Challenges of Future Internet Mobile Perspectives

Jan Uddenfeldt
Senior Vice President, Senior Advisor Technology to CEO
Ericsson
Mobile systems European influence

- The by far biggest mobile system, GSM and its successors WCDMA, HSPA and LTE are all very much influenced by Europeans.
- Primary driver for enhancements have been increased bitrates and more and more efficient radio interfaces.
- New services have been secondary until lately
- New infrastructure, existing services
Internet American influence

- The big success of Internet is based on American influence
- Primary driver for the success has been easy service introduction
- Existing infrastructure can easily be used for new services
Current situation

- The infrastructure of mobile systems have been in rapid and strict standardised development but often optimised for existing services.

- Basic Internet functionality has been optimised for a situation with lower bitrates, no mobility, no security issues, no lack of addresses etc and standardisation has been ad hoc.
Impressive broadband growth

Mobile broadband 2/3 of all subscriptions in 2012

Mobile Broadband includes: CDMA2000 EV-DO, HSPA, LTE, Mobile WiMAX, Other
Fixed broadband includes: DSL, FTTx, Cable modem, Enterprise leased lines and Wireless Broadband

Source: Ovum RHK & Internal Ericsson

© Ericsson AB 2008

Mobile broadband

- Mobile broadband take-off right now
- Rapid growth in many countries
- Mobility adds a new dimension as it did for telephony
- Great opportunities for Europe to contribute to Future Internet
Swedish perspective

- Both Internet and mobile phones are widely used
- Mobile Internet is growing rapidly
- But services are still lagging behind
Ambient Sweden

– a national initiative to introduce the Personal Internet

• Always connected wherever you are with sufficient speed
• Enhanced services both public and private
• New opportunities for industry
• Sustainable society
• Internet is a natural part of school and education on all levels
e-Inclusion
- to be part of the information society

1. Solutions for Enterprises
   - Transport solutions
   - Virtual workplace, home working and Business travel substitution
   - Utility solutions
   - Mobile health
   - National Security Public Safety

2. Solutions for People
   - m-Commerce, m-Government, m-Health, m-Learning
   - Solutions for transportation, food, consumption and housing
   - Communities and social networking (de-urbanization)
Challenges

- Internet infrastructure needs future enhancements to keep up with the rapidly increased demands e.g.:
  - From Mb to Gb access speed
  - From one to several billion users
  - From mainly fixed to full mobility
- Investigations with radical ambitions are started in US, Europe and Asia, often with a clean slate approach.
- However, Internet has to be upgraded while in full operation.
Present problems

- Mobility and Multi-homing
- Scalable Routing
- Operational Cost
- Security, Privacy & Unwanted traffic
- Addressing & Identity
- Reliability, Availability and Quality of Service
Future Challenges

- Information Networking
- Internet of things and sensors
- Changing Usage Patterns
- Self-management
- Managing flexibility and evolvability
- Network Virtualisation
Back-up
Strong growth in data traffic
WCDMA & HSPA world average

Packet data outgrows voice traffic

Source: Ericsson
Fixed broadband lines & usage
- twofold subscription and at least tenfold traffic growth

- More higher speed access connections (FTTx, VDSL 2, DOCSIS 3, etc)
- Triple Play/HD ready
- Asia Pacific largest (China biggest)

- The connected Home
- IPTV & Internet drive access traffic
- Flat rate experience

* IPTV assumptions 50 million IPTV subs. 2011, 4 hours/day, 5Mbps (from 2007)
Mobile subscriptions & usage
- exceptional growth, twofold subscriptions and tenfold traffic

- International roaming GSM/WCDMA/HSPA, Now also Japan, Korea, etc.
- GSM passed 2.8 billion subs/718 nets.
- 202 WCDMA networks/87 countries of which 174 HSPA networks launched. User throughput 800 kbps to 7Mbps now, increasing
- More than 403 HSPA devices
- 1067 million subs GSM/WCDMA/HSPA

Source: Internal Ericsson
Behaviors are evolving
Service usage among 15-24 year-old today – digital natives

85% never leave home without their mobile

<table>
<thead>
<tr>
<th>Service</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>82% Daily</td>
</tr>
<tr>
<td>SMS</td>
<td>71% Daily</td>
</tr>
<tr>
<td>MMS</td>
<td>18% Weekly</td>
</tr>
</tbody>
</table>

6.5 hours daily on TV, Internet, gaming 25% of the time multi-tasking (USA)

Social networking/On line life
- Personalization/Interactivity
- User generated content
- Infotainment consumption
...and everywhere
Not only at home or work

Optimizing service staff travel in UK
Anywhere internet access in Sweden
Firefighting in Australia supported by mobile broadband
Mobile broadband supports local US police
Detecting breast cancer in rural Australia
Broadband on the move in Hong Kong

>50% wants Internet access everywhere
Evolution

1+ Trillion RFID/Sensors:
- Location
- Vibration
- Humidity
- Liquid
- Temperature
- Weight
- etc.

Tens of Billions Smart Devices:
- Appliances
- Machinery
- Vehicles
- Bldg. Eqpt.
- etc.

Billions of Mobile Phones
- Web Tablets
- etc.

Hundreds of Millions of PC’s
Ambient Sweden

– a national initiative to take lead in Europe to introduce the Personal Internet