Mobile Converged Networks

2.2.1 Shaping the Future: Mobile Network Evolution to NGN

Regional Workshop for the Arab Region on Guidelines on the Smooth Transition of Existing Mobile Networks to IMT-2000 for Developing Countries

Damascus, Syria   13-15 June 2005

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>THIS IS **THE WAY**

Shaping the Future:
Mobile Network Evolution to NGN

John Visser, P.Eng.
Sr. Mgr., International Network Standards
Damascus, 13 -15 June 2005

>THIS IS N❂RTEL

Objective and Outline

> **Objective**
  - Show network transformation and convergence are essential for enhancing the user experience, and are driven by user demand
  - Show mobility must be an integral capability of the Next Generation Network

> **Outline**
  - Value: User Services / Service Infrastructure / Network
  - Shifting "demographics"
  - Convergence opportunity: mobility is a key dimensions of the NGN
  - Convergence and network transformation
  - Realizing the Vision: simplifying the user's life / transforming the network

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What's Life Like ….

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

> **In 2010 …**
  - Everyone is connected and people can't do without being on-line
  - The first place people go for content is on-line
 - Informal peer groups and sharing is open and legal

> **In 2015 …**
  - Everyone and everything is connected all the time, everywhere
  - The only place people go for content is on-line
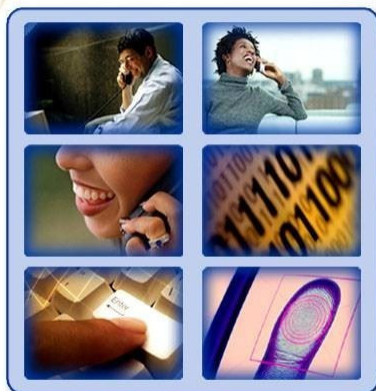 - Dynamic communities of interest without any boundaries

Today's technology savvy teenager (software downloading, IM addicted, camera phone wielding) **is grown up, a key decision maker at home and at work, and your target customer!**

End Users Value ...

The Multimedia Experience

Security & Personalization

The Freedom of Mobility
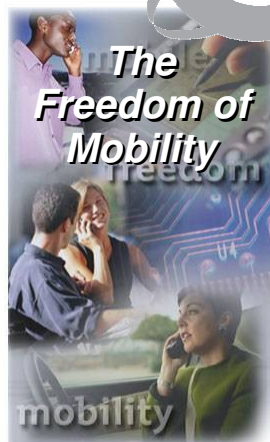
… for enhanced productivity and user experience

Eliminate boundaries ...
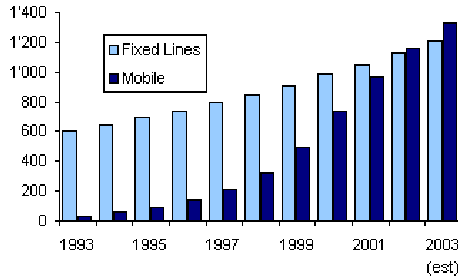
Transformation

Services and Applications

Broadband Connectivity

... to enable ubiquitous and seamless solutions

Mobile and Internet Revolution is Underway

Mobile overtakes fixed: total subscribers, world, millions

Fixed Lines
Mobile

Users (millions) and penetration per 100 pop.

Mobile subscribers
Internet users
Mobile penetration
Internet penetration

From: "ITU and its Activities Related to IP Networks" (Apr 2004)

Data source: ITU World Telecommunication Development Report, 2002.
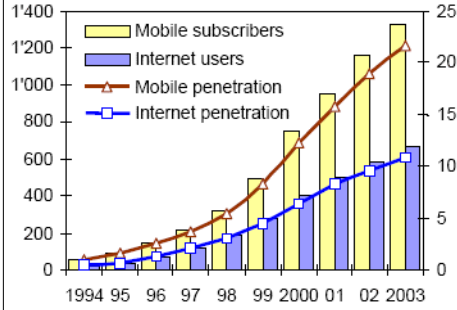
From ITU Internet Reports 2004: "The Portable Internet"

Data source: ITU World Telecommunication Indicators Database

Jan 2005
• UK: >100%: http://www.telecompaper.com/site/news_TA.asp?type=abstract&id=64718&NR=680
Mar 2005:
• Ireland: 94%: http://www.rte.ie/business/2005/0318/comreg
• Singapore: 91%: http://www.w2forum.com/item/singapore_mobile_phone_penetration_past_

Mobile Revolution - Japan

> Example: TCA Japan Telecom Data Book 2004
   • Ref: http://www.tca.or.jp/eng/database/annual/2004/index.html
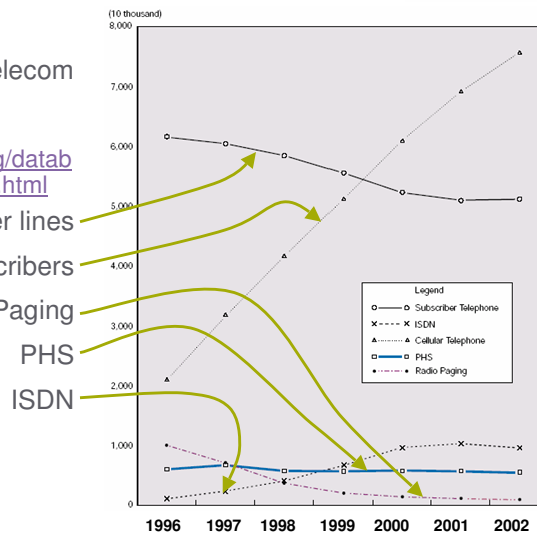
Fixed subscriber lines
Mobile subscribers
Paging
PHS
ISDN

> **Continuing strong growth in mobile subscribers**
> **Stabilizing fixed subscriber base**
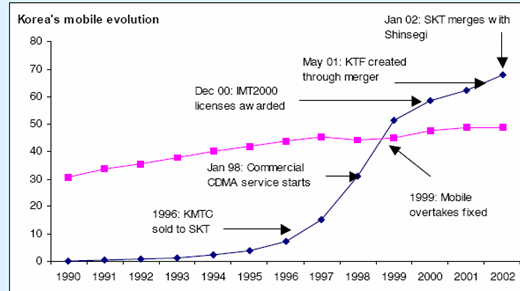> **ISDN starting to decline!**

Legend: Subscriber Telephone, ISDN, Cellular Telephone, PHS, Radio Paging

1996 1997 1998 1999 2000 2001 2002

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Mobile and Internet Revolution - Korea

Figure 1.1: Korea at a glance

Republic of Korea	
Geography	
Coordinates	37 00 N, 127 30 E
Area	98 480 sq km
Density (inhab per km2)	490
Terrain	Hills, mountains, wide costal plains
Population	
Total	48269037
Growth rate	0.66%
Life expectancy	
Women	79.3
Men	71.7
Median age	33.2
Economy (GDP, 2002)	
Total (PPP)	US$ 941.5 billion
Per capita (PPP)	US$ 19600
Growth rate	6.3%
Language	
Official	Korean
Studied widely	English

Source: CIA Factbook, 2003.

Figure 3.1: Korea's rapid mobile growth

Korea's mobile evolution

- Jan 02: SKT merges with Shinsegi
- May 01: KTF created through merger
- Dec 00: IMT2000 licenses awarded
- Jan 98: Commercial CDMA service starts
- 1999: Mobile overtakes fixed
- 1996: KMTC sold to SKT

Source: ITU World Telecommunication Indicators Database.

http://www.itu.int/osg/spu/ni/futuremobile/general/casestudies/koreacase-rv22.doc.pdf **(26 Feb 2004)**

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Internet Revolution - Korea

Table 5-1 | **Broadband Internet subscribers**

(unit: 1,000 people, %)

Classification	2000	2001	2002	2003	2004. 6
Subscribers	4,017.5	7,805.5	10,405.5	11,178.5	11,617.8
Household rate	27.0	52.6	69.1	73.1	74.8

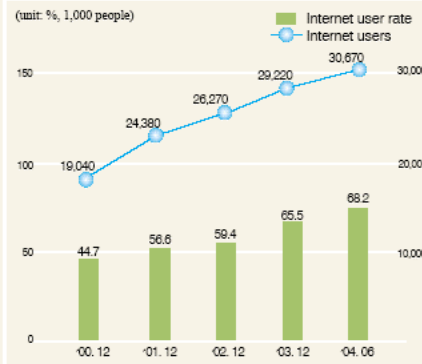Data : Ministry of Information and Communication, Juiy 2004

- *Strong correlation between mobility and internet usage*
  - *but varies by market: must always consider local factors*

http://www.nca.or.kr/homepage/ehome/ehome.nsf/BynewsV/1CACB7630D5C68F2C9256F3300114C44/$file/2004eng.pdf

Figure 5-1 | **Trend of Internet Usage Rate and Users**

(unit: %, 1,000 people)

Internet user rate
Internet users

	'00. 12	'01. 12	'02. 12	'03. 12	'04. 06
Internet users	19,040	24,380	26,270	29,220	30,670
Internet user rate	44.7	56.6	59.4	65.5	68.2

Data : National Internet Development Agency of Korea, August 2004

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Business in India
Country of Contrasts

Embracing Telecom
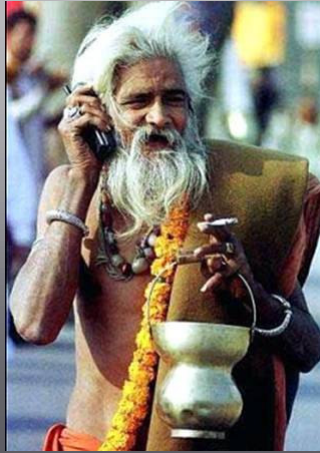
Stress All Designs

World Class-Capabilities
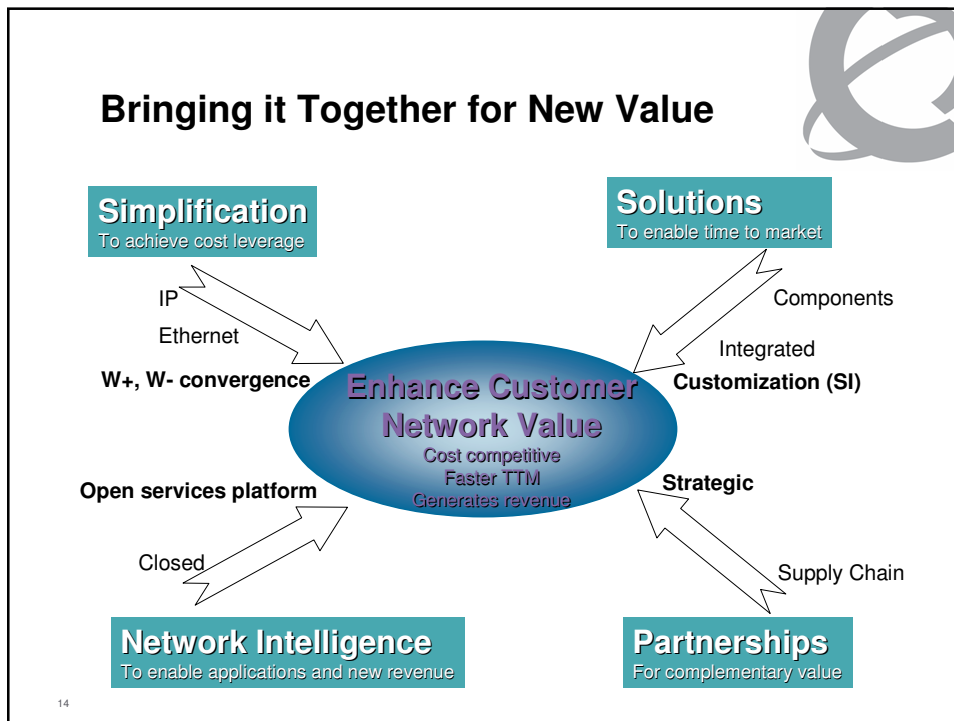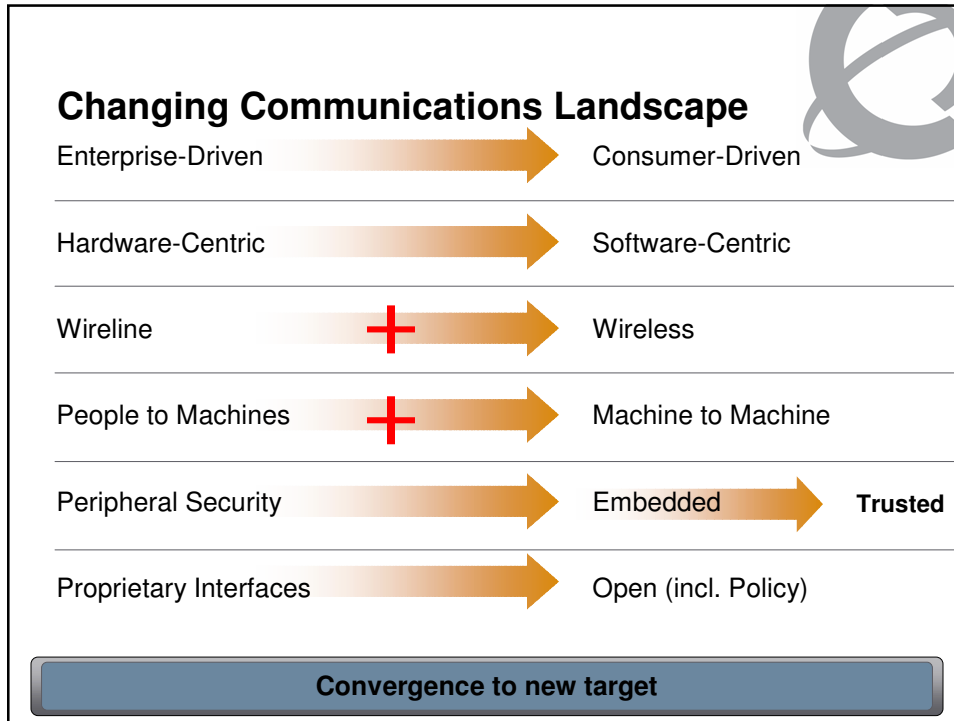
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Forecasts

> Many available!
- Example: Yankee Group, News Release 24 Jun 2003:
  - estimate 18.6% of world's population currently has mobile phones
  - global wireless user base will increase 49% over next 4 years, reach 1.72B by 2007
  - global cellular subscriber revenue will grow from $387B in 2002 to $584B in 2007, similar in value to crude oil production
- Reality: Dec 2004*:
  - enormous growth in Russia, India, China: e.g., China added 9.25M mobile subscribers in Feb 2005!**
  - global wireless user base: 1.5B at end 2004; internet user base: 700M at mid 2004
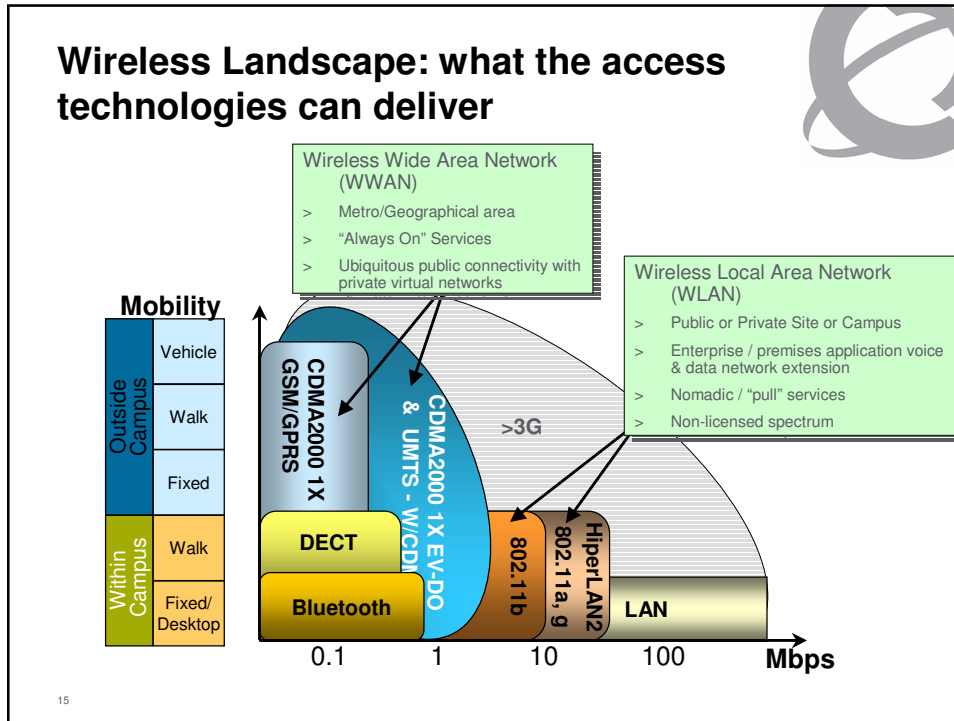 - global mobile revenue already $414B in 2003

*   CNN: www.cnn.com Dec 9, 2004, using ITU info

**   Shosteck Email Briefing, April 2005; www.shosteck.com

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Changing Communications Landscape

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

Bringing it Together for New Value

Simplification
To achieve cost leverage

Solutions
To enable time to market

IP

Components

Ethernet

Integrated

W+, W- convergence

Customization (SI)

Enhance Customer
Network Value
Cost competitive
Faster TTM
Generates revenue

Open services platform

Strategic

Closed

Supply Chain

Network Intelligence
To enable applications and new revenue

Partnerships
For complementary value

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Wireless Landscape: what the access technologies can deliver

Wireless Wide Area Network (WWAN)
> Metro/Geographical area
> "Always On" Services
> Ubiquitous public connectivity with private virtual networks

Wireless Local Area Network (WLAN)
> Public or Private Site or Campus
> Enterprise / premises application voice & data network extension
> Nomadic / "pull" services
> Non-licensed spectrum

Mobility

Outside Campus	Vehicle
	Walk
	Fixed
Within Campus	Walk
	Fixed/ Desktop

CDMA2000 1X GSM/GPRS

CDMA2000 1X EV-DO & UMTS - W/CDMA

>3G

DECT

Bluetooth

802.11b

802.11a, g HiperLAN2

LAN

0.1   1   10   100   **Mbps**

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Wireless Broadband – The New Category

Mobile

Cellular

UMTS

3GPP Evol?

Wireless Broadband

1xEV-DO   F-OFDM

Local Area

Cordless

WiMAX 802.16e

WiFi   802.11 n

802.11 a/b/g

Fixed

POTS

WiMAX 802.16d

DSL / Cable / Fiber

Voice & Messaging   *Broadband*

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● Existing   ● 2004-2006 Rollout   ● 2006+
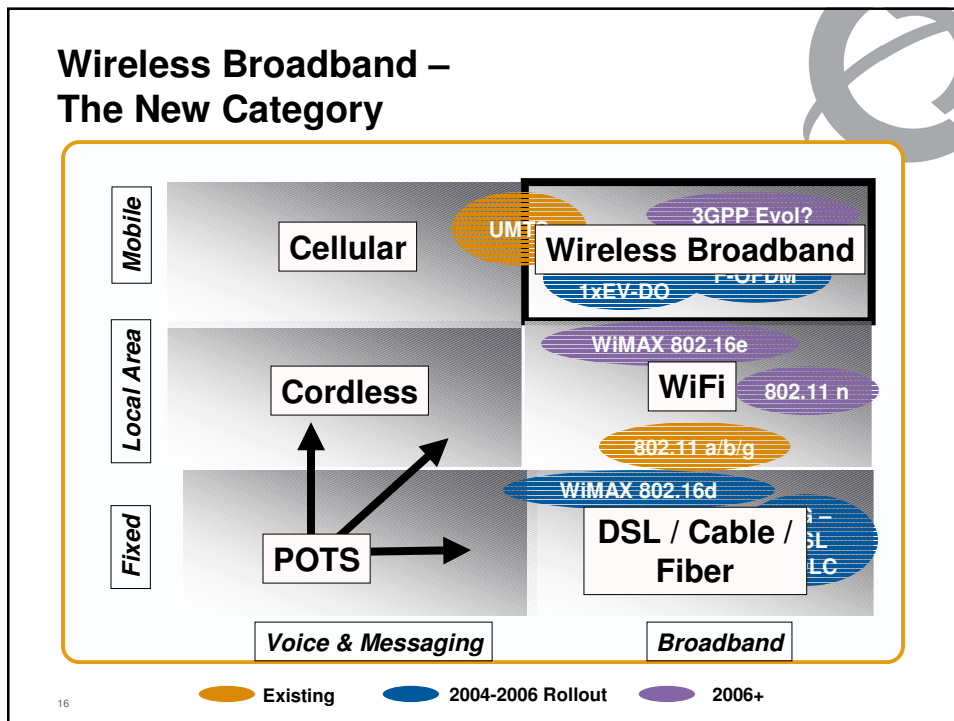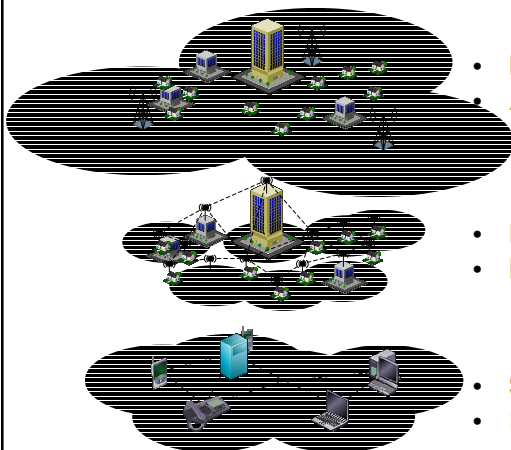
New Deployment - Wireless Mesh Networks
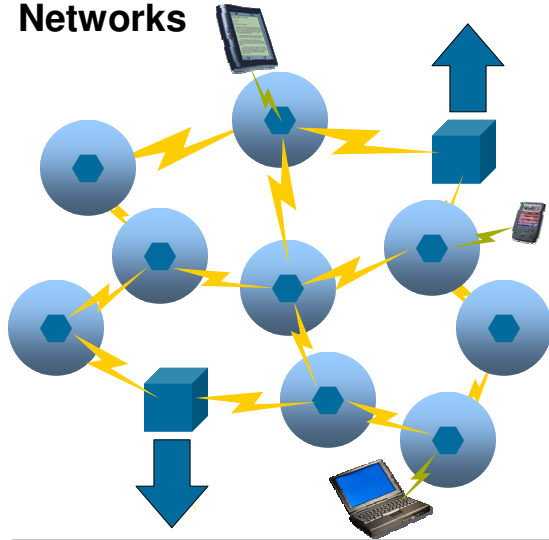
> Makes WiFi public / city hotspot deployment economic

> Reduces Operating Costs – Backhaul

> Commercially Available

> Taipei, Taiwan Deployment Announced

> 4 Universities – 2 continents

Can be used to extend WiFi coverage + Use WiMAX 802.16e or HSXPA MVNO to provide macrocellular coverage
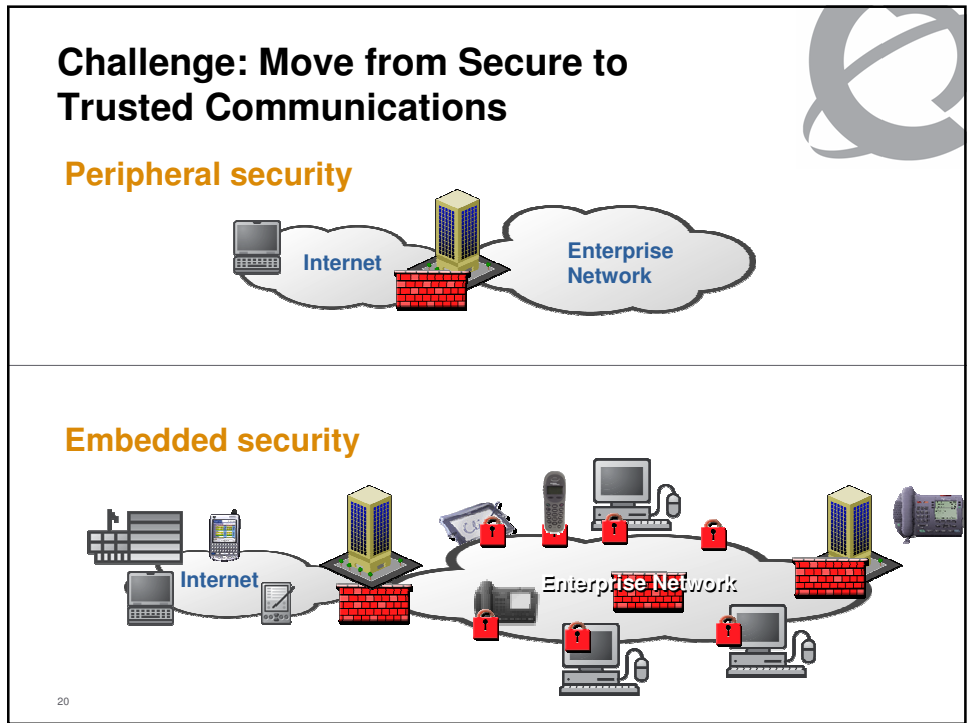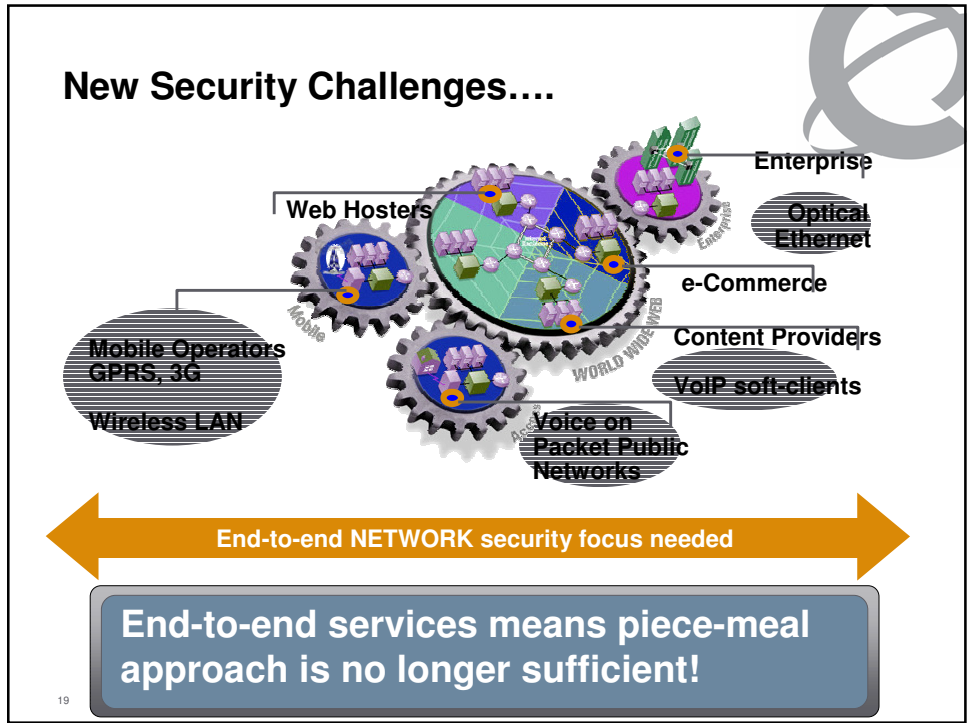
17

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

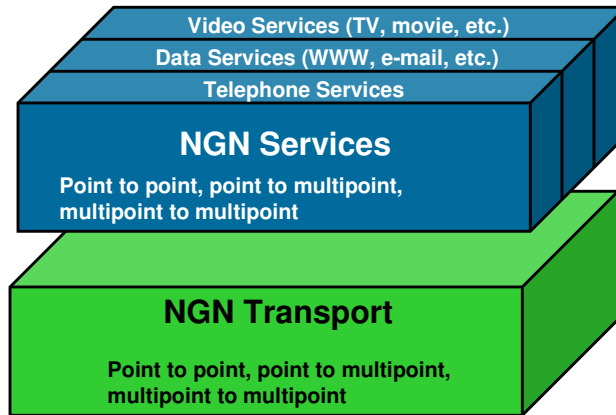*… connected through the Wireless Packet Network*

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New Security Challenges….

Enterprise

Web Hosters

Optical Ethernet

e-Commerce

Mobile Operators GPRS, 3G

Content Providers

VoIP soft-clients

Wireless LAN

Voice on Packet Public Networks

End-to-end NETWORK security focus needed

End-to-end services means piece-meal approach is no longer sufficient!

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Challenge: Move from Secure to Trusted Communications

Peripheral security

Internet

Enterprise Network

Embedded security

Internet

Enterprise Network

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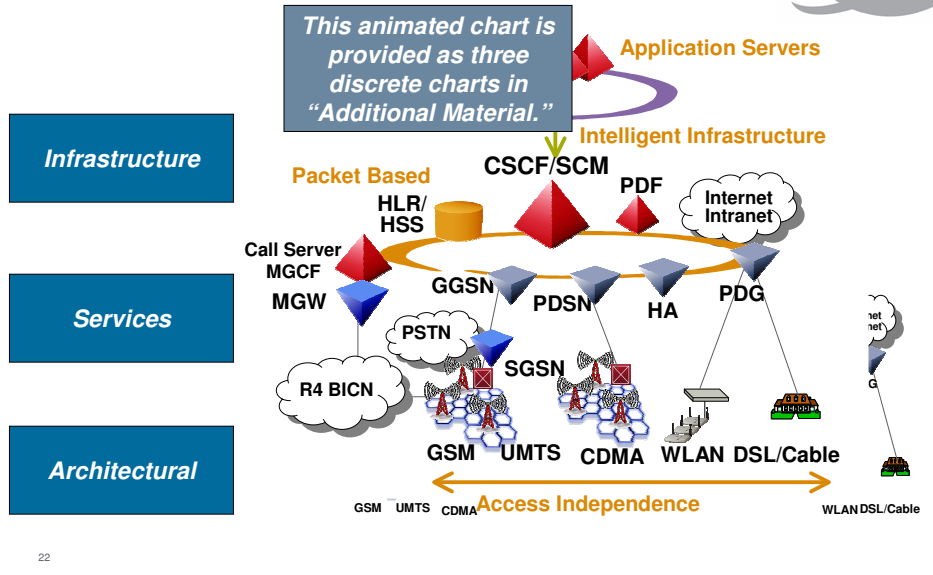
3GPP R5 network architecture

This animated chart is provided as two discrete charts in "Additional Material."

OSA
Gateway

Session
Control

HSS

Policy
Billing

Media
resources

3GPP R5

Signalling
Gateway

TDM
PSTN

Service
Edge

Packet
core

Media
gateway

Service
Edge

Internet
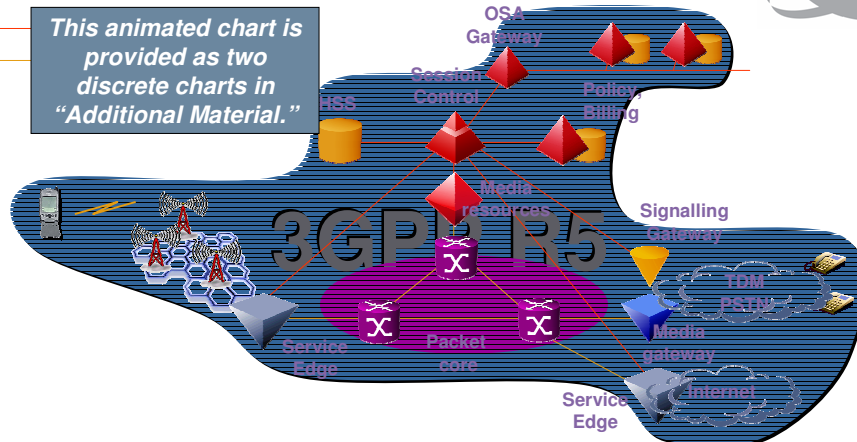
- **3GPP R5 IM Subsystem provides a SIP and H.248 framework for the applications and control environment of converged wireless networks**
- **Applications creation environment permits extending applications to users independently of their means and point of access**

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Nortel's fully Converged Architecture

Content
Application
Servers

3rd Party
applications

Roaming,
Personalisation,
Presence

PRI interworking,
BRI and lines gateway

3GPP R5

DSL

Multi-
Service
Edge

Cable

Enterprise

Application QoS
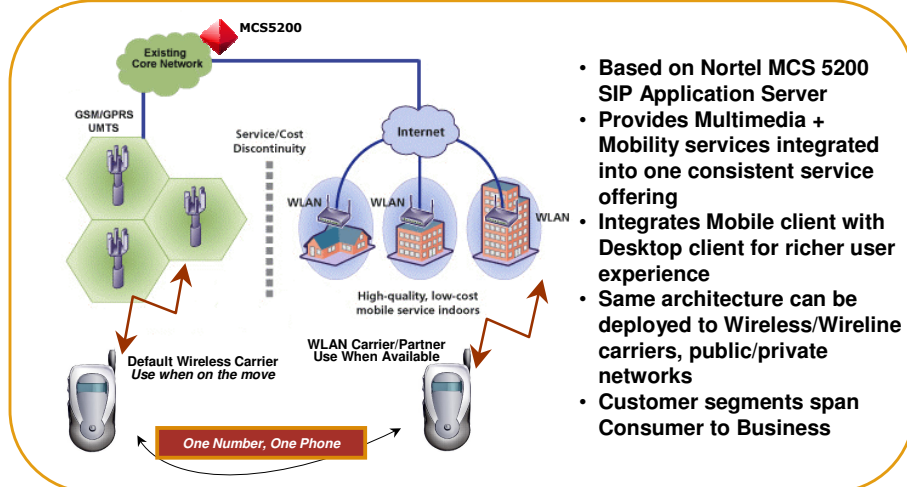Content switching

Multi-
Service
Edge
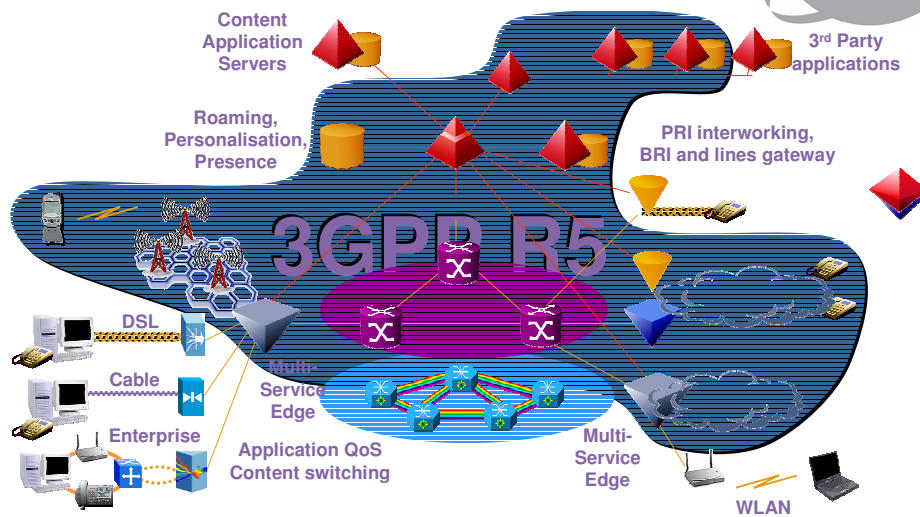
WLAN

Converging wireless, wireline, Enterprise, voice, multimedia and data

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Converged Mobility Solution – Access Virtualization

Leveraging MCS 5200 with Dual-Mode WLAN/Mobile Handsets

MCS5200

Existing Core Network

GSM/GPRS UMTS

Service/Cost Discontinuity

Internet

WLAN   WLAN   WLAN

High-quality, low-cost mobile service indoors

WLAN Carrier/Partner
Use When Available

Default Wireless Carrier
Use when on the move

One Number, One Phone

- Based on Nortel MCS 5200 SIP Application Server
- Provides Multimedia + Mobility services integrated into one consistent service offering
- Integrates Mobile client with Desktop client for richer user experience
- Same architecture can be deployed to Wireless/Wireline carriers, public/private networks
- Customer segments span Consumer to Business

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The Value Shift Opens up Opportunity & Threat for New Competitive Models

Voice Networks & Services

Data Networks & Services

Internet

Services (multimedia – anywhere, anytime, any device)
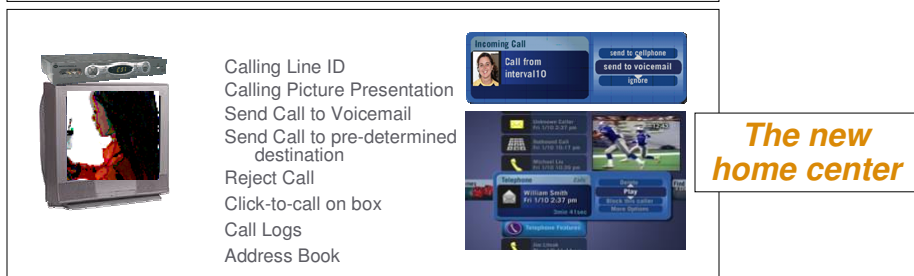
Network (connectivity – anywhere, anytime)
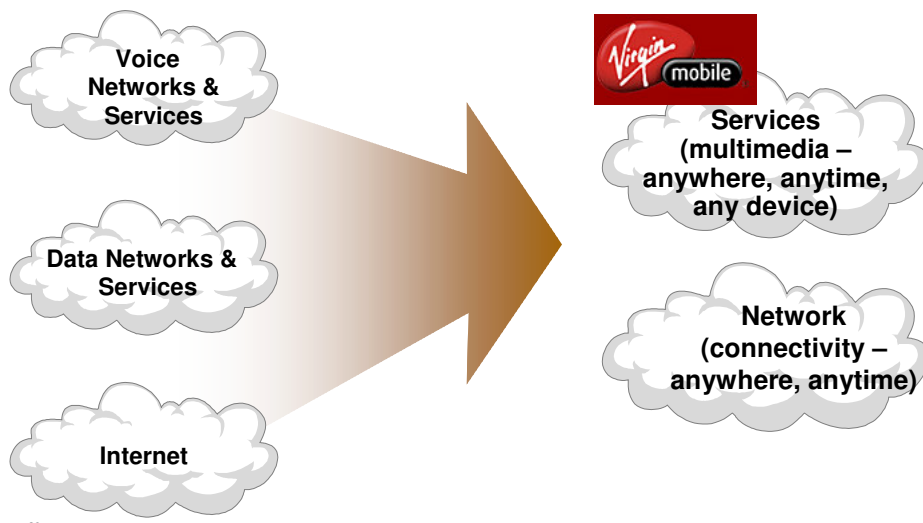
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Enhancing End User Experience: Blending User Devices

> 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
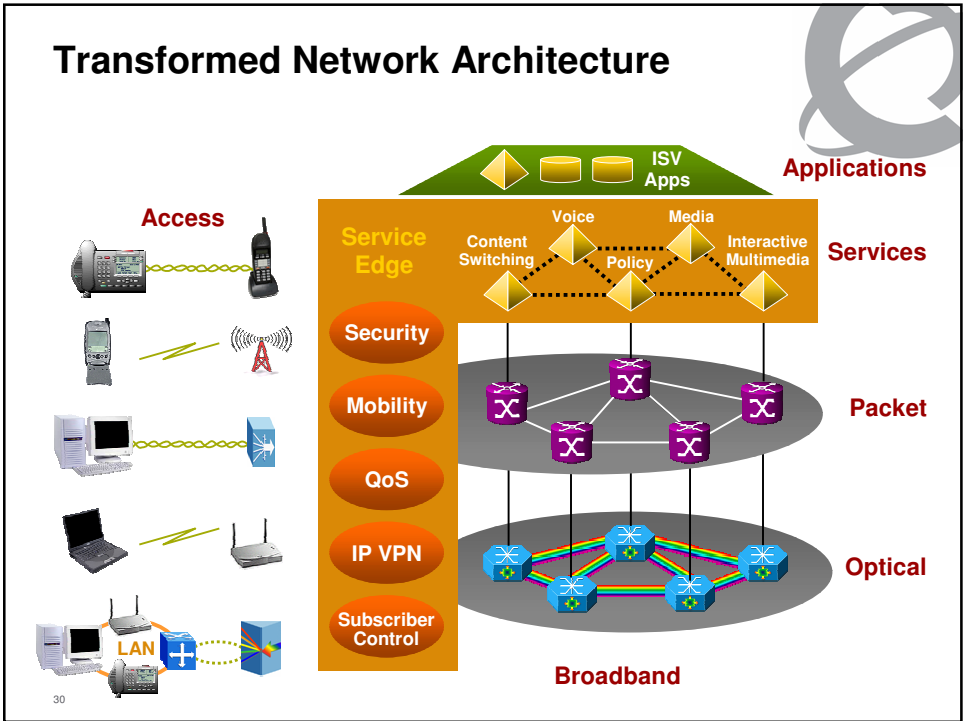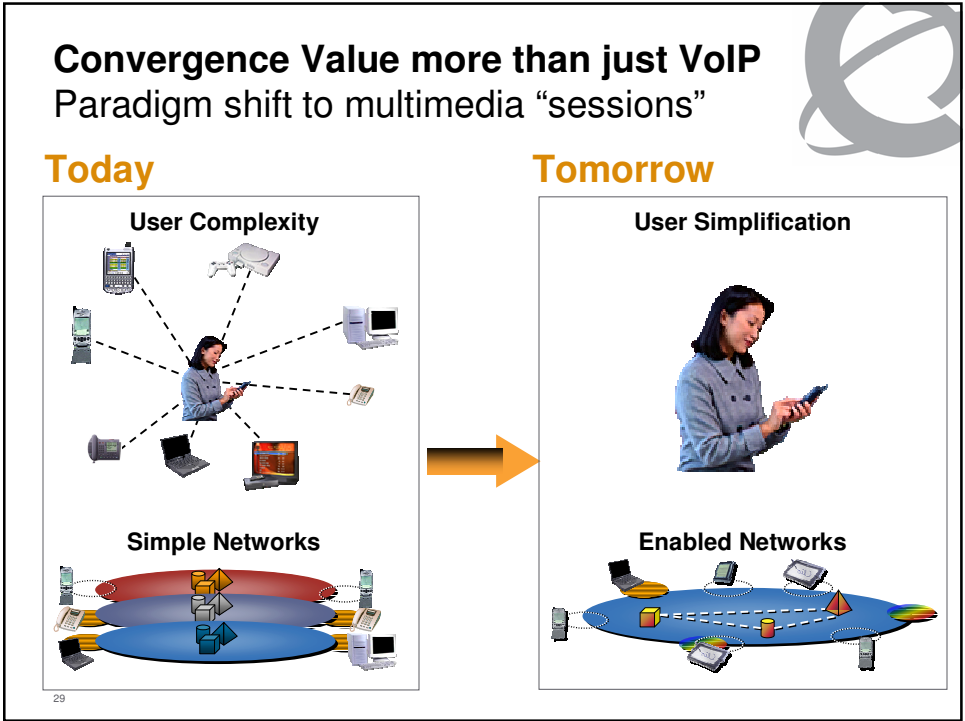
27

Transforming the User Experience – Application Convergence

Call Logging

"One-Click" to all contacts

Collaboration Services

Personal Agent manages your incoming calls

Wireless LAN Access

Desktop Video Conferencing

The new enterprise

Calling Line ID
Calling Picture Presentation
Send Call to Voicemail
Send Call to pre-determined destination
Reject Call
Click-to-call on box
Call Logs
Address Book

Incoming Call
Call from interval10
send to cellphone
send to voicemail
ignore

The new home center

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Convergence Value more than just VoIP
Paradigm shift to multimedia "sessions"

Today

User Complexity

Simple Networks

29

Tomorrow

User Simplification

Enabled Networks

Transformed Network Architecture

ISV Apps

Applications

Access

Service Edge

Voice Media

Content Switching Policy Interactive Multimedia

Services

Security

Mobility

Packet

QoS

IP VPN

Optical

Subscriber Control

LAN

Broadband

30

**The Transformed
Next Generation Network**

- Always on
- Anytime, anywhere and in any form
- Voice and multimedia
- Self service, intuitive
- Simple for the end user
- Secure, trusted and reliable

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Thank you!

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