

# Flexible Architecture for the Future Internet

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## Extended Abstract

Today's mobile and fixed communication networks have evolved over several steps to enable both people communication and content communication. Internet technologies are already embedded in modern mobile communication networks and the Internet as such has enabled new communication forms and business models not conceivable just 10 years ago. However, evolution in the current Internet is restricted by fundamental limitations that make it at least questionable to build future networks of information and things on the old designs of the Internet. Due to these restrictions, real innovation has taken place mainly in the application layer, by evolving Web technologies and by creating a plurality of overlay solutions. It is now questioned all over the world whether the architecture and the engineering process of the Internet can really address the existing and upcoming challenges in the areas:

- Explosion of the number and variety of communicating things
- Improper address semantics
- Spam and denial of service attacks
- Massive use of Peer-2-Peer networking in incompatible service layer overlays
- Lack of integrated support for Mobility, QoS, Security for increased efficiency
- Self-\* management for simplicity and stability

All this and more has raised the demand to bring innovation back into the network below the application layer, and research activities are being started to investigate a new holistic and clean approach. At the same time it has been realized that any new networking approach need not only to be the best solution for the given problem but as well to include a deployment solution (see the IPv6 experience).

We believe that there is no one solution that fits all right from the beginning. At least the current Internet and any new upcoming "Future Internet" has to coexist for quite some time and also to allow information exchange between peers in both the "old" and the "future" Internet. A flexible network architecture is envisioned, which shall be easily extendable to suit new needs without bumps and disruptions, and which includes a framework for running virtual networks on top of a shared underlying network infrastructure. This framework shall enable very different architectures to co-exist and inter-operate in a cost-efficient manner.

We believe that a clean-slate approach should be pursued in research in order to study the benefits possible to achieve with this. However, a Future Internet based on this approach would be reached after some steps including the coexistence with the current Internet. Network virtualization will be inescapable for the transition and will allow providing a common infrastructure abstraction on top of which a plurality of networking applications can exit and grow in parallel. Network virtualization is a key enabler in the common infrastructure abstraction.

