Media Delivery in Future Wireless Systems

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Motivation

Future networks will be *multimedia*

**Multimedia Delivery**
Will be a leading service in the future mobile Internet

![Graph showing the increase in multimedia streaming end-points worldwide from 2001 to 2007. The graph includes data for business, residential, and mobile users.](image)

Source: Ovum, Streaming Media: Commercial Opportunities, Forecast, 2002
Future networks will be *heterogeneous*

**Network Access Technologies**
Modem, ISDN, xDSL, Ethernet, ATM, GSM/GPRS, UMTS, WLAN, etc.
Different characteristics for loss rate, bandwidth, etc.

**Devices**
Varying Screen Sizes, Processors, Memory, Power Supplies, Interfaces, etc.

**Applications**
Interactive/non-interactive, realtime/non-realtime, unicast/multicast, adaptive/non-adaptive
E.g. IP Telephony needs low delay, Video-on-Demand needs bandwidth

**Users**
Different technology background and QoS requirements

'Normal User‘ likes to have an 'on/off‘ button

'Cyborg‘ wants to specify the importance of certain parameters
Media Delivery in Future Wireless Systems

Motivation

Future networks will be *Mobile*

- **Terminal Mobility**
  - support physically moving the device and eventually connecting to a foreign network

- **User Mobility**
  - supports to change the device and to have access on personal set of services in foreign networks

- **Session Mobility**
  - supports to maintain ongoing multimedia sessions during user and terminal movements
The Challenge

Content access and delivery methods

Service? 
- Multimedia Service Provider
- Messaging
- Download
- Streaming
- Conversational

Receiver?
- Single-user
- Many users

User context
- Ambient Media Delivery

Access? 
- DAB/DVB
- GPRS
- UMTS
- WLAN
- Fixed

State? 
- Offline
- Inactive
- Interactive

Device? 
- TV
- PC
- WLAN PDA
- Multimedia Phone
- Mobile Phone

Example: An inactive user with an MM phone connected via GPRS gets a news clip delivered via MMS.
The Challenge

**Ambient Multimedia Delivery Network**

- Hiding the complexity of the underlying heterogeneous transport networks and end-device environments to multimedia service providers and operators.
- Enabling efficient and high-quality multimedia delivery to large heterogeneous user groups.
- Providing common architectural support of communication- as well as consumption-oriented services.
- Access and terminal transparency for providers of services and content
- Support of multi-provider, multi-domain scenarios using different business models
- Control of media delivery needs to be possible not only for the recipients but also for the content providers
The Challenge

**Ambient Multimedia Routing Strategies**
- Selecting optimal path(s) through the ‘wireless world’ regarding resources and preferences from users and operators.
- Disjoint path delivery for individual media streams
- Optimal selection of delivery means (broadcast, multicast, unicast, anycast)

**Ambient Multimedia Adaptation Strategies**
- Optimizing the transmission parameters during a running session regarding resources and preferences of content providers and recipients.
- Optimization of the mix of available adaptation means
  - Codec/Content related
  - Protocol related
- Support of adaptive network nodes and adaptive end-systems
Expected Results

Designing an Ambient Media Delivery Network supporting

- a concept for abstracting network and content characteristics
- the provision of 'perfect' mix of media adaptation means considering the imposed quality impacts with objective and subjective criteria
- specifications of protocols and APIs for
  - internal communication purpose
  - information exchange with the network and application/service layer
- the description and evaluation of routing strategies as well as adaptation strategies within the media delivery system
- communication- as well as consumption-oriented services in a common manner
- efficient use of resources independent of concentration of users both in time and space
- multi-provider, multi-domain scenarios using different business models
- configuration of media delivery by providers and recipients of content