

1st Japan-EU Symposium on New Generation Network and the Future of Internet

Overlay Networks

R&D on Key Technologies and Future Application for
NWGN and Future Internet

9 June 2008

1st Japan EU Symposium on the "New Generation Network"
and the "Future of the Internet"



Theme: Overlay Networks

- Japan Introduction & moderator: **Prof Masayuki Murata**, Osaka University" **5mn**
- EC Introduction & moderator: **Bernard Barani**, "Converged Networks and Services" Directorate **5mn**
- **Dr Akihiro Nakao**, Associate Professor, The University of Tokyo **15 + 5 mn**
- **Dimitri Papadimitriou** Alcatel-Lucent , on routing challenges **15+ 5 mn**
- **Opportunity for position statements**
- **Discussion**

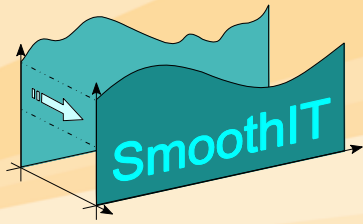
ON: Some Characteristics

- Logical network – application specific - constructed on top of other network(s), enabling additional functionalities or services not available in the existing network(s)
 - E.g. testbeds to test new protocols or systems on existing infrastructure
 - E.g. Provide security features on top of TCP/IP that were not foreseen
 - Other applications: QoS control, routing, addressing, multicast, mobility, P2P...
- Allow to route messages to destinations directly not specified by an IP address
 - E.g. Distributed Hash Tables (DHT) to route a message to a node identified by a logical address
 - Technique widely used in P2P networks (Napster, Gnutella, Freenet, JXTA...)

ON: Some Characteristics

- Enables to achieve QoS without massive changes in the Internet infrastructure
 - E.g. Low adoption of IntServ or DiffServ because of the requirements to have requirement of these proposals that all network elements between a source and a destination implement QoS mechanisms
- Virtual links in the overlay network enable to generate an end-to-end path along which a flow may be routed and guaranteed a specific amount of QoS
 - Advantage: does not require QoS mechanisms in all routers in the network
 - But requires modifications at all edge routers in a domain to achieve QoS functionality
- Edge controlled multicast (ALM)





Example, SmoothIT (FP7)

- **Simple Economic Management Approaches of Overlay Traffic in Heterogeneous Internet Topologies**
- **Partners:** University of Zurich (CH), Technische Universität Darmstadt (DE), **DoCoMo** Communications Laboratories Europe GmbH (DE), Athens University of Economics and Business (GR), Julius-Maximilians Universität Würzburg (DE), AGH University of Science and Technology (PL), PrimeTel Limited (CY), INTRACOM S.A. Telecom Solutions (GR), Telefónica Investigación y Desarrollo (ES)
- **Duration:** Jan 2008 – Dec 2010
- <http://www.smoothit.org/>
- Aiming at the development of economic traffic management schemes across domain borders in a multi-provider fashion, radically advancing existing management functionality across Europe's networks and ISP market.
- evolutionary



Example, AUTO-I (FP7)

- **Autonomic Internet** in a nutshell
- **Partners: Hitachi Europe SAS (FR)**, Waterford Institute of Technology (IE), University College of London (UK), Universitat Politecnica de Catalunya (ES), Institut National de Recherche en Informatique et en Automatique (FR), University of Passau (DE), Universite Pierre et Marie Curie – Lip6 (FR), Motorola (US), Ucopia Communications (FR), University of Patras (GR), Gingko networks SA (FR)
- **Duration:** Jan 2008 – Dec 2009
- <http://www.ist-autoi.eu>
- *AutoI will develop a self-managing virtual resource overlay that can span across heterogeneous networks and supports service mobility, security, quality of service and reliability. In this overlay network, multiple virtual networks co-exist on top of a shared substrate with uniform control.*

- **Publish-Subscribe Internet Routing Paradigm**
- **Partners:** Helsinki University of Technology, Helsinki Institute for Information Technology (FI), RWTH Aachen University (DE), British Telecommunications Plc (GB), Oy L M Ericsson Ab (FI), Nokia Siemens Networks Oy (FI), Institute for Parallel Processing of the Bulgarian Academy of Science (BG), Athens University of Economics and Business (GR), Ericsson Magyarorszag Kommunikacios Rendszerek K.F.T. (HU)
- **Duration:** January 2008 – June 2010
- <http://www.psirp.org>
- Specify, implement and test an inter-networked pub-sub architecture
 - There will be two versions: *clean-slate* and **overlay**
 - Changing the sender paradigm to the receiver paradigm
 - Long term reappraisal of packet forwarding

And many more

- Euro-NF,
- Ambient Networks, Agave, Emanics..(FP6)
- CHIANTI
- ECHOES
-

Question: how far overlay will challenge lower layer/today networking paradigms or even replace them?