

G-Lab: A Future Generation Internet Research Platform

Phuoc Tran-Gia

University of Würzburg, Institute of Computer Science, Germany

INTERNET OF THE FUTURE, FP7 Consultation Meeting, January 31st, 2008, Brussels

In recent years we can witness a new wave of activities and projects to explore different paths towards Next Generation Internet. There are two main fractions:

- Clean-Slate Approach: start new network design from scratch. The advantages are obvious: the approach is forward-looking and does not get trapped by the current Internet repair shop. The criticisms are: it is an “academic approach”, the acceptance from component vendors and network provider is questionable
- Evolutionary Approach: tries to find out emerging paths from today’s network. This approach is pragmatic, CAPEX-oriented, has a high acceptance level from main players. It is however unclear whether we can cope with the crisis of the current Internet development.

The G-Lab project, funded by the German Ministry of Education and Research, follows a combination of these two approaches by forming an experimental facility together with concept studies to test the tractability of evolving architecture.

There is an urgent need for future research on the following incomplete list of topics:

- Future Internet Routing: Scalability and robustness of network, overlay and application layer routing, convergence, locator/identifier split, mobility support, traffic engineering, resilience
- Protocol Architecture: Simplified architecture, stochastic scalability, interconnecting virtualized networks
- New Transport Technologies: Very high-speed transport (100 Gigabit/s and beyond), native Ethernet transport, inter and intra network management, energy-efficient networks, speed adaptation
- New Access Technologies: Very high-speed access, resource scheduling, connecting sensor networks to Internet
- Self-organization: Social and bio-inspired networks, performance aspects
- Network Architecture: Multi-Network Service, virtualization and its limit
- Content Distribution Platform: New architecture and business model content distribution, evolving architecture of distribution platform
- Quality of Experience (QoE): quantification of QoE, relationship between QoS and QoE, QoE measurement and enforcement
- Services Architecture: Edge-based services, controllability, fairness