Network Evolution to NGN and Convergence

1.3.2: Mobile Network Evolution to NGN

ITU/ITC Regional Seminar on Network Evolution to Next Generation Networks and Fixed Mobile Convergence for CEE, CIS and Baltic States

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John Visser, P.Eng.
Sr. Mgr., International Network Standards
Phone: +1-613-763-7028
Fax: +1-613-765-6257
Mobile: +1-613-276-6096
Email: jvisser@nortelnetworks.com

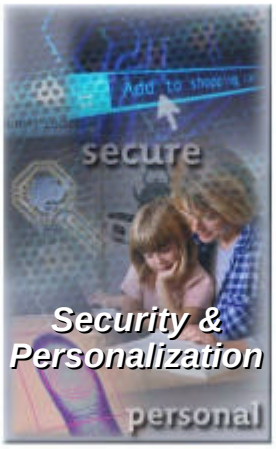
Abstract: Mobile Network Evolution to NGN

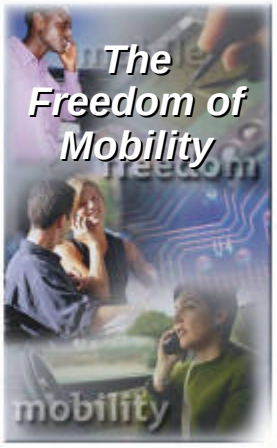
Change is necessary. As we manage our lives more and more on telecommunications networks, we increase the traffic they must carry. This increases costs but does not drive up revenues as connectivity becomes a commodity. Today, we have different networks for different services, different networks for different enterprises. We have boundaries within service providers that cause different services to be provided by different platforms without something ensuring the overall consistency of the user experience. At many levels the transformed network needs to eliminate these boundaries. This is essential both for end user satisfaction and for operator profitability.

Outline

- What do end users and operators want?
- Mobility is a key dimension of the NGN
- Review: ITU-T SSG: forward looking areas
- Major shifts occurring
  - Subscriber base
  - What the access technologies can deliver
- Convergence of Telecoms, Data, Broadcasting
  - Wireless access and network transformation
  - Blending user devices
- Realizing the Vision

End Users Value ...



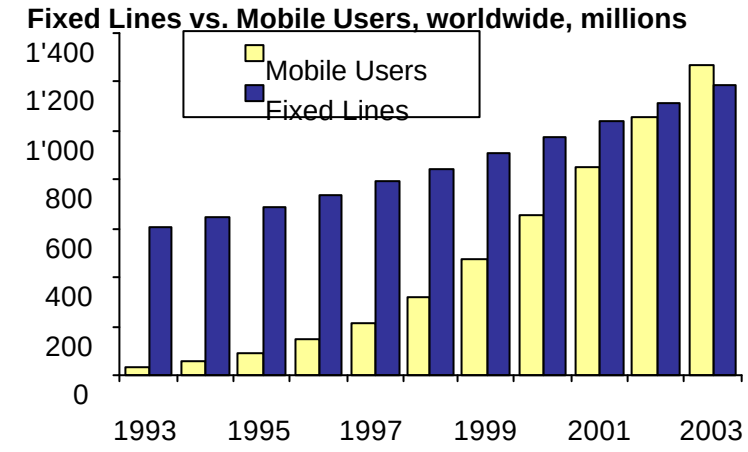


… for enhanced productivity and user experience

Eliminate boundaries ...

... to enable ubiquitous and seamless solutions

Mobile Revolution is underway



Source: ITU World Telecommunication Indicators Database.

Forecasts

Many available!

- **Example: Yankee Group, News Release 24 Jun 03:**
  - **estimate 18.6 percent of world's population currently has mobile phones**
  - **global wireless user base will increase 49% over next 4 years, reach 1.72 billion by 2007**
  - **global cellular subscriber revenue will grow from $387 billion in 2002 to $584 billion in 2007, similar in value to crude oil production***

- **Mobility is a key dimension of the NGN**

* Underscore added

Summary of SSG Mandate

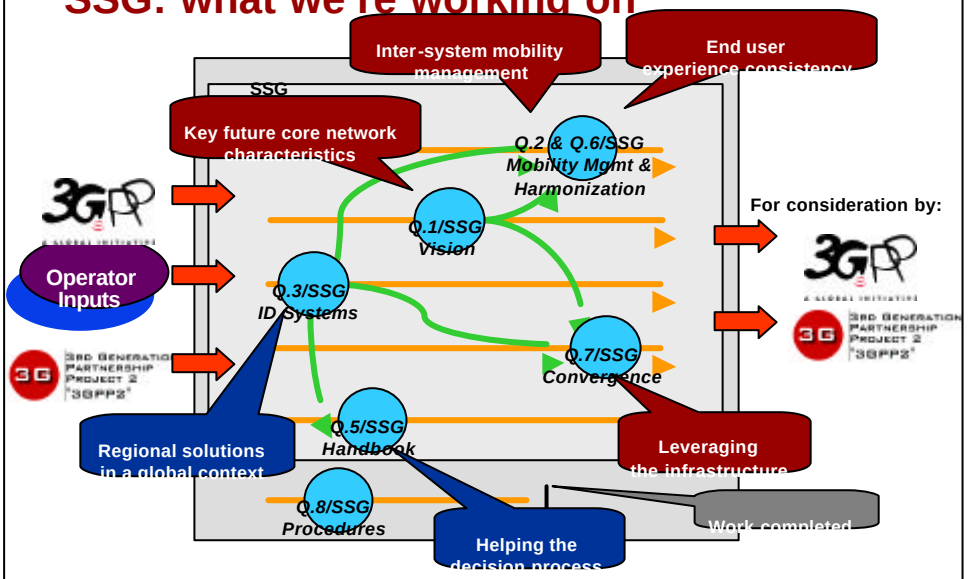
- **Lead SG on IMT-2000 and beyond and for mobility**
  - **Primary responsibility within ITU-T for overall network aspects of IMT-2000 and beyond**
- **To study:**
  - **Vision for IMT-2000 and Beyond (circa 2010)**
  - **Identification and globalization of IMT-2000 Family members**
  - **Support harmonization of evolving IMT-2000 Family members**
  - **Convergence of fixed and wireless networks**
- **To assist developing countries in applying IMT-2000**
- **Emphasis on strong cooperative relations and complementary programs with SDOs, 3GPPs**
- **Make use of provisional working procedures specific to SSG:**
  - **Recommendation A.9: Provisional working procedures for SSG**

SSG Mandate translated into Study Questions

- **Q.1/SSG** Service and network capability requirements and network architecture ("Vision")
- **Q.2/SSG** NNI Mobility Management protocol
- **Q.3/SSG** Identification of existing and evolving IMT-2000 Systems ("ID Systems")
- **Q.4/SSG** Interworking functions to be used with existing and evolving IMT-2000 systems
- **Q.5/SSG** Preparation of a Handbook on IMT-2000 ("Handbook")
- **Q.6/SSG** Harmonisation of existing IMT-2000 Systems
- **Q.7/SSG** Convergence of fixed and existing IMT-2000 systems ("Convergence")
- **Q.8/SSG** Special Study Group working procedures ("Procedures") (now deleted: work finished)

Details available at: http://www.itu.int/ITU-T/studygroups/ssg/questions.html

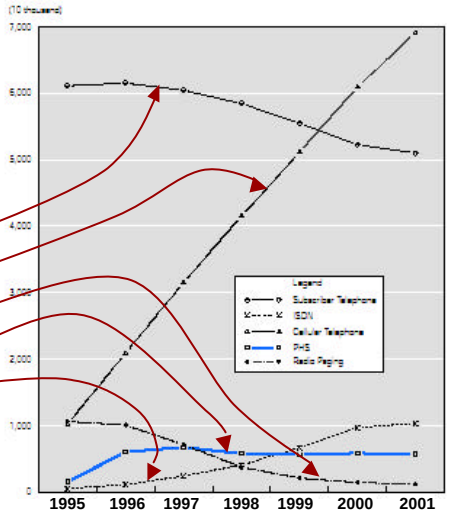
SSG: what we're working on



Large shifts taking place in subscriber base!

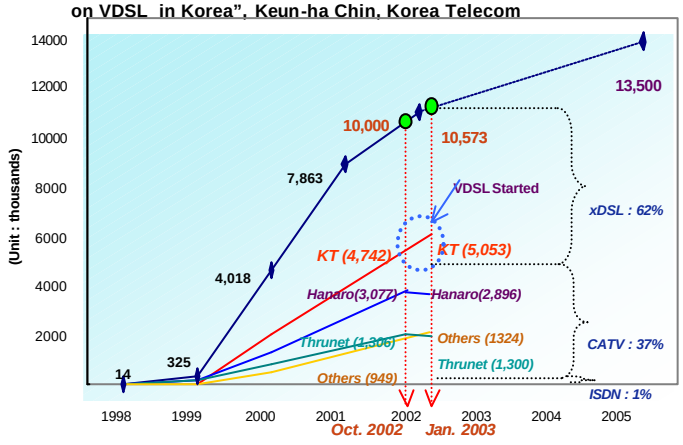
- **Example: TCA Japan Telecom Data Book 2003**
  - **Ref: http://www.tca.or.jp/eng/database/annual/2003/index.html**

Fixed subscriber lines
Mobile subscribers
Paging
PHS
ISDN

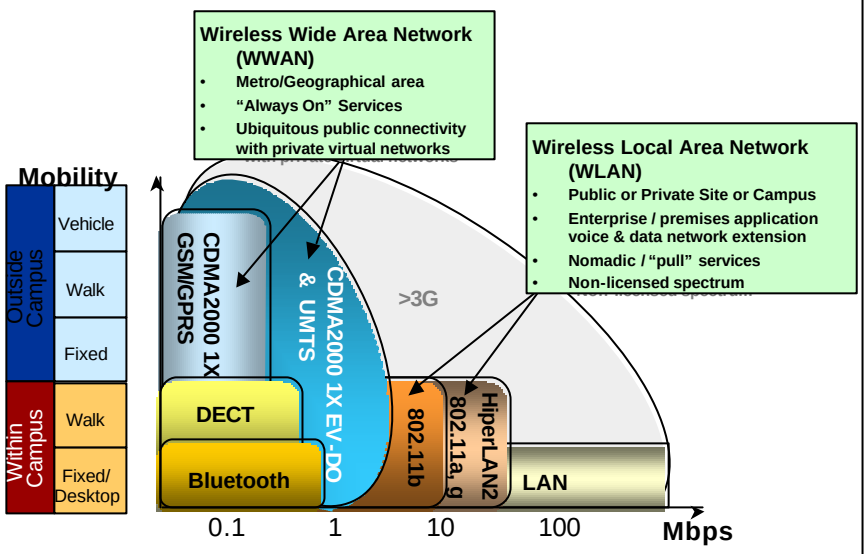


Large shifts taking place in subscriber base!

- **Example: South Korea: >10 million broadband access as of Jan 2003**
  - **Ref: GSC-8 (Ottawa) Doc. 76 "Broadband Service Status and implementation issues on VDSL in Korea", Keun-ha Chin, Korea Telecom**



Wireless Landscape

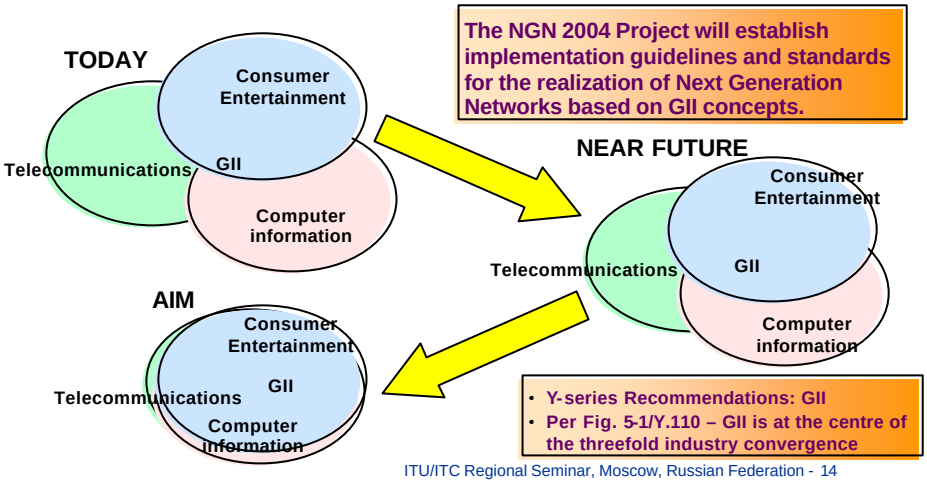


Looking forward: the Internet and Telecoms Convergence

- PSTN designed for voice
  - Data added by making it behave like voice (modems, ...)
- ISDN designed for both data and voice
  - Voice treated as data using CS paradigm (2B+D, ...)
- Internet designed around "best effort" data transfer (IP, ...)
  - QoS, performance issues for voice, high quality audio, high quality video, real time interactive applications
  - can be addressed using a "managed" internet
- Major changes in data capabilities of access interfaces

GII is all about convergence

Internet, Broadcasting, Telephony, ...

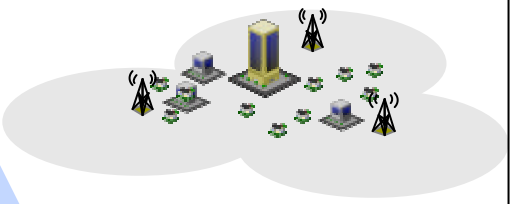


The NGN 2004 Project will establish implementation guidelines and standards for the realization of Next Generation Networks based on GII concepts.

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

The Wireless Packet Network

- **Wireline Network**
  - Good for Voice, not Data
- **Data Router Network**
  - Best Efforts
- **Wireless Network**
  - Mobility



Wireless Packet Network Attributes

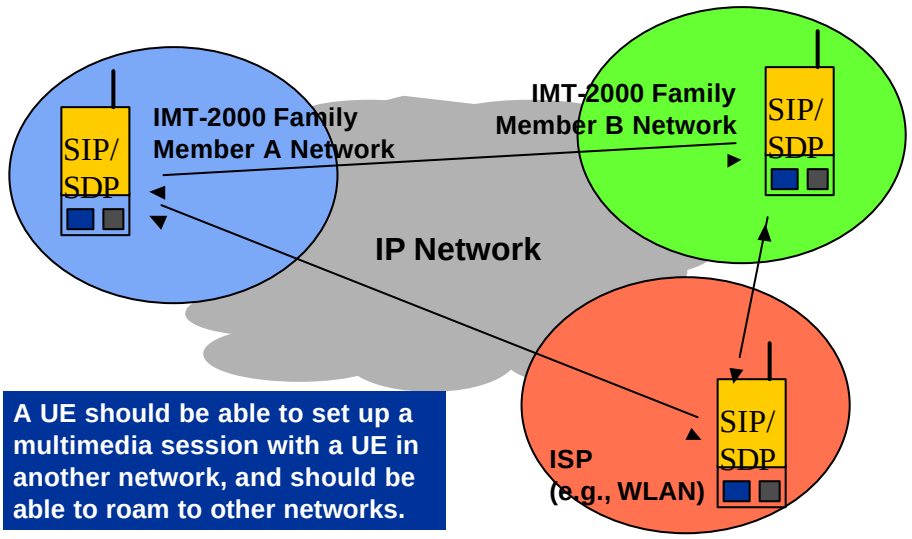
- Voice over IP
- Universal Mobility
- Five 9's Reliability for Mission-Critical Applications
- Network-embedded Services – VPN, QoS, Billing, ...
- Enable Consumer and Business Services

What does this mean for the IMT-2000 Core Network?

- Common CN solution: IP-based using IETF protocols
- Integration of Wireless LANs into basic mobile telecommunications paradigm
- Common issues to be dealt with:
  - QoS
  - Fraud/Privacy
  - CS (legacy) interworking
  - Charging
  - ...

- Solution: do it on a common infrastructure
- But there are issues ...

IMS and Interworking

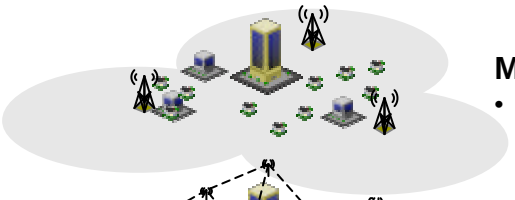


A UE should be able to set up a multimedia session with a UE in another network, and should be able to roam to other networks.

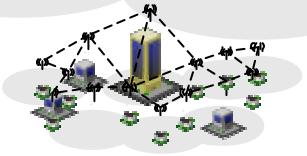
Enhanced End User Experience: Blending User Devices

- PC, phone(s) and PDA: different user interfaces to the same network-based application
- Common, network-based directory for:
  - Phone numbers
  - Buddies & presence
  - Email address book
  - All applications
- Just one address to reach the user
- Unified, network-based, user profile applying to all terminals
  - E.g., set presence location, (call routing preferences), etc., on any terminal and it applies to all

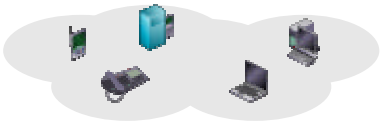
The Un-Wiring of the Future



Mobility / WWAN
- *A Million nodes @ $50k*



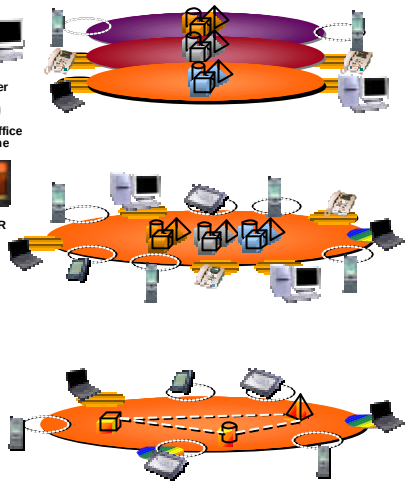
Nomadic / Mesh / WLAN
- *Millions of Nodes @ $100*



Sensor / Ad-hoc / WPAN
- *Billions of Nodes @ $1*

… connected through the Wireless Packet Network

Network Transformation

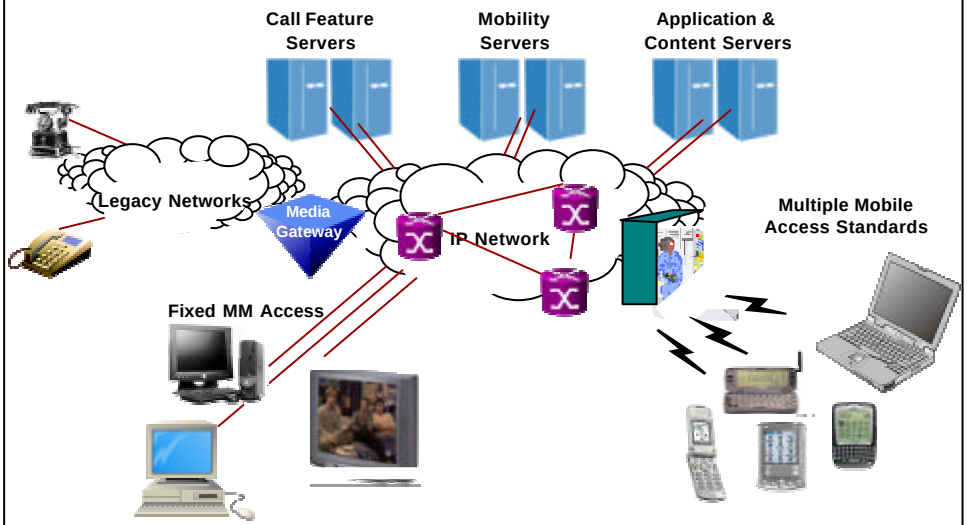


Existing
- Multiple networks
- Simple devices
- Disparate services

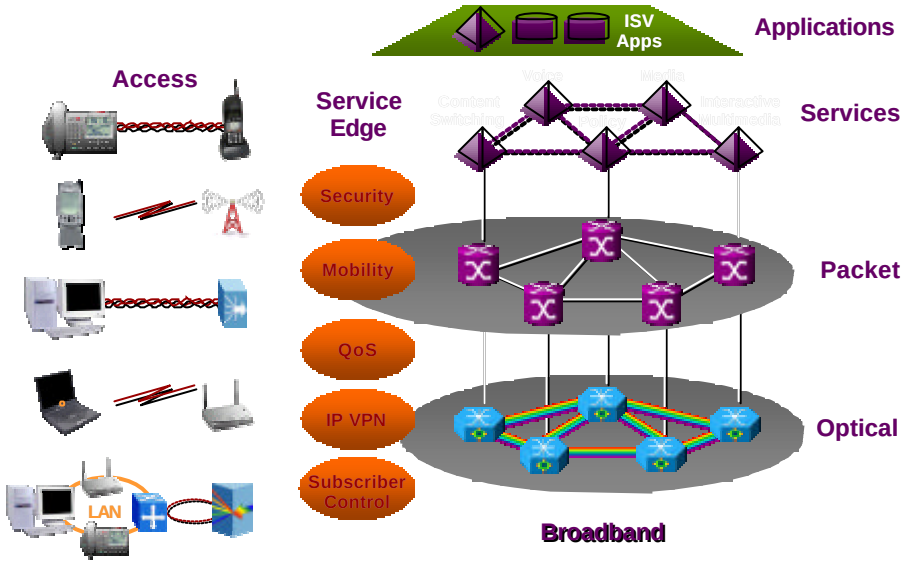
Transition
- Converged packet network
- Multimedia devices
- Linked services

Transformed
- Dynamic packet/ optical network
- Secure multimedia services
- Ubiquitous broadband
- Integrated functionality

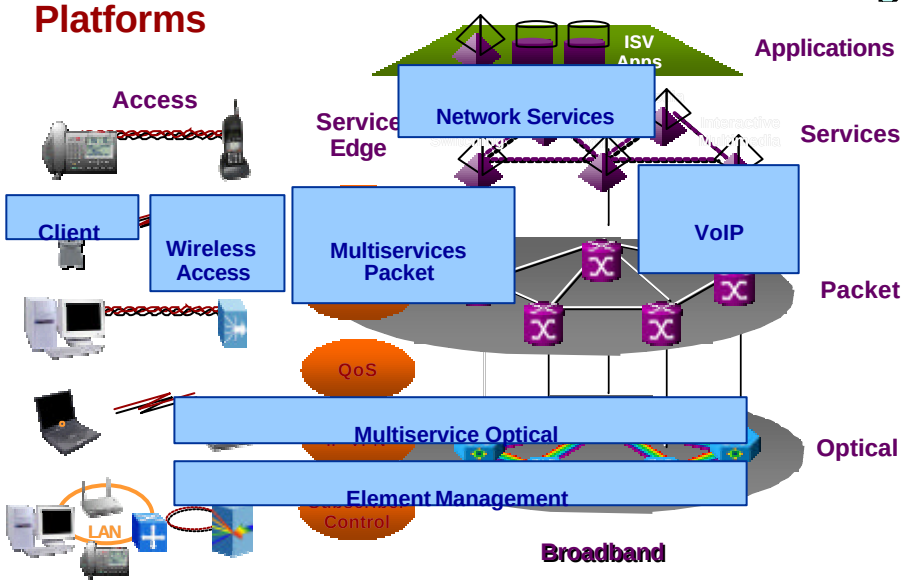
Common infrastructure



Transformed Network Architecture



Transformed Network Architecture Platforms



Some Key Work Areas for Realizing the 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!

The Transformed Network

Thank you!