service Control in NGN – Mr. Enrico Deluchi, Head of Marketing, Europe, Cisco Systems



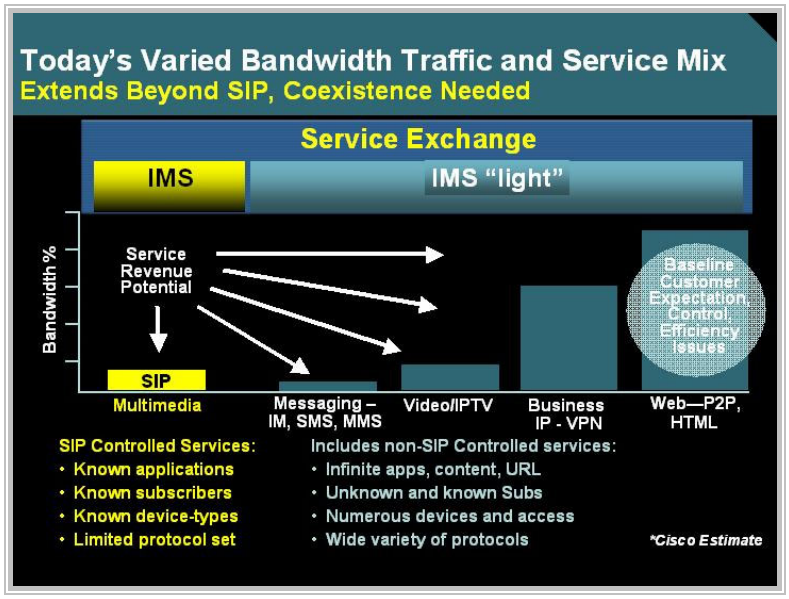


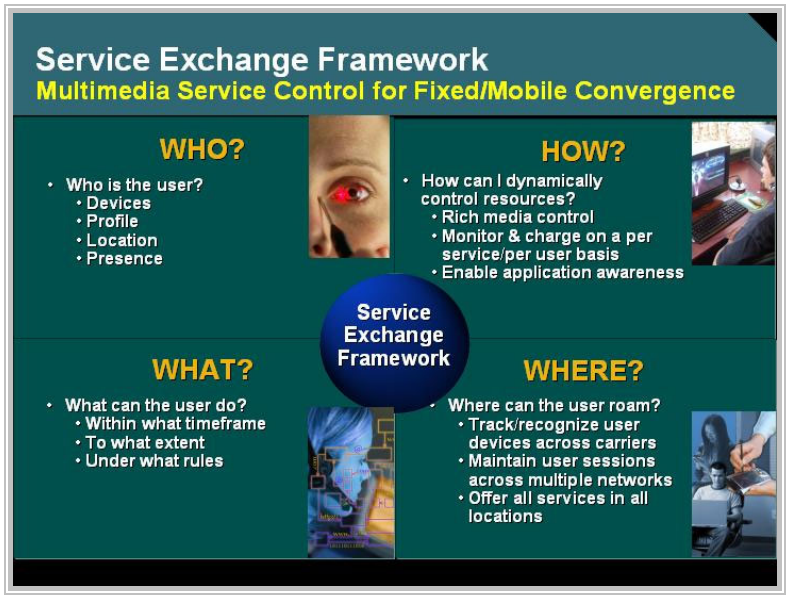

Common "IMS" Elements & Segment Differences
One Size, Doesn't Fit All… Exactly
Mobile
Wireline
Cable
• PDP Access specific focus
• GSM wireless networking in 3GPP, CDMA wireless 3G networking in 3GPP2
• Resource and admission control subsystem
• Network attachment subsystem
• Access and interconnect border control
Common IMS Elements
BGCF MGCF CSCF SEG
PDF HSS/SLF SGW
IMS MGW MRFC/MRFP
• Firewall / NAT traversal and QoS over Cable HSD
• Policy enforcement for non-SIP services
Vendor IMS Strategies Must Be Flexible
To Adapt to Each Segment's Needs

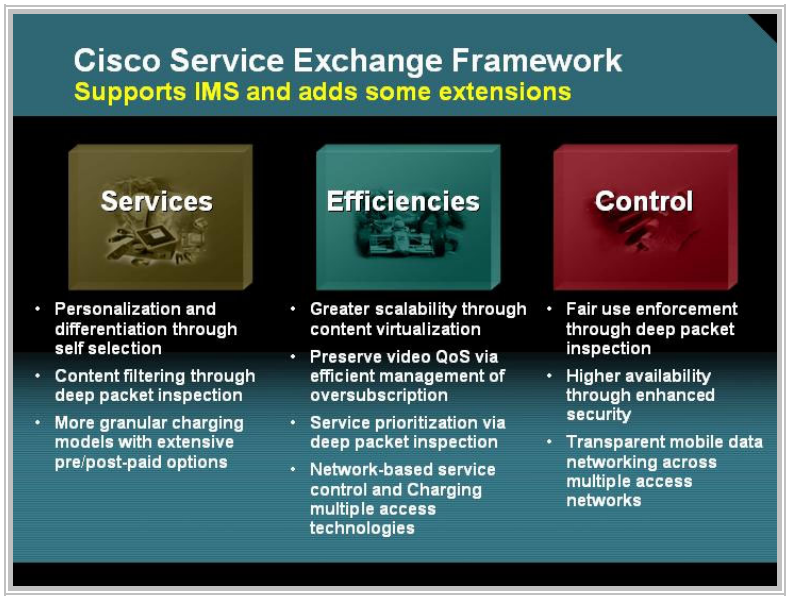

New Telecom Competitive Environment
Regulated
Facility based
Wireline + Cable Operators:
Increased competition
Development of low cost SPs
Regulation (e.g. ULL)
IP, Fixed-mobile substitution
Mobile Operators:
Voice saturation, data services
FMC convergence
Mobility (3G, WiFi)
Broadband access
Retailers
MNVO:
Agility, profitability
Pressure on mobile operators
Unregulated
Internet Players:
Google
Microsoft MSN
Yahoo!
Ebay / Skype
.. Many others ..
Broadcasters
Outsoucers
IBM, HP, EDS
Vanco


"Disintermediation" is a tangible risk
BitTorrent
Google Video BETA
AKIMBO
your wish is on demand
CINEMANOW
WATCH MOVIES AND MORE...
iFilm
MUSIC
.. FAT PIPE ?
VONAGE
skype
YAHOO! MESSENGER
TELIO
MoviesChannel
Film Clips & Trailers, Exclusives, Interviews, Showtimes.

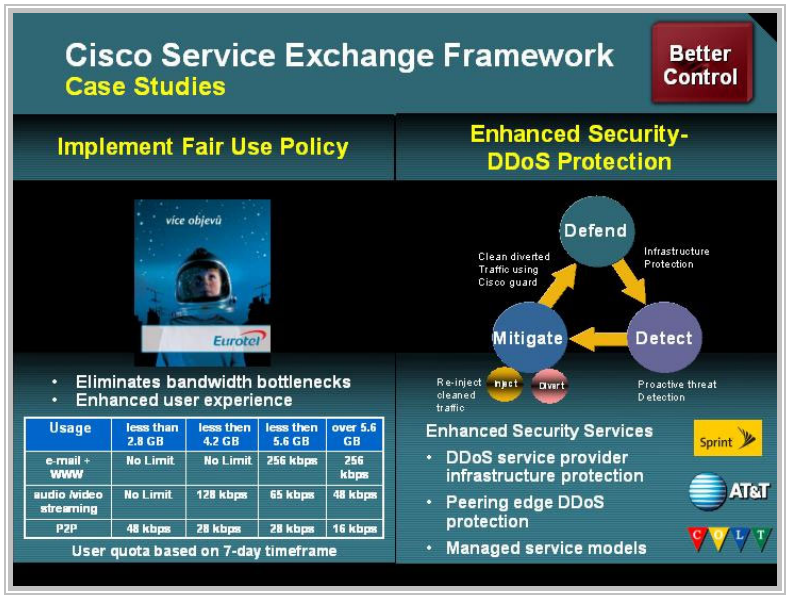

Service Delivery Environment for IMS Applications
Example: Sprint PCS Ready Link (3G Push-to-Talk)
• Drives ARPU increase
• Interoperability with mobile partner networks
• 100% available since 2003
Sprint
"Sprint is one of the first to deploy services based on an IMS service structure. Our push-to-talk service follows an IMS service structure."
- Oliver Valente, CTO, Sprint
Other Publicly Announced Cisco IMS Deployments
UNEFON
Bell
USACEL
Telecom

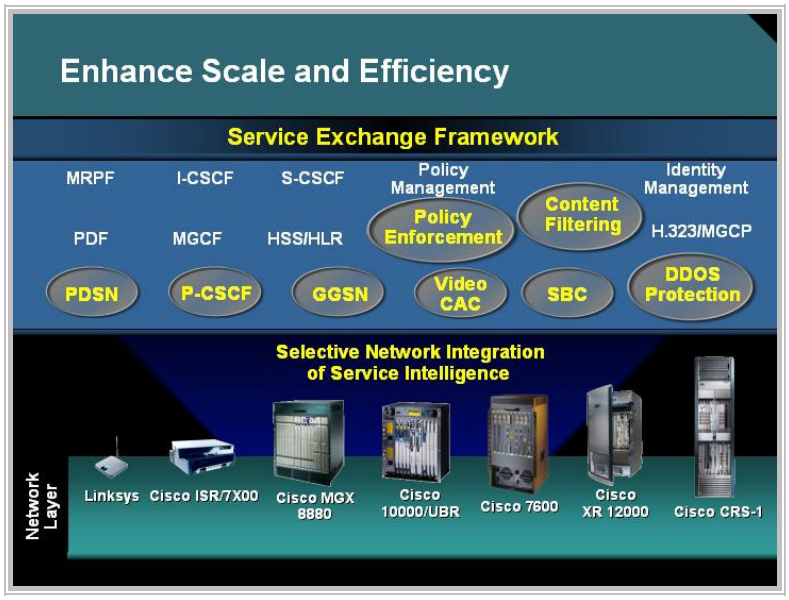

Today's Varied Bandwidth Traffic and Service Mix
Extends Beyond SIP, Coexistence Needed
Service Exchange
IMS
IMS "light"
Bandwidth %
Service Revenue Potential
Baseline Customer Expectation, Control, Efficiency Issues
SIP
Multimedia
Messaging – IM, SMS, MMS
Video/IPTV
Business IP - VPN
Web—P2P, HTML
SIP Controlled Services:
• Known applications
• Known subscribers
• Known device-types
• Limited protocol set
Includes non-SIP Controlled services:
• Infinite apps, content, URL
• Unknown and known Subs
• Numerous devices and access
• Wide variety of protocols
*Cisco Estimate


Service Exchange Framework
Multimedia Service Control for Fixed/Mobile Convergence
WHO?
• Who is the user?
• Devices
• Profile
• Location
• Presence
HOW?
• How can I dynamically control resources?
• Rich media control
• Monitor & charge on a per service/per user basis
• Enable application awareness
Service Exchange Framework
WHAT?
• What can the user do?
• Within what timeframe
• To what extent
• Under what rules
WHERE?
• Where can the user roam?
• Track/recognize user devices across carriers
• Maintain user sessions across multiple networks
• Offer all services in all locations

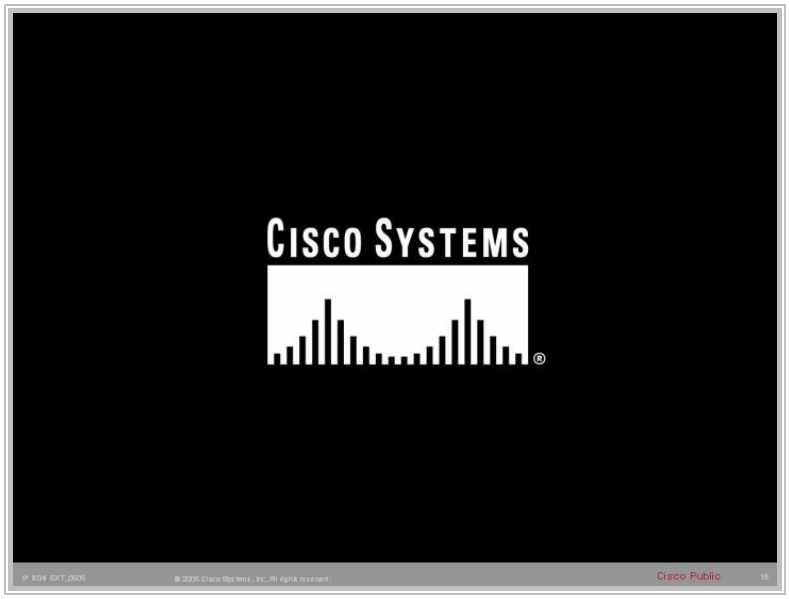

Cisco Service Exchange Framework
Supports IMS and adds some extensions
Services
Efficiencies
Control
• Personalization and differentiation through self selection
• Content filtering through deep packet inspection
• More granular charging models with extensive pre/post-paid options
• Greater scalability through content virtualization
• Preserve video QoS via efficient management of oversubscription
• Service prioritization via deep packet inspection
• Network-based service control and Charging multiple access technologies
• Fair use enforcement through deep packet inspection
• Higher availability through enhanced security
• Transparent mobile data networking across multiple access networks


Cisco Service Exchange Framework
Case Studies
More Services
Personalization via Self Selection
Content Filtering
plala
Microsoft Inte...
Page Blocked!
Forbidden
Content Detected
• Simplifies the end user experience
• Personalize per user including self subscription and account refresh—e.g., new consumer service activation
• Subscriber-managed parental control
• Basic web site blacklisting provided free of charge
• Comprehensive filtering and security for a small monthly subscription

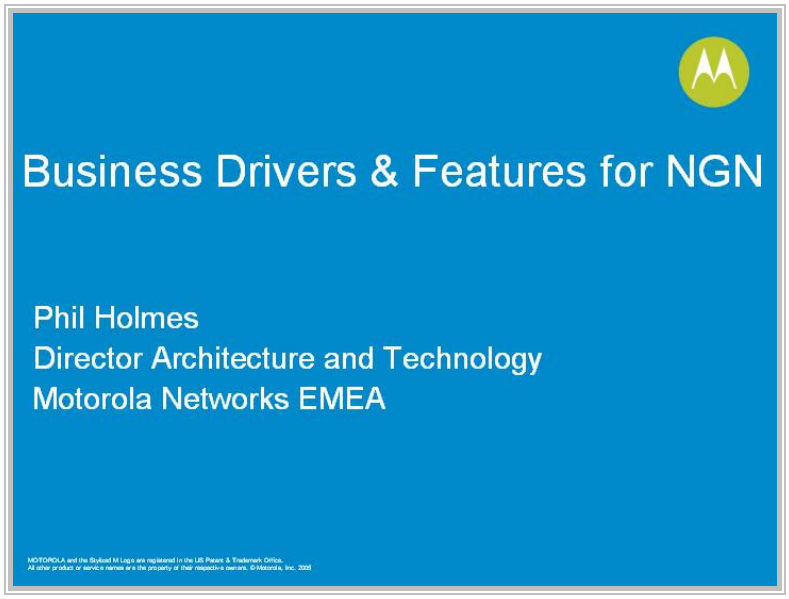

Cisco Service Exchange Framework
Case Studies
Better Control
Implement Fair Use Policy
Enhanced Security-DDoS Protection
vice objevů
Eurotel
• Eliminates bandwidth bottlenecks
• Enhanced user experience
Usage | less than 2.8 GB | less then 4.2 GB | less then 5.6 GB | over 5.6 GB
e-mail + WWW | No Limit | No Limit | 256 kbps | 256 kbps
audio /video streaming | No Limit | 128 kbps | 65 kbps | 48 kbps
P2P | 48 kbps | 28 kbps | 28 kbps | 16 kbps
User quota based on 7-day timeframe
Defend
Infrastructure Protection
Clean diverted Traffic using Cisco guard
Mitigate
Detect
Re-inject cleaned traffic
Inject
Divert
Proactive threat Detection
Enhanced Security Services
• DDoS service provider infrastructure protection
• Peering edge DDoS protection
• Managed service models
Sprint
AT&T
C O L T

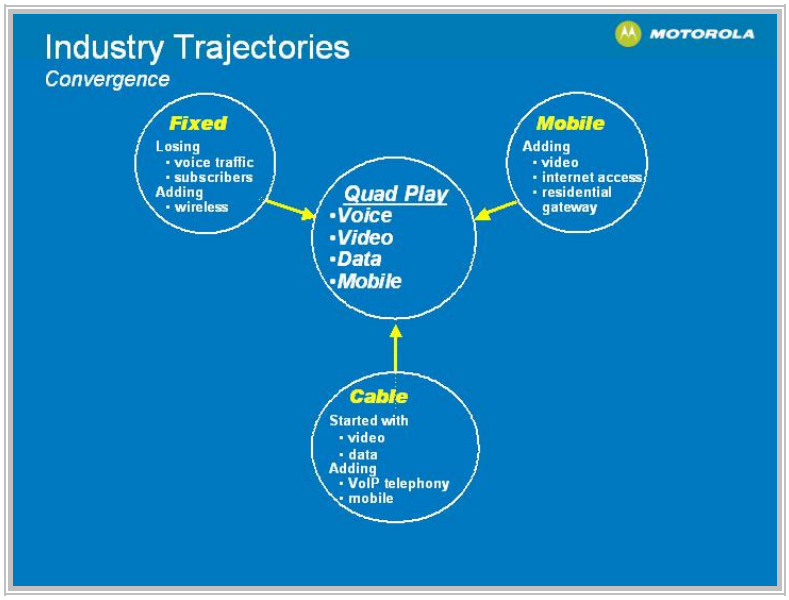

Enhance Scale and Efficiency
Service Exchange Framework
MRPF
I-CSCF
S-CSCF
Policy Management
Identity Management
PDF
MGCF
HSS/HLR
Policy Enforcement
Content Filtering
H.323/MGCP
PDSN
P-CSCF
GGSN
Video CAC
SBC
DDOS Protection
Selective Network Integration of Service Intelligence
Network Layer
Linksys
Cisco ISR/7X00
Cisco MGX 8880
Cisco 10000/UBR
Cisco 7600
Cisco XR 12000
Cisco CRS-1

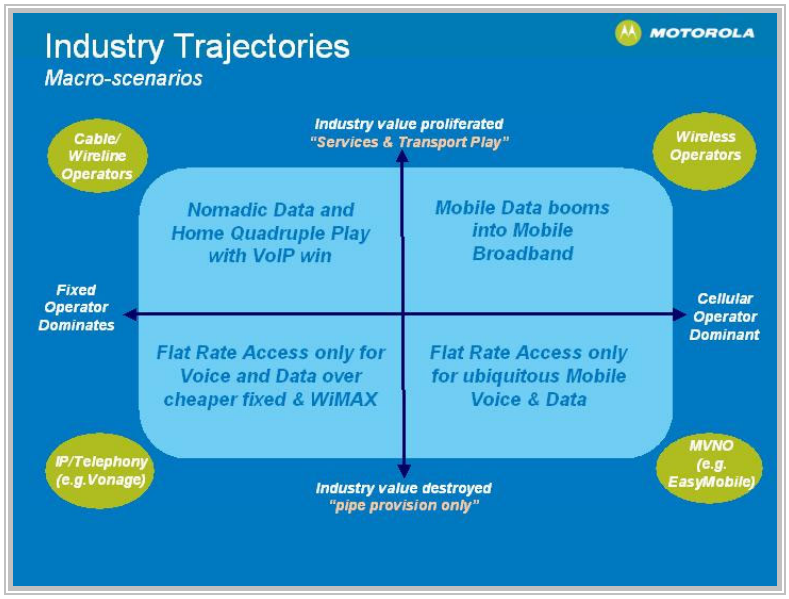

Cisco IP NGN Partners:
Key to Service Providers Success Globally
Technology Partners
Application Partners
Go-To-Market Partners
PRIMAL
JacobsRimell
AUSPICE
CAMIANT
apertio
VERINT
SS8 Networks
bea
IP UNITY
Tellme
VoiceBox
COGNITRONICS
SIPquest
OPENWAVE
ERICSSON
ITALTEL
SIEMENS
accenture
IBM
MOTOROLA
FUJITSU
And More…..

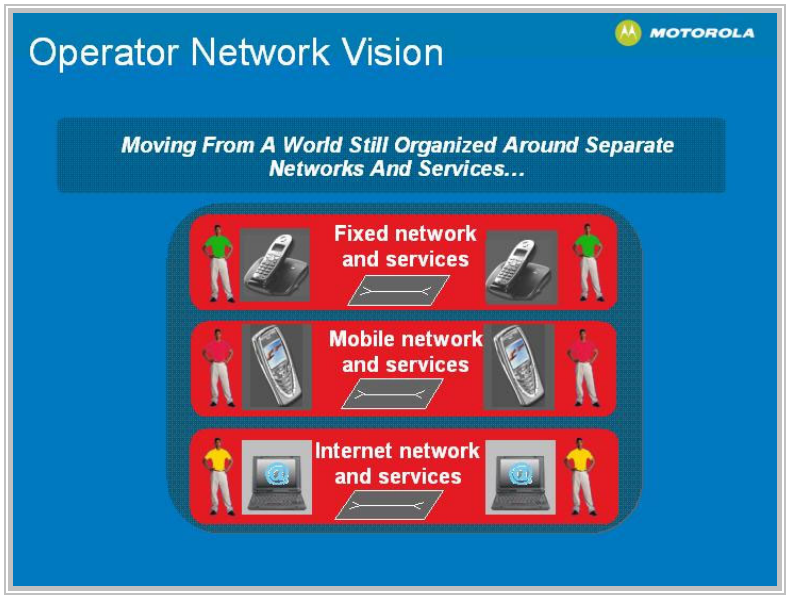

CISCO SYSTEMS
Cisco Public

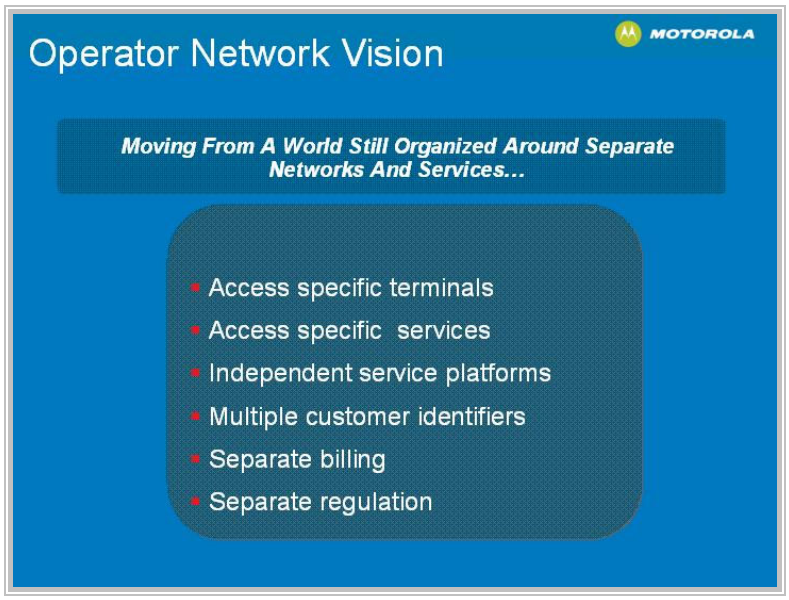
G.11 – Keynote Speech 4 – The business drivers and features for the NG Network – Motorola, Phil Holmes, Director of Architecture and Technology, Motorola Networks EMEA



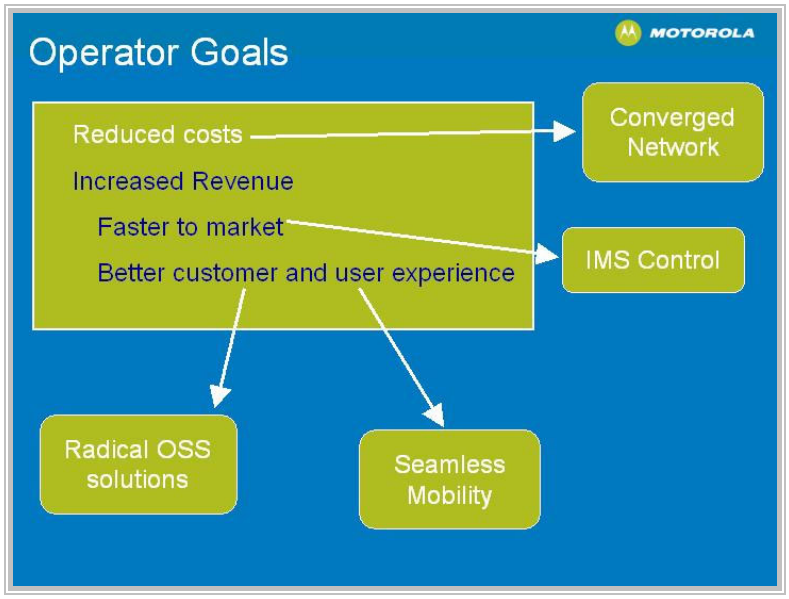


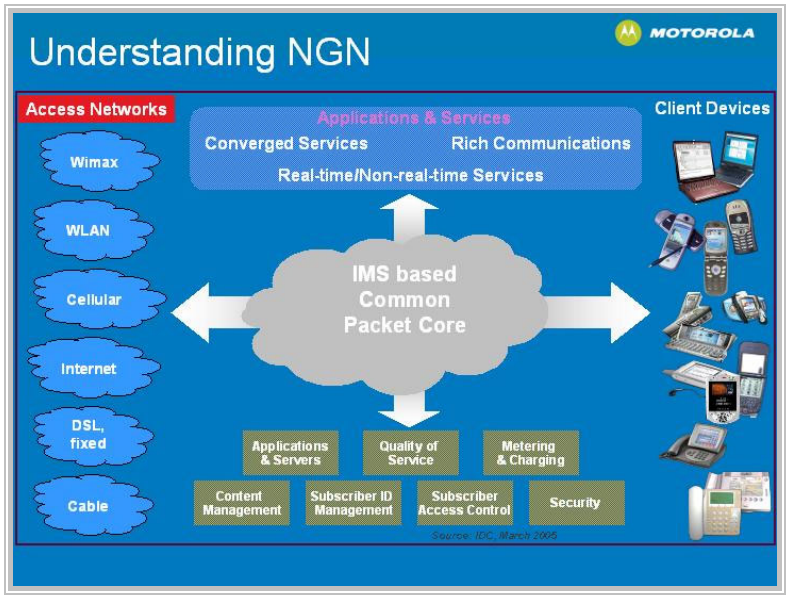

Industry Trajectories
Macro-scenarios
MOTOROLA
Industry value proliferated
"Services & Transport Play"
Cable/ Wireline Operators
Wireless Operators
Nomadic Data and Home Quadruple Play with VoIP win
Mobile Data booms into Mobile Broadband
Fixed Operator Dominates
Cellular Operator Dominant
Flat Rate Access only for Voice and Data over cheaper fixed & WiMAX
Flat Rate Access only for ubiquitous Mobile Voice & Data
IP/Telephony (e.g.Vonage)
MVNO (e.g. EasyMobile)
Industry value destroyed
"pipe provision only"

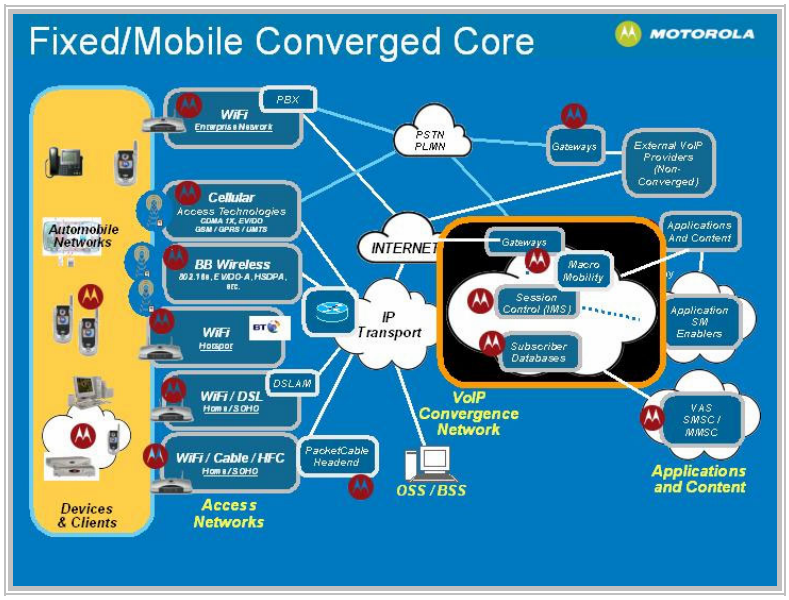

Operator Network Vision
MOTOROLA
Moving From A World Still Organized Around Separate Networks And Services…
Fixed network and services
Mobile network and services
Internet network and services

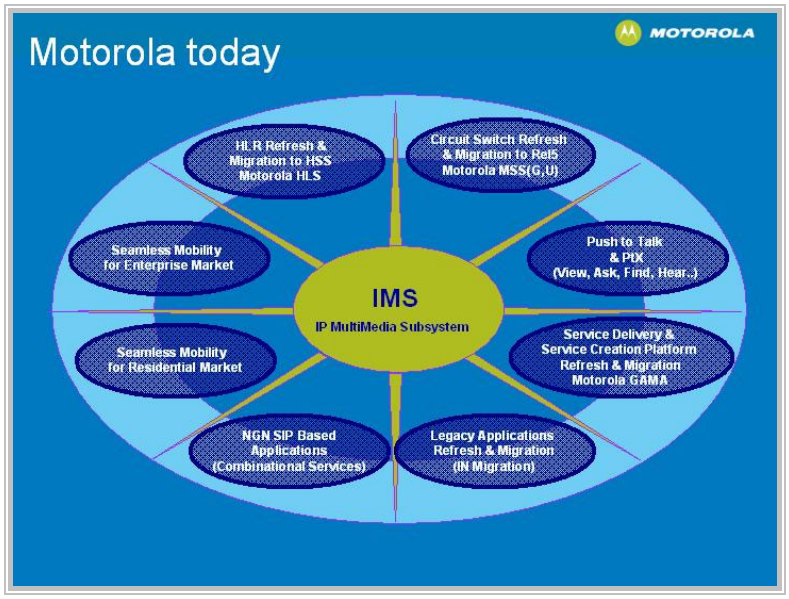

Operator Network Vision
MOTOROLA
Moving From A World Still Organized Around Separate Networks And Services…
Access specific terminals
Access specific services
Independent service platforms
Multiple customer identifiers
Separate billing
Separate regulation

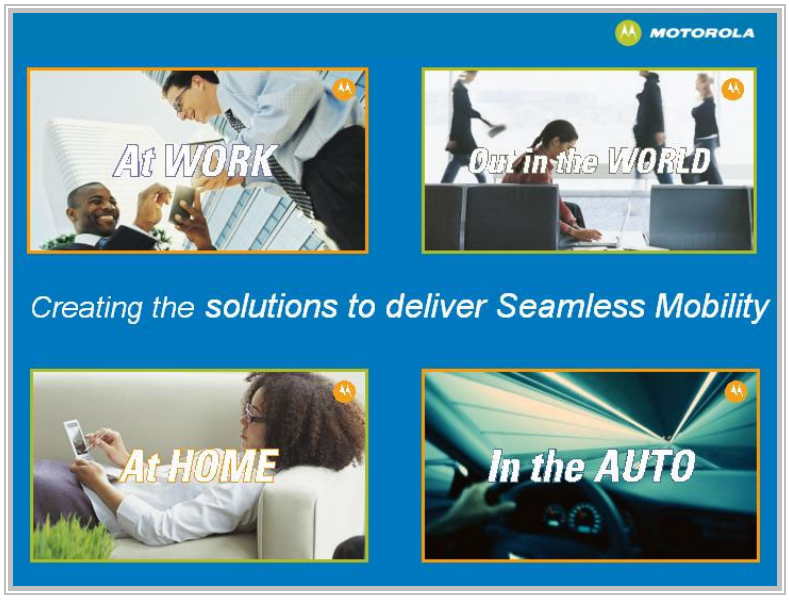

Operator Goals
MOTOROLA
Reduced costs
Increased Revenue
Faster to market
Better customer and user experience
21st Century Network Goals
Speed to Market
Customer Experience
Cost Transformation
BT


Operator Goals
MOTOROLA
Reduced costs
Increased Revenue
Faster to market
Better customer and user experience
Converged Network
IMS Control
Radical OSS solutions
Seamless Mobility


Understanding NGN
MOTOROLA
Access Networks
Wimax
WLAN
Cellular
Internet
DSL, fixed
Cable
Applications & Services
Converged Services
Rich Communications
Real-time/Non-real-time Services
IMS based Common Packet Core
Client Devices
Applications & Servers
Quality of Service
Metering & Charging
Content Management
Subscriber ID Management
Subscriber Access Control
Security
Source: IDC, March 2005


Fixed/Mobile Converged Core
MOTOROLA
PBX
WiFi
PSTN PLMN
Gateways
External VoIP Providers (Non-Converged)
Cellular
Access Technologies
Automobile Networks
INTERNET
Gateways
Applications And Content
BB Wireless
Macro Mobility
Session Control (IMS)
IP Transport
Application SW Enablers
WiFi
Subscriber Databases
DSLAM
WiFi / DSL
VoIP Convergence Network
VAS SMSC / MMSC
WiFi / Cable / HFC
PacketCable Headend
OSS / BSS
Applications and Content
Devices & Clients
Access Networks


Motorola today
MOTOROLA
HLR Refresh & Migration to HSS Motorola HLS
Circuit Switch Refresh & Migration to ReIS Motorola MSS(G,U)
Seamless Mobility for Enterprise Market
Push to Talk & PIX (View, Ask, Find, Hear..)
IMS
IP MultiMedia Subsystem
Seamless Mobility for Residential Market
Service Delivery & Service Creation Platform Refresh & Migration Motorola GAMA
NGN SIP Based Applications (Combinational Services)
Legacy Applications Refresh & Migration (IN Migration)


MOTOROLA
At WORK
Out in the WORLD
Creating the solutions to deliver Seamless Mobility
At HOME
In the AUTO

G.12 – Interconnection in a Next Generation Network World – Mr. Philip Hargrave, Chairman of the Communications Policy Committee (CPC), Intellect

NORTEL intellect

Interconnection in an NGN World

Philip Hargrave

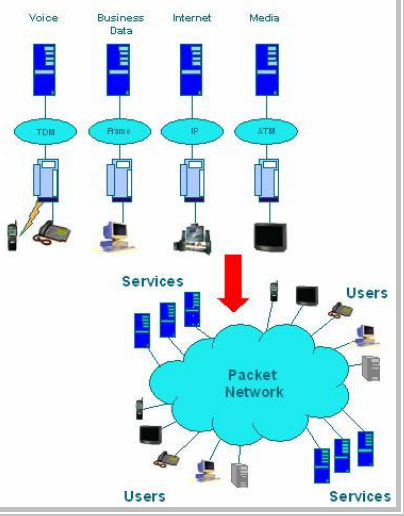
Chair of the Intellect Communications Policy Committee (CPC)

Chief Scientist Nortel Europe, Middle East and Africa

Next Generation Networks (NGNs)

intellect

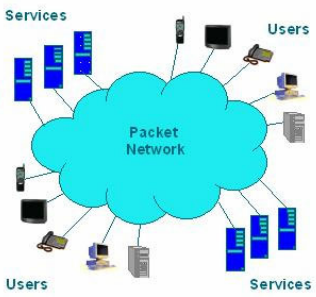
- **NGNs represent a tipping point in the way communications services are delivered**
  - NGNs are based around cores that carry IP packets and provide connectivity independent of service
  - Services are provided via servers linked to these cores rather than being associated with separate infrastructures
  - Whether access is fixed, mobile or via hot-spots, it is simply the means by which end users connect to such cores, access the servers and communicate with each other
- **Similar services can be provided by NGNs with wildly differing qualities and grades of service**
  - The major service providers will deploy their own distinct cores with carrier class capabilities and links to the Internet
  - Others will exploit the Internet itself to provide core functionality



Interconnection in an NGN World

intellect

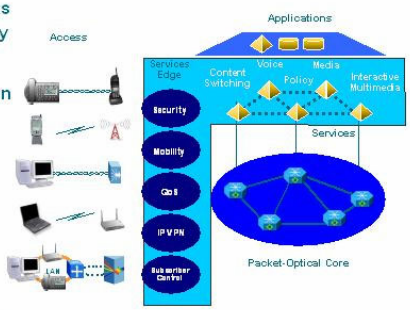
- **During the course of this year Intellect has responded to a number of Ofcom consultations**
  - These have included Phase 2 of the 'Strategic Review of Telecommunications' and a 'further consultation' on NGNs
- **In developing these responses Intellect consulted widely amongst its membership to develop positions on 'Interconnection in an NGN World' noting that**
  - To maximise the cost effectiveness of interoperability, it will be important that protocols defined by recognised standards bodies are specified for all new interfaces and that agreement is reached on their availability in suitably 'unbundled' forms
  - The development of appropriate transition plans will be a key consideration for NGNs deployed ahead of the publication of such standards
- **This perspective on 'Interconnection in an NGN World' draws on these Intellect consultations and Ofcom responses**



Interconnection in an NGN Word

intellect

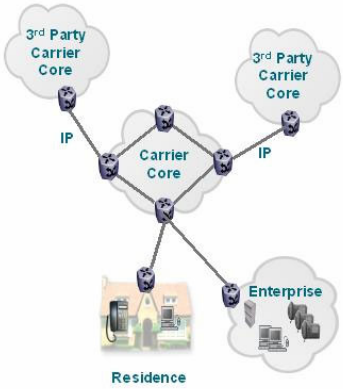
- **The deployment of NGNs provides an excellent opportunity to agree improved network interfaces**
- **If an NGN is being deployed as a replacement for an existing network it will lead to changes in the location and form of such interfaces**
  - NGNs have far less geographic dependence than legacy networks
  - The continued provision of legacy forms of interconnection might entail costly emulations
  - A balance must be struck between too rapid a transition to new arrangements, given the investments made by service providers already accessing the network being replaced, and too slow a transition requiring the NGN operator to continue with arrangements that prevent a fair return on investment
- **However, agreement on the ultimate form of such interconnections is the key issue**



Data Interconnection in an NGN World

intellect

- **Data interconnection between TDM networks has historically been through PDH interfaces, with recent migration to higher data rate SDH**
  - Such interconnection has always been well characterised in terms of security, guaranteed data rates and transfer delay
  - It has enabled voice and data calls to be passed from one service provider to another and has been fundamental to the provision of leased connectivity services
- **The more logical form of interconnection to an NGN is direct IP access**
  - It will enable multimedia calls to be passed from one service provider to another
  - With the ability to provide point-to-point and any-to-any connections, it will also enable service providers to extend voice, IP and Ethernet VPNs through each other's networks



Access to Intelligence in an NGN World

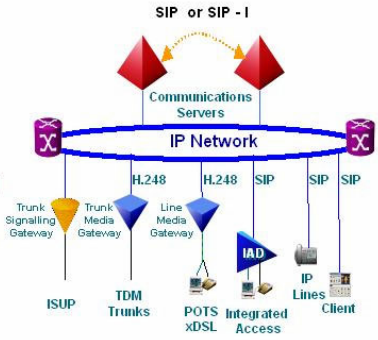
intellect

- **Other forms of intelligence will also increasingly become central to service provision**
  - Mobility
  - Location
  - Profile
  - Presence status
  - Connection characteristics
- **The possibility then arises as to the provision of 'open' Application Programming Interfaces (APIs) to provide 'hooks' into such intelligence**
  - The definition of 'network hooks' is still fluid and will be subject to much development effort and industry debate
  - A key issue will be the establishment of the deepest available APIs that do not compromise fundamental aspects of the network being accessed, such as that of security

Signalling in an NGN World

intellect

- Signalling between the switches in TDM networks has recently been based on variants of SS7
- Equivalent inter-server signalling in NGNs will almost certainly be based on SIP or SIP with encapsulated ISUP (SIP-I)
- TDM networks have exploited DTMF access signalling from analogue terminals, and ISDN access signalling from digital terminals
- SIP will almost certainly be the preferred basis for access signalling for customers with IP terminals and IP connectivity
- Where a customer continues to use a legacy terminal some form of Line Media Gateway will be required
  - A device control protocol such as H.248 is then required to provide the link between that Gateway and an appropriate NGN server



Signalling in an NGN World

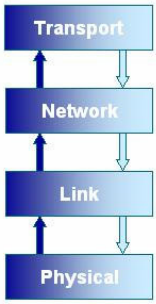
intellect

- It is highly likely that SIP and SIP-I signalling between NGNs will be agreed
  - SIP is the core session control protocol of the 3GPP IP Multimedia Subsystem (IMS)
  - SIP-I will be used when the interconnect must support full PSTN/ISDN service transparency
  - Work is underway on IMS based core architectures for multimedia services and Call Server based architectures (using SIP-I) for full legacy service support
  - Further work is also ongoing on a hybrid implementation known as 'IMS based PSTN/ISDN Emulation'
- It is debateable whether H.248 has the potential to become an inter - operator interface
  - Appropriately controlled IP access to the NGN incorporating the Media Gateway will enable third-party service provider interconnection of multimedia call streams and SIP connections to the NGN servers
  - This may well satisfy the NGN multimedia generalisation of today's Carrier Pre-select (CPS)

Data Link and Physical Interconnect

intellect

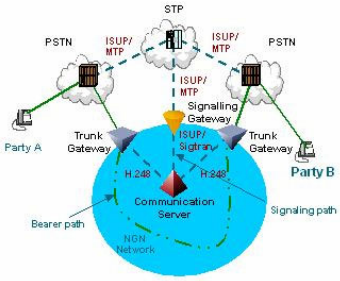
- Not all services currently using data link and physical layer interconnect will need to continue to do so
  - Over time a significant number of these services could migrate to using an IP interface with QoS control
- The need for data link and physical layer interconnect is, however, likely to persist with NGNs
  - A service provider seeking to exploit another's NGN network may find its ability to offer services compromised by the latter's IP architecture
  - Stringent delay requirements could dictate data link or physical layer connectivity
  - Data link layer connectivity is likely to remain as a pre-requisite for the most secure of services



Interconnection with Legacy Networks

intellect

- **Interconnection between NGNs and legacy TDM networks will almost certainly employ SS7 signalling and TDM transport via an appropriate Trunk Media Gateway**
  - Every conversion between the IP and TDM domain introduces delay and distortion, which result in poorer voice quality
  - Whilst this is unavoidable when interconnecting between NGNs and legacy networks, it would be undesirable if this emerged as 'the interconnection of choice' between NGNs for voice services



Multimedia Calls in an NGN World

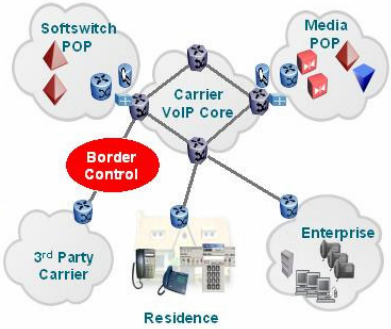
intellect

- **Access to physical layer, data link layer, IP connectivity and APIs controlling network intelligence would enable the provision of multimedia services with a range of qualities and grades of service without ubiquitous points-of-presence**
  - Voice services would be enabled with characteristics stretching all the way from a very basic Public Electronic Communications Service (PECS) to the more rigorously defined Publicly Available Telephone Service (PATS)
  - With API access to the NGN's intelligence, details of the location of the end customer would be available to assist with handling calls to the emergency services as well as providing more advance 'location' and 'presence' based services
  - Such an approach is the logical end point of today's embryonic 'voice over broadband' services

Security in an NGN World

intellect

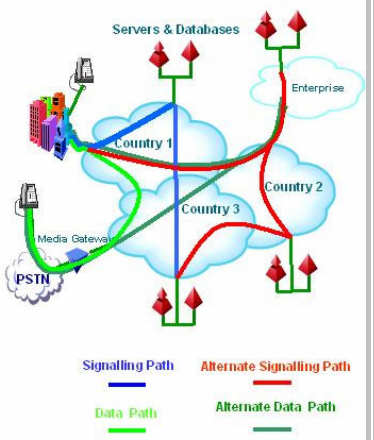
- **A Defence-in-Depth Layered Approach is central to ensuring that NGNs have no single points of failure**
- **A set of Border Control functions, including packet filtering, a firewall, intrusion detection and prevention, and signaling authentication, is a pre-requisite to ensuring secure carrier grade IP interconnection between NGNs**



Other Interconnection Considerations

intellect

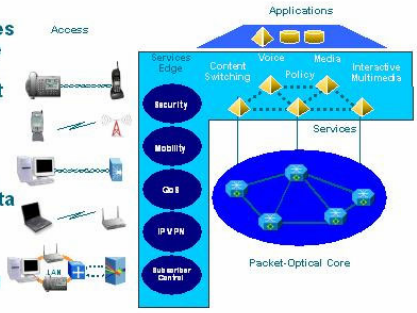
- NGNs enable end users to connect to servers located geographically anywhere
  - Such servers can be in portions of a network owned by either a carrier or an enterprise
  - The distinction between carrier and enterprise is less of an issue of role, and more a question of who owns what network component and where it is located
- New regulatory policies must recognise the freedoms in 'who does what' and 'where' inherent in NGN architectures
  - Regardless of who provides a service, the server hosting it can be located in the same or another country
  - It is important to ensure that unnecessary requirements to locate functionality within national borders do not lead to inefficient network structures and hence increased costs to end users



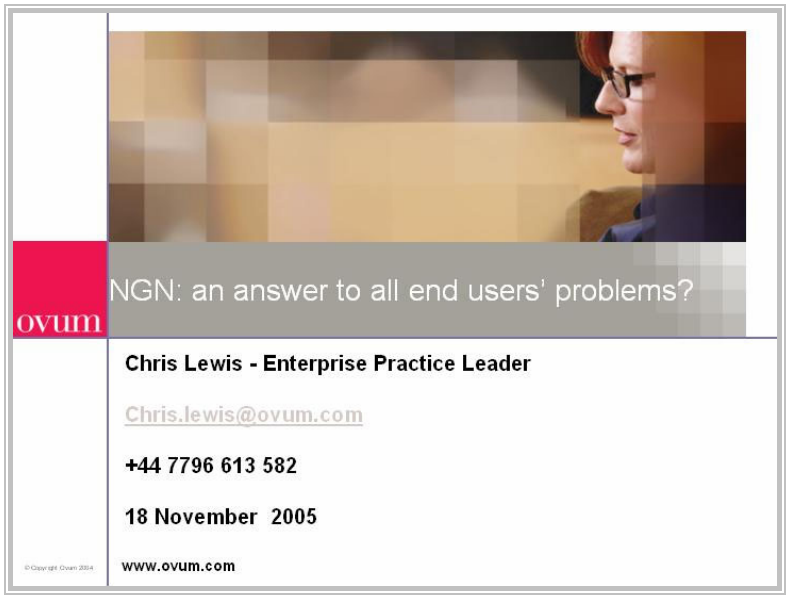
Conclusions

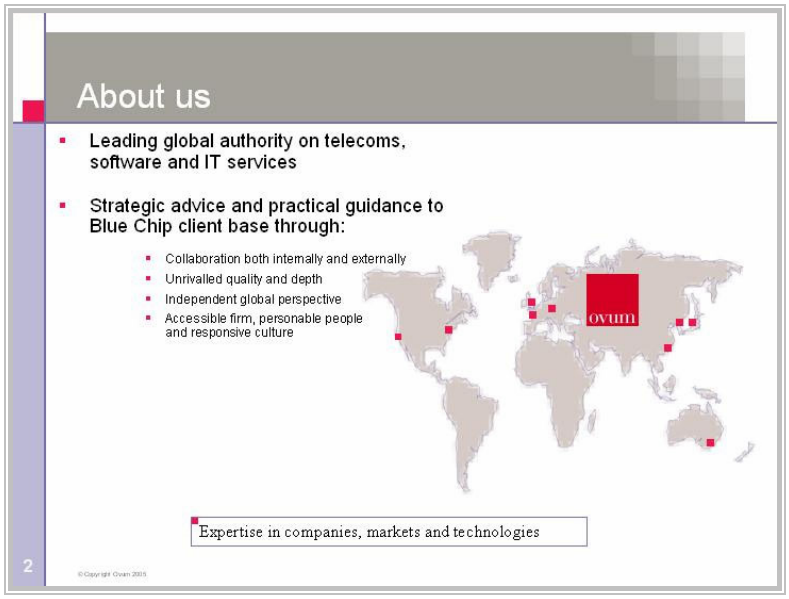
intellect

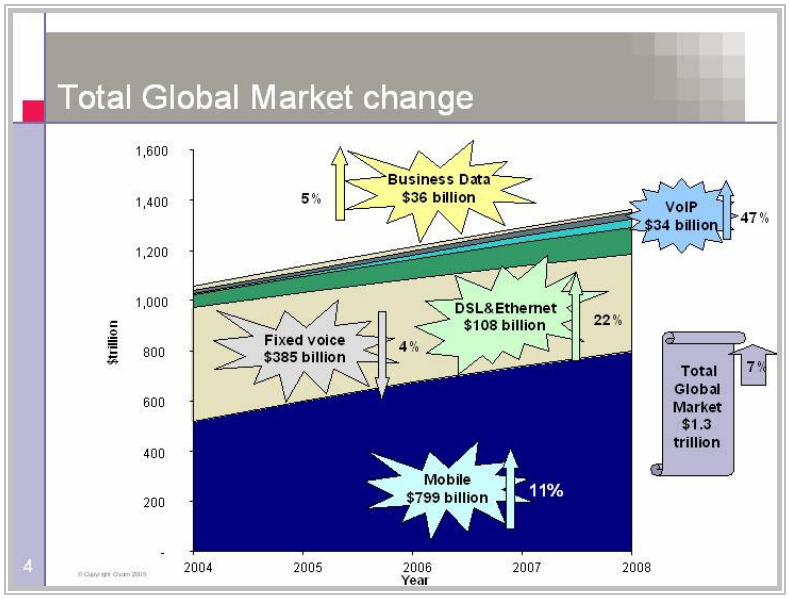
- The deployment of NGNs provides an excellent opportunity to agree improved interfaces to enable service providers to interconnect and cooperate in the delivery of services
- Agreement on such interfaces opens the door to the provision not only of today's voice and data services and their multimedia generalisations, but also an unlimited range of new applications and services limited only by human imagination

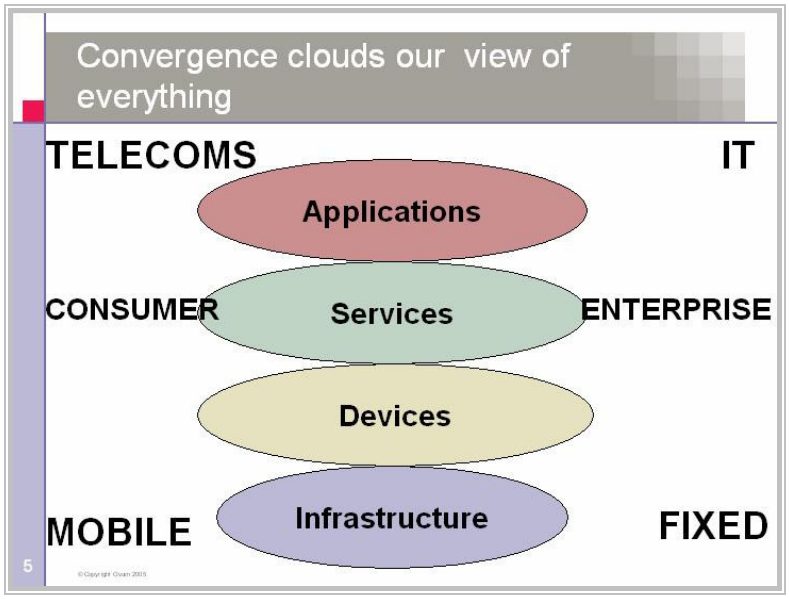


G.13 – NGN: Another Industry Initiative, But What About the End-users – Mr. Chris Lewis, Enterprise Practice Leader, Ovum

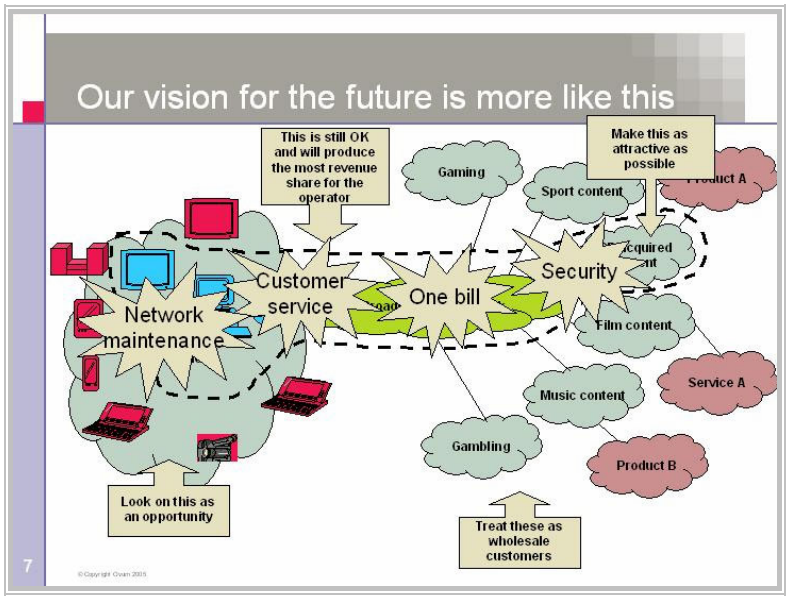


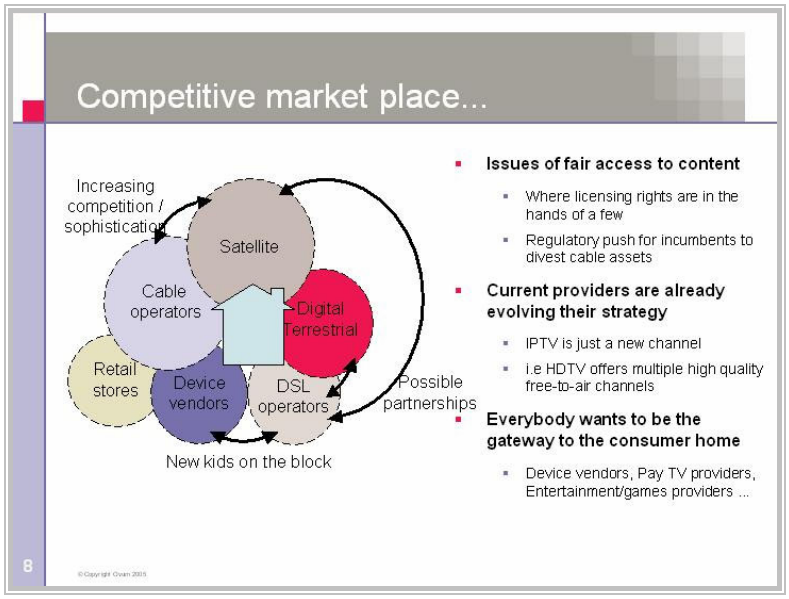


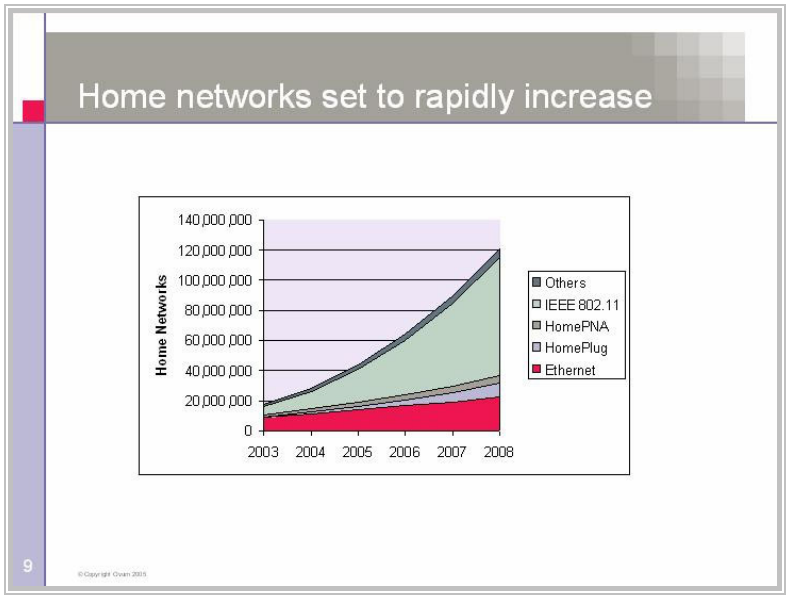

Total Global Market change
1,600
1,400
1,200
1,000
800
600
400
200
-
$trillion
Business Data
$36 billion
5%
VoIP
$34 billion
47%
DSL&Ethernet
$108 billion
22%
Fixed voice
$385 billion
4%
Total
Global
Market
$1.3
trillion
7%
Mobile
$799 billion
11%
2004
2005
2006
2007
2008
Year
4


Convergence clouds our view of everything
TELECOMS
IT
Applications
CONSUMER
Services
ENTERPRISE
Devices
MOBILE
Infrastructure
FIXED
5


ovum
Consumer market trends
www.ovum.com

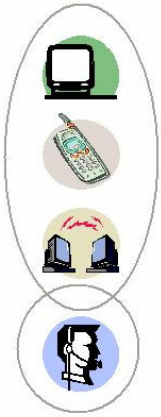

Our vision for the future is more like this
This is still OK and will produce the most revenue share for the operator
Make this as attractive as possible
Gaming
Sport content
Product A
Customer service
One bill
Security
Network maintenance
Film content
Service A
Music content
Gambling
Product B
Look on this as an opportunity
Treat these as wholesale customers
7


Competitive market place...
Increasing competition / sophistication
Satellite
Cable operators
Digital Terrestrial
Retail stores
Device vendors
DSL operators
Possible partnerships
New kids on the block
Issues of fair access to content
Where licensing rights are in the hands of a few
Regulatory push for incumbents to divest cable assets
Current providers are already evolving their strategy
IPTV is just a new channel
i.e HDTV offers multiple high quality free-to-air channels
Everybody wants to be the gateway to the consumer home
Device vendors, Pay TV providers, Entertainment/games providers ...
8

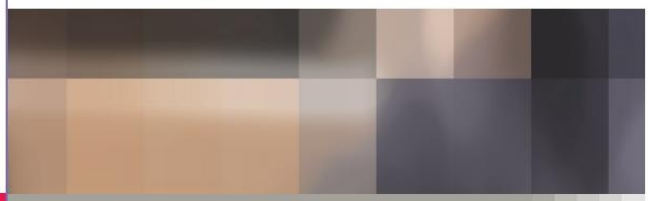

Home networks set to rapidly increase
Home Networks
140,000,000
120,000,000
100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0
2003
2004
2005
2006
2007
2008
Others
IEEE 802.11
HomePNA
HomePlug
Ethernet
9

Packaging is critical

- The winners will be those who bundle the right packages for customers



10

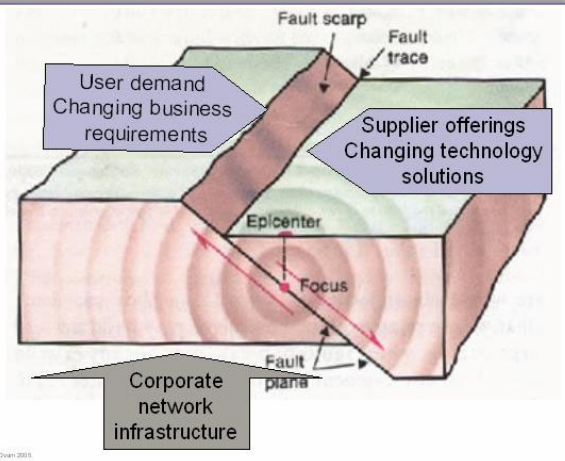


ovum

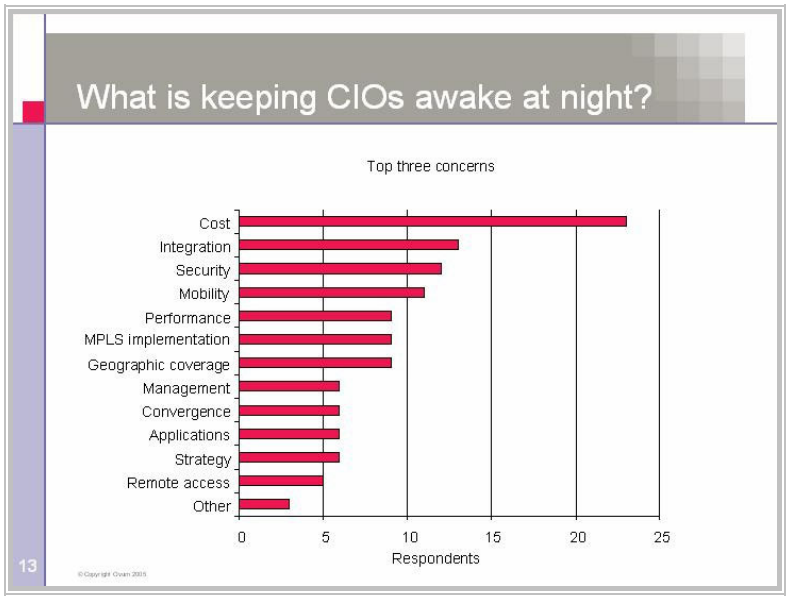
Business market trends

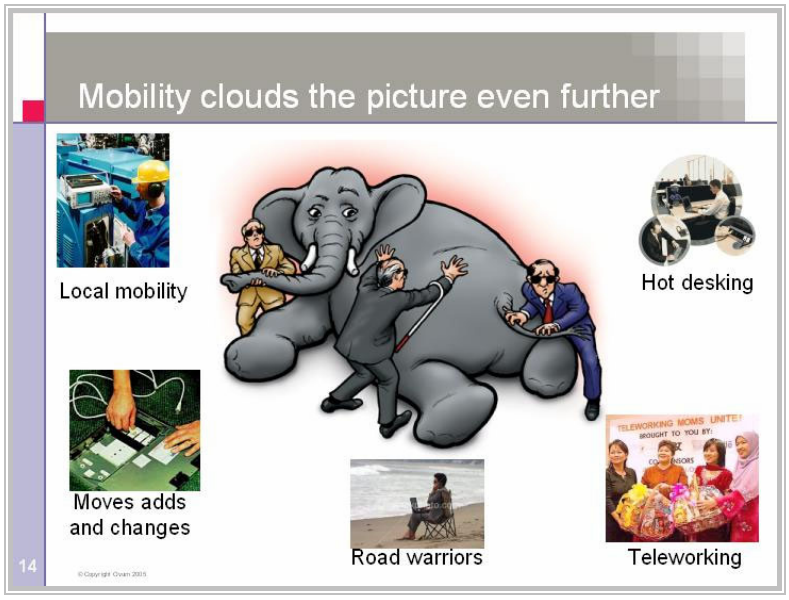
www.ovum.com

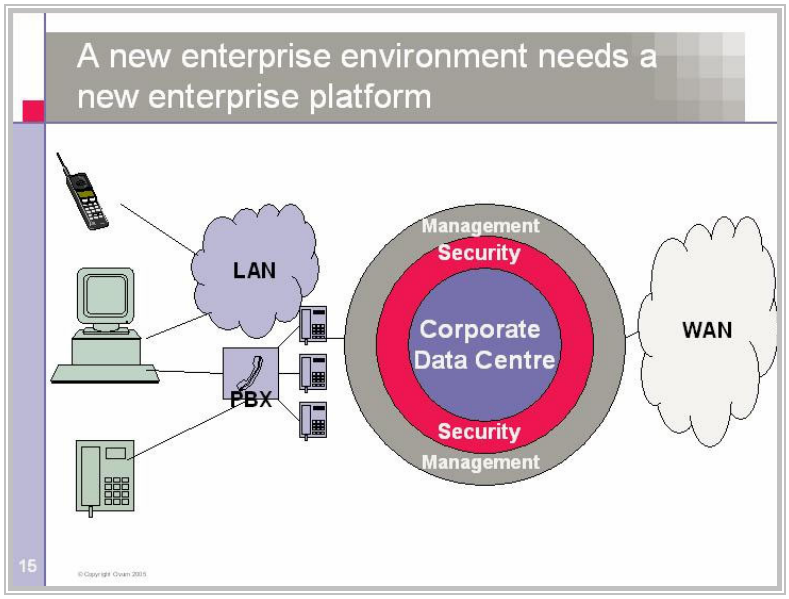
End user demand and supply are not in harmony

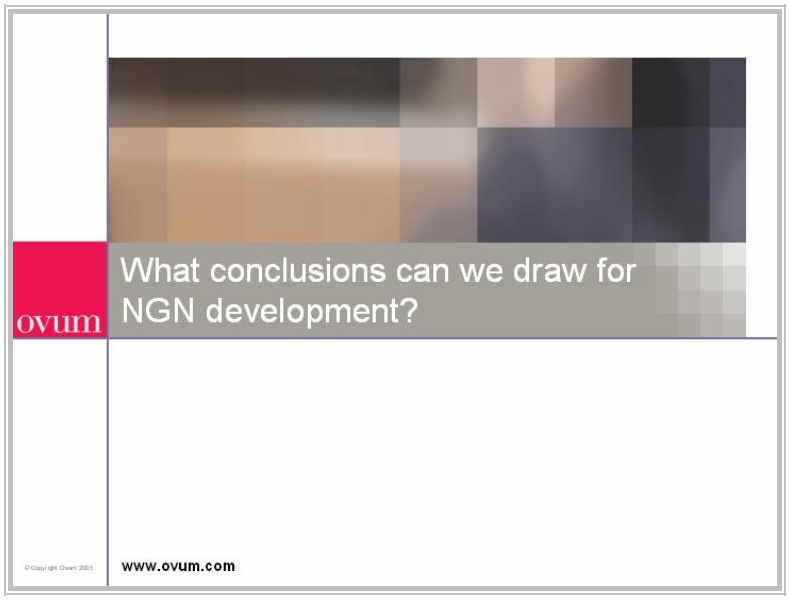


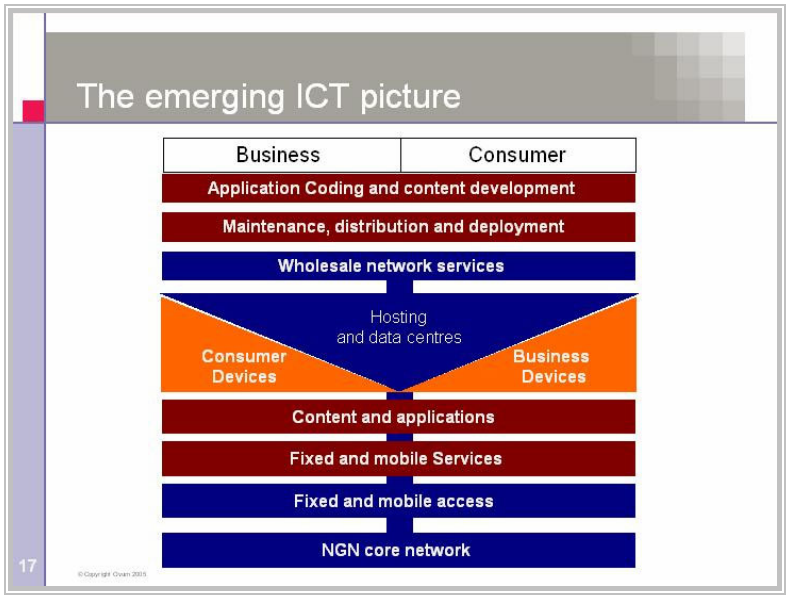
12

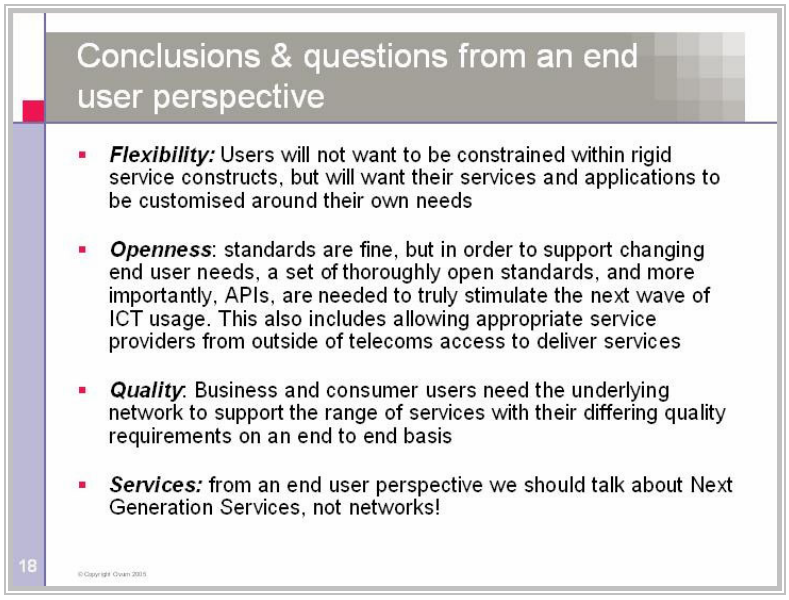

What is keeping CIOs awake at night?
Top three concerns
Cost
Integration
Security
Mobility
Performance
MPLS implementation
Geographic coverage
Management
Convergence
Applications
Strategy
Remote access
Other
0
5
10
15
20
25
Respondents
13


Mobility clouds the picture even further
Local mobility
Hot desking
Moves adds and changes
Road warriors
Teleworking
14

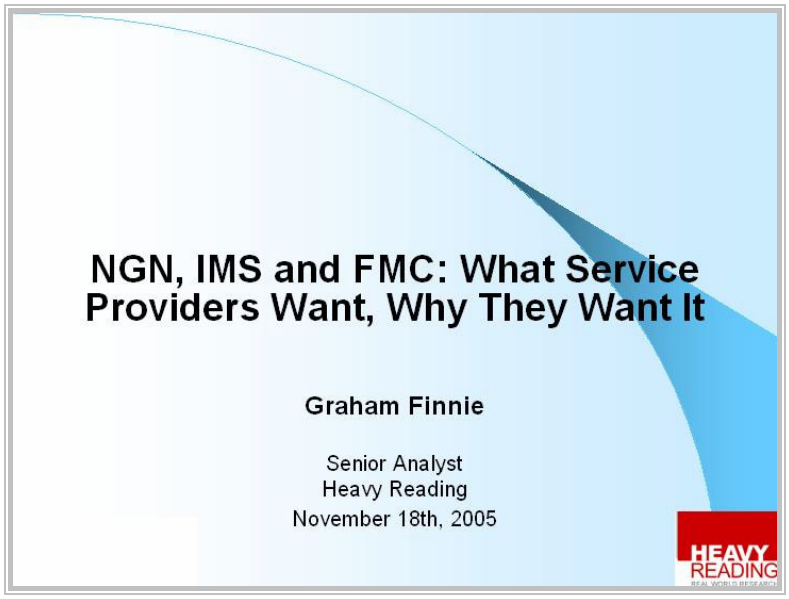

A new enterprise environment needs a new enterprise platform
LAN
PBX
Management
Security
Corporate Data Centre
Security
Management
WAN
15

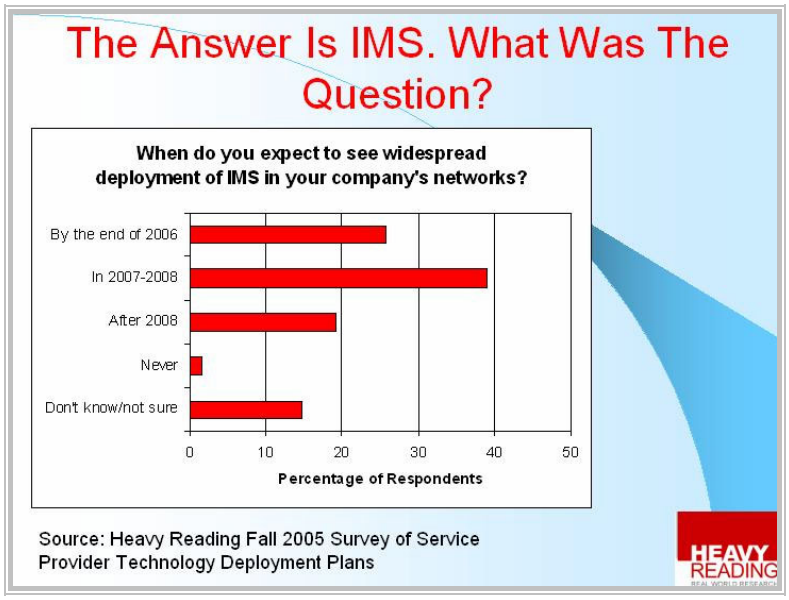

ovum
What conclusions can we draw for NGN development?
www.ovum.com


The emerging ICT picture
Business
Consumer
Application Coding and content development
Maintenance, distribution and deployment
Wholesale network services
Hosting and data centres
Consumer Devices
Business Devices
Content and applications
Fixed and mobile Services
Fixed and mobile access
NGN core network
17

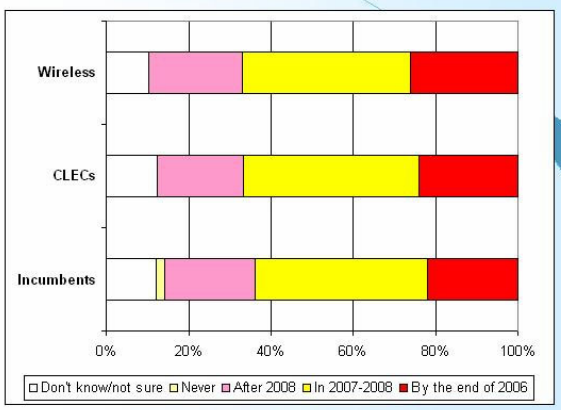

Conclusions & questions from an end user perspective
Flexibility: Users will not want to be constrained within rigid service constructs, but will want their services and applications to be customised around their own needs
Openness: standards are fine, but in order to support changing end user needs, a set of thoroughly open standards, and more importantly, APIs, are needed to truly stimulate the next wave of ICT usage. This also includes allowing appropriate service providers from outside of telecoms access to deliver services
Quality: Business and consumer users need the underlying network to support the range of services with their differing quality requirements on an end to end basis
Services: from an end user perspective we should talk about Next Generation Services, not networks!
18

G.14 – NGN, IMS and FMC: What Service Providers Want, Why They Want It – Graham Finnie, Senior Analyst, Heavy Reading





For All Types of Service Providers…



Source: Heavy Reading Fall 2005 Survey of Service Provider Technology Deployment Plans

Why They Want It

- Layered architecture
  - Separates transport, control and applications
  - **"We can buy best of breed at every layer!"**
- Access-agnostic
  - Simpler convergence of fixed and mobile networks
  - **"Services no longer tied to access network technology!"**
- Real-time IP applications
  - With QoS, security, charging
  - **"A means to fight IP applications leakage to the Internet!"**
- New kinds of applications
  - Blended together
  - **"Higher ARPU, lower churn!"**
- More applications, much more quickly, at much lower cost
  - But controlled, supplied and billed by service provider
  - **"No need to rely on a few killer apps!"**

Leading To A Vendor Bandwagon

Type of Company	IMS Strategy	Examples
Major Telecom Equipment Manufacturers	Usually a "soup-to-nuts" proposition that covers all aspects of IMS, sometimes involves partners for some elements.	Alcatel, Ericsson, Siemens, Lucent, Nortel, Huawei, NEC, Motorola
Softswitch Vendors	Leverage VOIP expertise to compete against the major vendors. Often have a strong Tispan angle.	Cirpack, Italtel, NetCentrex, Sonus, Veraz
Computing and IT Platform Providers	Use IMS to break into proprietary incumbent strangleholds in a range of areas, but often also partner with incumbents.	BEA, Hewlett-Packard, Intel, Sun, IBM, Solid, RadiSys
Control-Plane Specialists	Often focused on an innovative approach to specific control-plane elements.	Apertio (HSS), Leapstone (S-CSCF),
Applications-Server Specialists	Use IMS to build a stronger position in the telco applications space, usually via partnerships.	AePona, BroadSoft, Persona, Personeta, Ubiquity
Media Resource and Gateway Vendors	Be best-of-breed suppliers for key IMS functions such as MRFC/MRFP or MGCF.	AudioCodes, Brooktrout, Convedia, IP Unity
SBC or Policy Management	Migrate SBC to IMS; help define policy or bandwidth management in evolving standards.	Acme Packet, NexTone, Operax, Tazz
Client Software Providers	Fill an important gap in IMS specs for interoperable handset software.	Ecrio, SIPquest, Sonim
Signaling Vendors	Build on existing expertise to create better links between IMS and legacy nets.	Tekelec, Ulticom

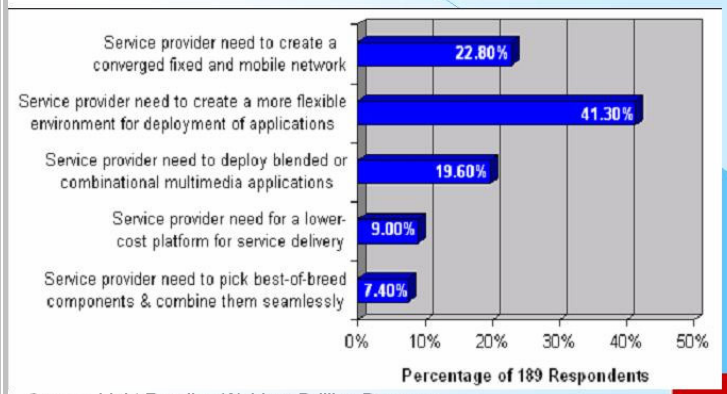
Note: Some companies on this list also fulfill other functions with IMS.

Market Drivers: Applications

service	what is it?
Converged Phone Book	A single phone book on one or more terminals
Converged Email Directory	A single email directory on one or more terminals
Converged Buddy List	One IM list on one or more terminals
One Phone Number	Single number covering more than one line or subscription
One Voicemail Service	All calls forwarded automatically to a single box
Converged Telephony	One phone can access more than one network type
Presence	IM extended to other devices and mobile locations
Video Telephony	Call between mobile and fixed locations/devices using the same interface
SMS	Make and receive text messages from non-mobile device/network
TV/Messaging	Make and receive text messages whilst watching TV
Conferencing	Between people using different types of devices
Corporate VPN	Extend VPN to wireless/nomadic devices and situations

HEAVY READING

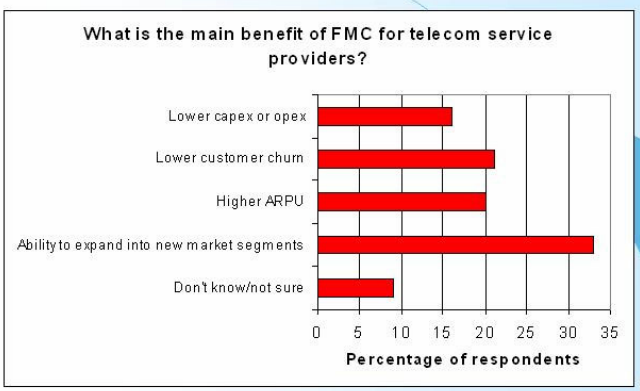
FMC Is One Of Several Motivators For IMS



Source: Light Reading Webinar Drilling Down on IMS, May 2005. n=230

HEAVY READING

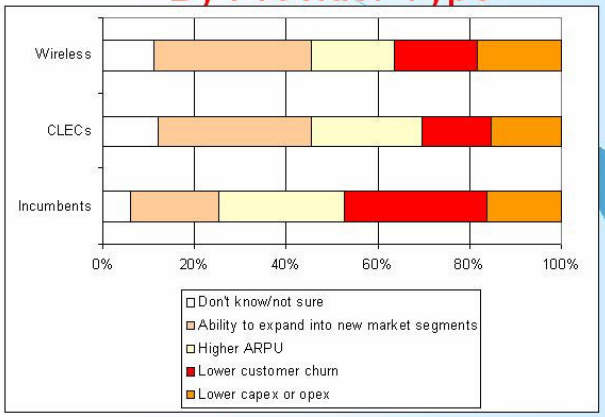
No One Clear Reason To Move To FMC



Source: Heavy Reading Fall 2005 Survey of Service Provider Technology Deployment Plans

HEAVY READING

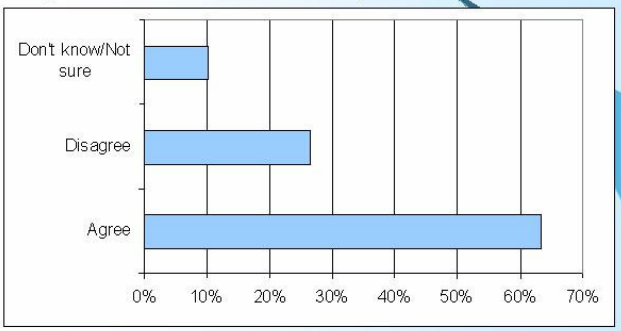
And Motivations For FMC Vary By Provider Type



Source: Heavy Reading Fall 2005 Survey of Service Provider Technology Deployment Plans

But All Service Providers Buy The Vision

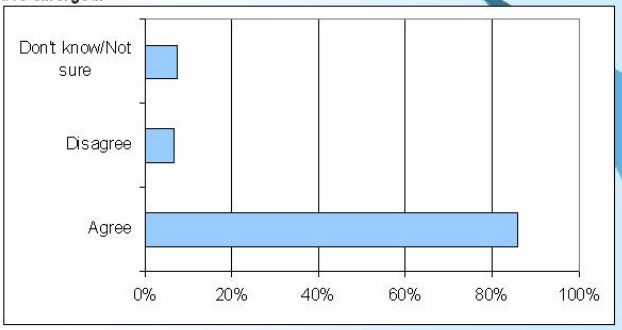
"Within the next decade, the first link in every network will always be wireless-cellular, WiFi, WiMax, UWB, and so on-and devices will automatically choose the most appropriate type of wireless link based on location, price, and bandwidth."



Source: Heavy Reading Survey of Service Provider Attitudes to Fixed-Mobile Convergence, November 2004. Base: 109 Service Providers

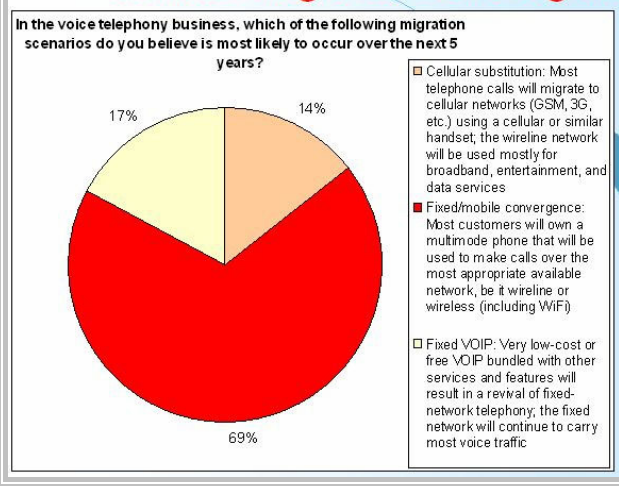
And Expect It To Transform The Industry

"Within the next decade, fixed-mobile convergence will gradually eliminate the border between wireline and wireless carriers and service providers. A new breed of supercarrier that uses any appropriate network technology to serve its customers will have emerged."



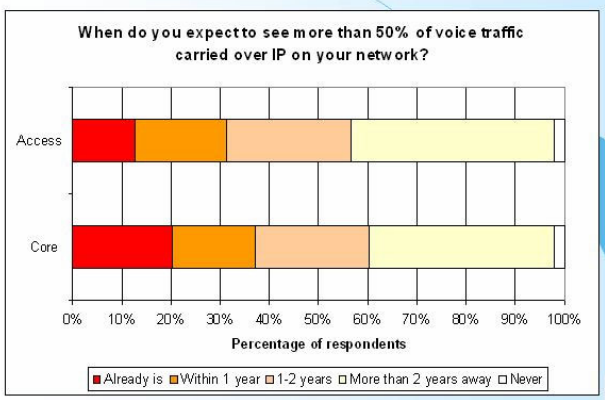
Source: Heavy Reading Survey of Service Provider Attitudes to Fixed-Mobile Convergence, November 2004. Base: 109 Service Providers

Service Providers Believe Telephony Is Heading For Convergence



Source: Heavy Reading Survey of Service Provider Attitudes to VOIP, August 2005. Base 125 Service Providers

And By 2007, VOIP Will Dominate

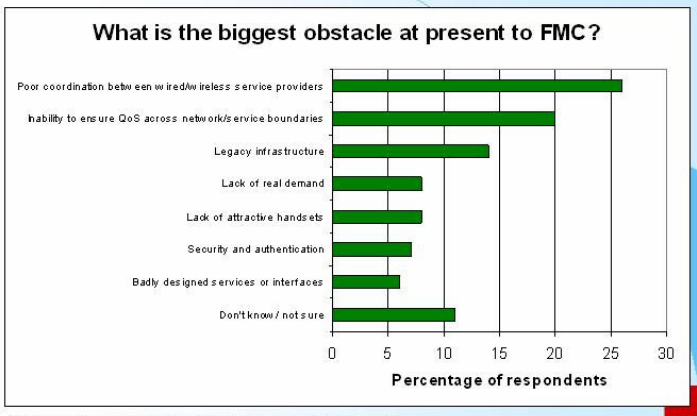


Source: Heavy Reading Survey of Service Provider Attitudes to VOIP, August 2005. Base: 125 Service Providers

New Opportunities: Telephony…

Opportunity	In Detail
Create more compelling services	By exploiting the flexibility of IP to add value to basic telephony, e.g. with personal numbers, active phone books, etc.
Create more attractive, stickier service bundles	Build telephony into a wider bundle—triple play via broadband for residential, collaborative work environment for enterprises
Enter new market sectors	For example, lower entry costs enable provision of IP Centrex to smaller businesses
Provide nomadic or quasi-mobile service	Taking advantage of non-location-specific nature of many VOIP services
Extend service to wider range of terminal devices	Not only conventional "black phones" but also soft PC clients, IP phones, video phones and multimode mobile phones
More competitive cost structure	Exploiting lower cost of network equipment by comparison with cost of legacy equipment
Exploit asymmetric regulation	Much lighter regulation of VOIP in most territories may lower cost structure still further

But How Do We Get There?



Source: Heavy Reading Fall 2005 Survey of Service Provider Technology Deployment Plans

There Is An Alternative… The Case Against IMS

- It's just another (A)IN
- It's just another way for legacy telcos to control customers
  - (and the horse has already bolted…)

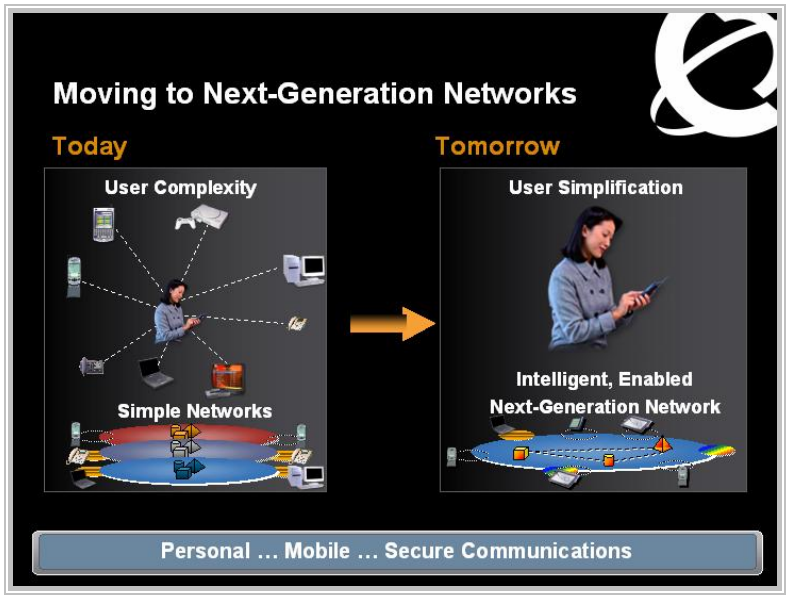
- **So…**
- It must really deliver on cost…
- And it must be truly interoperable…

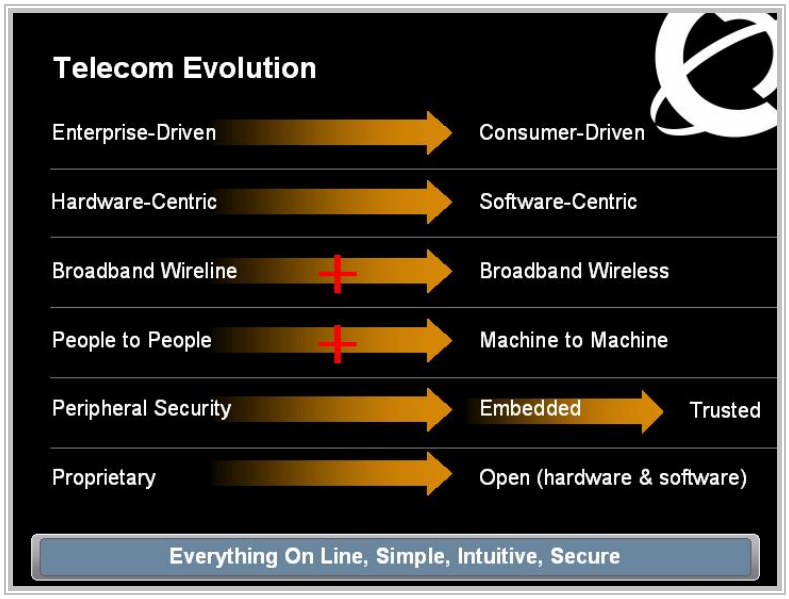
These objections must be addressed if IMS is to succeed

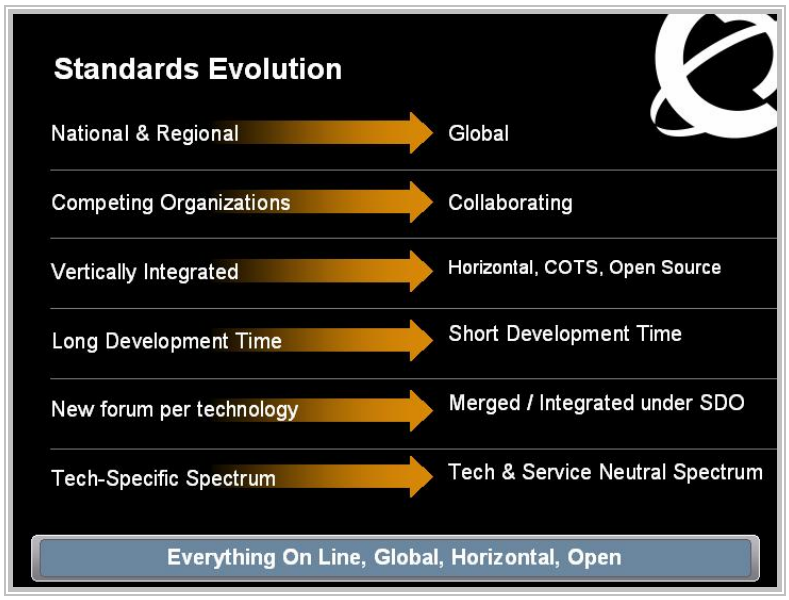
Summary: Key Points

- **The 2006-2007 time period will be the most important period in FMC, IMS and NGN technology and service development**
- IMS is the key emerging technology
- IMS is not the only technology that can fulfil the need for FMC– and its success is by no means guaranteed
- Motivations vary, but the key aim is development of a low-cost applications environment that delivers higher revenue (new services) and lower churn (more complex packages, lower prices)
- Although the overall long-term vision may be irresistible, there are organizational and interoperability challenges that are tough to resolve, especially for major telcos

G.15 – Keynote Speech 5 – NGN Standards: The Key to Success in Convergence – Mr. Brian McFadden, Chief Research Officer, Nortel


Moving to Next-Generation Networks
Today
Tomorrow
User Complexity
Simple Networks
User Simplification
Intelligent, Enabled
Next-Generation Network
Personal … Mobile … Secure Communications


Telecom Evolution
Enterprise-Driven
Consumer-Driven
Hardware-Centric
Software-Centric
Broadband Wireline
Broadband Wireless
People to People
Machine to Machine
Peripheral Security
Embedded
Trusted
Proprietary
Open (hardware & software)
Everything On Line, Simple, Intuitive, Secure


Standards Evolution
National & Regional
Global
Competing Organizations
Collaborating
Vertically Integrated
Horizontal, COTS, Open Source
Long Development Time
Short Development Time
New forum per technology
Merged / Integrated under SDO
Tech-Specific Spectrum
Tech & Service Neutral Spectrum
Everything On Line, Global, Horizontal, Open


The Recipe for Success
> Define global standards that can implemented locally
• Meet the unique requirements of each local market
> Deliver what people value
• Personalization
• Mobility
• Secure, multimedia experience
> Deliver value to all stakeholders
• Consumers, enterprises, service providers, government/society
• Network use cases validate NGN and interoperability standards
Global Standards to enable convergence

G.16 – Keynote Speech 6 – Applications in NGN: New Applications for Converged Networks – Mr. Thomas W. Anderson, Director, Chief Technology Office, Lucent Technologies

Applications in NGN:
New Applications for Converged Networks

Tom Anderson

Director – Chief Technology Office, Network Solutions Group

Lucent Technologies
Bell Labs Innovations

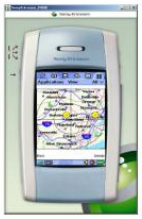
Market Trends - Seamless Communications!

- Users want access to their communications & entertainment services from many places…
  - Home, office, on-the-go
- …using several different devices…
  - PC, telephone, mobile phone
- …without having separate accounts
  - Single sign-on, common contacts, information/content delivery
- New family of intelligent, interactive, location-based broadband services
  - Anytime, anywhere access to messages, lists, calendars and conferencing
  - Live video to handheld devices
  - Mobile access to speech-enabled web services

With seamless blending across wireline and wireless, a service provider can gain larger share of the "telecom wallet"

iLocator – Presence & Location-Enabled Services

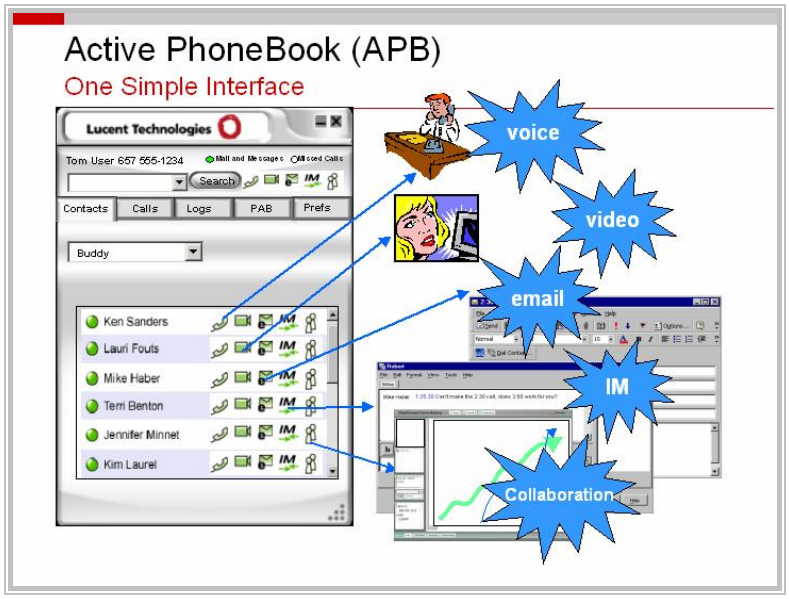
- Tracks people that carry mobile phones (your family, work group, buddies)
- Provides customized alerts when your designated group arrives at or departs from your designated areas, via email, SMS or phone call.

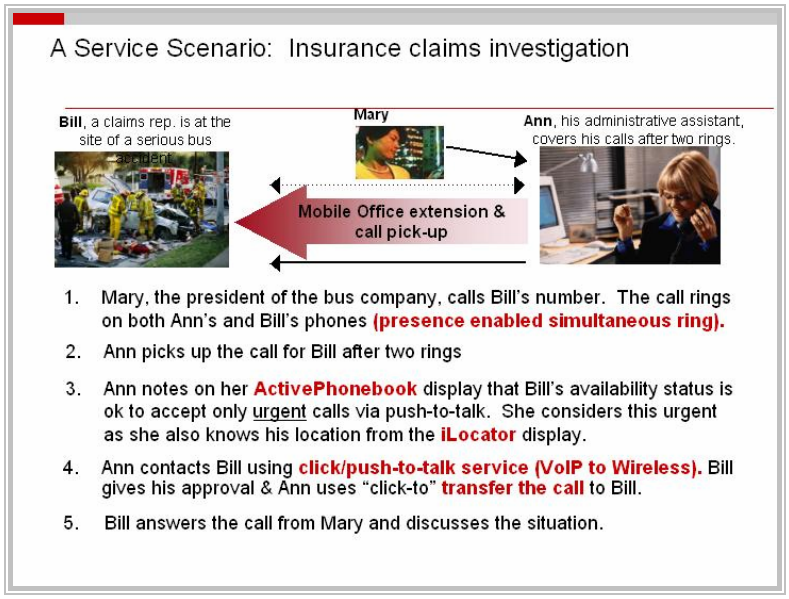


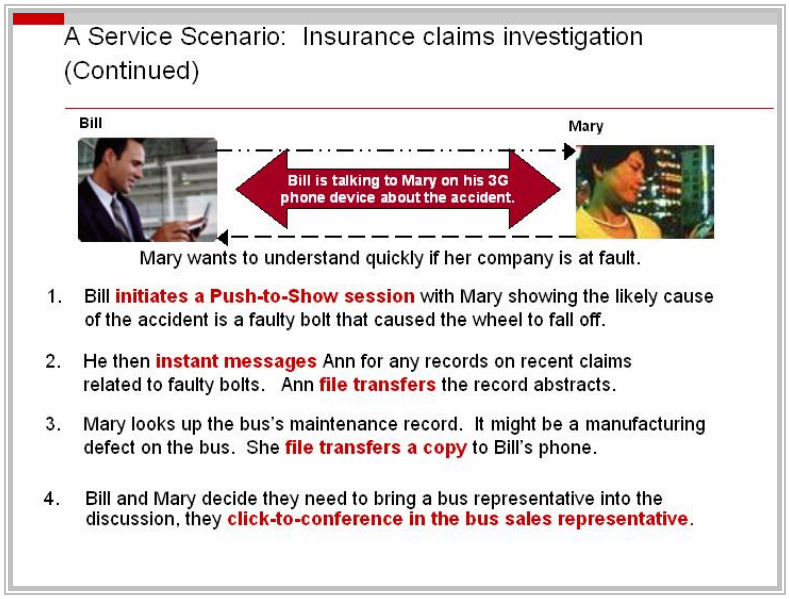
- Provides privacy: users control if they can be tracked and from how far
- Supports SMS'ing from within the application
- Provides personalization: what buddies to display based on the current context and interest groups
- Buddy alerts, Teen Tracker

Solution Components:

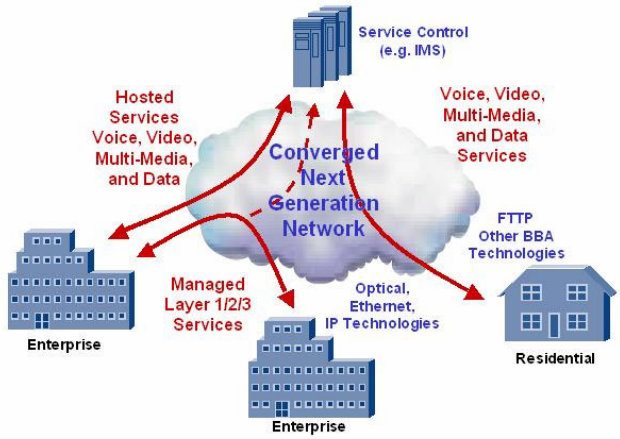
- iLocator Application on the MiLife Application Server
- MiLife Intelligent Services Gateway
- MAP Licensing Server
- Handset & Client Software


Active PhoneBook (APB)
One Simple Interface
Lucent Technologies
Tom User 657 555-1234
Search
Contacts
Calls
Logs
PAB
Prefs
Buddy
Ken Sanders
Lauri Fouts
Mike Haber
Terri Benton
Jennifer Minnet
Kim Laurel
voice
video
email
IM
Collaboration


A Service Scenario: Insurance claims investigation
Bill, a claims rep. is at the site of a serious bus accident
Mary
Ann, his administrative assistant, covers his calls after two rings.
Mobile Office extension & call pick-up
1. Mary, the president of the bus company, calls Bill's number. The call rings on both Ann's and Bill's phones (presence enabled simultaneous ring).
2. Ann picks up the call for Bill after two rings
3. Ann notes on her ActivePhonebook display that Bill's availability status is ok to accept only urgent calls via push-to-talk. She considers this urgent as she also knows his location from the iLocator display.
4. Ann contacts Bill using click/push-to-talk service (VoIP to Wireless). Bill gives his approval & Ann uses "click-to" transfer the call to Bill.
5. Bill answers the call from Mary and discusses the situation.

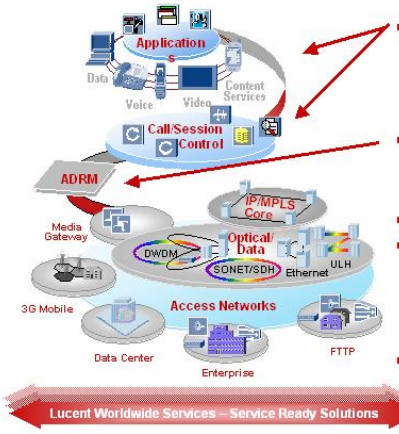

A Service Scenario: Insurance claims investigation (Continued)
Bill
Mary
Bill is talking to Mary on his 3G phone device about the accident.
Mary wants to understand quickly if her company is at fault.
1. Bill initiates a Push-to-Show session with Mary showing the likely cause of the accident is a faulty bolt that caused the wheel to fall off.
2. He then instant messages Ann for any records on recent claims related to faulty bolts. Ann file transfers the record abstracts.
3. Mary looks up the bus's maintenance record. It might be a manufacturing defect on the bus. She file transfers a copy to Bill's phone.
4. Bill and Mary decide they need to bring a bus representative into the discussion, they click-to-conference in the bus sales representative.

Services for the Next Generation Network



Next Generation Network Architecture

Supporting E2E Next Generation Services

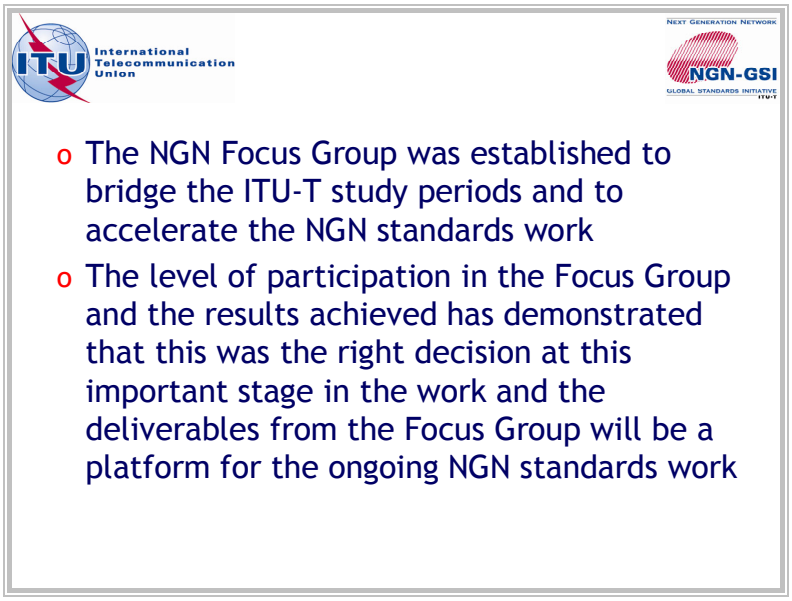


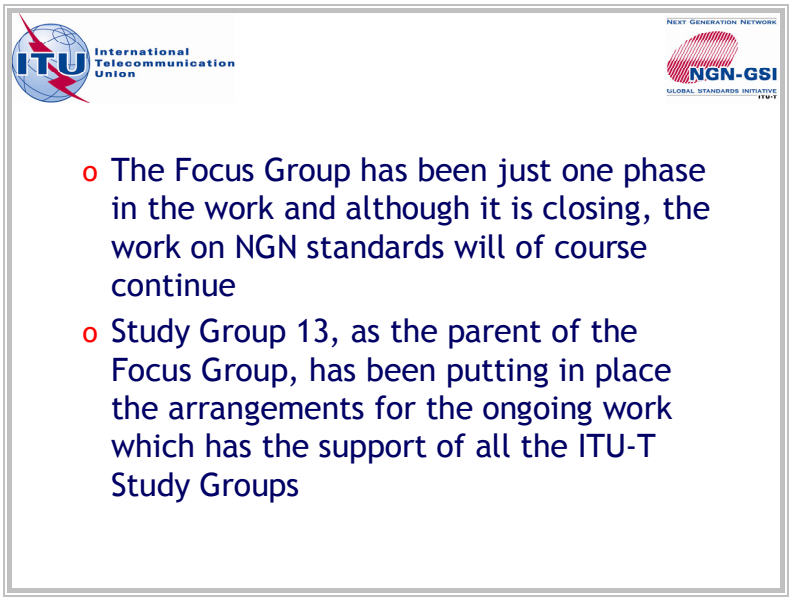
- IMS Service Architecture Supports Blended Lifestyle Apps
  - Residential / FTTP
  - Hosted Solutions for Enterprises
- Application Driven Resource Management (ADRM) - links Applications with Transport Networks to Manage Resources
- End-to-End Security Solutions
- Service Ready Converged Optical/Data infrastructure
  - Multi-Service Aggregation Network supports Video, Transparent LAN Services, IP access, SAN and Session based services
- Next Generation Access Platform meets Next Gen access needs
  - Supports fiber/GPON, DSL and Wireless/WiMax on one platform

Summary

Just buy everything from LU so that the LU stock prices hits $60US and I can retire in luxury and travel for pleasure for a change.

G.17 – NGN-Global Standards Initiative (NGN-GSI) – The Next phase of ITU's NGN Work, Mr. Brian Moore, Chairman ITU-T, Study Group 13





- A major consideration in the future planning has been the need to continue to have a visible focus for the NGN work and to maintain as far as possible the co-location of the closely related NGN work performed under the umbrella of a coordinated work plan

- The ongoing work will be done by the Study Groups, meeting together as necessary, according to an NGN work plan being coordinated by Study Group 13 under the banner of the NGN Global Standards Initiative (NGN-GSI)
- A schedule of NGN-GSI activities has been developed which will ensure that the pace of the work meets the needs of the ITU-T members

- An NGN Joint Coordination Activity (NGN-JCA) involving the leaders of the work in the Study Groups and representatives from other standards organisations who are involved in NGN activities will oversee the coordination, planning and strategic direction of the ongoing work

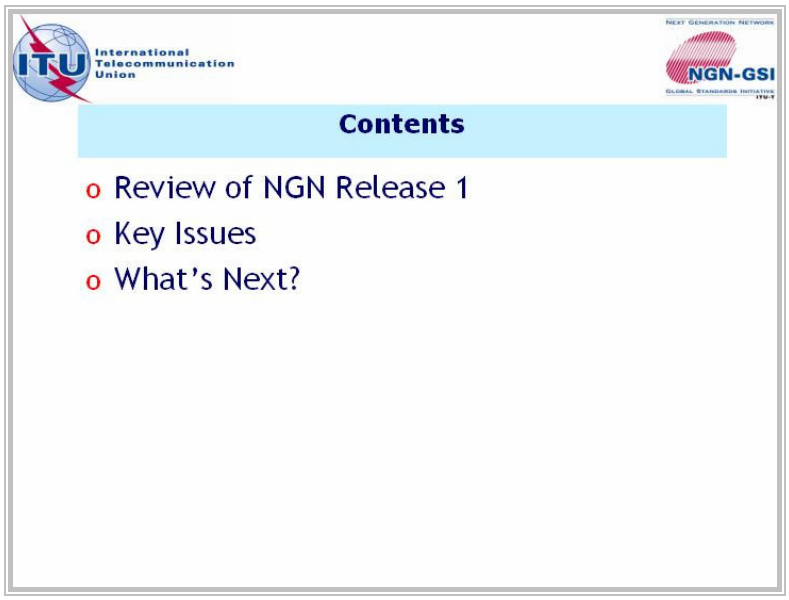
- At each NGN-GSI event a 'Technical and Strategic Review' will be held where results can be shared amongst the participants and NGN technical coherence and strategic / coordination issues can be raised
- The Technical and Strategic Review will report to the NGN-JCA any issues requiring resolution / guidance and will also input planning issues to the Study Group 13 NGN project planning activity

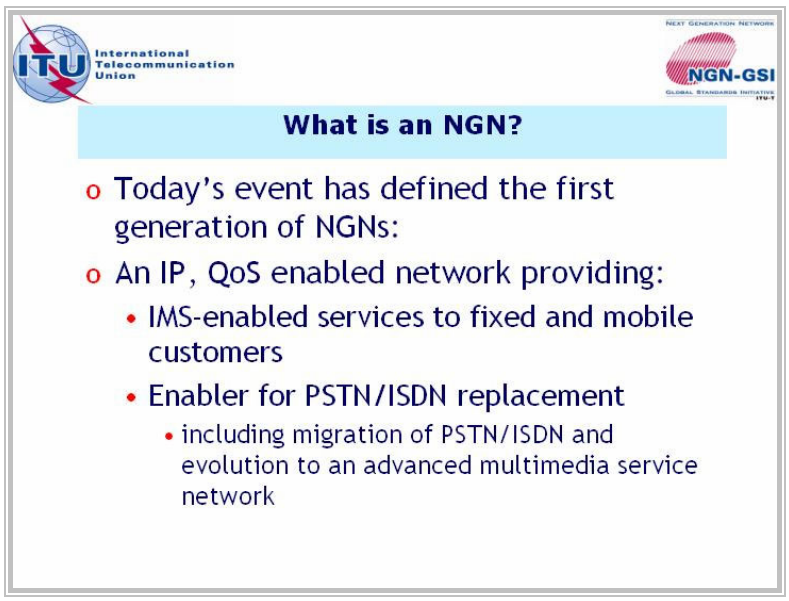
- The following co-located NGN-GSI events have so far been scheduled:
  - January 2006 Study Group and Rapporteur meetings (Announced in TSB Circular 48)
  - April 2006 NGN Workshop followed by Rapporteur meetings
  - July 2006 Study Group and Rapporteur meetings

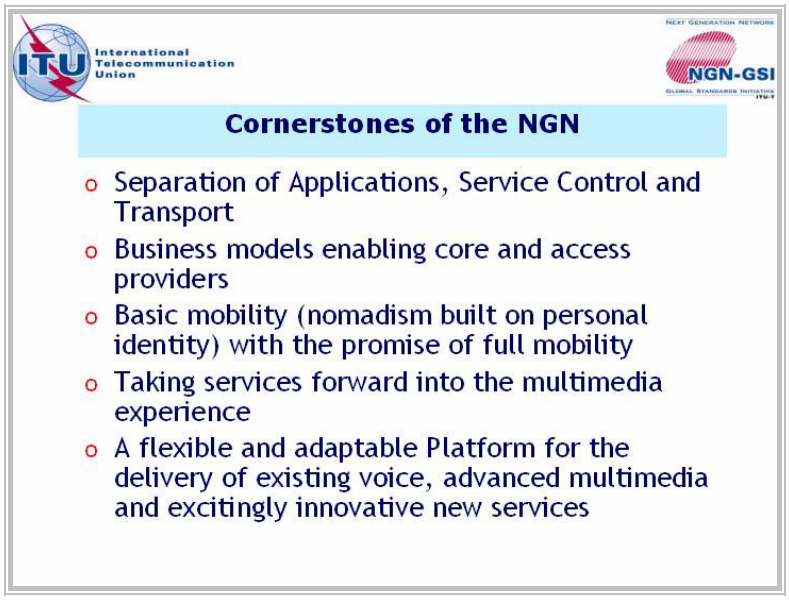
- October 2006 Rapporteur meetings
- January 2007 Rapporteur meetings
- April 2007 Study Group and Rapporteur meetings
- September 2007 Rapporteur meetings
- Planning beyond this to be arranged later depending on progress and need

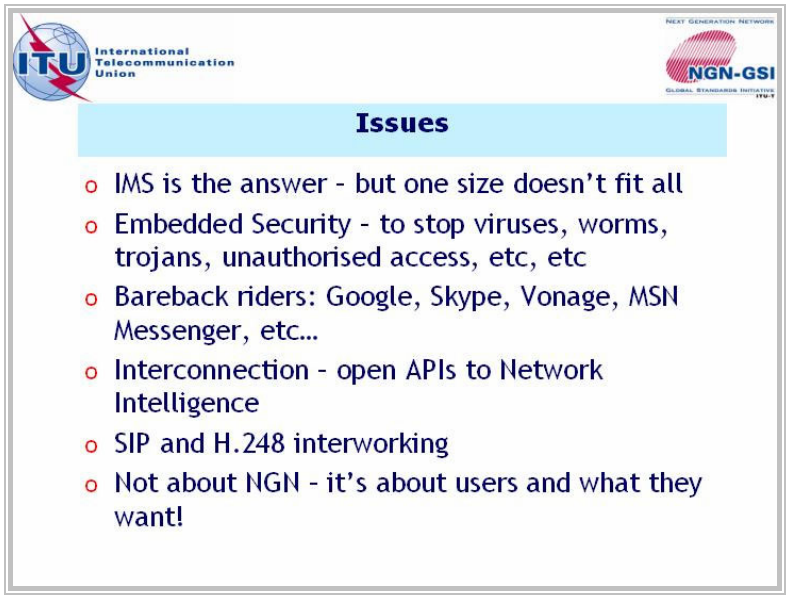

International
Telecommunication
Union
NEXT GENERATION NETWORK
NGN-GSI
GLOBAL STANDARDS INITIATIVE
o With these arrangements and with the continued support of the ITU-T members we are sure that we will be successful in delivering the standards necessary for the global implementation of Next Generation Networks

G.18 – Future Direction of NGN Standards – Wrap-up of Sessions I and II






International Telecommunication Union
NGN-GSI
Cornerstones of the NGN
o Separation of Applications, Service Control and Transport
o Business models enabling core and access providers
o Basic mobility (nomadism built on personal identity) with the promise of full mobility
o Taking services forward into the multimedia experience
o A flexible and adaptable Platform for the delivery of existing voice, advanced multimedia and excitingly innovative new services


International Telecommunication Union
NGN-GSI
Issues
o IMS is the answer - but one size doesn't fit all
o Embedded Security - to stop viruses, worms, trojans, unauthorised access, etc, etc
o Bareback riders: Google, Skype, Vonage, MSN Messenger, etc...
o Interconnection - open APIs to Network Intelligence
o SIP and H.248 interworking
o Not about NGN - it's about users and what they want!


International Telecommunication Union
NGN-GSI
What's Next for R2?
o More focused support on Corporate Communications requirements
o Customer Networks - delivering QoS to the end-terminal - where will this be standardised?
o Protocols (profiles!) to deliver the NGN promise
o Full Mobility -> true convergence between fixed and mobile
o Making entertainment more interactive - IPTV, VoD, etc.
o Evolution of carrier Ethernet/FPBN


International Telecommunication Union
NGN-GSI
What's Next for R2?
o Broadband Wireless Access
o Interconnect (IPsphere?)
o Service delivery platforms
o Auto configuration - providing ease of use for SoHo, enterprise and corporate (unstable load of software)
o Single-Sign on
o Network Management


International Telecommunication Union
NGN-GSI
ITU NGN-GSI will provide the Global Standards for the NGN of the 21st Century
...in cooperation and conjunction with many regional standards bodies and fora worldwide
Thank you for coming

Annex H

TSB Circular 236 and Addendum 1

H.1 TSB Circular 236 – 7 May 2004

INTERNATIONAL TELECOMMUNICATION UNION

Telecommunication Standardization Bureau

Geneva, 7 May 2004

Ref: **TSB Circular 236**

Tel: +41 22 730 5866
Fax: +41 22 730 5853

E-mail: tsbfgngn@itu.int

URL: www.itu.int/ITU-T/ngn/

- To administrations of Member States of the Union;
- To ITU-T Sector Members;
- To ITU-T Associates;
- To ITU-T Study Group Chairmen and Vice-Chairmen

Copy:

- To the Director of the Telecommunication Development Bureau;
- To the Director of the Radiocommunication Bureau

Subject: **- Creation of a new Focus Group on NGN;**
- First meeting of the Focus Group on NGN, Geneva, 23 - 25 June 2004

Dear Sir/Madam,

1. As the Information and Communication Technology (ICT) industry works to define and deploy the next generation network (NGN), NGN standardization has become an increasingly important topic. In order to meet market expectations, ITU-T has taken several measures since July 2003 to further its work on NGN. Activities include forming a new Joint Rapporteurs Group in SG 13, establishing a working definition of NGN, and planning meetings of the Rapporteur Groups of SG 11 and SG 13 during the June/July 2004 period to progress existing drafts. Furthermore, ITU-T membership has brought a number of proposals to the ITU-T restructuring discussions, among which are the establishment of a proper structure to address NGN issues.

2. In view of the rapid global development of NGN, some sector members have expressed their wish to urgently form a new group to address their needs. Specific importance was given to a speedy working environment that can deliver necessary specifications as the marketplace demands.

3. Discussions among some sector members and some of the Chairmen of related Study Groups resulted in a proposal, submitted to me for endorsement, to form immediately a Focus Group on NGN, under the Director of TSB.

4. Guided by ITU-T Resolution 1 (WTSA-2000), Section 5, particularly 5.11, and after consultation with the Chairman of TSAG, I decided to endorse this urgent request. I hereby announce that an NGN Focus Group is now established, which under the current circumstances will exceptionally and temporarily report to the Director of TSB. The draft terms of reference and action plan indicating urgent topics to be studied, as proposed by a group of experts, are given in **Annex 1**. These shall be subject to agreement at the first meeting of the NGN Focus Group.

I am pleased to inform you that this initiative as per Annex 1 is supported by all Study Group chairmen.

5. This NGN Focus Group will be open to all individuals from ITU Member States. The mode of operation of the NGN Focus Group will be defined in compliance with ITU-T Recommendation A.7. After consultation with members, I propose Mr. Chae Sub Lee (Korea Telecom) as Chairman for the first meeting of the NGN Focus Group. One of the tasks of the first meeting is for the NGN Focus Group to select its own management team, the Terms of Reference and work plan going forward.

To simplify the ITU-T NGN studies now being undertaken by the Rapporteur Groups of both SG 11 and SG 13 it was suggested that, after the Rapporteur Groups' forthcoming meetings, their NGN activities which are related to the mandate of the NGN Focus Group be moved into the NGN Focus Group. It should be noted, as indicated in **Annex 1**, that the NGN Focus Group will be moved under a specific Study Group after WTSA-2004. Also, the establishment of the NGN Focus Group will by no means interfere with the current discussions on ITU-T Study Group restructuring. Rather, it will serve to help ITU-T membership develop NGN standards with the required speed and focus.

6. I encourage ITU-T membership to actively participate in the studies of the NGN Focus Group. A report on the creation of the NGN Focus Group will be provided to the next TSAG meeting in July 2004, and later on to WTSA-2004. It is my sincere hope that by creating this NGN Focus Group, ITU-T will meet the expectations of the ITU-T membership, and demonstrate its ability to address the pressing needs of the market.

7. The first meeting of the NGN Focus Group will be held in Geneva from 23 to 25 June 2004, immediately after the next meeting of SG13 NGN Joint Rapporteurs Group from 14 to 22 June 2004. The web site for the NGN Focus Group is http://www.itu.int/ITU-T/ngn/. The documents of the NGN Focus Group including reports and any additional information will be published on this web site. Participants are encouraged to submit input documents to the NGN Focus Group meeting by electronic mail to the following address: **tsbfgngn@itu.int** preferably by 18 June 2004.

8. For your convenience, wireless LAN facilities are available in the ITU main conference room areas and in the CICG building (International Conference Centre of Geneva) for participants' use. Detailed information is available on the ITU-T website (http://www.itu.int/ITU-T/edh/faqs-support.html).

9. For your convenience, a hotel confirmation form is enclosed as **Annex 2** (see http://www.itu.int/travel/HotelList.html for the list of hotels).

10. In order to enable TSB to make the necessary arrangements concerning the organization of the meeting, I should be grateful if you would send to TSB the registration form in **Annex 3**, duly completed (one per participant) by fax (No.: +41 22 730 5853), by e-mail (tsbreg@itu.int) or via the on-line form at http://www.itu.int/ITU-T/ngn/, as soon as possible, but **not later than 11 June 2004**.

11. We would remind you that citizens of some countries are required to obtain a visa in order to enter and spend any time in Switzerland. The visa must be requested and obtained from the office (embassy or consulate) representing Switzerland in your country or, if there is no such office in your country, from the one that is closest to the country of departure.

If problems are encountered by ITU Member States, Sector Members or Associates, and at the official request made by them to TSB, ITU can approach the competent Swiss authorities in order to facilitate delivery of the visa. Any such request must specify the name and functions of the individual(s) for whom the visa(s) is/are requested and be accompanied by a copy of the approved registration form for the ITU workshop in question. **Please note that the ITU can assist only representatives of ITU Member States, ITU Sector Members or ITU Associates.**

Yours faithfully,

H. Zhao
Director of the Telecommunication
Standardization Bureau

Annexes: 3

Annex 1

(to TSB Circular 236)

Draft terms of reference and action plan for ITU-T NGN Focus Group

Beijing Drafting Group
ITU-T NGN Standards Globalization

1.0 Objective

The purpose of this paper is to propose the ITU-T action plan to address the immediate industry need for focused global NGN standards development.

2.0 Background

A number of Sector Members have identified an urgent need to define global NGN standards. Several Recommendations are being drafted under various Rapporteur groups and Study Groups within ITU-T.

In addition, there are currently a number of technical proposals being considered in regional standards organizations, e.g., ETSI/TISPAN. These activities need a venue to become internationally accepted global standards.

ITU-T is currently going through restructuring with the intent to restructure at WTSA in October 2004. The following proposed action plan does not interfere with the current discussion on restructuring – it is independent from it.

3.0 Proposed Action Plan

The proposed action plan has a two-stage approach: short term and long term.

3.1 Short term:

- **By May 7th 2004** - Create a Focus Group under the TSB Director to provide a single focal point for NGN activities within ITU-T.
- The terms of reference of this Focus Group are to provide deliverables within 12 months relating to:
  - A nomadicity architecture (for example 3GPP/3GPP2 IMS) supporting broadband xDSL access. The following issues need to be resolved:
    - Quality of Service in the xDSL access
    - Authentication
    - Security
  - Current NGN activities within SG 11 and SG13 on QoS Signalling, IP QoS Signaling requirements and other NGN signaling related requirements that have not been CONSENTED in June 2004 following the JRG-NGN
- The proposed lifetime of this Focus Group is dependant on the completion of its objectives – estimated mid 2005
- The FG uses the ITU-T EDH, and other ITU-T support structures including secretariat support.
- The working methods will be defined by the Focus Group, according to Recommendation A.7

3.1 Long term:

- **By October 2004 WTSA**: - The future structure of ITU-T should be clear, stable, and include a clear focus on NGN
- **By November 2004** (shortly after WTSA):
  - The expectation is that this Focus Group will operate under the most appropriate ITU-T SG.

4.0 Participants:

- Houlin Zhao, TSB
- Keith Dickerson, BT
- Gary Fishman, Lucent
- Yukio Hiramatsu, NTT
- Bilel Jamoussi, Nortel Networks
- Lintao Jiang, CATR of MII
- Chae Sub Lee, Korea Telecom
- Bernard Marti, France Telecom
- Brian Moore, Lucent UK
- Helmut Schink, Siemens AG

April 28, 2004

H.2 Addendum 1 to TSB Circular 236 – 18 May 2004

INTERNATIONAL TELECOMMUNICATION UNION

Telecommunication Standardization Bureau

Geneva, 18 May 2004

Ref: **Addendum 1 to TSB Circular 236**

Tel: +41 22 730 5866
Fax: +41 22 730 5853
E-mail: tsbfgngn@itu.int

URL: www.itu.int/ITU-T/ngn/

- To administrations of Member States of the Union;
- To ITU-T Sector Members;
- To ITU-T Associates;
- To ITU-T Study Group Chairmen and Vice-Chairmen

Copy:
- To the Director of the Telecommunication Development Bureau;
- To the Director of the Radiocommunication Bureau

Subject: **Further elaboration on the Focus Group on Next Generation Networks (NGN FG) and its first meeting in Geneva, 23 - 25 June 2004**

Dear Sir/Madam,

1. In TSB Circular 236 of 7 May 2004, I announced the creation of a Focus Group on Next Generation Networks (NGN FG). I herewith responded to urgent calls from some Sector Members for globally accepted standards which are needed to meet the pressing market demands to deploy NGN. The creation of the NGN FG is a place for members to discuss NGN-related topics. The fact that the NGN FG is under the TSB Director is a temporary measure to bridge the gap between now and WTSA-04. Since its creation I noted high interest, and I very much appreciate your support for this action. This addendum provides further elaboration for the launching of the NGN FG as part of the preparation of its first meeting in Geneva from 23 to 25 June 2004.

2. After consultation with some members, I propose Mr Dick Knight (BT) and Mr Ron Ryan (Nortel Networks) as Vice Chairmen of the NGN FG. They will assist the NGN FG Chairman, Mr Chae Sub Lee (KT). The NGN FG will select its own management team at its first meeting.

3. The NGN FG Chairman prepared, in consultation with some members and in order to facilitate the first meeting, his first thoughts on the preparation of the first meeting in Annex 1 of this Addendum. He will provide soon further details on the NGN FG mailing list.

4. This NGN FG will be open to ITU Member States, ITU-T Members and Associates. I strongly encourage ITU-T membership to actively participate in the studies of the NGN Focus Group:

- The NGN FG mailing list for technical discussions is fgngn@itu.int. You are welcome to join this reflector to further progress the work prior to the first meeting of the NGN FG. You may subscribe to this reflector using the online subscription form available on: http://www.itu.int/ITU-T/ngn/.
- Participants of the first NGN FG meeting are encouraged to submit input documents to the email account tsbfgngn@itu.int preferably by 18 June 2004. All documents for the first meeting will be available to the public.
- The web site for the NGN Focus Group is http://www.itu.int/ITU-T/ngn/.

5. The meetings of the NGN FG will be paperless.

Yours faithfully,

H. Zhao
Director of the Telecommunication
Standardization Bureau

Annexes: 3

Annex 1

(to Addendum 1 to TSB Circular 236)

This addendum provides further elaborations for the launching of the Focus Group as part of the preparation of the first meeting of the NGN FG (23-25 June 2004).

1. General Mandate of NGN FG

The Focus Group on Next Generation Networks (NGN FG) is mandated to create its deliverables within 12 months concerning the following three topics:

- A nomadicity architecture (for example, based on 3GPP/3GPP2 IMS) that includes support for broadband xDSL access. QoS in the xDSL access, Authentication and Security issues need to be resolved
- Current NGN activities within SG 11 and SG 13 on QoS Signalling include IP QoS aspects and other NGN signaling related requirements
- Other NGN-related documents that have been initiated within the JRG-NGN, but have not been CONSENTED by June 22, 2004

2. Detailed ToR of NGN FG

2.1 NGN Functional Architecture

This study will describe the functional and structural architecture of the NGN using the generic definitions, symbols and abbreviations that are defined in related ITU-T Recommendations. This study will include xDSL and IMS Architectures as well as the NGN work already undertaken in ITU-T, which refers to e.g.:

- Draft Rec. Y.NGN-Overview, Y.NGN-SRQ and Y.NGN-GRM from Q.1/13 and Q.11/13
- Draft Rec. Y.NGN-FRA: Functional Architecture of NGN from Q.1/13
- 3GPP 23.228 (IMS.stage 2)
- 3GPP2 X.S.0013-002-0 (All IP Core Network Multimedia Domain: IP Multimedia Subsystem Stage 2)
- xDSL Based Service Architecture : Q.B/16
- Others: To be added

2.2 Nomadicity and Mobility

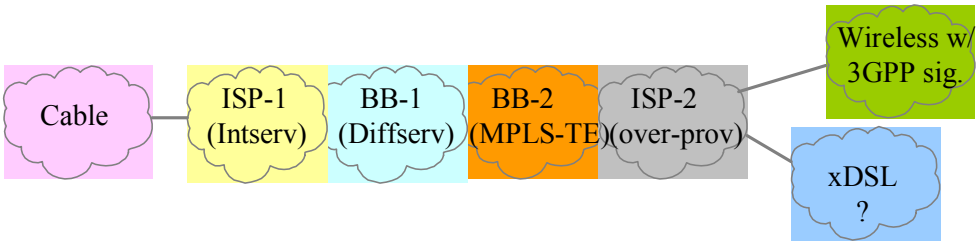
This study identifies requirements about various types of mobility and its behaviours such as nomadicity as part of overall NGN Functional Architecture. This study develops an architecture model to arrange various functions for management of nomadicity-mobility and includes development of control architecture and relevant network capabilities. Examples of references on this study are:

- Draft Rec. Y.NGN-FRA: Functional Architecture of NGN (from Q.1/13)
- Draft Rec. Y.NGN-MOB: Mobility management requirements and architecture for NGN (from Q.11/13)
- TD34R1 from Q.2/SSG: Mobility management draft output
- 3GPP 23.228 (IMS.stage 2)

- 3GPP2 X.S.0013-002-0 (All IP Core Network Multimedia Domain: IP Multimedia Subsystem Stage 2)
- Draft Rec. Q.1703 (TD89) from Q.1/SSG: Vision
- 3GPP TR 23.864 (Commonality and interoperability between IMSs)
- Others: To be added

2.3 QoS

This study defines an end-to-end QoS architecture and includes QoS signaling and relevant protocol aspects. For support of a wide range of services (including real time/ streaming/ non-real time services and multimedia) over NGN, NGN should be capable of providing a predictable and consistent end-to-end QoS guarantee for each service flow with requested QoS class. The following picture shows one complex example of how QoS needs to be supported in a heterogeneous environment.



This study refers to e.g.:

- Rec. Y.1291: An architectural framework for support of Quality of Service (QoS) in Packet networks (from Q.16/13)
- Rec. Y.1541: QoS classes quantify user application needs in terms of IP network performance (from Q.6/13)
- Rec. Y.1221: "traffic contract" complements QoS class by describing flow characteristics/limits (from SG 12)
- Draft Rec. Y.e2eqos: End-to-End QoS Architecture for IP/MPLS networks (from Q.16/13)
- Draft Rec. Y.123.qos : (Q.16/13)
- 3GPP 23.207. End-to-End Quality of Service (QoS) concept and architecture (Release 6)
- 3GPP2 S.R0035. Quality of Service. Stage 1 Requirements
- 3GPP TS 26.236 version 5.4.0 Release 5: Universal Mobile Telecommunications System (UMTS); Packet switched conversational multimedia applications; Transport protocols Rec. G.1010 "End-user multimedia QoS categories": from Q.13/12
- Rec. H.360 (from Q.H/16)

2.4 NGN Control, Signaling and Authentication Capability

This study specifies service architecture and capabilities for "Reliable and Controllable NGN" as well as reference configurations from the transport and control plane aspects. Control and authentication mechanism with signalling requirements of NGN have been requested as one of the urgent issues for the realization of NGN. This study would cover these requirements which refer to e.g.:

- Draft Rec. Y.NGN-MAN: Manageable NGN Network (from Q.1/13)
- TRQ.NCAP1 (TD.GEN/45R1 from SG 11): High level functional requirements for Packet-based network control architecture
- Draft Rec. Q.NGN-NCA (TD.GEN/75 from SG 11): Network control architecture
- TRQ.NCAP2 (TD.GEN/25 from SG 11): Gate control protocol requirements
- TRQ.NCAPX (TD.GEN/76 from SG 11): Session control protocol requirements
- TRQ.NGN-STM (TD.GEN/26 from SG 11): Service Triggering Mechanisms in SIP environments
- TRQ.IPQOS (from SG 11)
- 3GPP 23.228 (IMS.stage 2)
- Others: To be added

2.5 Security

This study will define the security related aspects of a "Reliable and Controllable NGN network". More detailed work items will be identified soon and contributions are urgently requested. ITU-T SG 17 work will also be considered by the Focus Group.

2.6 Migration from TDM to NGN

This study will define the appropriate migration and interworking strategies for existing networks and services towards NGN networks as a target network taking into account that the building of a network takes place through several evolutionary steps / milestones. An urgent request was addressed for the migration from TDM into NGN during the last JRG-NGN meetings, which refers to e.g.:

- Draft Rec. Y.NGN-MIG: Migration of networks (include. TDM Networks) to NGN (from Q.1/13)
- Rec. Q.1900 series: BICC
- Others: To be added

3. Time Plan

The proposed lifetime of this NGN FG is dependent on the completion of its objectives – estimated mid 2005.

- 1st Meeting: 23rd ~ 25th June 2004, Geneva, Switzerland

  Note: IMS related matters will not be addressed on the first day to avoid overlap with the ETSI TISPAN/3GPP workshop.
- 2nd Meeting: 19th ~ 23rd July 2004, Geneva, Switzerland (right after TSAG)
- 3rd Meeting: Beginning of September 2004, Geneva, Switzerland
- 4th Meeting: End of November 2004, Geneva, Switzerland (overlap periods between SG 11 and SG 13 meetings)

  Note: Schedules for 2nd ~ 4th meetings to be confirmed at the first meeting. Further meetings will be scheduled as necessary.

Annex I

ITU-T Information

ITU: A Short History

On 17 May 1865, after the first International Telegraph Convention was signed in Paris by 20 founding members, the International Telegraph Union (ITU) was established.

In 1947, after the Second World War, ITU held a conference in Atlantic City with the aim of developing and modernizing the organization. The newly created United Nations recognized ITU's specific competencies and the organization became a UN specialized agency.

- 1837 Invention of the first electric telegraph
- 1844 Samuel Morse sent his first public message over a telegraph line between Washington and Baltimore
- 1865 17 May Foundation of the International Telegraph Union by twenty States with the adoption of the first Convention. First Telegraph Regulations.
- 1876 Alexander Graham Bell patents his invention of the telephone
- 1924 Paris – Creation of CCIF (International Telephone Consultative Committee)
- 1925 Paris – Creation of CCIT (International Telegraph Consultative Committee)
- 1927 Washington – Creation of the CCIR (Intl. Radio Consultative Committee)
- 1932 Madrid – Plenipotentiary Conference. Telegraph Union changes name to International Telecommunication Union
- 1947 ITU became a Specialized Agency of the United Nations
- 1956 Geneva – CCIF and CCIT merged into CCITT (International Telegraph and Telephone Consultative Committee)
- 1992 Geneva – Plenipotentiary Conference. Creation of 3 Sectors: ITU-T replaces CCITT, ITU-R replaces IFRB, CCIR, and ITU-D replaces TCD

Figure I-1 – History

In 2004 ITU was named as one of the world's top ten most enduring institutions by a panel of distinguished scholars from universities across the United States. The awards were announced by Booz Allen Hamilton, a global strategy consulting firm, in order to celebrate institutions that "have reinvented themselves time and again — and remained market leaders — as the unique circumstances of their founding have given way to changing conditions."

The ITU provides an essential forum without which the global telecommunications network (including the Internet) of today could not have been realised and the next generation network (NGN) would remain an unfulfilled dream.

ITU Today

The main work of ITU is divided between three Sectors, namely:

- the Radiocommunication Sector (ITU-R);
- the Telecommunication Development Sector (ITU-D);
- the Telecommunication Standardization Sector (ITU-T).

The ITU-R plays a vital role in the management of the radio-frequency spectrum and satellite orbits, finite natural resources which are increasingly in demand from a large number of services such as fixed, mobile, broadcasting, amateur, space research, meteorology, global positioning systems, environmental monitoring and, last but not least, those communication services that ensure safety of life at sea and in the skies.

The ITU's Telecommunication Development Bureau has well-established programmes of activities to facilitate connectivity and access, foster policy, regulatory and network readiness, expand human capacity through training programmes, formulate financing strategies and e-enable enterprises in developing countries.

ITU-T ensures the efficient and on-time production of high quality standards covering all fields of telecommunications on a worldwide basis, as well as defining tariff and accounting principles for international telecommunication services.

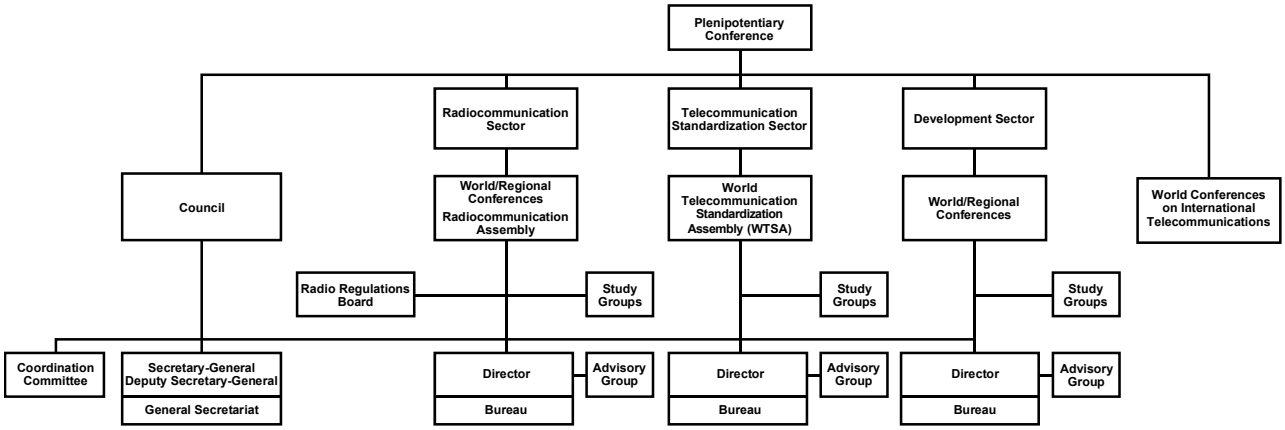


Figure I-2 – The Structure of ITU

What does ITU-T do?

The Telecommunication Standardization Sector (ITU-T) of ITU is the premier **International Platform for the Creation of Standards for Information and Communication Technologies (ICT)**. Nearly 3000 ITU standards (in ITU parlance, ITU-T Recommendations), are in place and **form the backbone of the world's communications systems, ranging from fixed-telephony through mobile telephony to the Internet.**

ITU-T provides a unique environment open to all – private and public sector – in which standards are built to meet the demands of the fast moving ICT industry. Currently, the ITU-T comprises 189 Member States and some 450 sector members from the private sector including service/network providers, manufacturers, regulators, research and development institutions, universities, regional/international telecommunication organizations, forums, consortia etc. ITU-T produces standards that are a fair representation of its members' concerns using a consensus based voting system.

"The functions of the Telecommunication Standardization Sector shall be, bearing in mind the particular concerns of the developing countries, to fulfill the purposes of the Union relating to telecommunication standardization,… by studying technical, operating and tariff Questions and adopting Recommendations on them with a view to standardizing telecommunications on a worldwide basis."

Chapter III, Article 17, the ITU Constitution.

The work of ITU-T fosters seamless interconnection of the world's communication network and systems. And moving forward, ITU-T, is already playing a leading role in shaping the next generation of ICT.

International standards for ICT are growing in importance not only because of globalization but also because the ICT sector is one of the pillars in today's economy. Whether we exchange voice, data or video messages, communication cannot take place without standards linking the sender and the receiver such as Q.708, E.164, E.212, H.262, H.264, X.509, X.805, J.112, G.711, H.323, T.30, T.80, T.800 etc. The telephone network, arguably one of the most complex projects ever undertaken, is based on a myriad of standards, and ITU's work was instrumental in its creation. ITU's work has also been one of the key enablers of the rapid growth of the two most recent telecommunication technologies: mobile telephony and Internet.

ITU-T Recommendations aim to create a world of ICTs that work together, where innovation is encouraged, and not stifled by restrictive proprietary environments. Network interoperability is a key concern for service providers who don't want to be locked into the equipment of one manufacturer and need the reassurance that as they move to more converged services all network elements will work together. Consumers want the reassurance that products that they buy will work with other products – reassurance that only products produced using standards can offer.

ITU-T aims to continue to be recognized as the pre-eminent worldwide telecommunication standards body. In recognition of the rapidly changing ICT environment, ITU-T has been changing its procedures and practices to ensure that it can respond quickly to the demands of the industry. The Alternative Approval Process (AAP) introduced in 2000 has been a tremendous success, with the majority of new Recommendations being approved within six weeks of completion.

	Before 1988	**1989-1993**	**1993-1996**	**1997-2000**	**2001-2004**
Approval time	4 years	2 years	18 months	9 months (exceptional case: 5 months)	2-9 months
Publication time	2-4 years	2 years	1-1.5 year	6-12 months	3-9 months

Figure I-3 – ITU-T's refined processes have contributed to a much improved time to market for its standards

Activities

ITU-T Study Groups do the technical work of ITU-T developing Recommendations and other publications. The people involved in these groups are experts in telecommunications from all over the world.

ITU-T workshops and seminars are held to promote existing work areas or explore new ones. The events cover a wide array of topics in ICT and attract high-ranking experts as speakers, attendees from engineers to high-level management from all industry sectors. Recent topics covered have been next generation networks, ICT in vehicles, IPv6, home networking, cybersecurity and video coding.

Current work areas

ITU-T is now addressing standards needs for the 21st century in areas such as:

- Next-generation networks (NGN);
- Broadband access;
- Multimedia services;
- Emergency telecommunications;
- Home Networking;
- IP issues;
- Optical networking;
- Network management;
- ICT security issues;
- Fixed/mobile convergence.

ITU-T Structure

The technical work of ITU-T is managed by the study groups (SGs) that develop Recommendations and other publications. The people involved in these SGs are experts in telecommunications from all over the world.

There are 13 SGs:

SG 2 – Operational aspects of service provision, networks and performance

SG 3 – Tariff and accounting principles including related telecommunication economic and policy issues

SG 4 – Telecommunication management

SG 5 – Protection against electromagnetic environment effects

SG 6 – Outside plant and related indoor installations

SG 9 – Integrated broadband cable networks and television and sound transmission

SG 11 – Signalling requirements and protocols

SG 12 – Performance and quality of service

SG 13 – Next-Generation Networks (NGN)

SG 15 – Optical and other transport networks infrastructures

SG 16 – Multimedia terminals, systems and applications

SG 17 – Security, languages and telecommunication software

SG 19 – Mobile telecommunication networks

In addition, TSAG (Telecommunication Standardization Advisory Group) meets regularly to review the priorities, programmes, operations, financial matters and strategies of the Sector.

WTSA (World Telecommunication Standardization Assembly), meets every four years, to adopt working methods and procedures for the management of ITU-T's activities. The last WTSA, WTSA-04 was heldin October 2004. Specific matters within the competence of WTSA can be assigned to TSAG. The four-year cycle between two WTSAs is called a Study Period. The current Study Period is 2004-2008.

Focus groups

Focus groups are an instrument created by ITU-T to provide an additional working environment for the quick development of standards in specific areas. The procedure in ITU-T Rec. A.7 defines how an "arms-length" entity (called a "focus group" in ITU-T parlance) can be created to work with an ITU-T study group as a parent body while at the same time maintaining a high degree of independence, in particular concerning working methods, types of outputs, membership, financing and administration.

Focus groups generate outputs in well-defined areas within a short-term charter; these products can remain stand-alone focus group deliverables (e.g. technical specifications or technical reports), or may be progressed into the study groups in order to become traditional ITU-T products (e.g. Recommendations and supplements).

Focus groups can originate within ITU-T or from an external group.

Products

The main products of ITU-T are non-binding Recommendations. These are divided into themed series, i.e. the G-series covers Recommendations on "Transmission systems and media, digital systems and networks"; and the H-series covers "Audiovisual and multimedia systems". Recommendations can be amended with additions or corrections that could become Annexes, Amendments or Corrigenda, depending on the nature and content of the changes. Additionally ITU-T develops other products including supplements to Recommendations, implementer's guides, handbooks and manuals.

Catalogues of publications as well as a complete list of ITU-T Recommendations are available at: itu.int/ITU-T/publications

ITU-T also publishes the Operational Bulletin, which is a fortnightly detailed update containing information that is required to maintain the global interconnection of the world's telecommunication networks. In particular, it contains information on changes to numbering and routing plans, whether at the national or international level.

Cooperation with other organizations

ITU-T cooperates with many other organizations which also develop international standards such as the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC). In addition ITU-T has established partnerships with many others including the Internet Engineering Task Force (IETF), the Institute of Electrical and Electronics Engineers (IEEE), the third generation partnership projects (3GPP/3GPP2) etc. There is also active cooperation with other standards development organizations (SDOs) and forums and consortia. The procedures for communicating with forums and consortia are defined in ITU-T Recommendation A.4.

Recommendation A.5 deals with situations where ITU-T wishes to make reference in its own Recommendations to documents from forums and consortia or other SDOs.

Recommendation A.6 addresses cooperation and exchange of information between ITU-T and national and regional standards development organizations.

The list of qualified organizations according to ITU-T Recs. A.4, A.5 and A.6 is available at: itu.int/ITU-T/tsb-director/sdo/qualified.html.

For more detail on working methods, ITU-T structure and meeting logistics please request a copy of the ITU-T Guide for Beginners from standards@itu.int.

The Telecommunication Standardization Bureau (TSB)

Friendly and Educated to the highest level, ITU-T's **Secretariat** – the **Telecommunication Standardization Bureau (TSB)** – offers a range of services to create the best environment for the creation of world-class standards, from **Electronic Working Facilities** to **Meeting Management**. ITU's headquarters in Geneva has many **Meeting Rooms** equipped with **State-of-the-Art Meeting Facilities** and **over 60 Multilingual Staff** to provide meeting support, backed by the ITU General Secretariat.

Meeting facilities include **Wireless LAN coverage** throughout, **LAN** and **Power Points** at every delegate position, **Multiple PCs** for delegate use, and an option for **Paper or Electronic Documents**.

Essentially, TSB provides logistical support to the Study Groups in which standards are made. It also manages telecommunication numbering resources, ICT Intellectual Property Rights (IPR) issues, promotion, workshops, membership, documents, finance, the website etc. Headed by an elected representative, it's the body responsible for providing cohesion to ITU-T's standards making process. In addition TSB acts as an **Umbrella Organization** for forums wishing to give their work the added value and **International Status** that comes with the ITU-T brand.

Membership

Membership of ITU-T offers the chance for the private sector to join with international administrations to shape the future of ICTs, in a **Open, Fair and Transparent Environment**. As well as **Networking Opportunities** and the chance to **Influence the Creation of Worldwide Standards**, members have a unique opportunity to get **Return on Investment** (ROI) by being able to **Implement Ahead of the Pack**, and **Get Products and Services to Market Quicker than their Competitors**. **Exposure on an International Platform** allows access to a wealth of information and offers unbeatable marketing opportunities.

Members that participate in the ITU-T standards making process have an unparalleled opportunity to shape standards, ensuring that their concerns are heard and that they are able to implement standards before they are officially released as Recommendations.

ITU-T meetings attract the cream of the ICT world, and offer an unparalleled opportunity for networking for all concerned with the refinement and development of ICTs. Visibility at ITU-T's meetings is to mix with and become a player in global ICTs.

ITU-T's membership fee is currently very low, at $23,500USD a year.

Members are entitled to **Unlimited Participation** in any or all of ITU-T's Study Groups. Associates can participate in meetings of their chosen Study Group.

Resources

ITU-T has a wealth of **Freely Available Resources** through its **Website**. These include **Databases of Numbering Resources**, **ASN.1 Modules**, **Terms and Definitions**, **Implementation Guides for Recommendations**, **Guides and Tutorials** for systems designers**. All new** Recommendations and related texts are available in **Six Different Languages**, online and on **Fully Searchable CD-ROMs.** Members enjoy free web-access to ITU-T Recommendations with one user account per membership.

An ITU-T specific **Communications Centre**, *the Lighthouse*, offers a web-based user-friendly and alternative view of ITU-T. With dynamic content, news, features and FAQs, *Lighthouse* sheds light on ITU-T's activities, past, present and future.

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