

Future Internet Assembly
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Report: Future Internet Service Offer - Sessions 1 & 2

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Description: The sessions at FIA Madrid consisted of 4 focused panels on different aspects of Future Internet Service Offer. The goal of these panels was to draft a set of 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). The desired functionalities and collected requirements will be published online and an open document will be made available where interested people can add functionalities. An open call for contributions will be sent 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 to select from these contributions for further panel discussions.

Chairs: Stefano de Panfilis (Engineering Ingegneria Informatica)
John Domingue (KMi, The Open University & STI International)

EC Contact: Anne-Marie Sassen (European Commission)

Panelists: Alberto Sillitti (Free University of Bolzano)
Patrick Hayden (TSSG Waterford)
Alberto Leon (Telefonica)
Joris Claessens (EMIC)
Juanjo Hierro (Telefonica)
Andrew Oliphant (BBC)
Pete Bramhall (HP)
Alex Galis (University College London)
Ignacio Llorente (University Complutense Madrid)
Thierry Priol (INRIA)
Sergio Gusmeroli (TXT)
Frederic Gittler (HP)
Santi Ristol (ATOS Origin)

Future Internet Service Offer – Session 1

1. Future Internet Service Offer Introduction (John Domingue)¹

John presented the position paper² prompting the session and clarified the objectives and overall process model behind the session and working group.

¹ http://services.future-internet.eu/index.php/Image:1_Introduction_to_the_Future_Internet_Service_Offer_Session.pdf

² http://services.future-internet.eu/images/e/e0/Future_Internet_Service_Offer_v4.pdf

Session aims to continue defining the following:

- Requirements for the Future Internet Service Offer
- Desired functionalities for the Future Internet Service Offer
- Requirements of a new (comprehensive) architecture, and whether one is required

Each panel should lead to a set of desired functionalities/requirements of the Future Internet Service Offer. Analyzing these might give an answer to the questions above, in order to ultimately decide whether the current Internet is still sufficient for FISO, or whether fundamental changes are needed.

Future Internet Service Offer Use Cases for FIRE

2. Use Case Scenarios for FIRE (Alberto Sillitti)³

Alberto introduced two use cases of NEXOF-RA⁴, one in the domain of assisted living and the second one in the domain of traffic management during emergencies. He also mentioned that NEXOF-RA has developed a methodology for collecting scenarios with specific templates.

During the discussion with the people of FIRE it was noticed that the distance between these use cases and what they expect is still very big. They are interested in knowing the architecture and components that will run this use case and what kind of network support is needed for this.

Panel 1: Internet of Services and Internet of Things: Adapting to User, Task and Location in a Seamless Fashion

3a. Internet of Services and Internet of Things Panel - PERSIST Project (Patrick Hayden)⁵

Patrick Hayden introduced the notion of Personal Smart Spaces of the project PERSIST⁶, that will bridge the void in between Smart Homes and Smart Offices. It is a combination of ad-hoc networking with devices and sensors available and services. In order to make this concept work, Personalisation, Learning and Reasoning seem to be important functionalities.

3b. Internet of Services and Internet of Things Panel - Telefonica (Alberto Leon)⁷

Alberto Leon asked the question whether we are ready to scale up to many more devices and more people connected to the internet. We also need new revenue models where there is a win-win situation for all actors involved.

3c. Internet of Services and Internet of Things Panel - Security (Joris Claessens)⁸

Joris Claessens mentioned that adapting to user, task and location means that we need to establish trust mechanisms across different trust domains. Security researchers are

³ <http://services.future-internet.eu/index.php/Image:2. Use Case Scenarios for FIRE.pdf>

⁴ <http://www.nexof-ra.eu/>

⁵ <http://services.future-internet.eu/index.php/Image:3a. Internet of services and internet of things Panel - PERSIST Project.pdf>

⁶ <http://www.ict-persist.eu/>

⁷ <http://services.future-internet.eu/index.php/Image:3b. Internet of Services and Internet of Things Panel - Telefonica.pdf>

⁸ <http://services.future-internet.eu/index.php/Image:3c. Internet of Services and Internet of Things Panel - Security.pdf>

already working on this problem, but further research is needed. It is also important to take into account that the internet will be very heterogeneous: everything will be connected to the internet, from small sensors to large scale cloud computing facilities. Since adaptation to user, task and location involves service composition, it also means that the security needs to be composed from smaller security component to a secure service. Mechanisms for this "hop" security still need to be researched.

Discussion

The audience seemed to like the idea of the Personal Smart Spaces, but saw still many problems that need to be overcome before it can work on a large scale (how to do decentralized composition of services, how to deal with many sensors, how to have reasoning engines on PSS). To pose strong requirements on the service lifecycle seems necessary.

PSS seems only to capture a small part of the relationship between Internet of Services/Internet of Things. How to deal with events for instance?

Also when the real world machines such as robots are interacting with human beings through seamless personalization and adaptation, safety issues become critical as well.

Preliminary Issues:

Persistent Personal Spaces – adapt and learn according to context

Adhoc dynamic -> “hop security” transitive transparent partial

Real physical world -> proximity, safety!

Panel 2: User Generated Services and User Generated Content: Similarities and Differences

4. Content and Service Front Ends Panel (Juanjo Hierro)⁹

Juanjo Hierro made a presentation on behalf of the three panelists (Andrew Oliphant, Pete Bramhall). The conclusion was that things developed for user generated services might be very useful for user generated content. This is also valid the other way around.

Discussion

The discussion after the panel was centered around the question who is the user. Are all users able to generate their own services or content? For some people of the audience it seemed clear that it is easier to upload some content to the Internet than it is to create a service. However, tested experience in the OPUC project¹⁰ has shown that users from all age groups were able to compose their own services, on the precondition that interfaces are very simple and some services to base variations on are available.

In general, there are many users that can all play a role. Some users might make raw content available that can be enhanced by professionals who on their turn deliver that to users again.

From the security perspective it is important to understand that users can also do things wrong. Since services involve data processing it is necessary to think about security. Users should be protected against making mistakes, and their liabilities

⁹ http://services.future-internet.eu/index.php/Image:4_Content_and_Service_Front_Ends_Panel.pdf

¹⁰ <http://www.opuce.eu>

should be understood by them very clearly. A simulation environment seems necessary.

Preliminary Issues:

Who is the user? - Everyone is the user (and provider)

Multiple roles pervasive

Partial value-add chain of users

Panel 3: Beyond Amazon: Using and Offering Services in a Cloud.

5a. Beyond Amazon Using and Offering Services in a Cloud – Introduction (Alex Galis)¹¹

Alex Galis mentioned that companies that offer cloud computing also need the possibility to outsource part of their cloud. So interworking between different clouds will be important.

5b. Beyond Amazon Using and Offering Services in a Cloud – Cloud Infrastructures to Provision Virtualized Resources (Ignacio Llorente)¹²

Ignacio Llorente explained that Amazon's cloud computing service EC2 is a closed black box. Everybody can use it to host applications, but nobody knows how it internally works. The project Reservoir¹³ is developing open source software through which every company can offer cloud computing facilities. A first release of Reservoir software is already available.¹⁴

5c. Beyond Amazon Using and Offering Services in a Cloud – Clouds and Grids (Thierry Priol)¹⁵

Thierry Priol explained the difference between grids and cloud computing. The main difference is that grids support virtual organizations and can work across different administrative domains. For cloud computing this is not the case. Grid research needs to continue, there will remain a need for grid computing, but lessons can be learned from cloud computing and vice versa.

Discussion

During the discussion after the panel a remark was made that companies that offer cloud computing facilities need to have instrumentation to monitor the workload that the applications running in the cloud are generating. This means introspection in the applications, which might not be acceptable for the application owners.

Preliminary Issues:

Closed Black Box -> open reservoir (cross-organizational domains)

Outsource clouds – interlinking clouds

¹¹ http://services.future-internet.eu/images/2/2b/5a._Beyond_Amazon_Using_and_Offering_Services_in_a_Cloud_-_Introduction.pdf

¹² http://services.future-internet.eu/index.php/Image:5b._Beyond_Amazon_Using_and_Offering_Services_in_a_Cloud_-_Cloud_Infrastructures_to_Povision_Virtualized_Resources.pdf

¹³ <http://www.reservoir-fp7.eu>

¹⁴ <http://www.opennebula.org/doku.php>

¹⁵ http://services.future-internet.eu/index.php/Image:5c._Beyond_Amazon_Using_and_Offering_Services_in_a_Cloud_-_Clouds_and_Grids.pdf

Grid influence Large scale data management, programming models, self*, infrastructure based on p2p
Utility costs and efficiency – workload consolidation requires instrumentation

Future Internet Service Offer – Session 2

Panel 4. Global Service Delivery Platform (GSDP) for the Future Internet: What is it and How to Use it for Innovation?

6. Global Service Delivery Platform Panel (Sergio Gusmeroli, Frederic Gittler, Santi Ristol)¹⁶

Frederic Gittler explained the NESSI view about a global service delivery platform. A service framework makes sense only if you also consider the wider context in which the platform plays a role. Also, a service framework needs to live in a society where use of the service framework is routine. One project on its own cannot develop a GSDP. In NEXOF-RA, which is a tool for implementing the NESSI vision, they are building on the results of a whole community of people and projects. NEXOF as the (technical) foundation for NESSI should be a long living architecture that can grow over time. It is an integrated, coherent and consistent set of technologies and associated methods and tools. It is open to the power n, open source, open standards, open consultation process, open for evolution. Its main characteristics are: technology independent, federated, trusted and dependable.

Santi Ristol presented the high level architecture of SOA4ALL¹⁷, which can also be considered as a GSDP. There are 27,000 publicly available web services today. The aim of SOA4ALL is to make billions of web services available, as many as there are static web pages in the internet. SOA4ALL is based on semantic technology and an important component will be a web crawler that will detect automatically a new service. It will add the necessary metadata so it can be discovered in the future. This model of service description and service discovery mimics the search model of Google for static web pages and could be an alternative for UDDI service registry. The SOA4ALL architecture comprises three levels: SOA4ALL Studio - which enables users to have a unified view of the whole life cycle of services; SOA4ALL Cloud – semantic spaces and enterprise service bus; and SOA4ALL Infrastructure Services – basic services for the architecture. The use of “Micro WSMO” or “WSMO Lite” is being considered. The first prototype will be available in two or three months’ time.

Sergio Gusmeroli presented a viewpoint of the project COIN¹⁸ on a GSDP. Cooperation and interoperability are two sides of the coin. The glue is a semantically enabled service architecture. Enterprise collaboration environments are the starting point. These have involved different collaborative platforms in FP6 research, focusing on supply chains, collaborative networks and business digital ecosystems. Building on this, COIN is addressing collaborative platforms to access the Internet of Services; specifically GSDP will need to connect enterprise environments to the open Internet. Sergio pointed out that enterprises will also be prosumers in the future internet. They will provide and consume high level services which also have a manual part. The question is how to manage enterprise services in the Future Internet (e.g. outsourcing of services?); how to manage the distribution of enterprise applications between

¹⁶ http://services.future-internet.eu/images/0/0a/6_Global_Service_Delivery_Platform_Panel.pdf

¹⁷ <http://soa4all.eu/>

¹⁸ <http://www.coin-ip.eu/>

enterprise systems and facilities like service parks, data centers, clouds? Enterprises should not underestimate the usefulness of user generated services. COIN will start with enabling employees to generate their own services. If that is desired, those can be made available to others such as business partners.

Discussion

During the discussion it was noted that AAA & billing are necessary components of a GSDP. The question as regards what is a unit of analysis for service constellation was raised. Another comment was that services spread through social links and business partners; understanding the different linkages and interactions is critical and socio-economics would help. Also it is important to develop standards for such a GSDP and projects therefore should be clear about the standards that they are targeting. However, standards development should be done only when research results are mature. Projects need to have a process to collect and coordinate research results to input to standards, and “scouting” of standardization bodies is needed.

In the discussion about the global properties of GSDP, it was remarked that such a platform should be generic, that it could cope with different functionalities. There was a concern about the proliferation of platforms. A response to this concern was that while platforms should be transparent to the service consumers, service providers need to discuss the topology of the platforms, and what the purposes of the platforms are. Another response was that we need a connected world of federation of platforms. A further contribution (from the telco perspective) was that a GSDP should position itself vis-à-vis certain technical layers, not forgetting that the IMS (in telecommunications) is already tailored for vertical services. Overall, the word Platform had a different meaning for different people in the room, just like the word Service. If a GSDP supports different types of services, it is necessary to develop technology that can glue these services together.

If a project develops a GSDP it should be tested on FIRE (with a large amount of users) to test for performance and scalability. Users should be taken into account from the beginning. The term “large scale” as in large scale testing facilities needs to be clarified.

Preliminary Issues:

- Services are not just WSDL Web Services
- New types of services will emerge which we do not know of
- Enterprise prosumers
- Web services disseminated through social channels
- Federation of service platforms
- Coordination of research results to input to standards

Future Internet Service Offer Conclusion Session

7. Achievements of the Future Internet Service Offer Session (Stefano de Panfilis, John Domingue)¹⁹

Telecom operators are currently opening up their walled gardens, since that is the only way to survive. They can play a role as GSDP provider – the opportunity for telcos to move to service discovery was described by a contributor as “a last

¹⁹ http://services.future-internet.eu/images/e/eb/7_Achievements_of_the_Future_Internet_Service_Offer_Session.pdf

opportunity for telcos". But in principle a GSDP can be owned by anyone (even SME's for niche markets). There will be many GSDP's in the future that need to be able to interoperate. A GSDP is full of tensions that need to be reconciled. This is very difficult. A GSDP needs to be open for different models of service delivery, such as telco model and web services model as well as entirely new service delivery models. Also, with an enormous diversity of services, what is the glue that ultimately glues all these services together? Striking a balance between interoperability (of services and platforms) and innovation (doing something new) is said to be very tough. One suggestion in this respect is to include (end) users and SMEs in the development process. On the other hand, it was said that making users understand the process is difficult. It was asked: what is the role of a (Web 2.0 like) community in this? Can anyone offer services to each other? If any entity can be a service producer as well as a service consumer, how can we accommodate the dynamic behaviour of an entity?

Is a GSDP a public good? Should be rephrased to: "What are the smallest number of things that are needed for the public good?" and related to that governments have a role to encourage that small set of services to be developed. These could be addressed by pre-competitive standardization.

Other requirements to a GSDP:

- Security and trust
- Context awareness
- Usability
- Simplicity
- "Comfort"
- Scalability

Every GSDP needs to manage communities of prosumers. It is important to study how users will use and combine services. Field data will play a key role. We need to define better the service lifecycle and how to do service management with monitoring. Not consider only web services, but also storage services, logistic services, TV services etc.

Finally a question was raised if anything needed to be changed to the current architecture of the Internet. Perhaps the only thing was UDDI, that doesn't work and needs to be replaced. It is also important to understand that research on these issues only makes sense if industry in Europe is prepared to support one or more GSDP's.

