Market Challenges:
competition, implementation costs, changing marketplaces, complex migration scenarios and regulatory uncertainties

Convergence towards Ubiquitous Network Societies

SESSION 9: Market Opportunities and Challenges

August 2009

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Outlook

- Market drivers
- Operator challenges
- Spectrum and regulatory

Market Drivers for Ubiquitous Networks

- Electronic customer support any time, everywhere
- Emerging bandwidth-intensive applications and services
- Continuing innovations and cost reductions of infrastructure and active equipment
- Increasingly extended capacity of traditional access networks
- Ability to use existing infrastructure to capture incremental revenues and an accelerated RoI
Vision of Ubiquitous Networks

- Transient, spontaneous “composition” of networks
- Competitive & Cooperative networking (limited sharing of resources & functions)
- Scalability & Manageability of the concept (easy to use/deploy, many networks everywhere)
- Integration of legacy technologies & networks

The subscriber wants ...

... it cheap, wants it now and wants to choose:
- to get one bill, one number
- to have one phone book
- to check one mailbox instead of many
- to communicate immediately in real-time
- to communicate cheaply
- to communicate with many people who are using different media at the same time

... his services anytime, anywhere, on his device:
- Personalized and highly customized
- More individual bandwidth
- Always-on
- Global roaming
- Seamless network, GSM-EDGE-UMTS-beyond IMT-2000
- Rich multimedia services: information, transaction, entertainment

Loss of subscriber loyalty
Increase of subscriber knowledge
Increase of subscriber sovereignty
Ubiquitous Networks are subject to a number of opposing forces:

- Technical Enhancements
- Technical Challenges & Enhancements
- Spectrum
- Regulation
- Market

Changing lifestyles and end-user habits:

<table>
<thead>
<tr>
<th>Year</th>
<th>Sending a “hello” from vacation</th>
<th>Gaming Service</th>
<th>Find out a nice movie and buy a ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Phone, postcards &amp; pictures</td>
<td>Board games</td>
<td>Phone guide &amp; telephone</td>
</tr>
<tr>
<td>2000</td>
<td>E-mails, attachments, SMS, etc.</td>
<td>Gameboy, PlayStation etc</td>
<td>Online guide &amp; online ticket reservation</td>
</tr>
<tr>
<td>2006</td>
<td>Video, telephony, video-messaging via mobile</td>
<td>Interactive Movie gaming</td>
<td>Real-time guide over remote cinema &amp; mobile ticketing</td>
</tr>
</tbody>
</table>

New mobile services will have a strong impact on everyday life of end-users.
Operators’ needs:
Deploying Profitable Multimedia Networks

- New revenues
- Optimized utilization of networks
- Harmonized & standardized infrastructure

Operators’ Challenges:
Shift of Revenues’ Sources

- Messaging
- Multimedia Conference
- Video/Audio-On-Demand
- Video Telephony
- Online Gaming

Add application revenues to boost profits
Operators’ Challenges:
More Bandwidth = Increased Revenue?

- Most European operators are loosing money on flat-rate concepts
- Peer 2 Peer is major driving force
- Each household has a limited amount of money to spend
- Adding further BW does not resolve the QoS problem, generally worsens it by attracting more QoS-sensitive applications eg. Broadcast Video
- Increased bandwidth is NOT increasing ARPU automatically!

Bandwidth capacity is multiplying
- Deployment of xDSL, WiMAX, WLANs

Bandwidth demand is growing even faster
- Gaming and Video Services are bandwidth intensive

Bandwidth & Demand are both exploding
- Near real-time & real-time traffic puts more stress on the BW
- The nature of traffic is changing to more dynamic with QoS orientation

Operators’ Challenges:
Complexities

- Set Top
- Encryption
- Network
- DRM
- Piracy in Territory
- Partners
- Commercial Opportunity

Paradigm shift | Market unsure | PC or TV centric?
---|---|---
Open MPEG4 issue | What is good video quality? | Individual “TV culture”
60+% Hollywood margins | Young market | Proprietary solutions
Fixed to mobile substitution | VoIP telephony | New players as ISPs & ASPs
Investment delays | Operator role? | Business model?
Technical Challenges and Enhancements

**Challenges**
- Higher frequencies increase processing requirements
- Coexistence of different radios requires sufficient separation
- Underlay of ultra wide band (UWB) raises the noise floor for other users
- Higher data rates require wider bandwidth and new radio principles
- Seamlessness and ubiquitous use imply multimode & multiband devices

**Enhancements**
- Microelectronics innovation (Moore’s Law) delivers increased performance
- Improved filter technologies
- Radio technology improvements
- Higher order modulation schemes and smart / MIMO antenna systems
- Software configurable radio

Innovation is able to compensate many challenges but complexity and cost increase in the process

Upside Potential through Fixed-Mobile Convergence

Increasing ARPU by
- Attractive service packages
  - Convenience
  - Common look & feel
  - Transparent pricing by unified charging
- Faster uptake of new services
  - Increasing critical mass of users
  - Especially for person-to-person services
  - Like Peer-to-peer Real time Multimedia
- Stimulation of additional voice calls
  - Induced by increased usage of data services

All kind of services are suitable to be offered simultaneously in fixed & mobile
Different Categories of Convergence

Service Convergence
- same service offering for fixed and mobile user access (e.g., SMS / MMS, multimedia conferencing, gaming)
- universal numbering
- one bill

Product Convergence
- common application server
- common service enabling solution (incl. charging)
- common session control
- common interworking functions

Network Convergence
- common core network (control, user and transport plane)
- common operation
- support of any access network

Data Rates and Access Technologies

Year Mbit/s per user
- PSTN-Modem
- ADLS
- ISDN
- GPRS
- GSM
- UMTS
- WLAN
- WiMAX
- FTTH
All-IP: ...hype or necessity?

Hybrid networks rule today in for long time
- High OPEX
- Service convergence slow
- Service evolution slowed-down by the hybrid infrastructure (physical, logical and operational)
- Slow terminal equipment price erosion in hybrid environment

It is a must, to come to a common denominator:
- IP infrastructure
- IP control
- IP based terminals
- IP based services

All-IP is necessity to decrease overall communication costs

Radio spectrum is a precious asset

- Spectrum is the raw material for mobile business - it is of strategic importance for the entire industry
- The largest economic value per radio spectrum unit is generated by the mobile network user
- Many new players want a piece of this billion dollar pie
- We cannot generate new spectrum, only optimize its use
- Spectrum is licensed nationally, but is a global issue - radio waves do not recognize geopolitical boundaries
- Spectrum regulatory rules are in change process to adopt to rapidly increasing wireless broadband requirements
The regulatory framework is under discussion to increase efficiencies and take advantage of innovations

- Success of GSM is built upon concerted industry approach
- Today's regulators accept technology choices made by operators
- Technology Neutrality ensures the implementation of best solutions
- New applications and usage scenarios blur the boundaries
- Suitable & harmonized spectrum is hard to find, therefore very valuable and in high demand
- Spectrum Trading provides new options for underutilized frequencies
Summary / Conclusion

- Telecommunication market is here to stay as growth engine of global economy
- Generating new revenues is still the major challenge
- Customers like the variety of services, but not the burden of technology details
- Newest technologies and applications provides the optimal response to the end-users needs
- Migrating towards customer centric networks: continuous process, solid performance and reliability

Thank You!

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