Mobile Adventure

Seamless Integration of Heterogeneous Wireless Network Technologies and Services

ASWN 2003 Panel, July 3rd 2003
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Established on November 10th 2000 (Labs opened in April 2001)

Research on leading mobile communications technologies centered on network infrastructure technologies for the 4th Generation

Collaboration with European universities and research institutes

Standardization activities for 3G (3GPP) and 4G systems (including pre-standardization research activities such as WWRF or EU projects)
What services and applications need to be supported in future cellular and wireless networks?

- Future networks: not technology centered
- Future networks: service centered
- Yet more: user centered

- No killer applications -> killer features (enhanced functionality as evolution basis for innovative services, arises from networks)
- New business model: operators invite 3rd party service providers (cf. i-mode)
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Services and Applications (2)

- Key Features
  - Personalization (selection, composition)
  - Context-awareness
  - Ubiquitous computing
  - Intelligent Agents
  - Service-level mobility
  - Seamless Access

- Technologies
  - Programmable Platforms
  - Flexible signaling frameworks
  - Resource constrained middleware (SmartCards, ...)
  - Peer-to-Peer
  - IP QoS
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Example: Personalized Service Discovery

Mobile services
- banking
- traveling
- route planning
- location tracking
- payment
- Taxi
- city guide

choose service

achieve goal

It’s not about using services, it’s about supporting your goals!

Business Meeting at 15:00 in Bern

Michael

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Scenarios for mobile ad-hoc networks?

What is Ad-Hoc?
- WLANs/Infostation (single hop)
- Multi-hop

Mobile Ad-Hoc Networks: complement structured networks to fulfil some certain user requirements:
- Provide connectivity in infrastructure-less areas
  - Extension of cellular
- Self organizing networks (e.g., sensors)
- Support wireless peer-to-peer communication
  - E.g., location based community
Do we need better QoS support in future wireless (IP-) network environments?

- For success IP must become a (flexible*) QoS network
- Ways to achieve:
  – Introduce QoS on several layers independently ✓
  – Adapt IP networks to wireless transmission (again each layer independently) ✓
  – Adapt applications to the channel (without considering IP layers) ✓
  – Solution: combine vertical and horizontal optimization: Cross Layer interworking

* adapt to challenges of wireless transmission and user requirements
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QoS (2) - Cross Layer Design

Cross Layer Design:
Application - Service Platform - Network – Interaction

WLAN/4G
>3;4G
WLAN
4G core network
>3;4G
WLAN
4G

User Terminal
Communication Provider / Network Operator

Server Farm
High-speed wired

Application Provider

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Seamless Integration

Will a seamless integration of networks and services ever happen or will network technologies evolve as stand-alone networks?

- Seamless integration has already started!

- Integration?
  - Make wireless networks ubiquitously usable
  - Federation between operators needed

- Seamless?
  - Service transfer: functionality or QoS transfer?
  - Quality differences inherent to systems (selections depending on the user preferences/application capabilities)
Summary

• Combination of killer features for innovative services and applications

• Focus on the user

• Integration to enable a seamless user experience

• Integration of focus areas: cross-layer optimization