VHO project based research ideas on Wi-Fi and WiMAX networks, services and technologies

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VHO-project based research ideas.

Research questions addressed in VHO project

- IP mobility
- Handover
- VHO applications
- Wireless radio interfaces, migration and parallel use
- Operator infrastructure systems

Current future view

- WiMAX markets divided into two groups:
  - Fixed wireless access, 802.16-2004
  - Mobile/nomadic access
- Wi-Fi mature and market base growing and new applications developed
- Wi-Fi based network services evolve gradually beyond basic access→ managed access and services
- Network and solution integration approaches become drivers for larger scale deployment
- Adoption of WiMAX services is larger and more complex task for operators

WiMAX and WiFi

- WiMAX interoperability testing started by WiMAXforum in July 2005
- PreWiMAX products already in use in Finland
  - 3.5 GHz wireless local loop links and bridges
  - Net 10-12 Mbps capacity, 7 MHz channel
- WiFi access also in 5 GHz is becoming more popular
- More integrated WiMAX and WiFi products expected to market during 2005 & 2006
  - Requires careful business model
  - Intergrated WiMAX and WiFi products represent high end wireless access products

Early experience of WiMAX network integration

- IP, Ethernet or ATM
- Association and service configuration process time required 20-30 seconds, in 802.11 networks 1-2 seconds!!
- Service back-end managed in centralised way
- IP mobility support in first stage nomadic access
- Integration of WiMAX and Wi-Fi product design offers additional challenges in service and application levels
- HW and SW architectures evolving to different product market specific designs
- WiMAX (3.5 GHz) brings more range and distance, which are value added impact to existing markets

Emerging research questions in Wi-Fi/WiMAX hotzone

- IP access services, managed access provisioning, supporting heterogenous access networks
- 802.11e, QoS supported mobile Wi-Fi
- Mobile broadband solutions, high throughput 1-20 Mbps data throughput, seamless handovers
- Efficient NOC architectures, managing traffic and service dependent traffic flows in optimised way, new functional Network Management Element roles
- Multimode products, integration of bridged and routed topologies
- Scalability of network and services

Summary: VHO project based research issues

- IP access services, service support from IP mobility solutions, limitations/strenghts, open IP protocols, ”transparent protocols” packet analysis methods..
- Mobility as a ”network service” heterogenous networks, alternative network policy management approaches:
  - Network = End User, Service=Network
  - Network > End user, Network < End user
  - Network#1=Network#2, #1<#2, or #2<#1...
- QoS based mobility rules; Service reach, e.g. mesh enabled networks meet QoS limits after 3-4 hops, RF management for network systems
  - Link control policies
  - Access control policies
- New WLAN standards...
- PHY and RF designs; VHO capable product design limitations, application area limitations

Thank you

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