

Future Internet Service Offer: An Overview

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Scope and context

The rapid development of the Internet, both in speed and in capabilities, will create a whole new and innovative market of services providing a new experience to users. The everyday life of citizens and workers of all types will be supported by new convergent services of the Future Internet that can also sense and react to the physical world¹. In this paper we will examine the research challenges associated with this Internet of Services.

According to the ICTAG report referenced above, the Internet of Services will offer very rich “horizontal services”. These services will foster an interoperability and trust framework for service integration, authentication, privacy and security, which in turn will enable the Web-based service industry to procure, extend and repurpose services for new markets.

ICTAG also describes the concept of a global and open Service Delivery Platform to be part of the Internet of Services². This platform will go beyond the client-server model of service delivery and will support rich mechanisms of global service supply, where third parties have the capability to aggregate services, act as intermediaries for service delivery and provide innovative new channels for consuming services. This reflects the future requirements of the mainstream enterprise service communities and the globalization of these enterprise services.

Such a platform will need to build upon and extend Web 2.0 concepts to allow for community-driven service innovation and engineering on a large scale, providing global repositories for value-added services and, semantic support to enable the automatic on-the-fly composition of value-added services. The above will enhance the reusability of services and also allow for reasoning to derive further knowledge.

Figure 1 below, from Lutz Heuser's presentation on the Bled conference shows these 2 layers of the Internet of Services.

¹ ftp://ftp.cordis.europa.eu/pub/ist/docs/web-based-service-industry-istag_en.pdf

² in ftp://ftp.cordis.europa.eu/pub/ist/docs/future-internet-istag_en.pdf

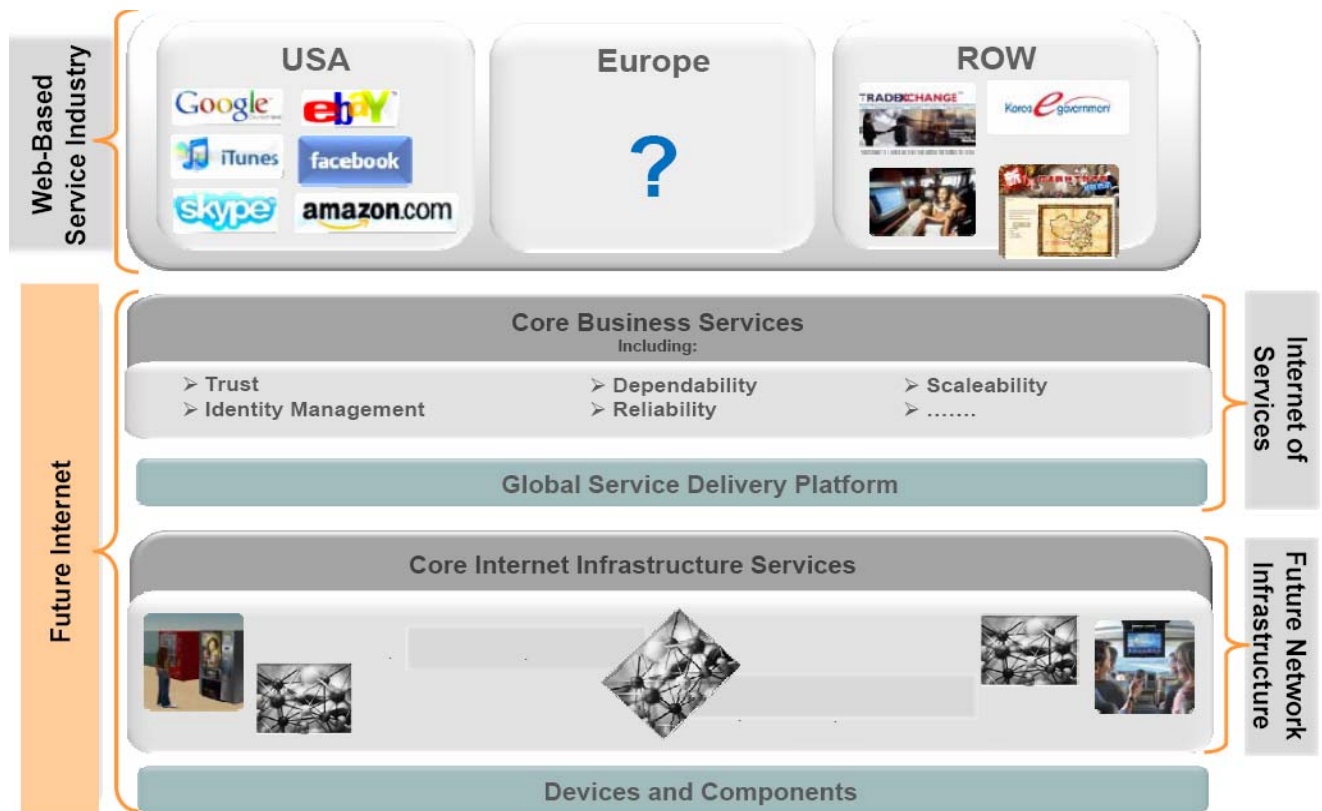


Figure 1. A Global Service Delivery Platform. Source:
ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/ch1-g940-280-future-internet-ld_en.pdf

Research Orientation / Grand Challenges

In order to realise the Internet of Services able to offer services to consumers at the right time and place it is necessary to understand and be fully aligned with other technical domains which are also developing concepts and technology for the future internet.

1. The Internet of Services and the Internet of Things: How can the Internet of Services leverage on the capabilities offered by the Internet of Things that can sense and react to physical objects? And vice versa, how can service technology be used to transform the basic information provided by RFID tags into useful and manageable services?
2. Leveraging on individuals and virtual communities to develop content and services. The largest source of data on the Internet is now user generated. For example, Facebook's 41 million active users (with 10^5 new users every day) have uploaded 1.8 billion photos and created 1,800 applications. Additionally, user generated content will grow as the world's 4+ billion applications - cameras, phones, PCs, CCTVs, - increase by 50% by 2010. Newer types of devices are also coming onto the market such as the iPhone, Amazon Kindle and road navigation devices which will produce richer Internet content. It is expected that user generated services will follow the same trends and patterns as seen around user generated content. Open questions here include: What actions are needed to facilitate the exchange of user-generated content/services (whether for payment or not)? What standards are needed, in particular metadata standards, to ensure searchability and interoperability? How can the origin of user-generated content/services be verified? How do notions of trust change within a dynamic user-generated service and content context? Should the

- originator have the right to control subsequent use and if so how can this right be enforced? How can small payments be made securely and cheaply?
3. Cloud computing. This still vaguely described term tends to cover the ability to provide computing resources (power, storage and communication) as a service. Amazon is already providing such a service. If more and more companies rely on cloud computing instead of relying on their own in-house services, what does this mean for the Internet of Services? Which parties will manage the “global service platform” and the “horizontal services”? What are possible business models?
 4. Global service delivery platform for the future internet: What is this specifically and how might one use it for innovation? Within the ICTAG vision, this global platform plays a prominent role. However, it is not exactly clear what it is. In defining this term following questions need to be addressed:
 - a. What does Global mean? One platform, one single point of access, a federation/network of interoperable platforms, centralized / decentralized to what extent?
 - b. What does “service” mean? The vision of billions of services (and then the platform is mostly a search/discovery/composition tool), the vision of IT Service Parks (and then the platform is mostly a QoS-preserving secure integration platform), the vision of Telco (and then the platform is mostly a well-controlled secure platform on which services can be accessed by authenticated paying customers), the vision of Future Media (and then the platform is mostly a distribution platform of content with digital rights management), the vision of Business Services - enterprise government healthcare banking consultancy services - (and then the platform is mostly an intelligent reasoner, able also to configure - i.e. annotate ontologies, tune input parameters -, test, simulate the execution of the services).
 - c. Is the platform solely concerned with delivery? Or does it incorporate development?
 - d. What are the basic functions (services) of a GSDP? Functional and not-functional?
 - e. Who owns a GSDP? What is its business model? Is there any market for GDSP? Could we “sell” GDSPs on the market independently of the applicative services? How to model a GDSP, how to compare different GDSPs implementations, GSD Platform as a Service?

Possible integration paths towards the Future Internet

At the Madrid FIA there will be 4 to 5 focused panels on different aspects of Future Internet Service Offer. All these panels will lead to desired functionalities of the Future Internet (which should be of a granularity which is finer grained than grand challenges, it should be of the level of topics to which projects can contribute). We can publish the list of desired functionalities on the future internet website³, as an open document to which people can add functionalities if they want. Once we have this, we will place an open call for contributions to all projects to make position statements about which desired functionalities they have to offer. All these position statements will be published on the future internet website, publicly available to anyone and in Prague we will be able select from these contributions for again some panel discussions.

³ http://services.future-internet.eu/index.php/Main_Page

Roadmap and Milestones

Dec 2008

- Panel discussions during FIA Madrid to list requirements for Future Internet Service Offer (FISO)
- Panel coordinators to write report about their panel discussion

Jan 2009

- Publishing and requests for comments on requirements for FISO (on http://services.future-internet.eu/index.php/Main_Page)
- Call for contributions to projects to write position papers about (early) results they have for FISO. Contributions will be published on http://services.future-internet.eu/index.php/Main_Page

April 2009:

- Taking stock of contributions received to prepare the Prague meeting.