

**ITU-D Regional Development Forum for the EUR  
and CIS Region: "NGN and Broadband,  
Opportunities and Challenges"**

**Chişinău, Moldova; 24-26 August 2009**

# **Leapfrogging with New Telecoms Technologies**



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## **Abstract**

Leading edge end users demand the latest services and capabilities, and these users are often the most lucrative for the operator. Operators are faced with an accelerating stream of evolving technologies and are therefore faced with ongoing decisions on upgrading or replacing their deployed infrastructure as each new Release or Generation is standardized and products become available. The latest technologies are attractive in terms of capacity, capability and cost. Local market needs are an essential input to determining what an operator should do. Leapfrogging to current technologies is a means to meet market needs, significantly reduce costs and increase access to services.

## Outline

- Introduction
- What users demand
- Challenges operators face
- What holds us back?
- Taking advantage
- Summary and Conclusions

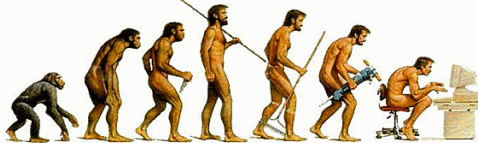
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## Introduction

- Society is evolving, with technology both driven by societal needs and a driver of societal directions

➤ Light heartedly:



➤ Or more seriously:



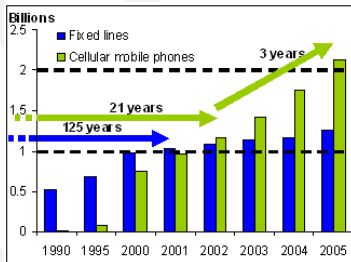
Kashmir's mobile phone chroniclers  
[http://news.bbc.co.uk/2/hi/south\\_asia/7618092.stm](http://news.bbc.co.uk/2/hi/south_asia/7618092.stm)

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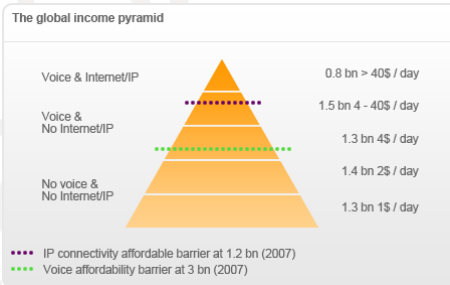
# Introduction

- Telecommunications is becoming available everywhere, but is not always affordable:
  - ♦ 80% of the world's population is covered by GSM but <40% can afford it\*



ITU/UNCTAD, *World Information Society Report*, and ITU World Telecommunication Indicators Database

~4B subscribers today: [www.gsmworld.com/](http://www.gsmworld.com/)



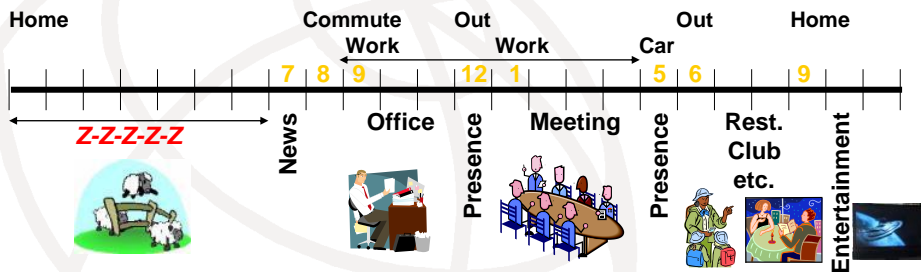
\* and above figure are from the Nokia Siemens Networks web site: [www.nokiasiemensnetworks.com/global/AboutUs/Corporate+responsibility/bringing-connectivity/Internet-for-the-next-billion.htm?languagecode=en](http://www.nokiasiemensnetworks.com/global/AboutUs/Corporate+responsibility/bringing-connectivity/Internet-for-the-next-billion.htm?languagecode=en)

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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

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

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

Continuous broadband integrated wireline and wireless technologies

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## Usage Patterns Are Changing



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## What Users Demand

- Always on and available
  - People are used to interacting with those close by, miss doing so when apart
  - Telecoms bridges this gap but adds other benefits, especially being able to contact others instantly instead of spending a lot of time getting to where the other people are before being able to do so
  - Result: today most people can't do without their mobile phone

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## What Users Demand

- Anytime, anywhere, ...
  - we've just covered that
- ... and in any form
  - Not just voice but data, too (the Internet!)
  - When people talk face to face, they don't just exchange the sounds of their voices, but also their facial expressions and body language
  - The more telecoms can deliver the "in person" experience, the more effective it will be, hence ...

## What Users Demand

- Voice and multimedia
  - Multimedia is now about adding images, initially still and monochrome, now colour and motion
  - Humans have five senses and we are now only exploiting two of them
    - 3GPP SA1 is starting to explore haptics
  - Today's science fiction is tomorrow's science fact

## What Users Demand

- Self service, intuitive
  - Minimum administrative process
  - Should not require an engineering degree to set up and use
- Simple for the end user
  - Pick it up, turn it on: it works
  - UE HMI is obvious and simple to use
- Secure, trusted, reliable

## What Users Demand



## Challenges Operators Face

- User demands
- Is the existing infrastructure up to the job?
- Changing landscape
- Constant innovation
- Regulatory requirements and constraints



***What leaps are needed to meet the challenges?***

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## Is the existing infrastructure up to the job?

- Demand for new data services saw the voice network adapted for data calls (modems)
  - ◆ Major shift in average holding time
  - ◆ But calls still full time physical (analog) or virtual (TDM): inefficient, limited to number of connections (trunks) available, could be "busy" but not actually carrying payload
- Evolution of data networks and realization of value of voice traffic saw data networks adapted for voice (VoIP)
- Evolution of core network to packet switching enables a major change in the types of services that can be provided
  - ◆ Short calls with small amounts of data handled efficiently
  - ◆ Long calls with bursty traffic handled efficiently
  - ◆ Voice traffic is bidirectional but tends to be half duplex hence can be more efficiently handled as data (VoIP)
  - ◆ Long calls with large amounts of data can be handled at least as efficiently as dedicated lines, and generally more so

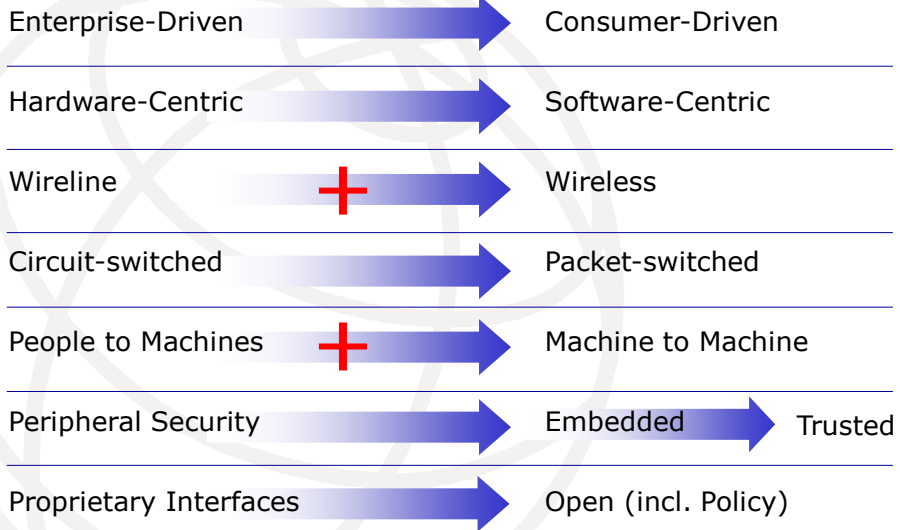
***Leapfrog from circuit-switching to packet switching***



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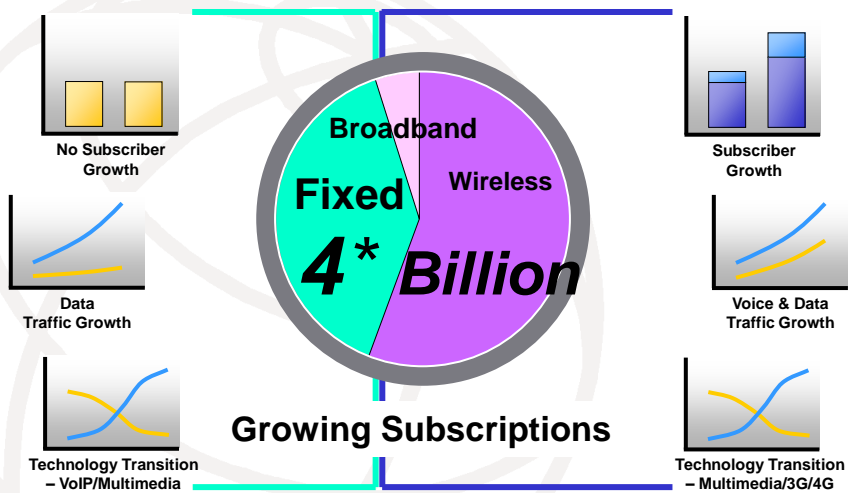
## Landscape is changing



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## Telecom Market Trends



\* ~4B subscribers today: [www.gsmworld.com/](http://www.gsmworld.com/)

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## Telecommunications Industry: Constant Innovation

**VoIP and Converged Communications**

**Wireless to WiMAX/4G/LTE**

**Wireline to Wireless**

**Copper to Fiber**

**Analog to Digital**

*Change comes from disruption.  
And disruption is constant!*

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## Regulatory Requirements and Constraints

- Universal access requirements
  - ◆ Costs and subsidies
  - ◆ Applies equally to all?
- Competition
  - ◆ Incumbents, "green field," virtual operators
- Regulation basis
  - ◆ Technology (changes rapidly), or
  - ◆ Services (changes slowly)
- Regulators and technology convergence
  - ◆ How to regulate VoIP vs. traditional circuit-switched analog/TDM systems?
  - ◆ How to cope with convergence across voice, data and broadcast?

*Need to leap past old models and ways of doing things.*

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## What Holds Us Back?

- Legacy infrastructure
  - What is the current state of what we have in place? Is it old and obsolete and not up to the demands? Is it getting too expensive to operate for the revenue it earns? Have we just installed it and it seems to be obsolete already? And the latest technology seems to be so much better!



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## What Holds Us Back?

- Finances
  - Money does not grow on trees!
  - Telecoms requires significant up front investment
- Market uncertainty
  - Is the demand there? Users need to live within their means so telecoms services have to be profitable at price points that users can afford. (Ref: chart 5)



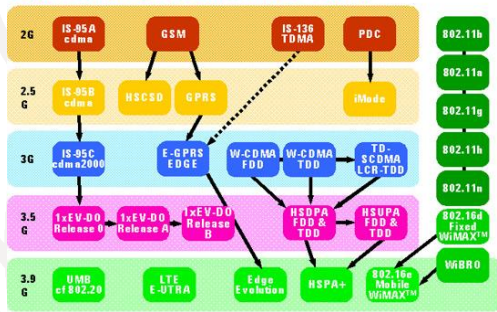
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# What Holds Us Back?

- Technology uncertainty
  - Core network: circuit-switched, TDM, all-IP?
  - Fixed access networks: Cu, xDSL, fibre?
  - Radio access: 2G, 3G, 3.14159G ( $\pi$ G 😊), 4G?

Digital wireless evolution 1990 - 2010



[www.agilent.com/about/newsroom/tmnews/background/2008/01oct2008\\_fieldfox](http://www.agilent.com/about/newsroom/tmnews/background/2008/01oct2008_fieldfox)

# Taking Advantage

- No need to take the same path as our predecessors!
  - But we're still doing it!



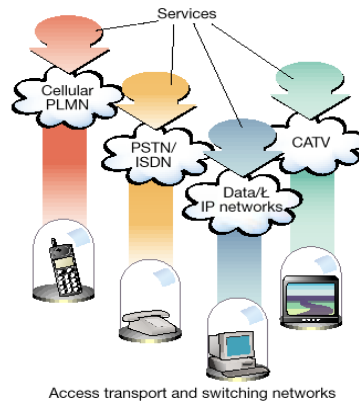
Manila, 2007  
[www.ericmackonline.com/ICA/blogs/emonline.ns/f/dx/would-you-like-dsl-or-cable-internet-with-that](http://www.ericmackonline.com/ICA/blogs/emonline.ns/f/dx/would-you-like-dsl-or-cable-internet-with-that)



Etching of Overhead Telephone and Telegraph Wires in Broadway, 1890  
 Book of Old New York  
 Henry Collins Brown 1913

## Taking Advantage

- No need to separate mobile from fixed networks from data form broadcast
  - Services are becoming independent of access
  - Broadcast is more about frequency band allocations than about content when content is available anytime, anywhere and on any access

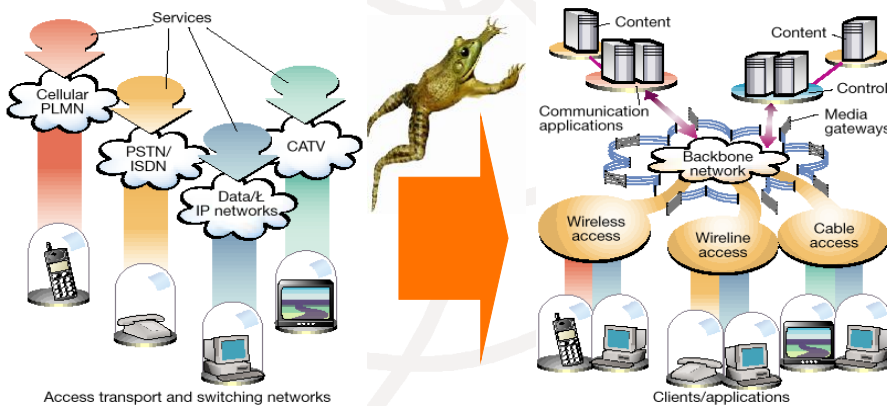


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## Taking Advantage

- Technology enables combining what used to be separate ...

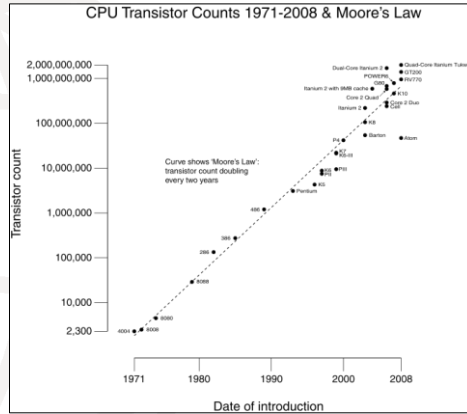


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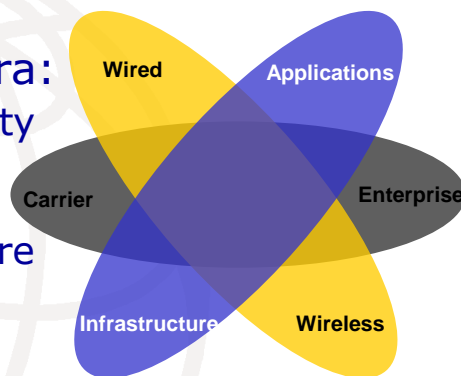
## Taking Advantage

- It is much less expensive to install and manage a common infrastructure
- Moore's Law means that both UE and core network infrastructure capabilities have increased greatly while costs have declined significantly



## Megatrends

- Mega trends are defining a new era:
  - Hyper-connectivity
  - Network-aware applications and applications-aware networks
  - True Broadband
- Technology is all about enabling users to do what they want to do



## Taking Advantage


- Mobile access and Next Generation Networks has been the leading edge of telecom standards work for some time now
  - “Megatrends” are the key drivers
  - There is sufficient experience and maturity to enable adoption with confidence



## NGN Benefits

- NGN: forward looking technologies, lower costs, greater flexibility, can meet user demands now and in the future
- NGNs will:
  - promote fair competition
  - encourage investment
  - meet regulatory requirements
  - provide open access to networks ...
- ... while:
  - ensuring universal access to services
  - promoting equality of opportunity to users
  - promoting cultural and linguistic diversity
  - recognizing need for global cooperation

## Summary and Conclusions

- People want to communicate
  - The next billion users will be primarily mobile
  - The Internet will increasingly be accessed from mobile terminals
- Major changes have taken place in both technology and markets
  - Every network is in transition
  - Wealth of experience to draw on and apply
- No need to follow all the same steps:  
 leapfrog to success with new telecoms technologies