

Broadcast Mobile Convergence for New Generation Media Networks



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and Guidelines on the smooth transition of existing mobile networks
to IMT-2000 for Developing Countries

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Abstract

Next Generation Networks (NGNs) must meet the demands of the next generation users.

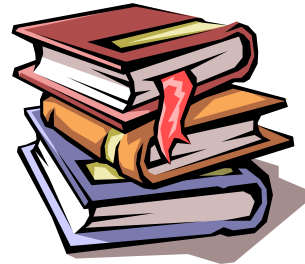
A "Network Everywhere", offering a broad range of different data services, multimedia support, security, personalization and mobility have to be provided by the operators of future networks. But the users do not want to worry about technical details like the access technology; they are only interested in the offered services and the quality and costs thereof. It will be the task of the network operator to choose the "best fitting" technology, or better the best mix of technologies for their next generation network meeting the customer's expectations in a cost-effective way.

The presentation will determine the demands towards Next Generation Media Networks and provide an overview of convergence between mobile and broadcast networks.

Based on the comparison of today's used and well-understood network technologies, new opportunities and benefits coming up with the development and introduction of hybrid mobile-broadcast networks will be pointed out.

The possibilities and challenges of such new hybrid media networks will be outlined taking into account the findings and experiences from actual market research and first field trials.

- **Next Generation Networks**
 - ▶ Demands
 - ▶ User's View
 - ▶ MobileMediaNetworks & EverNet
- **Wireless Technologies**
 - ▶ Mobile Networks
 - ▶ WiFi, WIMAX, etc.
 - ▶ Broadcast
- **Mobile Broadcast Convergence**
 - ▶ Why?
 - ▶ Hybrid Networks
 - ▶ New Opportunities and Benefits
- **Summary**
 - ▶ Conclusion
 - ▶ Prognosis



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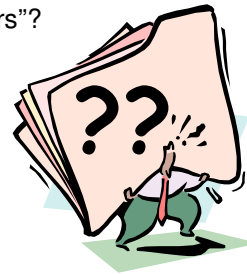


Overview

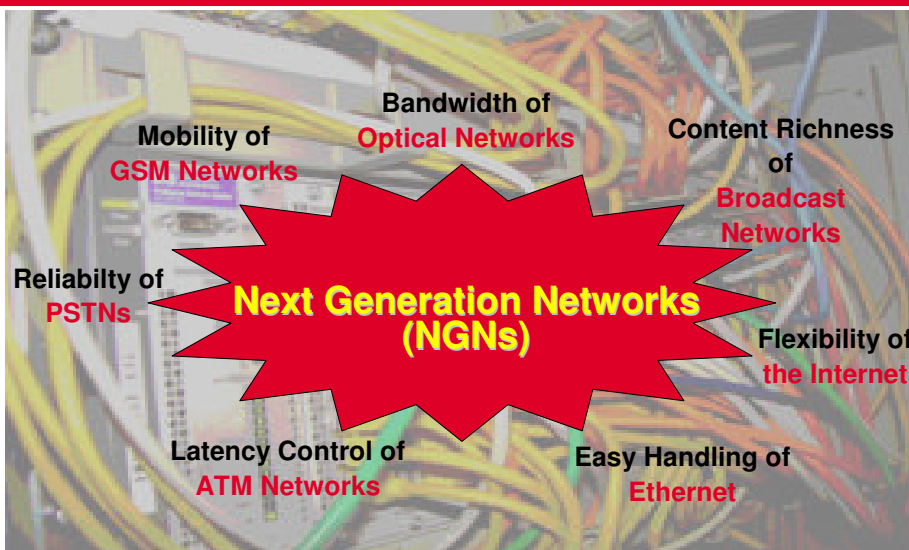
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Looking at the Evolution of Wireless Networks during the last years, the following questions could be asked:

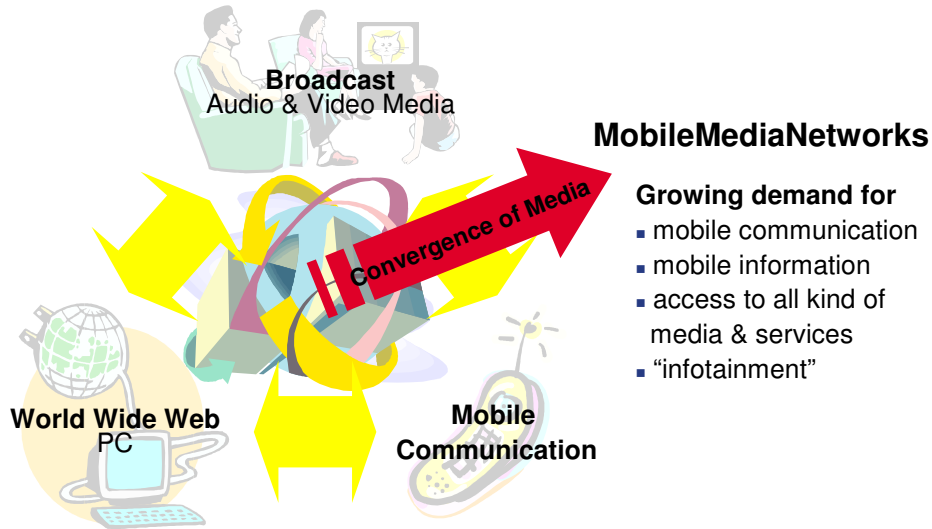
- What will be the next steps of evolution?
- What are the demands of the “Next Generation Users”?
- What are the requirements on the “Next Generation Networks”?
- Could one of the “traditional” networks fulfill these requirements?



Next Generation Networks: Demands



Next Generation Networks: Convergence of Media



Next Generation Networks: MobileMediaNetworks

Definition MobileMediaNetwork:

- Audio and Video content transmitted “quasi-live”
- Audio and Video content transmitted in high quality
 - ▶ interference not noticeable
- Bit rate per user: > 400kbit/s
- “broadcast” allowed!
 - ▶ Point-to-Multipoint transmission
 - ▶ many users could use the same signal
- Receiving requirements
 - ▶ Portable handheld
 - ▶ Static, low and medium speed



Next Generation Networks: Demands of „basic“ Media Services

 Service	Minimum Uplink-Rate	Minimum Downlink-Rate	Connection type	Asymmetric
Internet Surfing	50 kbit/s	400 kbit/s	Point-to-Point	Medium ~ 1:8
„Portable“ Audio and Video Services	8 kbit/s	400 kbit/s	Point-to-Multipoint	Very high ~ 1:100
Mobile Office	50 kbit/s	250 kbit/s	Point-to-Point	Low ~ 1:3

Next Generation Networks: EverNet - Network Everywhere

- **My Network is located, where I am located**
- **No matter via which access technology**
– I am located in my network



... like Electricity?

Network Services like Internet and www, that previously had been experienced for some hours a day and principally at the desk as a media space which is separated from the reality, will be integrated in our daily life and are rarely perceptible as independent part.

As little as nowadays you use electricity in a conscious way – you switch on the light, listen to the radio, use the vacuum cleaner.

As little you 'go into' the Internet under the conditions of omnipresent wideband network: The separation of off- and online disappears more and more.

Therefore, the EverNet makes the access network "disappear" in the same way as a working supply network the electricity.



Next Generation Networks: User's View

Users are **not** interested in

- Network technologies
- Comparing different access technologies
- Selecting the best fitting access technology

Users are interested in **SERVICES**,

that the end user/consumer can access

- User friendly
- Affordable
- Everywhere available

Users want to

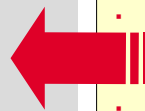
- Control cost
- Browse and find new services without added costs



Overview

▪ **Wireless Technologies**

- ▶ Mobile Networks
- ▶ WiFi, WIMAX, etc.
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Characteristics of typical Mobile Networks

	2G (GSM)	2.5G (GPRS)	3G (UMTS)
Facts	Start late 1980's Ignited success story of mobile networks	Start late 1990's Growing demand for data services	Start early/mid 2000's Co-existence with 2G systems
Main Application	Voice focus, 1st data service support	Voice & data services	Data services focus, Voice, media support
Data Rate (typ.)	9,6 kbit/s	30 kbit/s	30...300 kbit/s
Data Rate (max.)	14,4 kbit/s	57,6 kbit/s(4 channels)	64...384 kbit/s...
Switching Mode	Circuit	Packet	Circuit / Packet
Costs for „Media Transmission“ (5min / 380kbit/s)	Not possible	Not possible	ca. 110 € (10€/Mb)

Maximum mobility

Characteristics of WiFi („Wireless Fidelity“), WiMAX, etc.

	Wi-Fi (IEEE 802.11b)	Wi-Fi (IEEE 802.11g)	WiMAX (IEEE 802.16a)
Main Application	Nomadic Internet (to Laptop)	Fast Nomadic Internet (to Laptop)	Faster Nomadic Internet (to Laptop)
Data Rate (max.) shared by all users	11 Mbit/s	54 Mbit/s	70 Mbit/s
Frequency Band	2,4 GHz	2,4 GHz	< 11GHz
Coverage Area	< 100 m < 40 m (in-house)	< 100 m < 40 m (in-house)	up to 30 km using special antenna
Costs for „Media Transmission“ (5min / 384 kbit/s)	5 - 10 €	5 - 10 €	?

Maximum data rates

... and Broadcast? (e.g. Digital Video Broadcast)

	DVB-T / DVB-H (PDA)	DVB-T (SDTV)	DVB-T (HDTV)
Typ. Application	Smart phone, PDA	TV set	TV set
Resolution	360 * 288	720 * 576	1920 * 1080
Data Rate (max.)	384 kbits/s	10 Mbit/s	20 Mbit/s
Coverage Area	ca. 50 km	ca. 50 km	ca. 50 km
Costs for „Media Transmission“ (5min / 384 kbit/s)	Low cost	Low cost	Low cost

High data rates & mobile reception

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Mobile Broadcast Convergence

One network per application?

- Telephony network for one-to-one talking application
- Data communication networks for data transmission
- Broadcasting networks for radio and television services

One network can be used for multiple applications and services

- 2G mobile mainly for voice – but also for messaging and data
- 3G mobile also for fast-internet

Hybrid usage of networks

- One network for downlink, another for uplink
- Parallel usage of broadcast and one-to-one networks

Towards shared usage of

- Spectrum
- Network Resources



Mobile Broadcast Convergence: Current Situation

Mobile Networks

- 2G, 2.5G, 3G
- One-to-one
- Full Mobility
- Bi-directional
- Point-to-point
- On-demand
- Personalized
- Pay per use
- Billing
- Localization

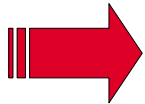
Broadcast Networks

- Analog, DAB, DVB
- One-to-many
- Uni-directional
- Point-to-Multipoint
- Restricted mobility
- Attractive content
- TV / Radio everywhere
- High data capacity (BC & IP)
- Low cost

Convergence: Why? Cooperating: a Must?

Broadcast Networks

- Go digital (DAB, DVB)
- Need a return channel to enable interactive services
- Need arguments to keep their spectrum
- Suffer erosion of advertisement revenues & audience
- Need to create new business models to get infotainment revenue



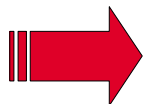
Any telecom access useable as return channel
Interactivity adds value
Mobility is an opportunity
Potential for new revenue streams



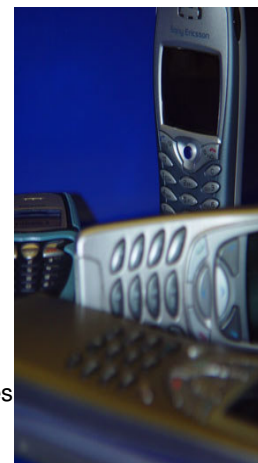
Convergence: Why? Cooperating: a Must?

Mobile Networks

- Telephony is limited by the number of people
- want to sell high value services
- need low cost data distribution and more bandwidth
- must keep UMTS promise
- video content over handset is a must



- „cheap“ downlink bandwidth is helpful
- television content is welcome
- new revenue streams from non voice services



Convergence: Why? Cooperating: a Must?

Cooperating a Must?

...the DVB-H Scenario:

- DVB-T allows mobile reception, but with high power consumption
- DVB-H is based on DVB-T, backwards fully compatible and gives additional features to support handheld portable and mobile reception
 - ▶ Battery saving
 - ▶ Mobility with high data rates
 - ▶ Increased general robustness
 - ▶ Support for seamless handover
- DVB-H is meant for IP-based services via MPE insertion
- DVB-H can share DVB-T multiplex with MPEG2 services



To transmit Video streaming via „point-to-point“ networks like GSM or UMTS is much more expensive and capacity situation is much more critical

Convergence: Why? Cooperating: a Must?

Remember:

- Mobile operators are trying to sell expensive MMS-Services, allowing to see a 10s Video clip in a bad resolution
- Broadcast operators using DVB-H will be able to transmit television programs in high quality and possibly for free to the handhelds

User's view:

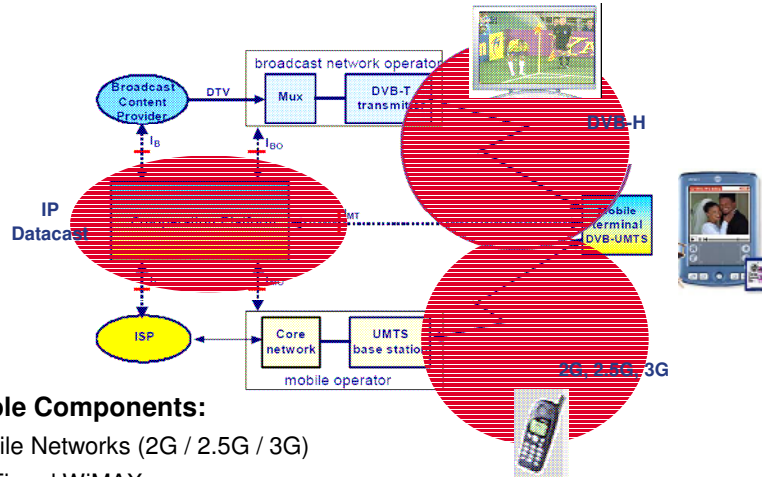
- Making phone calls via the mobile is fine!
- But why paying for a low quality 10s Video clip, if I can watch TV on my mobile for free?

A Horror Scenario for mobile operators?

- Billions spend for UMTS licenses
- Already in trouble with WLAN-Hype
- And finally overtaken by "old traditional" broadcast?



Mobile Broadcast Convergence: Hybrid Networks



Possible Components:

- Mobile Networks (2G / 2.5G / 3G)
- Wi-Fi and WiMAX
- Broadcast systems (DAB, DVB-T, DVB-H)

Source: DVB
TM-CBMS

Mobile Broadcast Convergence: New opportunities together



Benefits for both by using „Hybrid Networks“ taking the advantages of mobile and broadcast networks

Mobile Broadcast Convergence: Benefits of Convergence

Benefits for Broadcasters:

- Increased attractiveness of broadcasting services
 - More interactivensess
 - More mobility
- Allowing attractive new, combined services
 - Request program / data
 - Feedback on acceptance, user requirements
 - Offering a portal to the internet
- High number of (mobile receivers) are available
- Customer relations and billing could be „outsourced“ to mobile operator
- Most of their network infrastructure could be used
- New business



Mobile Broadcast Convergence: Benefits of Convergence

Benefits for Mobile Operators:

- Increased attractiveness of mobile services
 - More bandwidth
 - „low cost“ downstream
 - Content (television)
- Allowing attractive new, combined services
 - Wide range of new broadband multi-media services
- Interaction is initiated via mass medium
 - Volume of individual traffic will increase
- Infrastructure investments could be minimized
- Enhanced business

**Mobile operators which co-operate with broadcasters
will easily compete with single mobile operators!**



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Summary: Conclusions

- **Life goes mobile** – communication, information and services go mobile as well
- **Convergence** takes place **in content and services**
- **Multi-application hybrid networks** - no longer one network per application
- There are **opportunities** for broadcast and telecommunication **to co-operate**
- **Synergy** of the two platforms can **strengthen both and enable new services**
- Joint development and market activities are a the basis for **new business opportunities**
- The fusion of mobile and broadcast networks can develop a **powerful next generation mobile-broadband-Internet**

Summary: Prognosis

Prognosis?

Motorola Ventures:

- 2007: 100 Mio. DVB-H Smart phones
- 2009: 300 Mio. DVB-H Smart phones

Nokia:

- to optimistic! - It will last 1 or 2 years longer...



“We always over-estimate the change which will occur in the next two years and underestimate the change that will occur in the next ten.”

Bill Gates, Chairman Microsoft Corporation

Thank you for your attention !

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