Comments on the Evolution of the Future Internet

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I. AN ENTERPRISE SOFTWARE PROVIDER'S VISION FOR A CONVERGED FUTURE INTERNET

It is a stunning matter fact and genuine real-world paradox. The technological underpinning of what is supposed to be the emblematic bedrock and enabler of the envisioned Future Information Society, namely the Internet architecture, is based on a set of elementary concepts that are as old as 3 decades and even more. And indeed, the limits of this aging architecture are not unknown, but controversially debated since roughly two decades, first in academia and soon after also in industry.

Meanwhile this awareness has led to a number of truly large-scale research initiatives around the globe with all having one and the same goal. Designing, prototyping, evaluating, and by this, paving the way for the introduction of the Future Internet (architecture). Pioneered by GENI and FIND in the US, followed suit by Europe's ambitions FP7, which can safely be considered as the world leading approach, but also AKARI in Japan plus the many others, the current global pursuit is characterized by unprecedented scale, in terms of funds and engagement.

One reason is for certain the varying definition of Future Internet research. Its original focal point was set to the core architectural principles of future networks while in particular in Europe's FP7 a much more holistic and complete approach has been implemented, ranging from the Network of the Future (NoF), over the Internet of Things and Services (IoT/IoS) to the 3D and Media Internet, plus all the vertical issues like security for instance. Obviously, from enterprise software and solution provider's point of view, only the latter scope truly meets the multifaceted requirements of today's global business networks and mission-critical enterprise applications.

This is, however, not to diminish the central role and significance of future networks. It was at this level were the Future Internet debate originated and also were it is most fiercely and controversially discussed,. Most notably, a considerable number of prominent and early Internet pioneers call for a so-called clean-slate approach, which aims at radically redesigning the Internet architecture from scratch. This is being opposed by more moderate supporters of an evolutionary path motivated by fundamental obstacles hindering the introduction of any disruptive concept to such a central infrastructure and at the scale of the Internet.

But no matter, though, if one looks at future network research, he'll find that much effort contribute to more efficient network infrastructures that essentially delivers very similar services mostly ignores the potential of providing novel infrastructural services for rising applications, in particular those based on Service Oriented Architecture (SOA). This is the more interesting in view of the fact, that providing dedicated infrastructural support to a set of applications is common in other domains like Voice over IP, Video, and IP-TV.

The consequences in turn directly contribute to the original problem: fragmented, patchwork-like Internet architecture that, also due to the layering principle, motivates to locate missing functionality in additional layers and middleware, with the immediate consequence of complex interdependencies and redundant semantics. Naturally, this makes operating and managing a network a lavish task. Most importantly, though, it supports the established separation of application and network domains and prevents telecommunication operators from entering the service and application market and application providers from leveraging on capable and trustworthy infrastructure platforms that reach well beyond connectivity.

In conclusion, what needs to be addressed by Future Internet research is a holistic approach that is defined and implemented jointly by incumbents in the telecommunication and service plus application realm. The result must be a Service Oriented Infrastructure (SOI) that meets the requirements of the Internet of Service, the Internet of Things, and the 3D Media Internet. According to this vision, traditional network operators will evolve as platform providers that offer traditional plus new shared and dedicated services on-demand with fine granular pay-per-use subscription models. They do so by opening up and leveraging on the vast infrastructural resources in place within current fixed and mobile telecommunication infrastructures. For instance, telecommunication providers offer integrated and holistic billing, identity, or shared services like service repositories, or enterprise service busses. All these services in combination with computing, storage, managed services and exposed according to the Infrastructure as a Service (IaaS) paradigm. Users in turn, will neither be required to commit risky investments in infrastructure nor software assets and application and solution providers will benefit from unprecedented levels of flexibility and synergies by being able to concentrate on application semantic innovations with hopefully unprecedented levels of support by the underlying infrastructure.