Wireless Wonders: Part 1

3G and the road to the mobile Internet

MSU Telecom Summer Programme, 16th July 2002

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Note: The views expressed in this presentation are those of the author and do not necessarily reflect the opinions of the ITU or its membership. Lara Srivastava can be contacted at lara.srivastava@itu.int

Outline

- Introduction
- What is 3G or IMT-2000?
  - 1G, 2G, 2.5G, 3G…
  - Migration Paths
- What is “Mobile Internet”?
  - Trends
- Mobile Internet Services
  - Internet connectivity
  - Messaging
- The development of the market
  - Barriers to development
  - The road to success
- Regulatory aspects

Introduction

Some trends …

- Ubiquity of the Internet
- Innovation in digital mobile technology
- Growing importance & value of information
- Internet Protocol ("IP") technologies as strategic element in design, development and use of telecoms networks
- Integration/convergence of voice and data
- "Post-PC" growth in personal "communicator appliances" (PDAs etc…)
  - "The future of Internet access is mobile Internet access" (Jeff Hawkins, inventor of the Palm Pilot)
- High-speed 2.5/3G will enable this revolution…

So what is 3G?

What is “3rd generation (3G) mobile” or “IMT-2000”

www.itu.int/imt

From generation to generation

- Development of mobile communications described in terms of “generations”
  - 1G : analog cellular systems (1970s and early 1980s), mostly IMTS (Improved Mobile Telephone Service)
  - 2G : today’s digital cellular systems (end 1980s), such as GSM and PDC. Number of regional & proprietary standards
  - 3G : refers to standards developed at a global level under the IMT-2000 banner and under the leadership of the ITU

History of 3G or IMT-2000

- ITU developed the concept in mid-1980s
- Stands for "International Mobile Telecommunications"
  - Known as "3rd" generation systems (3G)
  - in Europe, often referred to as UMTS
- Unanimous approval resulting from collaboration of many entities, both inside and outside the ITU (ITU-R and ITU-T, and 3GPP, 3GPP2, UWCC, etc.)
- Promise of full interoperability and interworking of mobile systems on the basis of a single standard (without the fragmentation that had characterized the 2G mobile market)
- However, there were strong proponents of different approaches to 3G technology, resulting in ….

… 5 Terrestrial Radio Interfaces

IMT-2000 CDMA Direct Spread	IMT-2000 CDMA Multi-Carrier	IMT-2000 CDMA TDD	IMT-2000 TDMA Single Carrier	IMT-2000 FDMA/ TDMA
W-CDMA (e.g UMTS)	CDMA2000	UTRA TDD & TD-SCDMA	UWC-136/ EDGE	DECT

3G CDMA

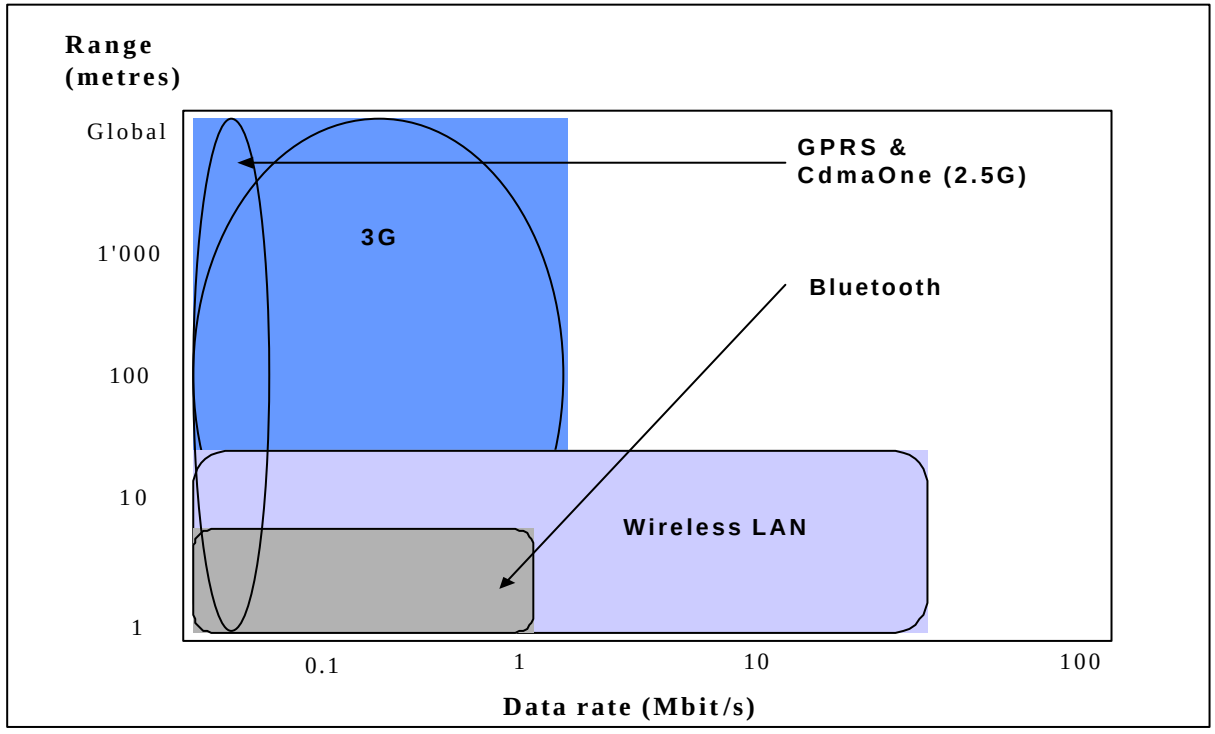
Although there are five terrestrial standards, most of the attention and energy in the industry has been toward the CDMA standards

IMT-2000 or 3G characteristics

- high data rates at a minimum of 144 kbit/s in motion and 2 Mbit/s in low-mobility and indoor environments;
- circuit-switched and packet-switched services, such as Internet Protocol (IP) traffic, enabling multimedia services such as real-time video;
- greater capacity & improved spectrum efficiency;
- global roaming between different 3G operational environments;
- an open international standard

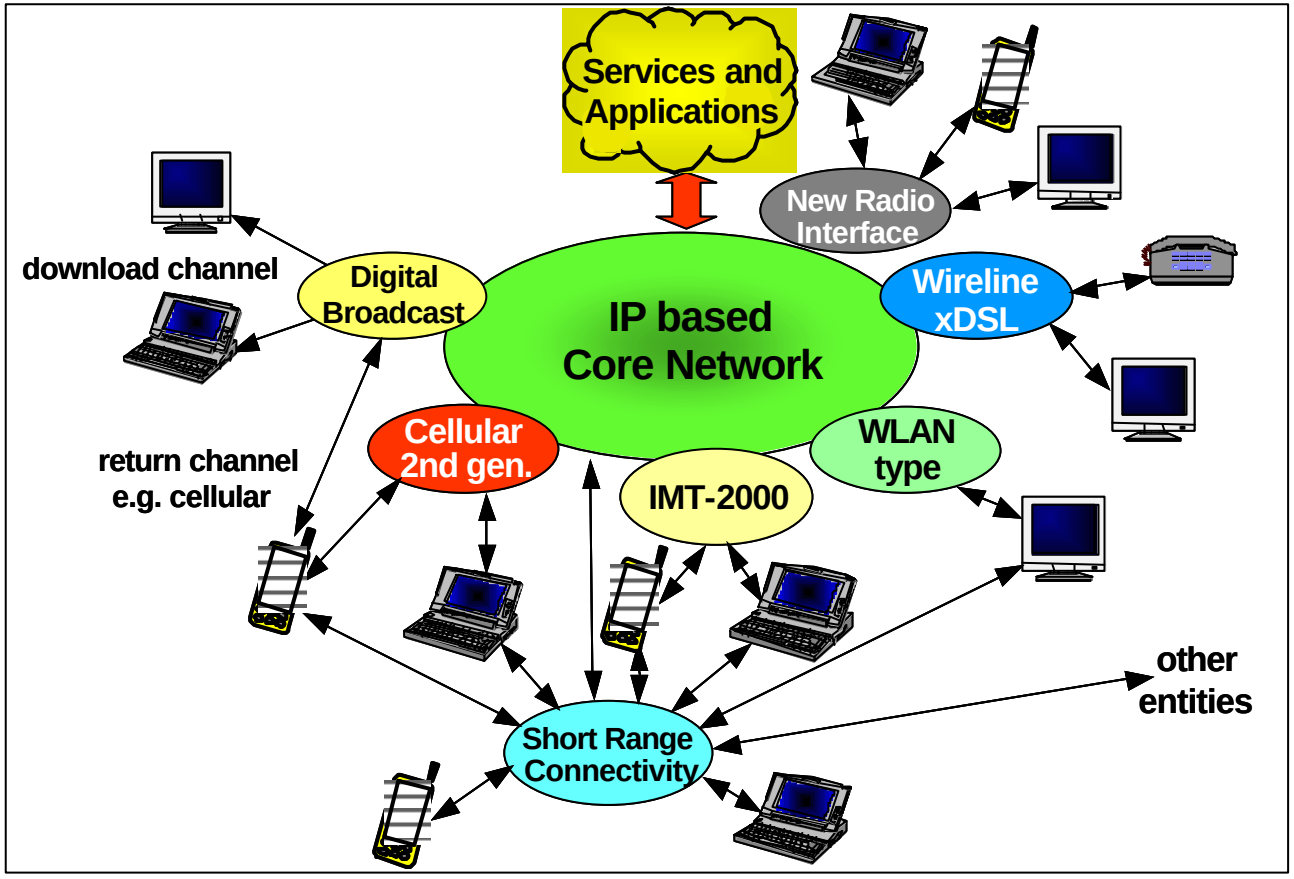
Note: 3G is not the only radio access system for mobile data…

- Other network technologies for the transmission of mobile data exist [e.g. Wireless LANs (e.g. 802.11b or Wi-Fi) & Bluetooth] and are seen as complementary rather than competitive.



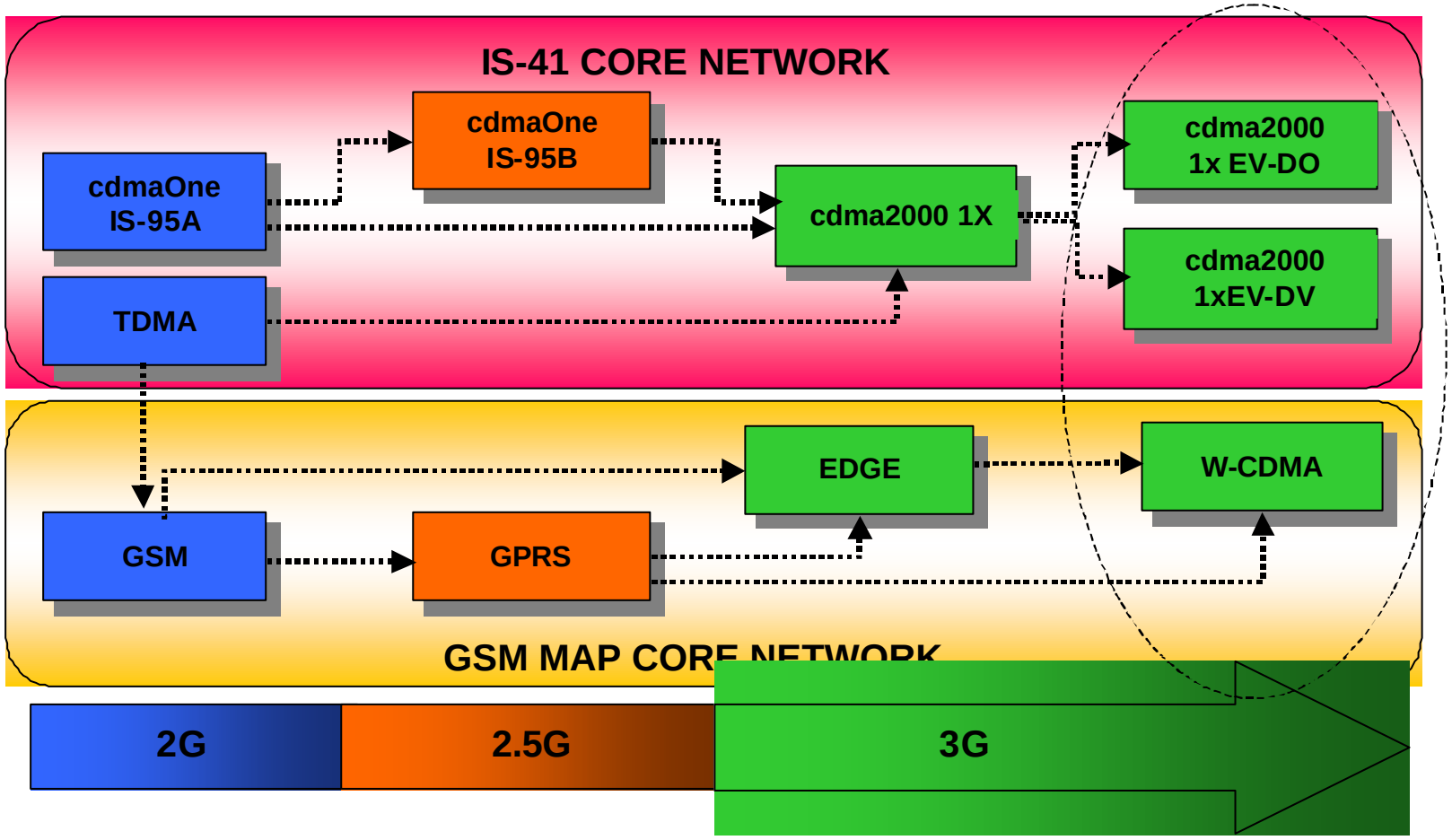
Source: Adapted from EITO 2002

…the vision for IMT-2000/3G is universal wireless coverage over an all-IP platform

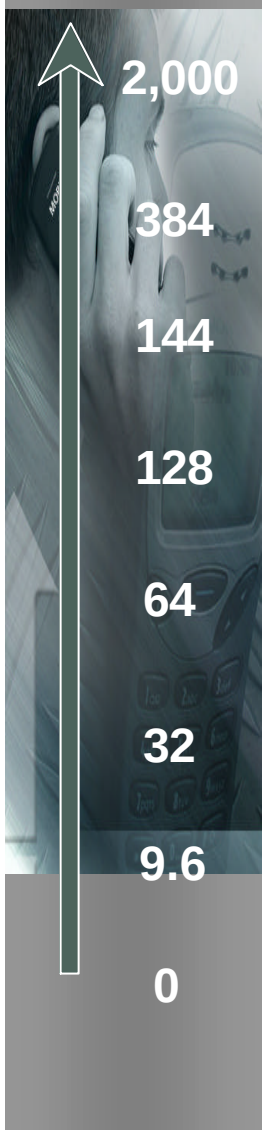


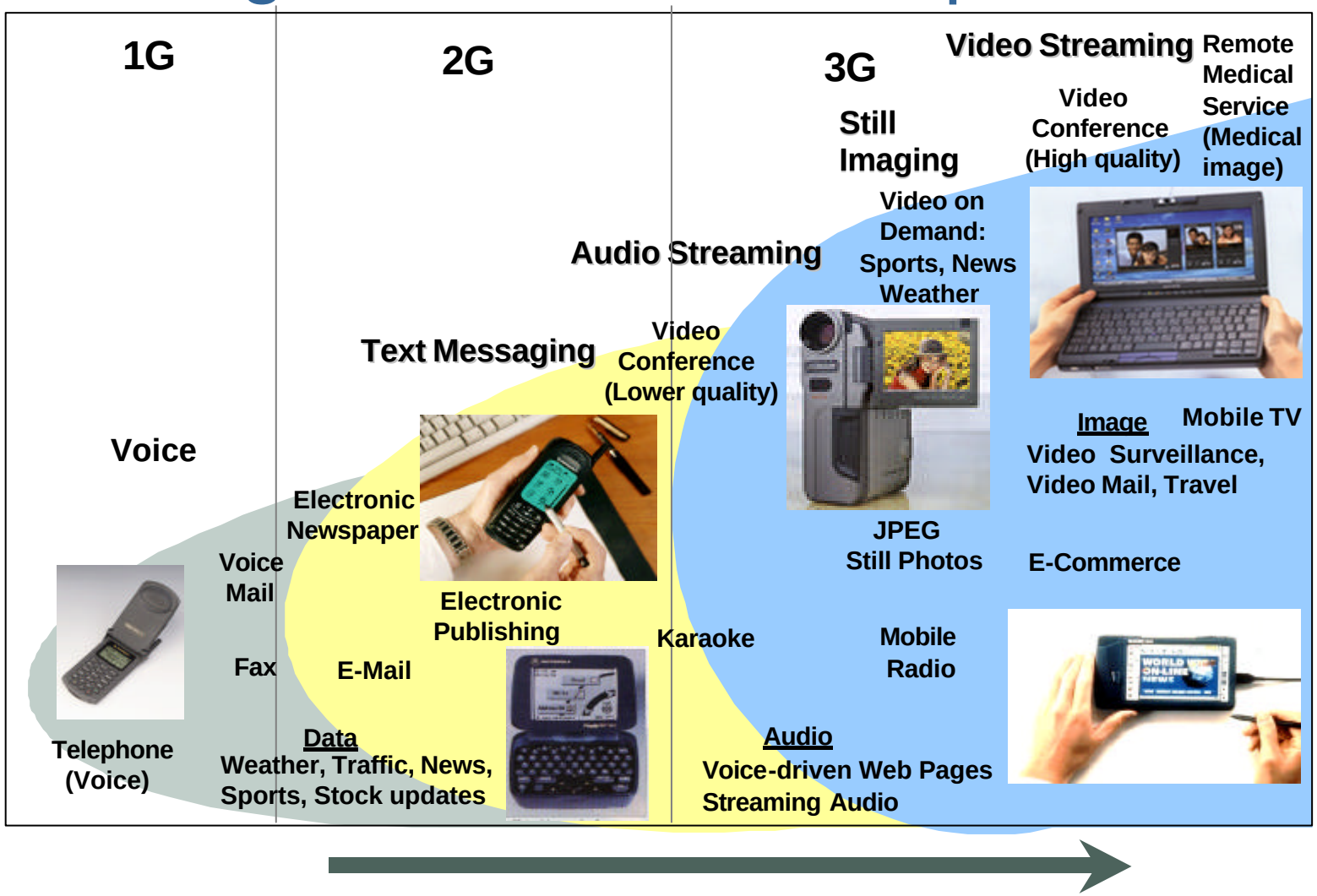
Source: ITU WP 8F

2.5G: Migration to 3G sometimes involves an intermediary step



Nonetheless, any evolution towards higher transmission speeds…





Source: Adapted from Motorola.

…. is music to the ears

e.g. approx. transfer times for a 3 minute MP3 song

Data Rate	Download Time
9.6 kbps	41 minutes
14.4 kbps	31 minutes
45 kbps	8.8 minutes
56 kbps	7 minutes
307 kbps	1.3 minutes
306 kbps	1.3 minutes
2-5 Mbps	6-12 seconds

3G/IMT-2000 service launch

The first two countries to launch 3G:

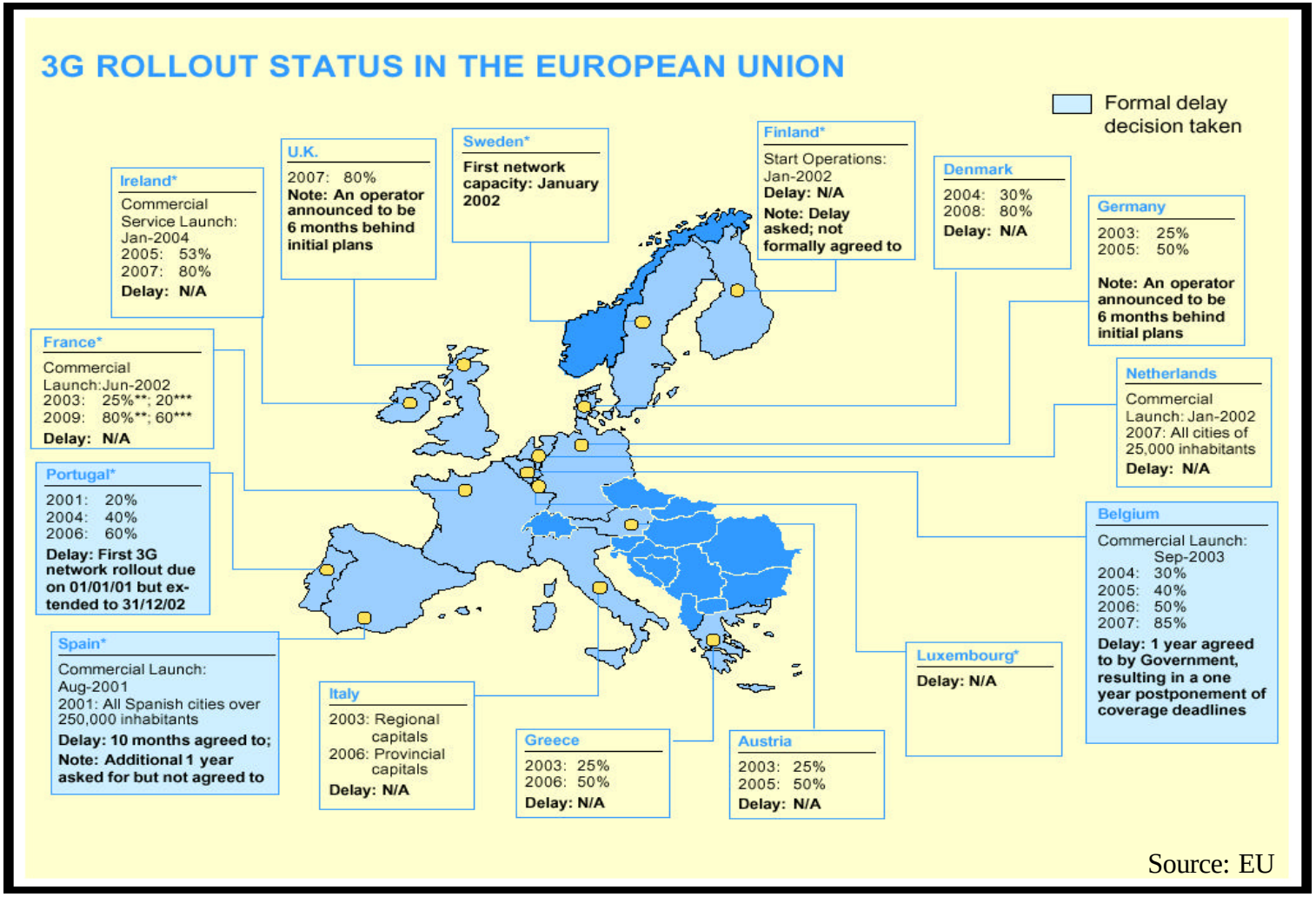
- *Korea*
  - CDMA 20001x launched in April 2001 (KT Freetel)
  - Jan 2002: SK Telecom launched higher-speed data service 1x EV-DO
- *Japan*
  - W-CDMA launched in Oct 2001 (DoCoMo)
  - CDMA 2000 1x launched in April 2002 (KDDI)

Since then:

- CDMA 20001x: Canada (Bell Mobility 02/02, Telus 06/02), US (MetroPCS 02/02), Puerto Rico (04/02), Brazil (Telefonica 04/02)
- W-CDMA: none

3G rollout in Europe

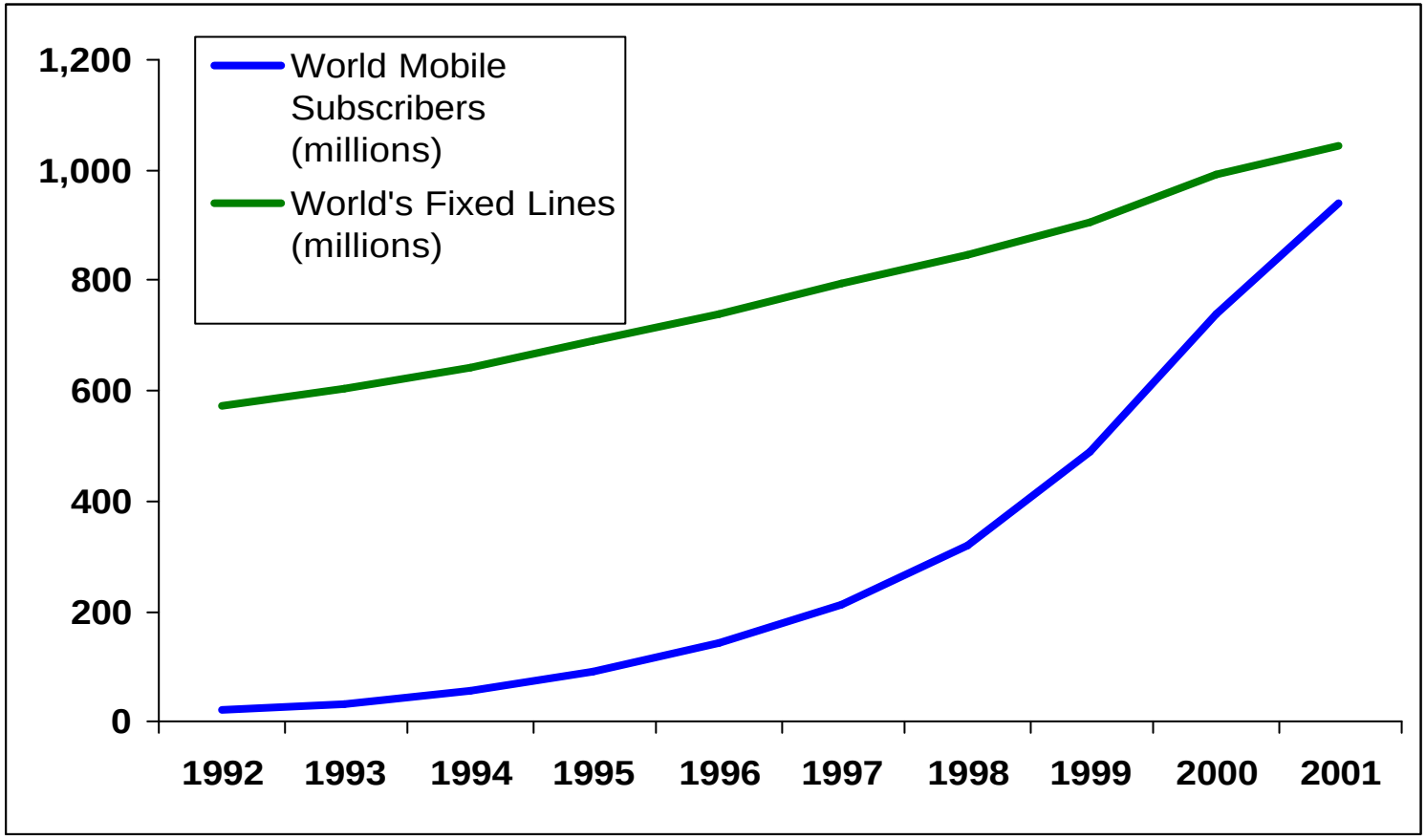
(W-CDMA a.k.a. UMTS)



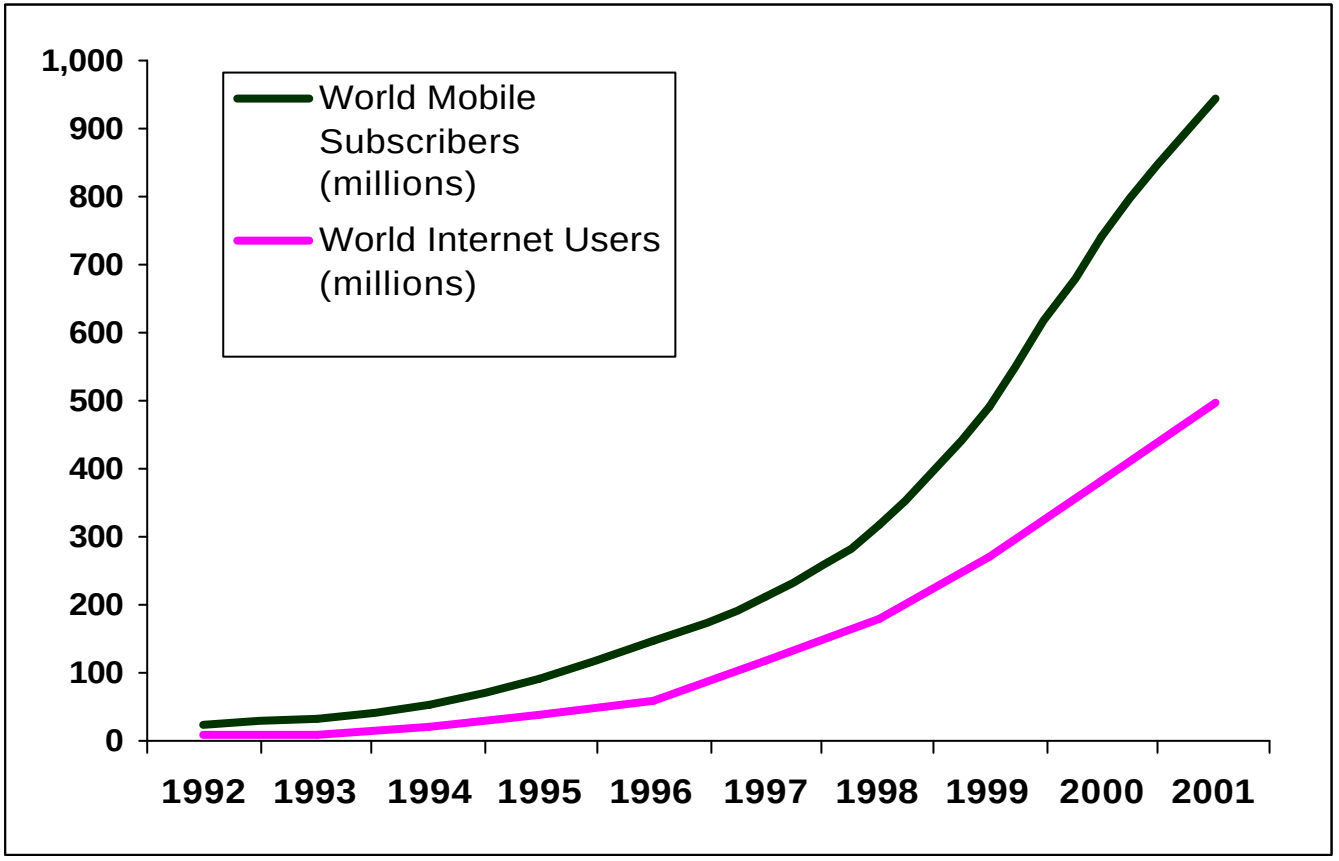
Source: EU

What is the “mobile Internet” ?

Market Trends: mobile will become the network of choice



The mobile revolution joins the Internet boom…



Source: ITU

… to enable the "Mobile Internet"

- Market trends
  - The phenomenal growth of mobile
  - The rapid take-up of the Internet
  - Increased use of portable and palmtop computers

- Technological Innovation
  - Higher speeds for data over mobile networks
  - Integrated multimedia applications
  - Small, powerful, application-rich user devices

- **A working definition**
  - **Combination of mobile technology with information and data communications services (such as Internet services), and eventually the flexibility of IP networks**

Mobile Internet Services

3G will fully enable the Mobile Internet, but it is is already here... *the 2G way*

- Internet access
  - WAP
  - i-mode
- Messaging
  - SMS – the short message service

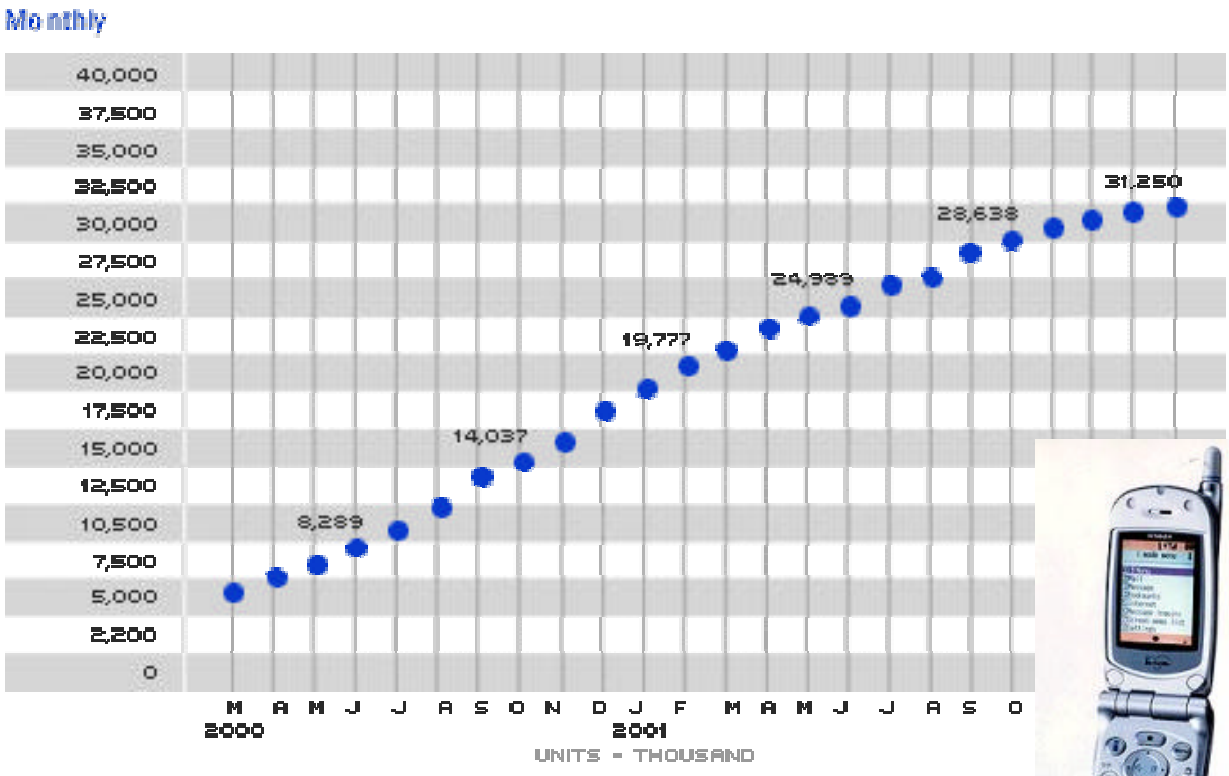
What is WAP?

Internet Access: WAP – a.k.a "Wait and Pay"?

- WAP = Wireless Application Protocol
  - one of the first attempts to develop a standard for viewing web content on wireless devices
- Low user adoption due to :
  - Slow downloading (9.6 kbit/s)
  - Circuit –switched
  - Availability of content
  - WML (wireless mark-up language)
- Is there hope?
  - Introduction of new version WAP 2.0 & xHTML
  - Higher transmission speeds offered by 2.5G/3G

Japan's i-mode service

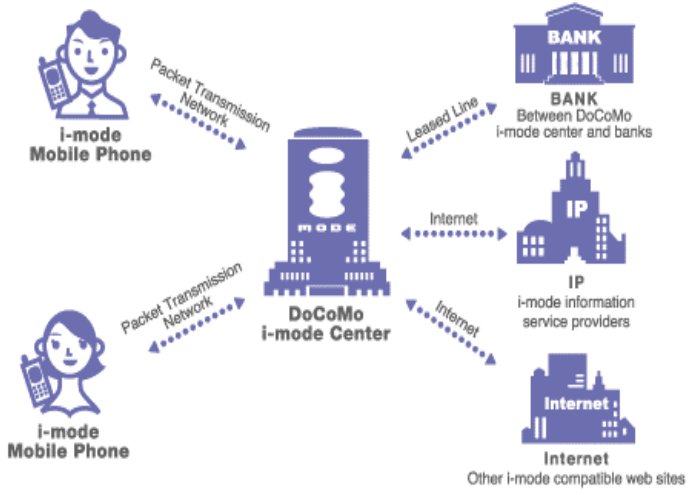
1 July 2002: 33.5 million subscribers



Source: http://www.nttdocomo.com

i-mode, mobile data success story

- Why?
  - Content Availability
    - Locally relevant
    - 3’000 + 53’000 sites
  - cHTML
  - Packet-based network
  - Billing model

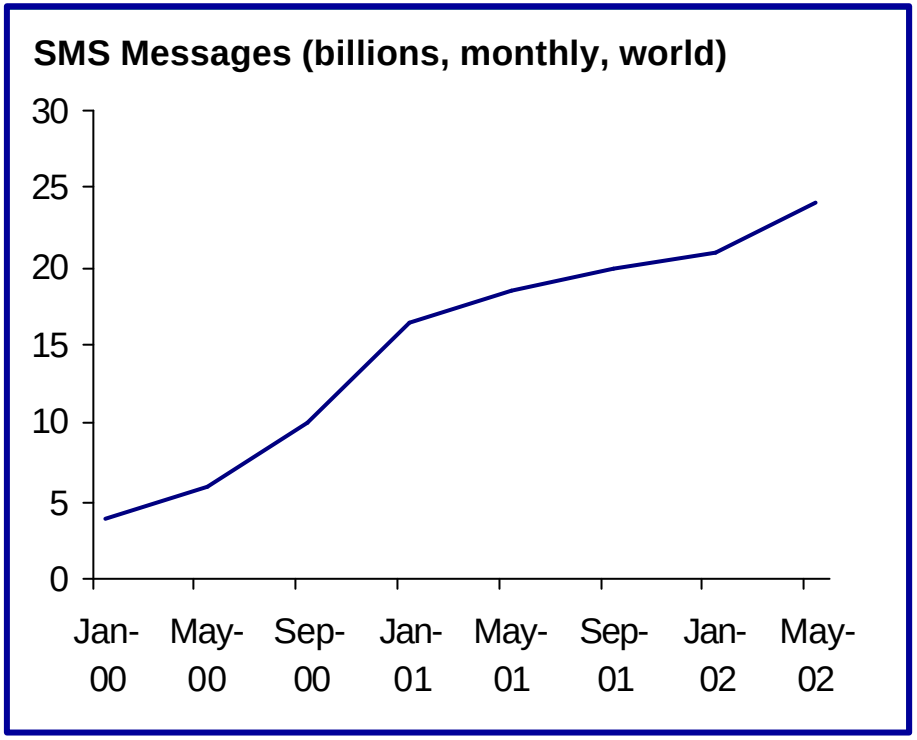


Source: NTT DoCoMo

- And next?
  - Offered over 3G
  - Enhanced 3G service: i-motion
  - i-mode network/specification now open to other companies, (e.g. ISPs) for content development

Mobile Communications: Messaging

- **SMS**
  - Unexpected, phenomenal growth
- **EMS**
  - Enhanced SMS
- **MMS**
  - Now being launched
- **Mobile IM**
  - Fixed & mobile convergence

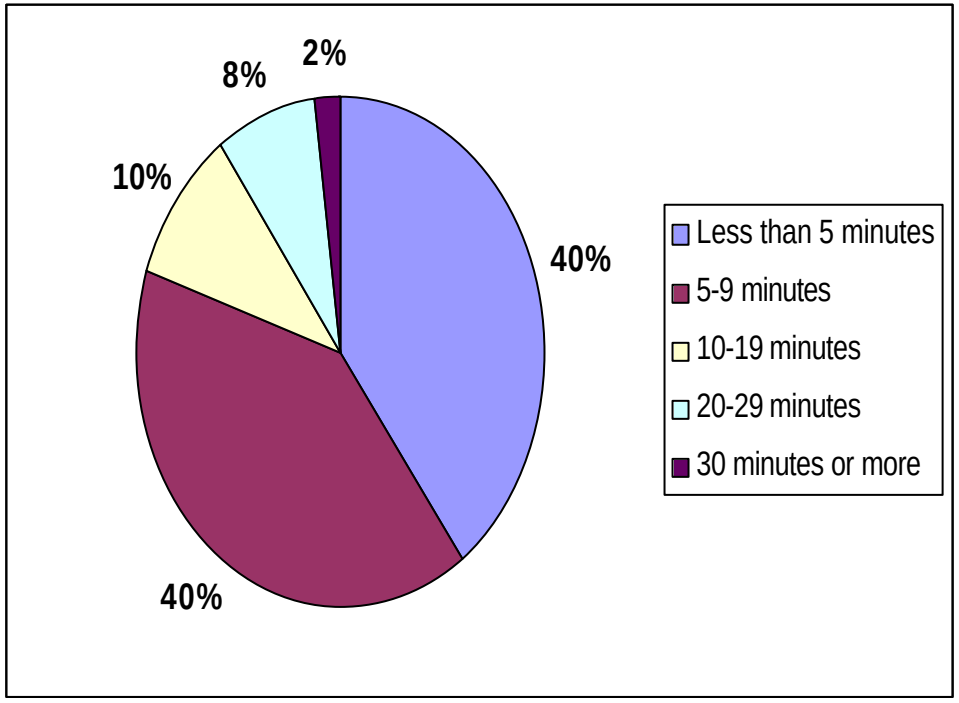


Source: GSM Association

Digital Content for Mobile

- Evolving content
  - E.g. Mobile gaming, mobile audio and video services, transaction services (m-commerce), location-based services
- Usage patterns
  - Short bursts of activity
- Key enabler:
  - the mobile portal
- Keywords:
  - *timeliness*
  - *location*
  - *mobility*

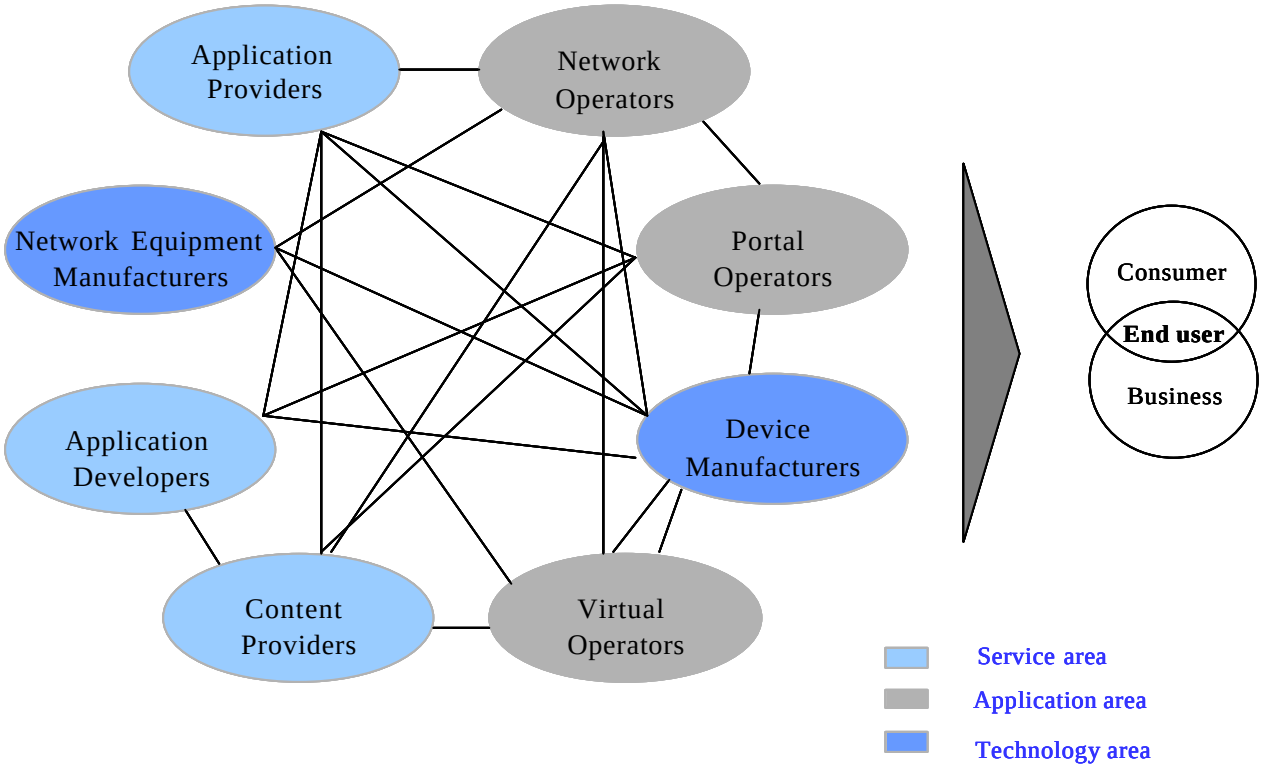
Average length of mobile data sessions



The development of the market

A changing landscape…

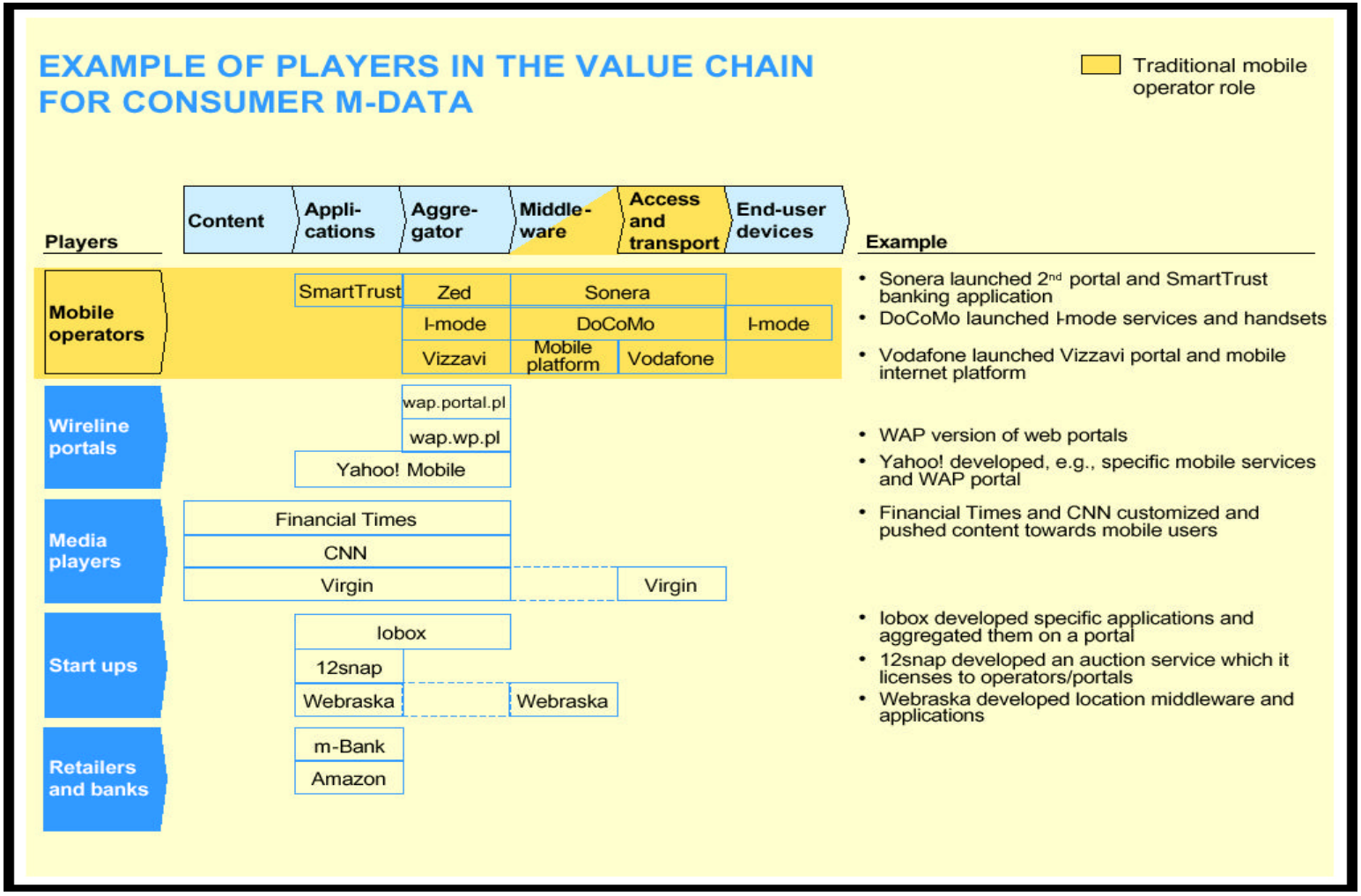
- New players, new roles



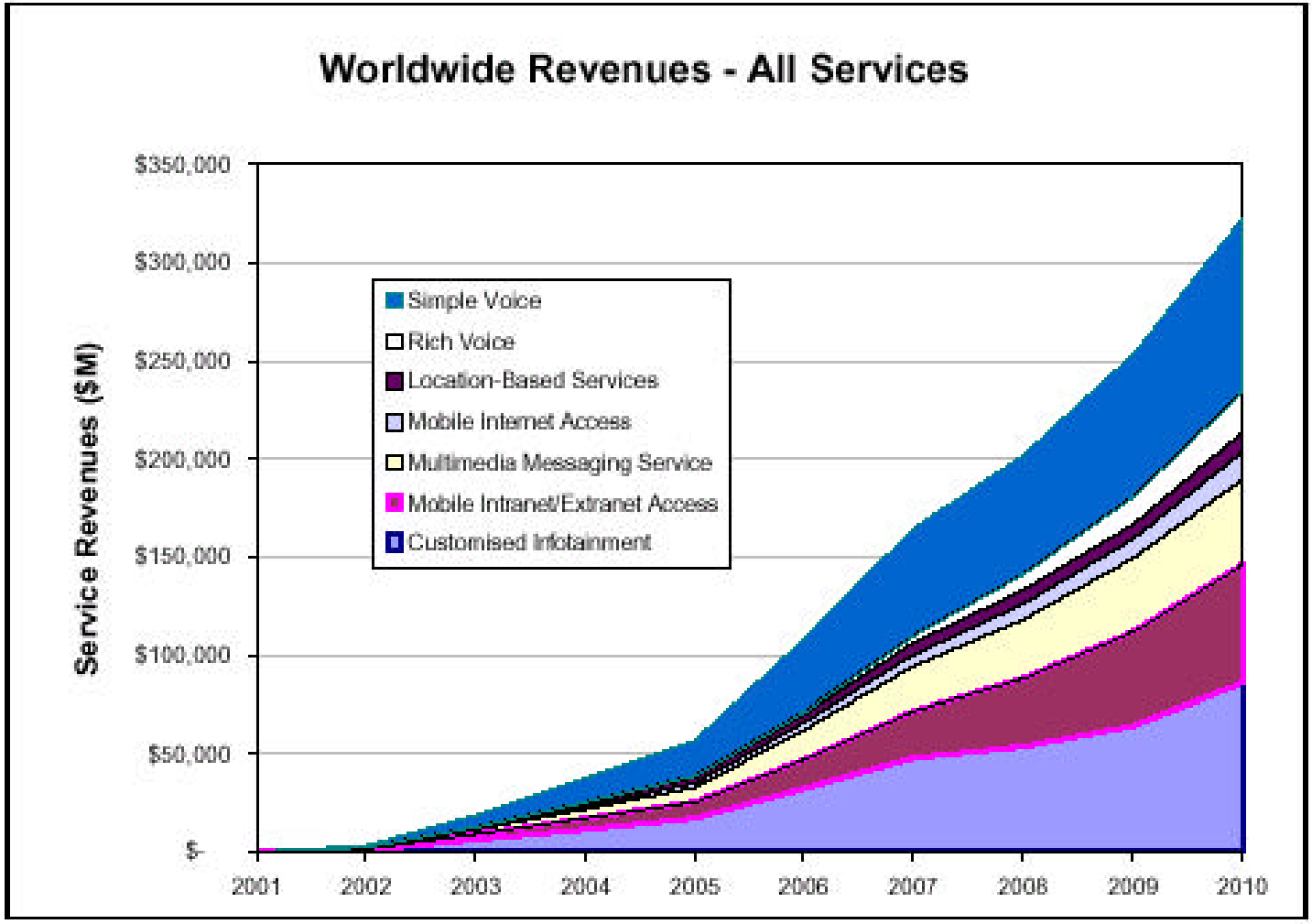
Source: EITO

- Partnerships for a converged world

…an evolving value chain



Potential Revenues from 3G services



Source: UMTS Forum

Key Barriers to Development

- Limited availability of handsets
- Lack of Open Platforms
- Plethora of mark-up languages and media formats
  - xHTML, cHTML, WML
  - MPEG-4, ActiveMovie,realplayer, mp3…
- Lack of effective revenue-sharing
- Existence of inadequate billing models

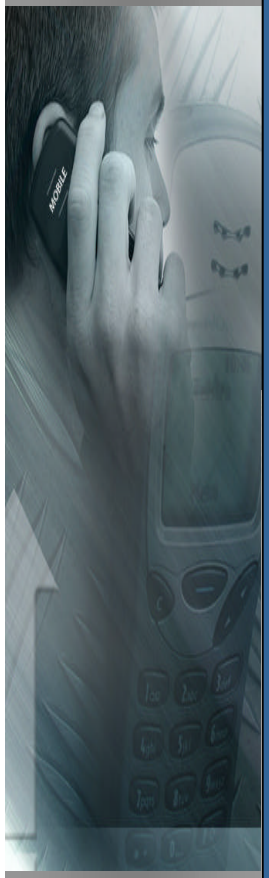
M-Internet: the road to success

- (i) Fast effective deployment of 2.5G & 3G
- (i) Development of installed base of data-enabled handsets
- (c) Availability of relevant content and applications and content harmonization
  - Avoid ‘imitation’ of fixed Internet experience
- (c) Open source technologies
- (c) Evolution of billing models
- (m) Collaboration and co-operation
- (r) an appropriate regulatory framework…

Part II:
Regulatory Aspects

… next up

For more information…



Watch for our upcoming publication:

ITU Internet Reports 2002:
The Internet for a Mobile Generation

(to be released this autumn)

Thank you !

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