Nomadism, a first step towards convergence – a MUSE perspective

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“Shaping the Broadband Society”
Dresden, 23 June, 2005
Outline

> The MUSE context
> Drivers for analysis of nomadism in MUSE
> Key issues and the view of MUSE partners: nomadism, mobility
> Main study issues
  • Definitions
  • Use cases
  • Requirements
  • Enabling Standards
  • Network functions
> The evolution towards convergence
MUSE Context and Objectives

Multi service access network that provides
- secure connectivity between end-user terminals and edge
- in a multi-provider environment
- at a low cost for every European citizen.

Consensus and standardisation
Evaluation in lab trials

Phase I: 2004-2005
Phase II: 2006-2007
34 partners -110 PY/year
The Drivers for convergence

> A changing service and network environment in Europe
  - 3G mobile network deployment and emerging 2.5G/3G value-added services
  - Widespread Broadband DSL and Wireless LANs
  - Potential for alternative wireless (WiMAX)
  - Adoption of the IMS concept for fixed as well as mobile solutions

> Technology breakthroughs
  - Potential for multiservice access
  - Evolution of terminals (PDA, Blackberry)

> Service Availability
  - Multitude of new services available on both mobile and fixed networks
  - The same end users available in different equipment (phone, lab-top..) with the same interface but different quality
  - “one network” – efficient use of both fixed and mobile networks decreased CAPEX and OPEX as well as end user cost

> The drive for a new business cycle
  - Saturation for the voice market
  - Value-added services and multimedia as new revenue streams
  - A new facet for the mobility premium
Wireless data in the IEEE roadmap

**WLAN**
IEEE 802.11x

- **QoS radio**
  - IEEE 802.11e
  - WME Profile
  - Soft QoS (priorità)

- **Security**
  - IEEE 802.11i
  - WPA/WPA2

- **Data-Link**
  - IEEE 802.11b
    - 11Mbps, 2.4Ghz ISM
  - IEEE 802.11g
    - 54Mbps, 2.4Ghz ISM
  - IEEE 802.11a
    - 54Mbps, 5Ghz, US

**Handover**
IEEE 802.21
Media Independent Handover Services

**QoS radio**
IEEE 802.11e
WSM Profile
Hard QoS (contention free)

**Throughput increase**
IEEE 802.11n (>100Mbps)

**Vehicular mobility**
IEEE 802.11p

**Mesh networking**
IEEE 802.11s

- **WiMAX 802.16e-based profiles**
  - Nomadicity, up to 15Mbps in 5 MHz channel
  - Licensed bands

- **WiMAX 802.16REVd-based profiles**
  - Wireless DSL, up to 75Mbps in 20 MHz channel

**Today**
Pre-WiMAX
Wireless DSL

**WMAN**
IEEE 802.16x

- IEEE 802.11u
- IEEE 802.11v
- IEEE 802.11w
- IEEE 802.11r
- IEEE 802.11p

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Broadband wireless standards: IEEE, ETSI, WiMAX

IEEE 802.15 - Bluetooth
WAN

IEEE 802.16 - WirelessMAN
ETSI HiperMAN & HIPERACCESS
MAN

IEEE 802.11 - WirelessLAN
ETSI HiperLAN
LAN

IEEE 802.15 - Bluetooth
ETSI HiperPAN
PAN

IEEE 802.20 (proposed)
3GPP, EDGE (GSM)

WiMAX: Worldwide Interoperability for Microwave Access

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Definitions

> Nomadism

  - The ability for a user who is re-connecting to the network at a new location, to recover his/her access to the network and his/her service environment

> Roaming

  - The ability for a user to function in a serving network different from the home network. The serving network could be a shared network operated by two or more network operators
Use Cse (1) - Roaming in the same access network

1. Not of immediate interest, save for Phase II
Use Case (2) - Roaming between Packagers

Fixed broadband network

BBW AP

RGW

CPN

GPRS/UMTS/BBW (3GPP interworking)

WCDMA/GPRS BTS

R-interface

Packager

Not of immediate interest, save for Phase II

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A consensus view of MUSE partners

> Grading of business role scenarios

  - 1<sup>st</sup> priority - nomadism within/between access networks within a single-packager context
  - Roaming across access domains - for further study

> Independence from access technology (seamless “always best connected” access)

> Multiservice support with high priority on non-real-time data and real-time based voice

> Multiple authentication mechanisms, but simple, transparent operation for the user
1. Agreeing on the basic definitions
   - Nomadism, Mobility
   - Roaming, Handover
   - Session Continuity

2. Identification of relevant use cases

3. Analysis of requirements
   - network service requirements: broadband data, real-time multimedia (voice/video)
   - roaming requirements (service roaming at the AAA level, session roaming)
   - handover requirements (application level, session level, networking level, lower layer level)

4. Analysis of Enabling Standards
   1. IEEE 802 family
   2. IETF and Mobile IP

5. Analysis of enabling network functions
   - Mobile IP (reference to v6 and transition scenarios)
   - Session Control
   - AAA (interaction of SIM-based and pwd-based mechanisms)
Nomadicity Levels

> Application level
  • Mobility of the user identity
  • Billing arrangement of service/application use

> Session level
  • Session continuity
    – Non-real-time typically

> Connectivity level
  • Real-time or non-real-time

> Radio/Fixed level
Network Functions for Nomadicity

- **Network technologies**
  - Wireless access to fixed networks
  - Intermediate “simple mobility”

- **Use of Mobile IP**
  - Basic protocol models and functions
  - Use of IPv4, IPv6 and transition mechanisms

- **Session control**
  - Home Agent functions & Relocation
  - QoS
  - Multihoming, Load Balancing

- **Authentication and profiles**
  - Log-in, SIM, interactions
MUSE Phase II plan for FMC

Architecture/Requirement oriented

Work out architecture for fixed-mobile convergence for different cases including nomadism between fixed access networks (dual packager), session continuity within an access network and finally roaming between fixed and mobile networks.

Planned joint work with Ambient Networks

Implementation oriented

The main goal of FMC subproject in MUSE phase II is to develop and evaluate an access solution with improved connectivity and optimised access nodes, first-mile technologies and residential gateways for end-to-end FMC aligned services.
Towards FMC from a MUSE perspective

> Nomadism in fixed access networks (On-going)

> Nomadism between different access networks (On-going)
  - Use cases
  - Definitions
  - Basic network enablers

> Seamless interaction between the fixed and the mobile networks (planned for Phase II)
  - Cooperation with Ambient Networks is planned

> A detailed architecture for nomadism will ready by December 2005