Advanced Next gEneration
Mobile Open NEtwork

ANEMONE: a large-scale testbed for testing, evaluation and validation of mobility technologies

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Workshop on "Research and Deployment Possibilities on MIPv6"

Budapest

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Information Society Technologies

- Challenges for MIPv6 operational deployment
- Related research topics
- The ANEMONE testbed
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  - Overall description
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  - How to use ANEMONE testbed?
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Challenges for MIPv6 operational deployment

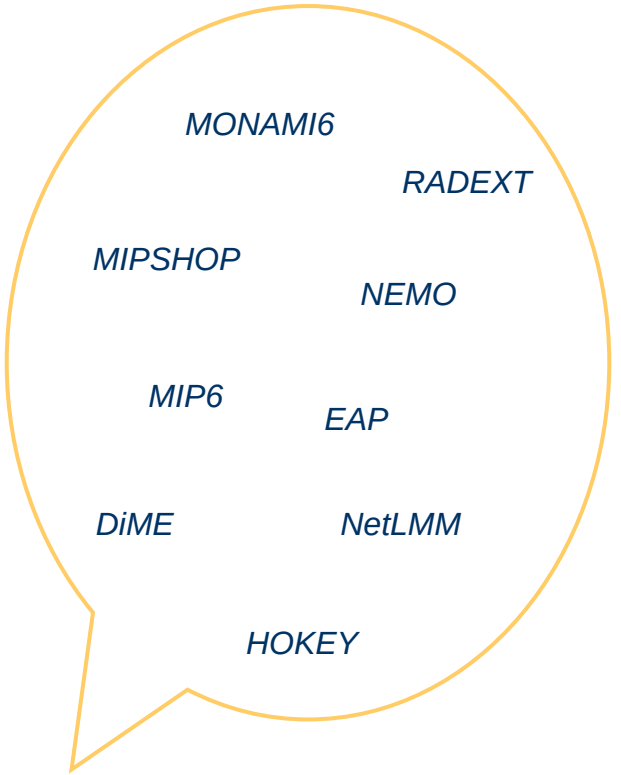
Mobile IPv6 is a mature and promising technology
but its deployment is a real challenge

- New Internet paradigm
  - Users want to get access to services
    - Anywhere and Anytime
    - On any device
    - Through any available wireless access networks
  - Users move
    - Always-best-connected
    - Seamless mobility
- New Challenges for Mobility Service Providers
  - Various deployment scenario
  - Identity management
  - Mobility service authorization
  - Billing
- Standards
  - E.g. IETF, 3GPP

MIPv6-related research topics

Various mobility research topics

- Security
  - Protection of MIPv6 signaling
  - Access control and authentication
  - MIPv6 bootstrapping
- Reliability and robustness
  - HA redundancy / relocation / load sharing
  - Host multihoming
- Performance
  - Pre-authentication
  - Fast re-authentication
  - localized mobility
- Deployment considerations
  - Dual-stack operation
  - Operation with firewalls



IETF

ANEMONE motivation

In the near future, billions of fixed and mobile users will require reliable, ubiquitous and uninterrupted access to online services and content

Growing demand of mobility R&D community for a playground to evaluate and validate innovative complex applications, services and devices

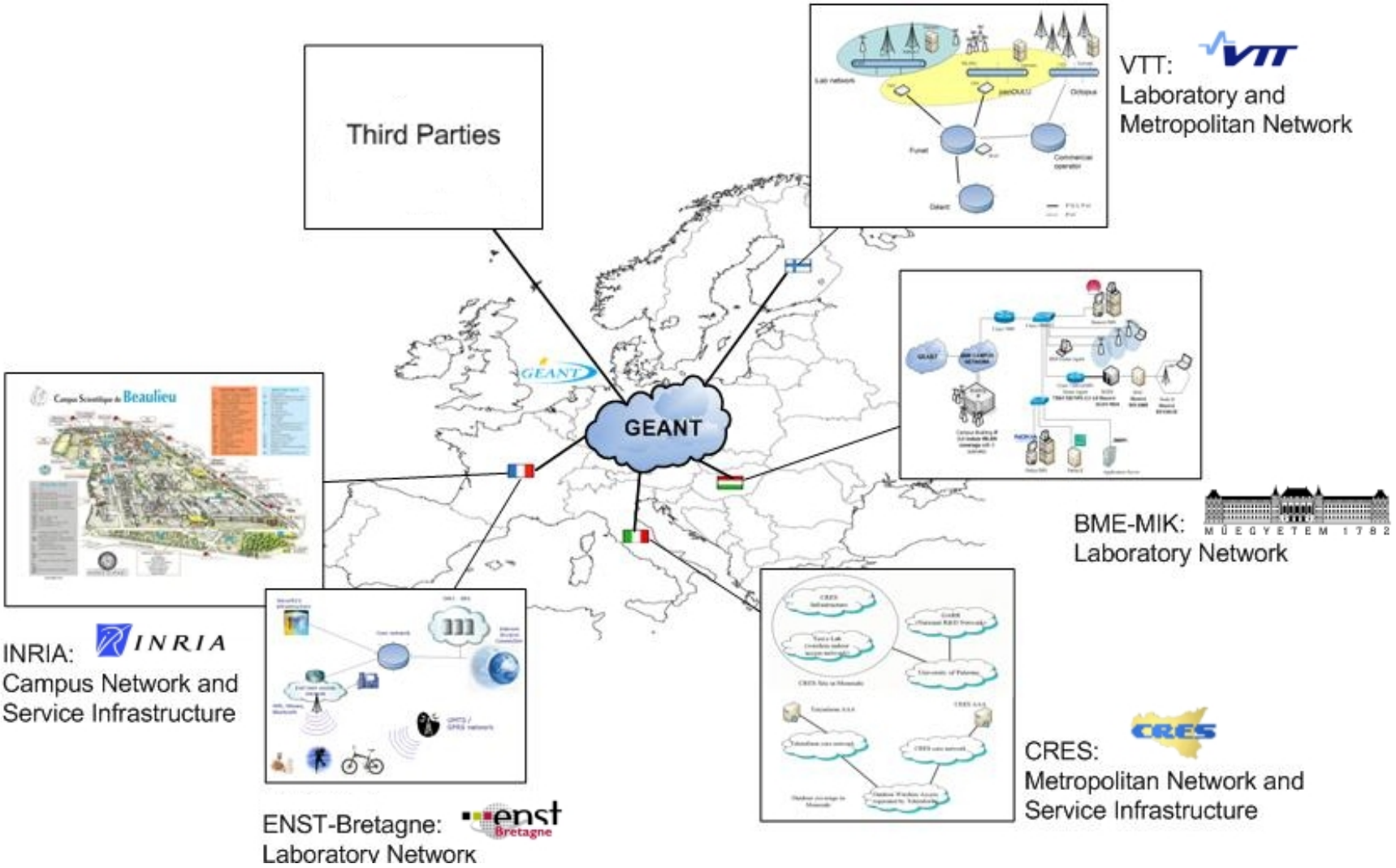
ANEMONE

A distributed & open IPv6 network aiming at hosting IETF mobility protocols, third party research projects and pre-industrial initiatives

ANEMONE testbed description – 1/2

- Large-scale mobility-oriented testbed
  - Different locations
  - Different network types and sizes (e.g. campus, metropolitan)
  - Different user profiles (e.g. researchers, students, man-in-the-street)
- Federation of the different sites
  - IPv6 interconnected pan-European core network (IPv6 in IPv6, IPv6 in IPv4)
  - Tunnels through GEANT network
- Heterogeneous IPv6 access networks
  - Diversity in wireless access technologies: IEEE 802.11 a/b/g, HiperLan, UMTS, GPRS (IPv6 via tunneling)
  - Diversity in connection (native IPv6, IPv6-in-IPv4 tunneling)

ANEMONE testbed description – 2/2

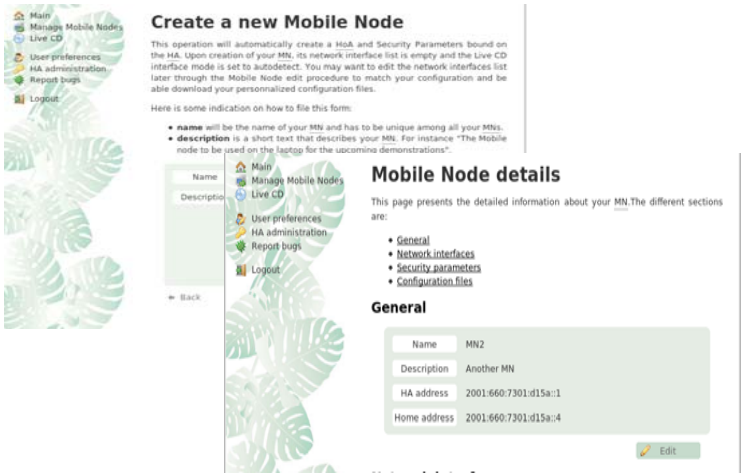


ANEMONE technologies and services – 1/2

- IETF IPv6 mobility protocols
  - Host mobility (Mobile IPv6)
    - Registration for Mobile IPv6 services via a web page
    - A LiveCD is generated for the mobile devices
    - Users can benefit from mobility support over the ANEMONE testbed
  - Network mobility (NEMO basic support)
  - Optimized mobility support

    E*.g., FMIPv6, Multiple Care-of Address, Flow binding*

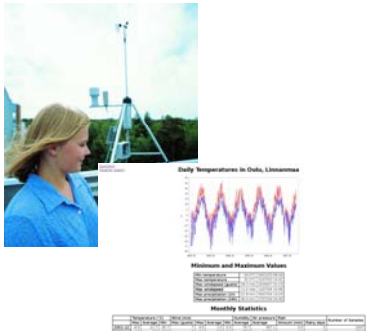
- Emulation of multi-operator environment
  - Realized via IPv6 Prefix exportation from one site to another
    - A Mobile Node can be multihomed (multi-ISP)
    - Roaming methods can be evaluated



Creation and configuration of a mobile node

ANEMONE technologies and services – 2/2

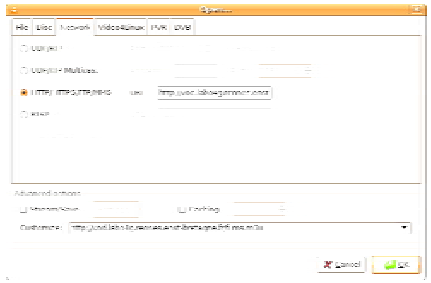
- IPv6 multimedia services
  - Web, Voice over IP, IP TV, Video on Demand, audio streaming, chat, weather station
  - Experimental IP Multimedia Subsystem



Weather station in Oulu

- AAA mechanisms
  - Authorization of network access
    (Currently Radius based)
  - Authorization of mobility service
    (Diameter based)

Linphone SIP video-phone



IPv6 video streaming

Why using ANEMONE testbed ?

- ANEMONE for testing and development of mobility and security

  Part of the work can be performed using simulated networks but…

  … Testing in realistic environment also needed

  - Drawbacks of using real (commercial) networks
    - High expenses
    - No knowledge on network parameters and users
    - No control on network configuration

How to use ANEMONE testbed ?

- *Openness* to third-party experiments is the very first design rule

- First version of the testbed is already set up
  - Third-party projects are welcome to use the testbed from July 2007
  - ANEMONE consortium is using the testbed for their research activities
  - Testbed usage procedure and rules are published

- By being a third party to ANEMONE testbed you benefit from:
  - A very versatile testbed for your innovative developments
  - A ready-to-use testbed for simple validation of prototypes
  - The expertise of ANEMONE consortium on IPv6 mobility, multimedia and security services

- Early contacts with several projects:
  - CVIS (Cooperative vehicle-infrastructure systems)
  - IST-Multinet (Multihoming and intelligent network selection)
  - French funded RNRT-Remora (MIPv6/NEMO reliability and multihoming)

ANEMONE testbed provides cost-effective and realistic environment for testing and development of wide range of mobility and security technologies.

- Realizes a proof-of-concept of IPv6 mobility deployment in real-life conditions
- Offers a large set of attractive services
- Is a “Living lab” with a large number of heterogeneous users

Expected Impact

- Reduces validation time of prototypes
- Supports the development of new services and businesses

PARTNERS

- BME (Hungary)
- CRES (Italy)
- ENST-Bretagne (France)
- INRIA (France)
- SFR (France)
- Thales Communications (France) - Coordinator
- VTT (Finland)

ANEMONE is an IST-FP6 STREP project

- Duration: 29 months (June 1st, 2006 – Oct. 31st, 2008)
- First testbed: April 2007
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Thank you for your attention !

Any questions?