Network Evolution to NGN and Convergence

1.2.1 ITU-T: Activities on NGN

ITU-BDT Regional Seminar on Fixed Mobile Convergence and Guidelines on the smooth transition of existing mobile networks to IMT-2000 for Developing Countries for Africa Region

Nairobi, Kenya 9-12 May 2005

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Objective and Outline

• Objective
  • Provide an overview of the activities within ITU-T on Next Generation Networks

• Outline
  • Historical Perspectives
  • Definition of NGN
  • GII, IMT-2000 and NGN
  • Creation of Focus Group NGN
    • What is a Focus Group?
  • FG NGN Structure and Leadership
  • FG NGN Participation, Deliverables
Historical Perspectives

- Everyone working on standards is working on “the next generation”
  - The “current generation” is already specified and deployed
- ITU-T SG 13 traditionally forward looking:
  - ISDN
  - Global Information Infrastructure
  - NGN 2004 Project
- Other SGs have turned vision into reality
  - SG 11: CCS7, ISDN protocols, Intelligent Networks, ...
  - SSG (now SG 19) separated from SG 11 in recognition of rapidly increasing importance of mobility as a high utility feature for users, global predominance of mobile subscribers, innate deployment efficiencies of wireless

Definition of NGN

Rec. Y.2001 “General overview of NGN” (Dec 2004):
- An NGN is a packet-based network able to provide Telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.
Global Information Infrastructure is all about convergence

Internet, Broadcasting, Telephony, ...

The NGN 2004 Project began to establish implementation guidelines and standards for the realization of Next Generation Networks based on GII concepts.

- Y-series Recommendations: GII
- Per Fig. 5-1/Y.110 – GII is at the centre of the threefold industry convergence

IMT-2000 Family Concept

- ITU-T Rec. Q.1701 (03/99) Figure 2: Framework for IMT-2000 networks
ITU and the SDO partners of the 3G Partnership Projects

Partner Standards Development Organizations (SDOs)

3GPPs and ITU-R WP 8/F

- High level description of air interfaces
- Refers out to the SDOs' standards (ETSI, T1, etc.)
3GPPs and ITU-T SSG / SG 19

Rec Q.1741.n, Q.1742.m

- 3G road map
- Refers out to the SDOs’ standards (ETSI, T1, etc.)

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3GPP IMS and 3GPP2 MMD essential alignment

- IMS: a set of core network FEs to support access to operator provided SIP based services
- Builds on IETF protocols: SIP, SDP, DIAMETER
- Vertical interfaces to transport level provide:
  - QoS
  - Media gating
  - Correlated Accounting/Charging
- Coordinated network interfaces provide:
  - Improved security, single authorization point for user
  - Enhanced user service experience: single sign-on
  - Common interfaces to Application Servers

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For a good tutorial on the IMS and how it works, go to [http://www.itu.int/ITU-T/worksem/ngntech/details.html](http://www.itu.int/ITU-T/worksem/ngntech/details.html) and download presentation 1-3 given at the NGN Technical Workshop (14-15 Mar 2005, Jeju, Korea).

3GPP R5 network architecture

- 3GPP R5 IM Subsystem provides a SIP and H248 framework for the applications and control environment of converged wireless networks
- Applications creation environment permits extending applications to users independently of their means and point of access

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**Harmonized IMS Functional Architecture**

![Harmonized IMS Functional Architecture Diagram]

**3GPP R5 network architecture**

![3GPP R5 network architecture Diagram]

- This animated chart is provided as two discrete charts at the end of this package.
NGN Standards

- Many organizations working on NGNs, future generation technologies, ...
  - ITU providing global perspectives for an overall framework
  - ITU leveraging near term detailed and well-focussed technical work of relevant bodies into this consistent global framework

ITU-T Focus Group on Next Generation Networks

- Launched by ITU TSB Director in May 2004
  - TSB Circular 236, 7 May 2004
    - [http://www.itu.int/md/meetingdoc.asp?type=sitems&lang=e&parent=T01-TSB-CIR-0236](http://www.itu.int/md/meetingdoc.asp?type=sitems&lang=e&parent=T01-TSB-CIR-0236)
  - Initial meeting: June 2004
  - Subsequent meetings: Jul, Sep, Nov 2004, Mar, Apr 2005
  - Future meeting plans: Jul, Sep, Nov 2005
  - Key topics to be addressed:
    - Functional architecture, nomadicity
    - QoS (including xDSL Access)
    - Security Capabilities (Authentication, ...)
    - Control and Signaling Capabilities
    - Evolution to NGN
ITU-T Focus Groups: a highly flexible means to progress technical work (1/3)

- Objective of focus groups
  - Help advance work of ITU-T parent study group
  - Encourage participation of experts and individuals who may not be members of ITU
- Establishment
  - Based on a proposal (incl. terms of reference)
  - A study group has authority to approve formation, become parent SG
  - May be established at or between study group meetings
  - Proposal may be submitted by any member to focus group review committee: parent SG leadership, TSAG Chairman, TSB Director
  - Once agreed, info posted on ITU-T web site and work may proceed
- Terms of reference
  - Must include plan of action, expected deliverables, time schedule
  - Relationship to work of parent SG must be indicated
  - Focus Group term and scope may be renewed, extended by parent SG as needed

ITU-T Focus Groups: a highly flexible means to progress technical work (2/3)

- Leadership
  - Chairman, vice-chairman initially appointed by parent SG
  - Further appointments made within focus group as needed
- Participation
  - Open to any individual from a country which is a member of ITU
  - Should not be used as an alternative to ITU membership
  - List of participants to be maintained for reference purposes
- Financing
  - Determines own method of financing
  - Does not draw on ITU-T resources except use of TIES
  - Non-ITU members pay a fee determined by TSB for use of TIES
  - Financing of meetings: volunteer hosting similar to Rapporteur groups, or per financial arrangements determined by the Focus Group
- Administrative support
  - May establish own method of providing, financing admin support
  - If TSB admin services used, costs to be covered by Focus Group
ITU-T Focus Groups: a highly flexible means to progress technical work (3/3)

- Meeting logistics
  - Frequency, location, duration decided by Focus Group
  - Use of EDH encouraged
- Patent policy
  - TSB patent policy to be used (RAND)
- Deliverables
  - May be in form of technical specifications, reports, etc.
  - Expected to form input to the work of the parent SG
  - Parent SG may convert to ITU-T Recommendations (AAP process)
  - May establish own rules of approval: expected generally by consensus
- Progress reports
  - To be provided to each parent SG meeting; to include:
    - updated work plan and status, schedule of planned meetings
    - summary of contributions considered; list of attendees
- Working guidelines
  - May develop additional internal working guidelines as required
- Reference: ITU-T Rec. A.7 Focus groups: Working methods and procedures

FG NGN Structure

<table>
<thead>
<tr>
<th>WG</th>
<th>Area of work</th>
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<tbody>
<tr>
<td>WG 1</td>
<td>Service Requirements</td>
</tr>
<tr>
<td>WG 2</td>
<td>Functional Architecture and Mobility</td>
</tr>
<tr>
<td>WG 3</td>
<td>Quality of Service</td>
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<tr>
<td>WG 4</td>
<td>Control &amp; Signalling</td>
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<tr>
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<td>Security</td>
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<td>WG 6</td>
<td>Evolution</td>
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<tr>
<td>WG 7</td>
<td>Future Packet-based Bearer Network</td>
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FG NGN Leadership (1/2)

**Chairman:** Chae-Sub Lee ETRI, Korea  
**Vice-Ch:** Dick Knight BT, UK  
**Vice-Ch:** Neil Seitz US DoC/NTIA, USA
- **WG 1** Marco Carugi Nortel, France  
  Brent Hirschman Sprint, USA
- **WG 2** Keith Knightson Canada  
  Tom Towle Lucent, USA  
  Naotaka Morita NTT, Japan
- **WG 3** Hui-Lan Lu Bell Labs, USA  
  Keith Mainwaring Cisco, USA  
  Hyungsoo Kim Korea Telecom

FG NGN Leadership (2/2)

- **WG 4** Rainer Muench Alcatel, Germany  
  Cagatay Buyukkoc ZTE, USA  
  Wei Feng Huawei, China
- **WG 5** Igor Faynberg Lucent, USA
- **WG 6** Ghassem Koleyni Nortel, Canada  
  Dongyang Fan SCNB Tel. Stds., China
- **WG 7** Jiang Lintao MII, China  
  David Meyer Cisco, USA  
  Keith Dickerson BT, UK
Participation, Input Statistics

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<td>Apr 05</td>
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- NGN work is clearly a “going concern” and high interest area for standards development: attracting significant volume of input material, significant participation

FG NGN Work Plan - Deliverables

<table>
<thead>
<tr>
<th>WG</th>
<th>Deliverable Title</th>
<th>Current Draft</th>
<th>Target Date</th>
<th>Release</th>
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Plan as of 22 March 2005

Release
- TBD  To Be Determined
- RI   Release Independent
-     Proposed

Status:
- P   Planned: document not yet available
- D   Draft: draft available, under review
- S   Stable: reviewed, some additional review needed for full consensus; new text not anticipated
- A   Approved
### FG NGN Work Plan - Deliverables

#### WG 2 Functional Architecture and Mobility

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**FG NGN Work Plan - Deliverables**

#### WG 3 Quality of Service

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# FG NGN Work Plan - Deliverables

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## WG 6 Evolution

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# FG NGN Work Plan - Deliverables

## WG 7 Future Packet-based Bearer Network

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### Release
- TBD: To Be Determined
- RI: Release Independent
- *: Proposed

### Status:
- P: Planned: document not yet available
- D: Draft: draft available, under review
- S: Stable: reviewed, some additional review needed for full consensus; new text not anticipated
- A: Approved
Coordination needed: multiple Study Groups involved

Principle SGs:
- 2 Operational aspects of service provision, networks and performance
- 4 Telecommunication management
- 11 Signalling requirements and protocols
- 13 Next Generation Networks
- 19 Mobile telecommunication networks

Other SGs:
- 12 Performance and quality of service
- 16 Multimedia terminals, systems and applications

All SGs have some degree of involvement

Coordination effected: Joint Coordination Activity (JCA)

- NGN is a major activity
  - SG 13 is designated the Lead Study Group on NGN
- Many other SGs involved
  - Ref. the list of deliverables
- JCA created to coordinate activities across the involved SGs
  - initial meeting: Dec 2004
  - second meeting: May 2005
- FG NGN provides regular updates on its work to ensure all involved SGs are fully informed
  - enables SGs to review provide input outside FG NGN cycle
  - avoids “surprises” when going to SGs for approvals
ITU-T / IETF NGN Workshop
1-2 May 2005

- ITU-T aims to engage all interested parties for development of worldwide standards for NGN
  - 3GPP IMS is at the heart of NGN
  - IMS uses IETF protocols
  - ... essential that ITU-T, IETF and 3GPP work together effectively to deliver needed specifications and standards

- Overall workshop objective:
  - 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 ... to further coordinate their work


Some key work areas for realizing the NGN converged network vision

**SERVICE ENABLING ENVIRONMENT**
- Voice quality & functionality
- Presence technology
- Application integration
- Server & database integrity
- Security
- Multi-service networking
- Carrier grade scaling, performance, reliability
- Mobility services

**COMMON OPTICAL & PACKET FOUNDATION**
- Multi-service access
- High speed high density
- Lambda management
- Photonic switching

**NETWORKING ATTRIBUTES**
- System availability
- Hardware availability
- Real-time software
- Scalability
- Interoperability
- Distributed software
- Management integration
- Solution integration

**Much interesting and challenging work still to be done!**
Thank you!

Selected Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>3GPP</td>
<td>Third Generation Partnership Project</td>
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<tr>
<td>3GPP2</td>
<td>Third Generation Partnership Project 2</td>
</tr>
<tr>
<td>AAA</td>
<td>Authentication, Authorization and Accounting</td>
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<tr>
<td>AS</td>
<td>Application Server</td>
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<tr>
<td>BGCFS</td>
<td>Breakout Gateway Control Function</td>
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<tr>
<td>CCN7</td>
<td>Common Channel Signalling System No. 7</td>
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<tr>
<td>CSCF</td>
<td>Call Session Control Function</td>
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<tr>
<td>DSL</td>
<td>Digital Subscriber Line</td>
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<tr>
<td>FG</td>
<td>Focus Group</td>
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<tr>
<td>GI</td>
<td>Global Information Infrastructure</td>
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<tr>
<td>HSS</td>
<td>Home Subscriber Server</td>
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<tr>
<td>I-CSCF</td>
<td>Interrogating CSCF</td>
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<tr>
<td>IMS</td>
<td>IP Multimedia Subsystem</td>
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<tr>
<td>IMT-2000</td>
<td>International Mobile Telecommunications 2000</td>
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<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>ISDN</td>
<td>Integrated Services Digital Networks</td>
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<tr>
<td>JCA</td>
<td>Joint Coordination Activity</td>
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<tr>
<td>MGCFS</td>
<td>Media Gateway Control Function</td>
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<tr>
<td>MGWS</td>
<td>Media Gateway</td>
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<tr>
<td>MRFC</td>
<td>Media Resource Function Controller</td>
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<tr>
<td>MRFPS</td>
<td>Media Resource Function Processor</td>
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<tr>
<td>NGNS</td>
<td>Next Generation Network</td>
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<tr>
<td>P-CSCFS</td>
<td>Proxy CSCF</td>
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<tr>
<td>QoS</td>
<td>Quality of Service</td>
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<tr>
<td>R5</td>
<td>Release 5</td>
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<tr>
<td>RAND</td>
<td>Reasonable And Non-Discriminatory</td>
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<tr>
<td>RTP</td>
<td>Real Time Protocol</td>
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<tr>
<td>S-CSCFS</td>
<td>Serving CSCF</td>
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<tr>
<td>SDO</td>
<td>Standards Development Organization</td>
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<tr>
<td>SDP</td>
<td>Session Description Protocol</td>
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<tr>
<td>SG</td>
<td>Study Group</td>
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<tr>
<td>SIP</td>
<td>Session Initiation Protocol</td>
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<tr>
<td>SSG</td>
<td>Special Study Group</td>
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<tr>
<td>TIEPS</td>
<td>Telecom Information Exchange Services</td>
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<tr>
<td>TSAG</td>
<td>Telecommunication Standardization Advisory Group</td>
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<tr>
<td>TSB</td>
<td>Telecommunication Standardization Bureau</td>
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<tr>
<td>TSG</td>
<td>Technical Specification Group</td>
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</table>
• 3GPP R5 IM Subsystem provides a SIP and H248 framework for the applications and control environment of converged wireless networks
• Applications creation environment permits extending applications to users independently of their means and point of access