

**ITU-D Regional Development Forum for the  
Americas Region: "NGN and Broadband,  
Opportunities and Challenges"**  
Santo Domingo, Dominican Republic; 25-27 November 2009

## **NGN migration strategies, scenarios and challenges**

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### **Abstract**

- NGNs will become reality only if we address how to move from the current infrastructure to the new. Some key elements of achieving NGN while retaining the value of existing investment will be addressed. Another perspective on this is the "green field" environment that exists for new features and services and how NGN overlays can be used to provide these capabilities.

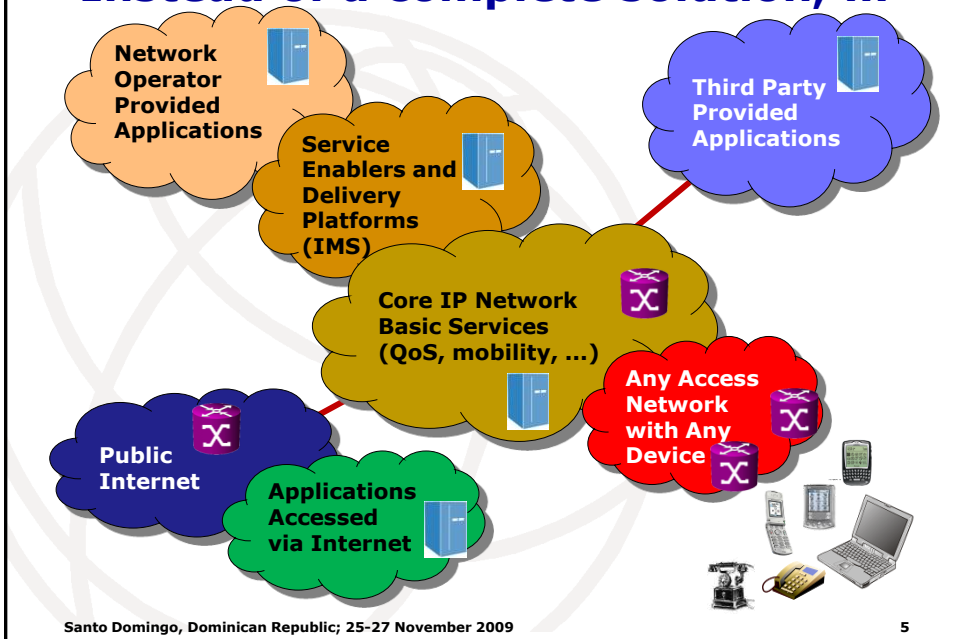
## Outline

- Introduction
- ITU-T SG 13 Structure
- Selected Work Items
- Extracts of Recommendations and work in progress
  - Multimedia, VPN, USN, IP Networks, Risk Analysis
- Summary

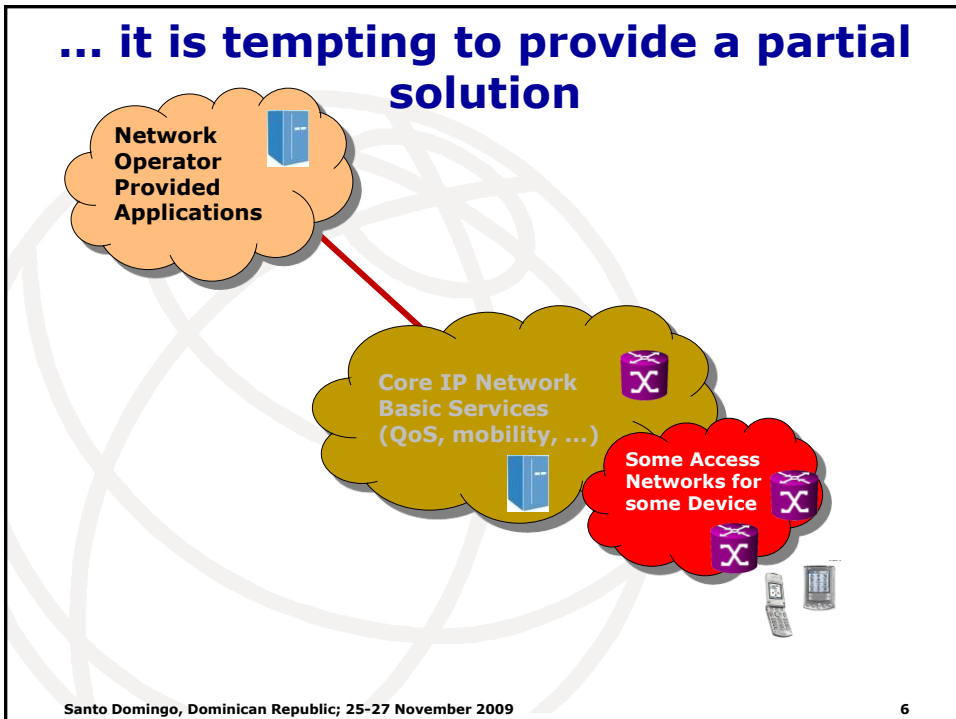
## Introduction

- Challenge: business case
  - It is nearly always less costly to deploy a service-specific solution when introducing a new service than to deploy a general purpose solution that has the potential to support multiple services
  - In the mid-1980s, operators were often reluctant to deploy SS7 because a business case based solely on replacing existing signalling systems wasn't attractive
  - Deploying SS7 in every case turned out to be a positive and forward looking decision

## Instead of a complete solution, ...



## ... it is tempting to provide a partial solution



## Need to look forward!

- 20/20 Hindsight
  - Today, it is widely recognized that SS7 was a transforming technology that enables many high revenue network wide services, plus it is the nervous system on which mobile systems depend
  - “Prediction is very difficult, especially about the future.”
    - Niels Bohr, Danish physicist, won the Nobel Prize in Physics in 1922\*

\* Aage Niels Bohr, son of Niels Bohr, also won a Nobel Prize in Physics in 1975

## ITU-T SG 13 Structure

- WP 1/13 Coordination, Planning and Global Outreach of NGN including Mobile
- **WP 2/13 Service requirements, scenarios and evolution aspects**
- WP 3/13 Frameworks and Functional Architectures
- WP 4/13 QoS and Security
- WP 5/13 Future Networks

[www.itu.int/ITU-T/studygroups/com13](http://www.itu.int/ITU-T/studygroups/com13)

## **WP 2/13 Service requirements, scenarios and evolution aspects**

### **Questions (work items) related to this topic:**

- **Q.3/13 Requirements and implementation scenarios for emerging services and capabilities in an evolving NGN**
- **Q.12/13 Evolution towards integrated multi-service networks and interworking**
- **Q.13/13 Step-by-step migration to NGN networks**
- **Q.14/13 Service scenarios and deployment models of NGN**
- **Q.18/13 Requirements and framework for enabling COTS components in an open environment**

## **Status of Material in Following Slides**

- **SG 13 is aggressively working a range of topics**
  - ◆ **Work Plan and deliverables: use tool at [www.itu.int/ITU-T/workprog/wp\\_search.aspx?isn\\_sp=545&isn\\_sg=552](http://www.itu.int/ITU-T/workprog/wp_search.aspx?isn_sp=545&isn_sg=552)**
- **Following slides represent work in progress, parts just getting underway, some more mature, and some complete**
- **OPPORTUNITY:**
  - ◆ **Get involved, participate and drive the work with your requirements, service scenarios, and use cases (meeting schedule on a later slide)**



## Selected Work Items I

- Q.3/12
  - ◆ Y.2215: Requirements and framework for the support of VPN services in NGN, including the mobile environment
    - Approved 2009 06
  - ◆ Y.2221: Requirements for support of USN Ubiquitous Sensor Network applications and services in NGN environment
    - Consented 2009 09, under Last Call Judgement as of 2009 11 11
  - ◆ Y.ngn-mcc: NGN service requirements to support Multimedia Communication Centre (MCC) services
- Q.12/13
  - ◆ Y.ipev: Best effort IP network evolution to NGN
    - Target 2010 09

## Selected Work Items II

- Q.13/13
  - ◆ The Handbook of evolving IMT-2000 Systems
  - ◆ Y.NGN-ncescen: Scenarios for migration of NGN with enhanced network capability
- Q.14/13
  - ◆ Y.2237: Service scenario and use case for high quality mobile VoIP service
    - Consented 2009 09, under Last Call Judgement as of 11 Nov 2009
  - ◆ Y.iras: IT Service Risk analysis service scenario over NGN
  - ◆ Y.son-NGN: Service overlay network model and scenario in NGN

## Y.2215: Req'ts & framework for ... VPN services in NGN, incl. mobile env.

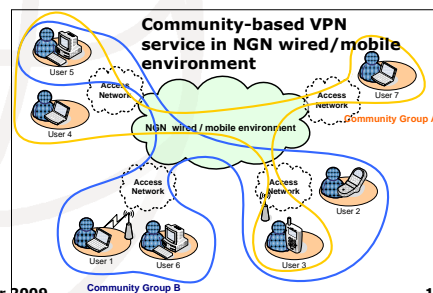
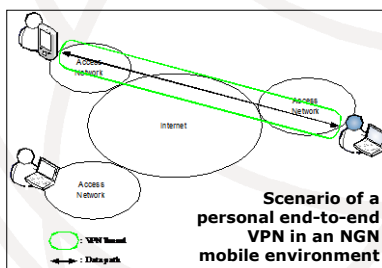
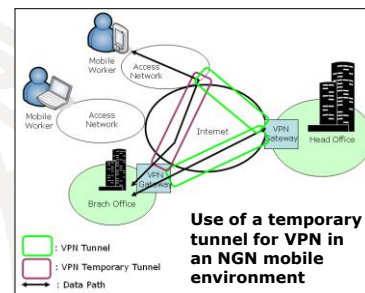
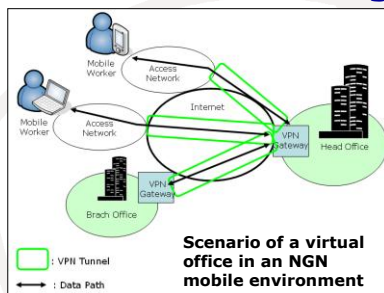
- Identifies NGN capabilities to support VPN applications in NGN mobile environment
- NGN to support:
  - Service configuration for VPN members
  - Wired/wireless tunnel coordination for peer-to-peer compatibility among VPN members
  - QoS/SLA (re-)negotiation for service mobility or upgrades, to ensure seamless VPN service
  - Provision of multiple security levels, as appropriate in response to VPN users' demands

[www.itu.int/rec/T-REC-Y.2215/en](http://www.itu.int/rec/T-REC-Y.2215/en)

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## Y.2215 Appendix: Scenarios of VPN services in NGN including mobile environment



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## Y.2221: Requirements for support of USN applications and services in NGN

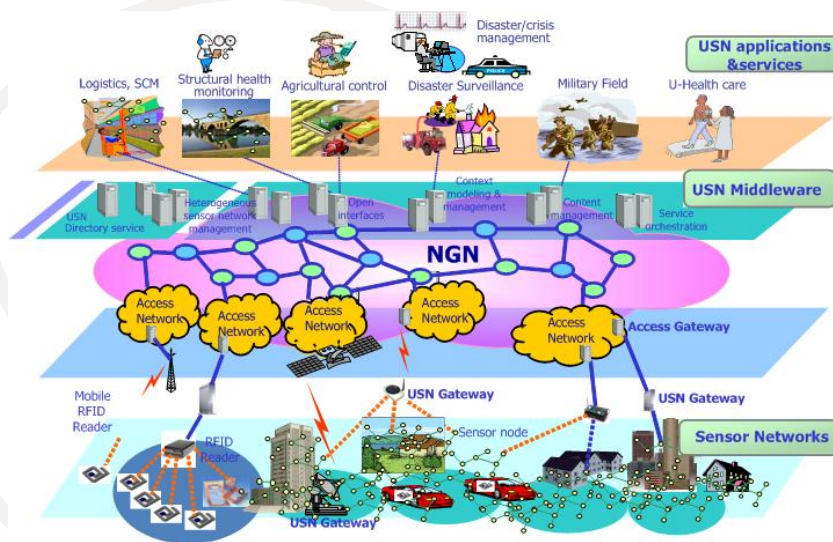
- USN is a concept and infrastructure which delivers sensed information and context to enable knowledge development
- Sensor networks to date monitor physical or environmental conditions, (e.g., temperature, sound, vibration, pressure, motion or pollutants) at various locations but as isolated networks. Networked sensor applications allow the development of intelligent information infrastructures enabling new possibilities for consumers, public organizations, enterprises, government, etc.
- USN applications and services integrate sensor networks into a network infrastructure with applications such as industrial or home automation, agricultural monitoring, healthcare, environment, pollution and disaster surveillance, homeland security, etc.

[www.itu.int/ITU-T/aap/AAPRecDetails.aspx?AAPSeqNo=1939](http://www.itu.int/ITU-T/aap/AAPRecDetails.aspx?AAPSeqNo=1939)

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## USN Overview

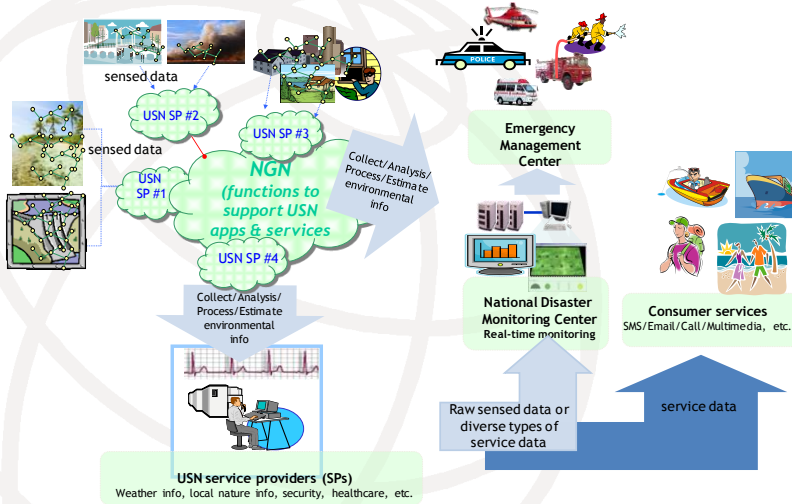


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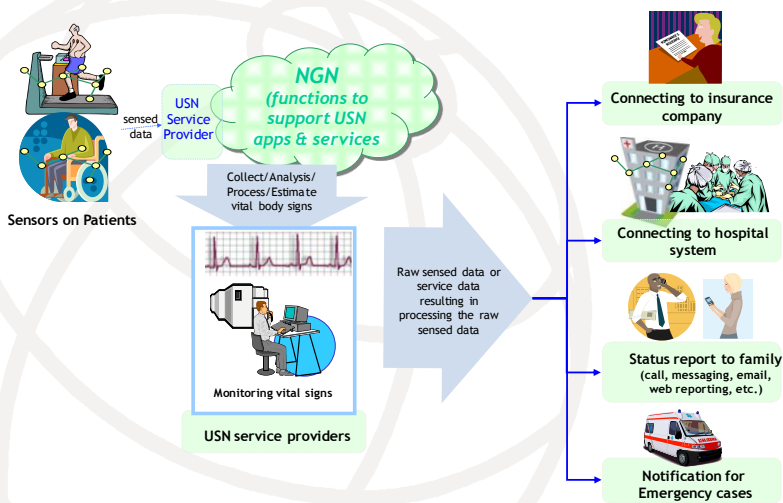
# Use Case: USN Weather Information Service



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# Use Case: USN Healthcare Service

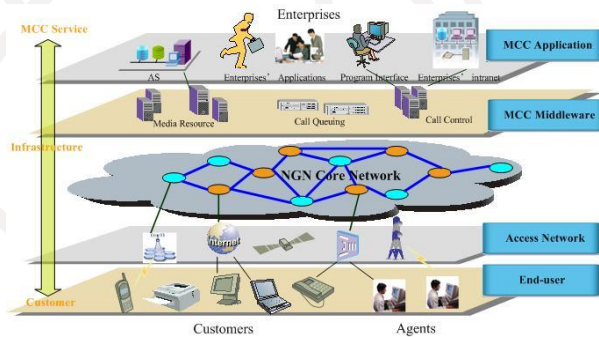


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## Y.ngn-mcc: NGN service requirements to support MCC services

- Users can access an enterprise's centralized information or customer service using multiple media. Allows efficient management using automated response or agents.
- Calls are distributed in queues to agent groups. Supervisor agent can monitor and manage other agents.



[www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0130](http://www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0130)

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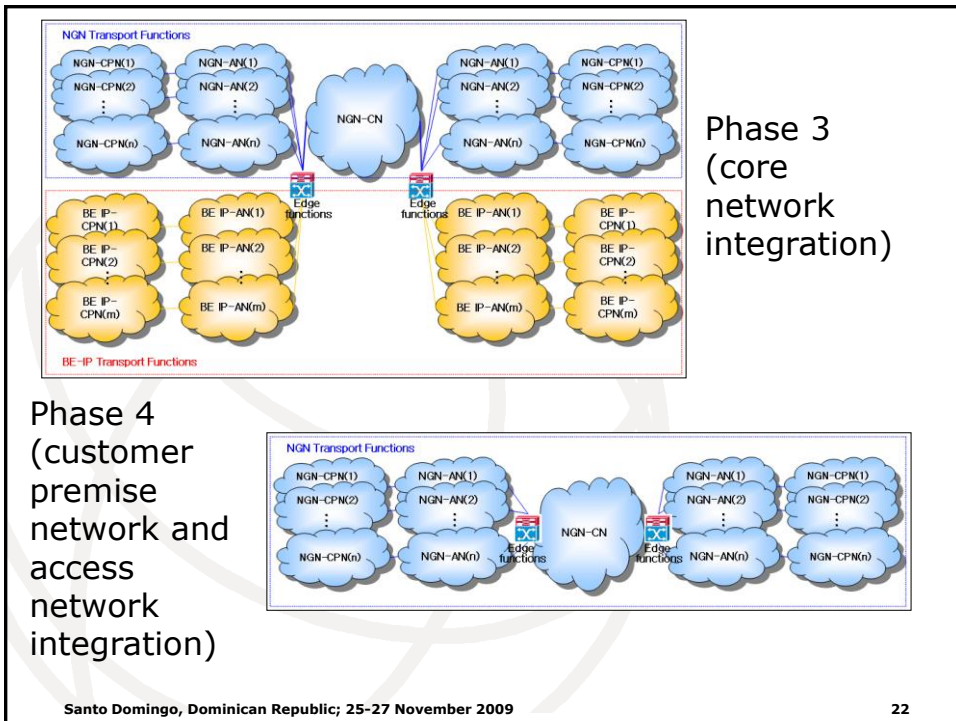
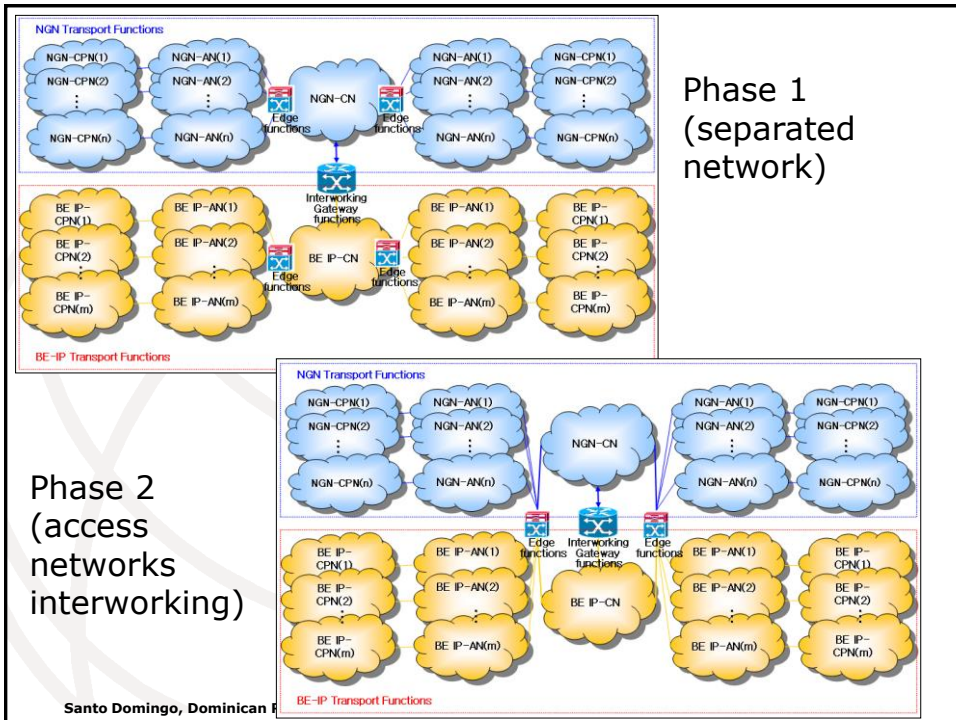
## Y.ipev: Best Effort IP Network Evolution to NGN

- Widely deployed Best Effort IP (BE IP) networks provide generally low-bandwidth legacy transport technologies and high access network aggregation ratios to provide internet connectivity to as many customers as possible
- High demand for new multimedia services (IP broadcasting, VoD, multimedia communication, etc.) means more capable networks are required
- Changeover ("flash cut") of BE IP networks to NGN is impossible, so need:
  - ◆ Ways to evolve a BE IP network to NGN
  - ◆ General BE IP network evolution architecture
  - ◆ Interworking functions and interfaces between a BE IP network and an NGN
  - ◆ Security considerations

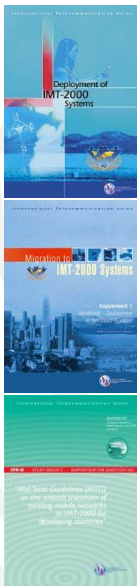
[www.itu.int/md/T09-SG13-090112-TD-WP2-0009](http://www.itu.int/md/T09-SG13-090112-TD-WP2-0009)

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## The Handbook of evolving IMT-2000 Systems



Handbook (ITU-T and ITU-R):

- Original edition: 2003
  - [www.itu.int/publ/T-HDB-MOB.01-2003/en](http://www.itu.int/publ/T-HDB-MOB.01-2003/en)
- Supplement 1: 2005
  - [www.itu.int/publ/R-HDB-46-2005/en](http://www.itu.int/publ/R-HDB-46-2005/en)

Related ITU-D Documents

- Mid-Term Guidelines on the Smooth Transition of Existing Mobile Networks to IMT-2000 for Developing Countries: 2006
  - [www.ictregulationtoolkit.org/en/Document.1478.pdf](http://www.ictregulationtoolkit.org/en/Document.1478.pdf)
- Revised Draft Outline of Supplement to Update the Guidelines on the Smooth Transition of Existing Mobile Networks to IMT-2000 for Developing Countries (GST)
  - [www.itu.int/md/meetingdoc.asp?lang=en&parent=D06-RGQ18.1.2-C-0042](http://www.itu.int/md/meetingdoc.asp?lang=en&parent=D06-RGQ18.1.2-C-0042)

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## Y.NGN-ncescen

- Y.NGN-ncescen: Scenarios for migration of NGN with enhanced network capability
  - Target: 2009 09
  - Progress slower than anticipated: document is presently an outline with little content
    - [www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0096](http://www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0096)
- **OPPORTUNITY:** "empty canvas" waiting to be filled!

### Table of Contents

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7	Use cases for the deployment aspect
7.1	Capability enhancement in application layer
7.2	Capability enhancement in service stratum
	Bibliography

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## Y.2237: Service scenario and use case for high quality mobile VoIP service

- Mobile WiMAX and Wi-Fi have focussed on Internet services, and 3G has focussed on circuit based voice service, packet based data and video service
- The functional model, service scenario and use case in this Recommendation provide guidelines for QoS enabled mobile VoIP service among Wi-Fi, 3G and mobile WiMAX networks
- Status (as of 8 Nov 2009):
  - Under Last Call Judgement
  - Comments from Saudi Telecom and France Telecom Orange

## Y.2237: Service scenario and use case for high quality mobile VoIP service

Figure 1 - General network architecture for QoS enabled mobile VoIP service

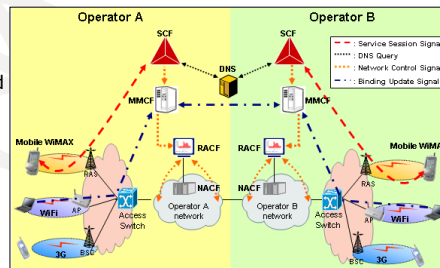
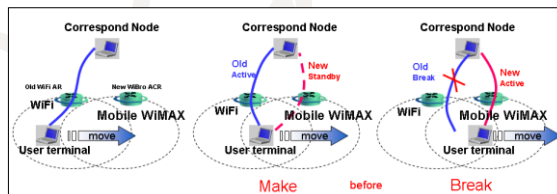


Figure 2 - Seamless mobility support by make-before-break handover scheme



[www.itu.int/ITU-T/aap/dologin\\_aap.asp?id=T01020007910701MSWE&group=13](http://www.itu.int/ITU-T/aap/dologin_aap.asp?id=T01020007910701MSWE&group=13)

# Y.iras: IT Service Risk Analysis Service Scenario over NGN

- Looks at availability, compliance, security, and application performance.
- Service failure risk: hardware failure, software errors, network outages, data centre failure, poor change management, network outages, network congestion, inadequate capacity, etc.
- Result: failure to deliver service transactions and operations, or slow or inefficient operation leading to abandoned transactions, lost sales, reduced customer, partner, and user confidence
- Need a systematic service scenario and assessment analysis to mitigate risks

[www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0189](http://www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0189)

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## Service Risk Analysis Scenario Flow

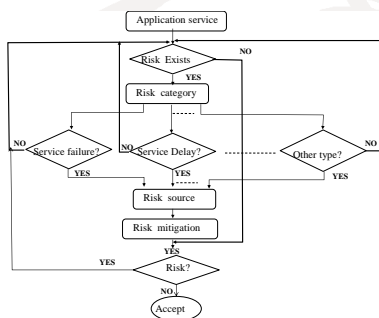


Figure 1. Service risk analysis service scenario flow.

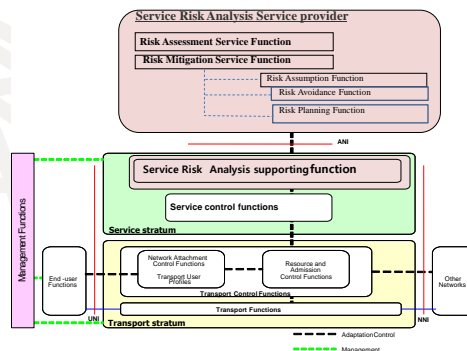


Figure 2. IT Service Risk Analysis Provider Architecture

- *Still an early draft*
- *Would benefit greatly from additional operator input and involvement*

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## Y.son-NGN: Service overlay network model and scenario in NGN

- Defines and provides a service scenario for a service model for overlay network based services in NGN and aims to provide a standard reference model needed in NGN
  - [www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0195](http://www.itu.int/md/T09-NGN.GSI-090511-TD-GEN-0195)
- Covers:
  - service model
  - functional architecture
  - service scenarios

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## Service Overlay Model

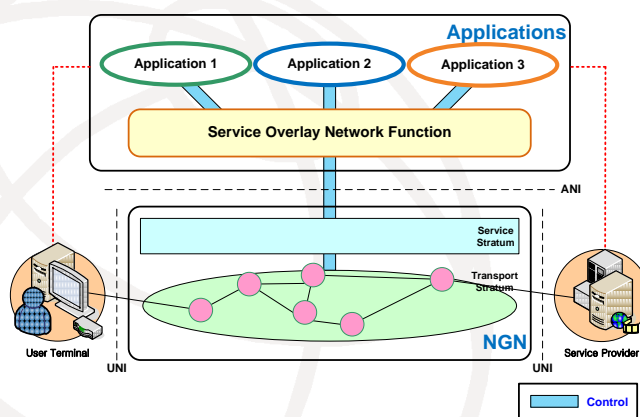


Figure 6-1 General model of service overlay network

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## Service Overlay Scenario

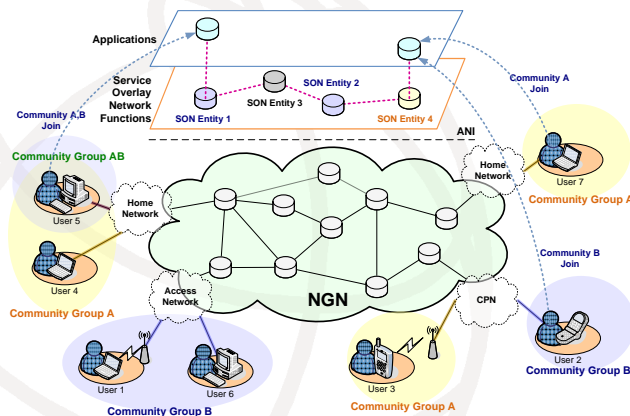


Figure 8-1 Service overlay network applied community service in NGN

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## NGN-GSI Meeting Schedule: *Opportunity to get involved!*

- Geneva, Switzerland unless otherwise indicated\*:
- 18-29 January 2010: GSI
- 19-30 April 2010: SGs 13 & 11
- 6-16 September 2010: GSI
- 17-28 January 2011: SGs 13 & 11
- 9-20 May 2011: GSI
- 10-21 October 2011: SGs 13 & 11
- 6-17 February 2012: GSI
- 4-15 June 2012: SGs 13 & 11

• **Dates beyond mid-2010 are subject to change**

\* **Hosting opportunities: GSIs and SG meetings**

- need 1 year lead time for SG meetings; contact ITU TSB for details
- easier for GSI Rapporteur level meetings ; contact ITU TSB for details

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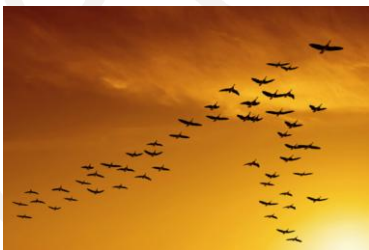
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## Summary

- Migration of services and networks to NGN presents challenges
  - Need to develop scenarios and strategies to move forward
- SG 13, the lead SG on NGN, has a WP addressing these areas
- Presentation has highlighted current work
- Opportunity - get involved: participate and drive the work with your requirements, service scenarios, and use cases!

# *Thank you!*



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