# Mobility and Fixed-Mobile Convergence

John Visser, P.Eng.
Chairman, ITU-T SG 19
Nortel Networks



## Outline

- What does the future look like?
  - And how near is it today?
- Convergence is happening and is unstoppable
- NGN architecture is based on key concepts and architectures from mobile community
- Mobility is a complex area with too much variation
- How Mobility Management and Fixed-Mobile Convergence are being addressed in the ITU-T's NGN-GSI

# Life Is Changing ….

**Today ...**

- Most people can't do without their mobile phones
- Content on DVDs, magazines, books, local hard-disk
- Contact Lists are by application, device, and individual situation

**In 2010 …**

- Everyone's connected: can't do without being on-line
- The first place people go for content is on-line

**In 2015 …**

- Everyone and everything is connected all the time, everywhere
- The only place people go for content is on-line

**Today's technology-literate young person is tomorrow's decision maker: our target customer!**



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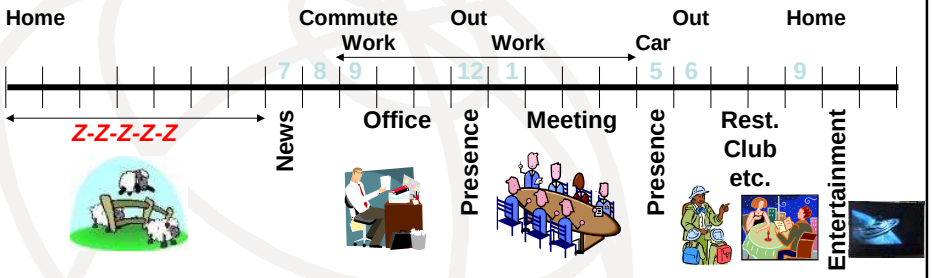
# Usage Patterns are Changing ...

## Convergence, mobility and personalization




***Today:*** **user must integrate across independent access means and live with device discontinuities**

CATV 3G Ethernet Wi-Fi Ethernet 3G Wi-Fi POTS CATV

***Tomorrow:*** **user enjoys seamless broadband communications services across multiple interoperable devices**

**Continuous broadband integrated wireline and wireless technologies**



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# Communications Landscape is Changing ...

| | | |
|---|---|---|
| Enterprise-Driven | → | Consumer-Driven |
| Hardware-Centric | → | Software-Centric |
| Wireline | + → | Wireless |
| People to Machines | + → | Machine to Machine |
| Peripheral Security | → | Embedded → **Trusted** |
| Proprietary Interfaces | → | Open (incl. Policy) |

**Convergence to new target!**



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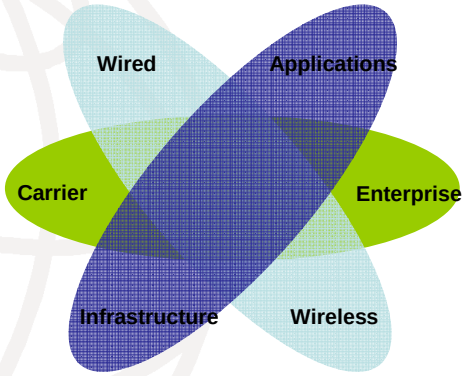
# Information and Communication Technologies are Converging ...

- Mega trends are defining a new era:
  - Hyper-connectivity
  - Network-aware applications and applications-aware networks
  - True Broadband



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# ICT Convergence Drivers

**TECHNOLOGY**
- Multiplicity of access methods
- Multimedia and real-time networking
- New standards

**COMPETITION**
- Disruptive business models
- Price pressure
- Eroding revenue

**CONVERGENCE**
- Move to IP infrastructure
- Intersection IT and Telecom
- "Value rich services"

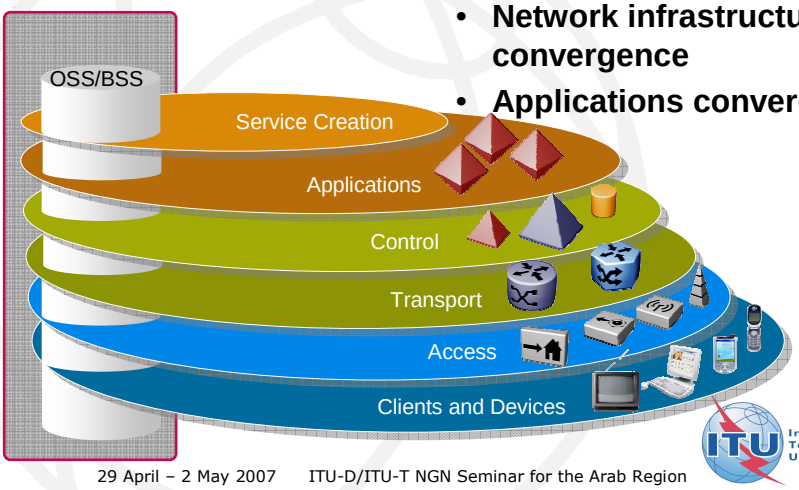
**USER PREFERENCES**
- Integrated value rich services
- Personalized and mobile
- Secure communications

**CONSOLIDATION**
- Lower costs
- Bigger brands
- Media/entertainment into Telecom/IT

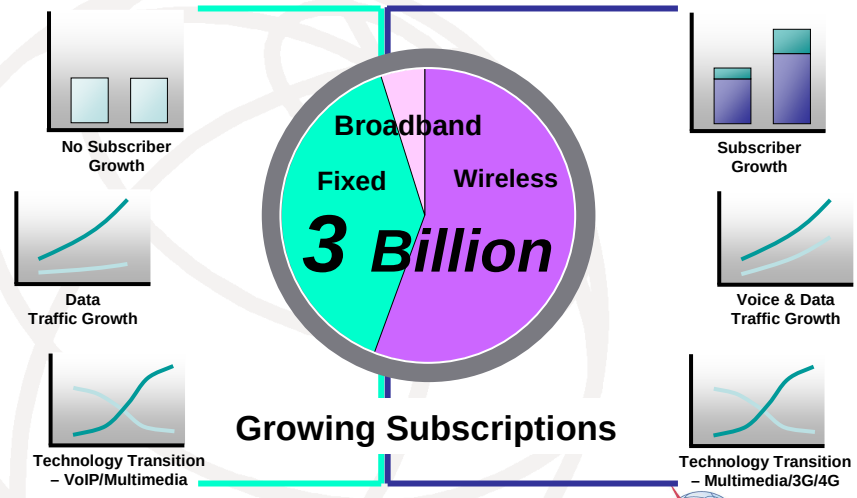


# To deliver an end-to-end converged solution, need ...

- **Ecosystem of partners**
- **Network infrastructure convergence**
- **Applications convergence**



# Telecom Market Trends



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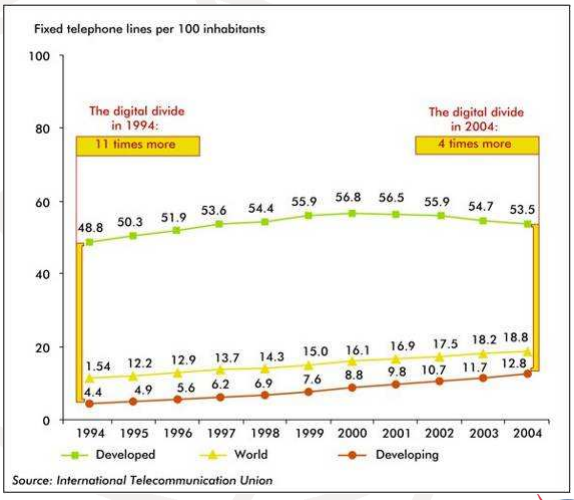
# Fixed Lines




http://www.itu.int/ITU-D/ict/statistics/ict/index.html



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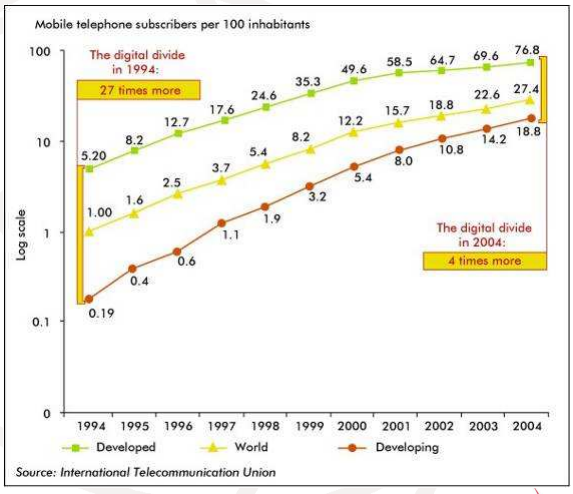
# Mobiles

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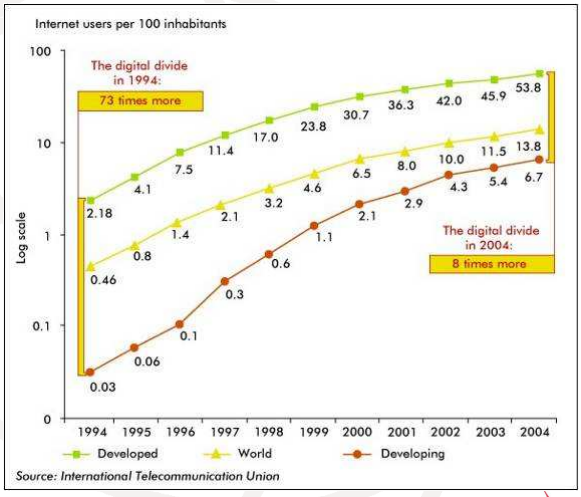
# Internet Users

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# Going Mobile! Some Statistics ...

100.5%

UK
- Population 60.8M (Jul 07 est.)
- Telephones: 32.9M (05)
- Mobile cellular: 61.1M (04)

105.7%

Bahrain
- Population: 709K (incl. 23[illegible],108 non-nationals (Jul 07 est.))
- Telephones: 197K (05)
- Mobile cellular: 749K (05)

102.5%

Ireland
- Population 4.1M (Jul 07 est.)
- Telephones: 2.03M (05)
- Mobile cellular: 4.21 million (05)

72.9%

USA
- Population: 301.1M (Jul 07 est.)
- Telephones: 268M (03)
- Mobile cellular:219.4M (05)

96.3%

Singapore
- Population 4.55M (Jul 07 est.)
- Telephones: 1.85M million (05)
- Mobile cellular: 4.39M million (05)

49.7%

Canada
- Population 33.4M (Jul 07 est.)
- Telephones: 18.3M (05)
- Mobile cellular: 16.6M (05)

Source: CIA Fact Book as of 2007 04 21 as posted at https://www.cia.gov/cia/publications/factbook/
(Other sources: Canada >50% in 1Q2006, anticipate 63% in 2007; USA: nearing 100% in 20-40 age group)



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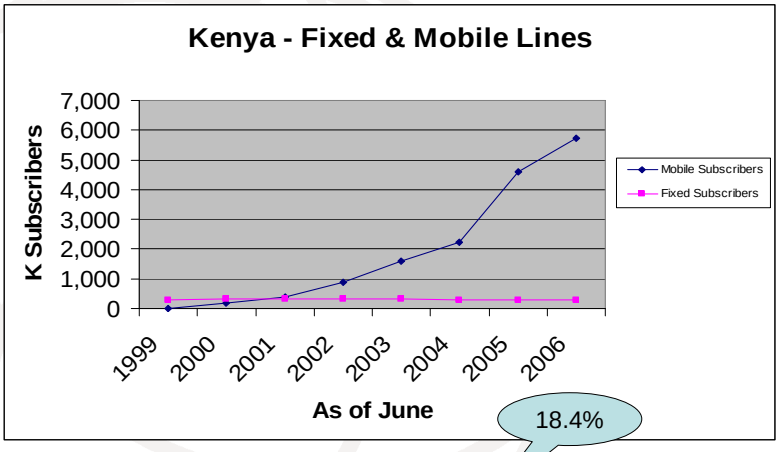
# Kenyans with phones are >95% mobile!




18.4%

Comms Commission of Kenya: www.cck.go.ke/statistics/
CIA Fact Book: www.cia.gov/cia/publications/factbook/
Pop = 36.9M; Telephones: 281K (05); Mobile cellular: 6.5M (06)



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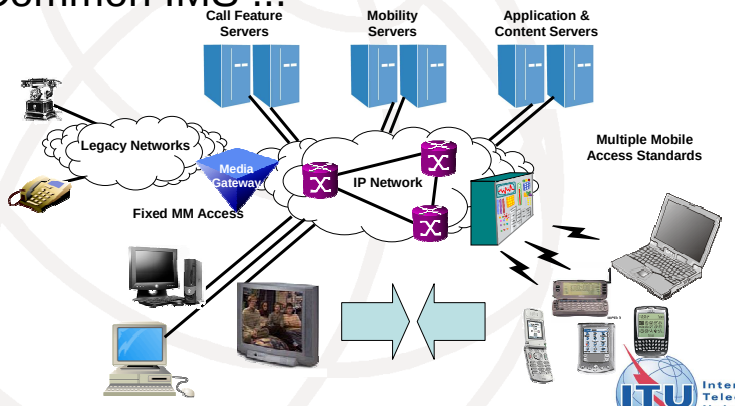
# Evolving Mobile Architecture Underpins ICT Convergence

- Telecoms, data, entertainment, ...
- Common IMS ...





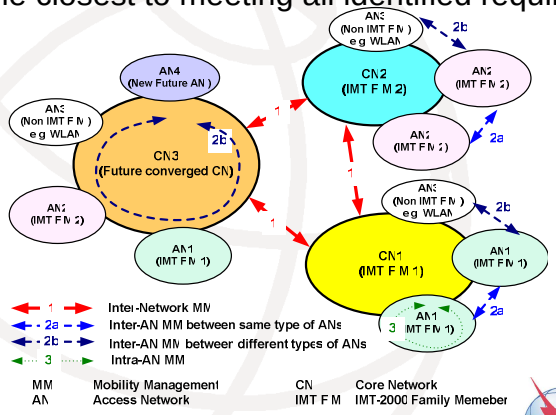

# Mobility Management Complexity

- 3GPP and 3GPP2 do MM in slightly different ways: not fully compatible
- There are multiple Mobility Management protocols*:
  - Mobile IP (MIP); extensions: HMIP and FMIP
  - Session Initiation Protocol (SIP)
  - Cellular IP (CIP): with MIP for MM; with SIP for MM
  - mobile Stream Control Transmission Protocol (mSCTP)
  - 3GPP Mobility Management Protocols: MAP
    - MIP and SIP in 3GPP system
  - 3GPP2 Mobility Management Protocols
    - MM in the ANSI-41 evolved IP MMD core network
  - BRAIN Candidate Mobility Protocol (BCMP)

** Q series Supplement 52 - Technical Report on NNI Mobility Management Requirements*

# Towards Commonality in Mobility Management

- MIP (used by 3GPP2 MM), SIP (used by 3GPP IMS), 3GPP MM come closest to meeting all identified requirements



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# Mobility + Convergence: Requirements & Standards

- Harmonization across boundaries increasingly important: consistent user experience
- Underlying transport converging on IP/SIP and IMS network architecture
- Revenues increasingly driven by content and services rather than by type of network
- "One size does not fit all!"
  - Meeting diverse and customer-segment-specific markets require a range of solutions



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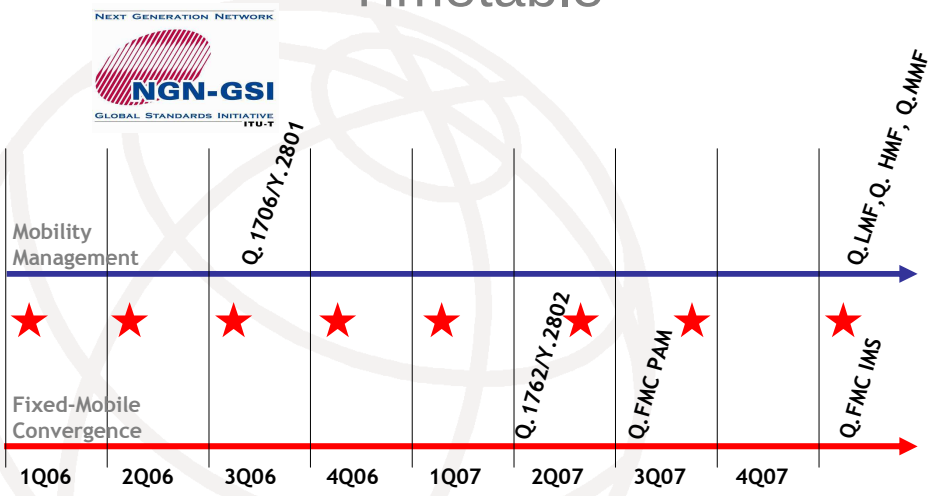
# ITU-T NGN-GSI

- 4 closely related co-operating Questions:
  - Q.2/19 Mobility management
  - Q.5/19 Convergence of evolving IMT-2000 networks with evolving fixed networks
  - Q.6/13 NGN mobility and fixed-mobile convergence
  - Q.29/16 Mobility for Multimedia Systems and Services

# Coordinated Joint Deliverables

- Rec. Q.1706/Y.2801 (2006): Mobility Mgmt Requirements
- Rec.MMF: Mobility Management Framework (Stage 2)
- Rec.LMF: Location Mobility Mgmt Framework (Stage 2)
- Rec.HMF: Handover Management Framework (Stage 2)
- Rec. Q.1762/Y.2801: Fixed Mobile Convergence General Requirements: identifies fundamental characteristics, requirements and capabilities for FMC
- Rec.FMC-PAM: FMC service scenario by using PSTN as the fixed Access network for mobile networks
- Rec.FMC-IMS: Stage 2 of fixed mobile convergence with a common IMS session control domain

# Timetable






# Converged Services on the Next Generation Network

# Selected Acronyms

| | |
|---|---|
| BCMP | BRAIN Candidate Mobility Protocol |
| BRAIN | Broadband Radio Access for IP based Networks (RACE project) |
| CATV | Community Antenna Television (aka Cable TV) |
| CIP | Cellular IP |
| FMC | Fixed-Mobile Convergence |
| FMIP | Fast Handover for MIP |
| GSI | Global Standards Initiative |
| HMF | Handover Management Framework |
| HMIP | Hierarchical MIP |
| ICT | Information and Communication Technologies |
| IMS | IP Multimedia Subsystem |
| LMF | Location Mobility Management Framework |
| MAP | Mobile Application Part |
| MIP | Mobile IP |
| MM | Mobility Management |
| MMD | Multimedia Domain |
| MMF | Mobility Management Framework |
| MMR | Mobility Management Requirements |
| NGN | Next Generation network |
| PAU | PSTN as fixed access to UMTS |
| POTS | Plain old telephone Service |
| PSTN | Public Switched Telephone Network |
| RACE | Research into Advanced Communications in Europe |
| SIP | Session Initiation Protocol |
| UMTS | Universal Mobile Telephone System |



# Thank you!

**John Visser, P.Eng.**
- **ITU: Chairman, ITU-T SG 19 Mobile Telecommunication Networks**
- **Nortel: Sr. Mgr., International Network Standards**

Tel: +1 613 763 7028
Fax: +1 613 763 2697
Mob: +1 613 276 6096
Emai jvisser@nortel.com

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