

POSITION PAPER

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Use case and scenarios considered to be the most appropriate and representative for large-scale experimentation with the FI platform

The following two scenarios are considered by Infovide-Matrix appropriate for experiments on the large scale:

- pervasive content financial content services,
- travel/mobility assistance.

They are extensively described in the appendix A (Future Internet Scenarios) to this paper.

Apart from these, the following additional scenarios are taken into account by Infovide-Matrix as promising:

- pervasive, exploratory education through Serious Games - this scenario should implement educational services enabling new educational experience, exploring the communication patterns and business models of entertainment services (especially collaborative games) and simulation.
- situation management - this scenario should implement an ecosystem of intelligent services enabling efficient response to a broad spectrum of emergency situations.

Innovative Internet functionality and technologies important for suggested use case and scenario

- context awareness,
- reasoning engines (discovery and analysis of complex events)
- event / data aggregation, transformation, correlation and filtering,
- intelligent, interoperable, autonomous services (agents),
- advanced real time processing capabilities handling huge volume of data,
- ad hoc service composition and mash-up,
- embedded media support for interfaces easing the interpretation of processed contextual data, etc.,
- frontend channel maker (frontend access to content and applications),

Functionalities expected to be delivered by the FI core technology

Context Awareness:

- Open context broker architecture, with generic support for presence awareness, localisation (absolute, relative), complex event processing.

- Event System capable of mapping events provided by various sources in the network to various domain oriented ontologies.
- Safe, universal E-Identity standards encompassing personal “digital trace” (personal sensor data, localisation, transaction records, credit ratings and other sensitive personal information) enabling broad range of privacy policy management.

Intelligent, interoperable, autonomous agents:

- Agent-to-agent (A2A) communication protocols based on context information and shared ontology.
- Intelligent agent reference architecture allowing for the separation of behaviour layers, such as communication, mission execution, mission management, and knowledge management.
- Intelligent agent deployment environment supporting scalability and virtualization.

Ad hoc service composition and mash-up

- Ontology based service discovery and invocation.

Experimentation environment necessary for broad large scale testing of the platform to be developed in your use area.

Future Internet test-bed consisting of:

- Core components of FI infrastructure, such as sensor and related communication protocols, Context Brokers, ontology based Event Management system, ontology based service discovery and invocation protocols.
- Deployment environment for the FI service components being tested.

Potential role of Infovide-Matrix in the FI-PPP

Infovide-Matrix can take the following roles:

- Application Architect – by designing the user experience which should be delivered to the Consumers of services in given Usage Area, as well as the technical component architecture required to deliver such experience, based on an available FI infrastructure.
- Developer/Integrator – by developing applications or selected components for particular usage area,
- Validator – by designing and implementing (in collaboration with the providers of FI infrastructure testbed) a sandbox environment for friendly user testing, and gathering the metrics providing quality feedback of the FI Services.

APPENDIX A

FUTURE INTERNET SCENARIOS

Introduction

E-service business is founded on meaningful, value based interaction between service consumer and service provider. E-Services become pervasive thanks to the growing reach and richness of communication networks. The fact that interaction between service provider and service consumer can potentially be initiated almost anytime, anyplace raises question – what is the right time and right place for a given service to be exposed, made available and – perhaps – be promoted to the user. In other words, how can be the mediation between vast number of service providers and service consumers made context aware.

The context awareness of services should be seen as a means to more productive use of e-services in work and non-work activities by matching service content and user experience with service consumer context dimensions such as time, place, interaction channel, current occupation of the consumer, their emotional status etc.

Few services today – if any – implement rich context awareness, limiting it to few basic dimensions such as device used for interaction. Also there are little – if any – solutions for managing and publishing rich context definition to potential service providers. On the other hand solutions and technologies such as identity management, instant messaging, or computer games provide examples of useful (albeit narrow) application of context awareness.

The „next generation“ electronic services which will emerge in the Future Internet, will be:

- **Pervasive:** delivered anytime, anyplace, over broad spectrum of channels and touchpoints. To achieve this the Future Internet core technology platform should implement intelligent, trusted communication platform integrating channels such as email, voice, instant messaging, social networks etc.
- **Interoperable:** enabling the creation of new customer value by configuration, composition and aggregation of existing services. To achieve this there is a need of methods and standards of user context definition and manipulation, as well as methods and tools for the design and development of context aware services.
- **Adaptive:** optimizing value for the service consumers by adopting to their behavioral and situational characteristics. This can be achieved by adding to the Future Internet core platform context broker module, serving as an intermediary between service providers and consumers. The context broker will be capable of accumulating user insight by analyzing user „digital trace“ of interactions, transactions, sensor data.

- **Lean:** increasing service consumer productivity by providing expected customer value while eliminating any unreasonable user distractions and non-value creating user involvement. This is achievable by using a recommendation system / decision support methods with combination with the SOA pattern.

Scenarios

Let us explore some hypothetical scenarios illustrating our idea. In our examples we will use the idea of “Context Broker” – a hypothetical process that is interactively managing personal context information and serves as an intelligent intermediary between service providers and a service consumer

Pervasive Content Financial Services

Lee, middle aged owner of small but very successful marketing boutique starts his usual working day. Lee has never been much excited about the intricacies of modern finances, or sophisticated banking products. His idea of money is that they just provide means to ends – such as well being and safety for his family and resources for his business. Thus it was quite a surprise when one day he realized that in his midlife he is using products from four financial institutions. One bank handles his mortgage, another provides him and his wife with credit cards, and handles the current account, another one provides debit cards for his teenage kids and student credit for his daughter and another one – the same he uses for business – helps him to invest his assets. At this point Lee has been spending already too much time analyzing his statements, taking care of on-time payments, cash and other financial obligations. To get rid of routine administration of his financial Lee started using a Financial Steward, pervasive service from a trusted provider of integrated financial e-services.

Lee stops at the gas station where he fills up his car – after presenting his Steward card (optionally, Steward can be coded into an id, but Lee prefers a separate card) the payment is handled by the Steward, who will also take care for reimbursing the amount from Lee’s company.

Steward communicates through all kind of channels. While Lee commutes to work, he gets a call from his Steward, who knows from Lee’s Context Broker that at this time, voice communication is the preferred channel. As Lee has purchased an expensive travel package he is now too short on cash to make all the payments planned for this week. Steward offers Lee the most reasonable options – to pay only the minimum payment on credit card (as here the credit is cheaper than the one for overdraft) or defer the payment for utilities (here interests are higher only when the delay is more than 30 days). The third option is to use the money from deposit – here Lee would lose some interests and viability of this option is not so straightforward. Lee wants a more detailed discussion on this topic, so Steward transfers him to a real person – a customer service agent which helps Lee to make a better decision.

During a meeting at work Lee receives 2 instant notifications from the Steward (who knows from Context Broker that Lee’s status does not allow a telephone conversation). Saul, Lee’s teenage son is purchasing a computer game for his mobile terminal. Lee wants to monitor this kind of purchase, for he knows that some games kids recommend to one another are not necessary suitable for teenagers. This time there is no problem, so Lee confirms and Steward completes the transaction with the e-store. The next notification is related to an interesting opportunity at the musical e-shop. There is an

auction of vintage Gretsch semi-hollow guitar from 1968. The rating of the seller shows high credibility, so Lee asks Steward to enter the auction, and use one of the available auction strategies with limit of \$ 3 500. If Lee wins the auction, the Steward will organize a safe escrow payment.

Later in the evening Lee receives via email a routine, consolidated report about all the assets, and near term financial plan – expected family income and obligations for the following 4 weeks. This is an interactive document which allows Lee to approve actions which will then be handled by the Steward. Lee approves the payments for current week – including the unbelievable \$2910 (only) for the Gretsch, and departs with his wife to celebrate wedding anniversary in the local restaurant. All the payments for the special evening, including flowers and a small romantic gift are handled by the Steward. Except for the tip.

Travel / Mobility Assistance

Kara, a young professional woman departs for a business trip. Context broker receives notification from the enterprise HR system, and associates it with the event of air ticket purchase and pending hotel reservation. It notifies Kara through her mobile terminal that at a convenient time she could make some decisions concerning the details of her trip. As Kara is very busy she declines the offer so context broker goes for her default setup related to seating, hotel chain and room preferences, and checks Kara in. Later Kara accepts context broker offer to switch on the Travel Assistance mode, and confirms to the broker that indeed she has never been in the city she is travelling to. She reviews and updates her business itinerary for the week and sets up her interest for the weekend as sightseeing, light meals, casual shopping, theatre.

The Context Broker negotiates car rental deals with local agencies, providing them with Kara's information related to vehicle preferences, discount plans and corporate insurance / mileage policies. At the arrival Kara gets the updated list of deals and accepts one of them. Meanwhile context broker is interrogated by Kara's social networking services where some friends of her posted new comments and videos, and the office has offered an update related to meetings Kara is going to attend. As in Kara's setup business related issues take priority over her personal stuff, context broker notifies Kara that a business briefing is available on her notebook, while declining the social notifications. These get reviewed later, during lunchtime for which context broker has reviewed the offers of restaurants offering light meals close to Kara's location. The menu is provided to Kara through voice service on her way to the restaurant.

While Kara is executing her business itinerary the broker is collecting opportunities for weekend according to Kara's initial preferences. Each evening the list is available to Kara for review which is used by the broker to refine the service search and negotiation rules. List includes shopping deals from favorite stores, tickets for local gallery of modern art, movie and theatre shows on Saturday evening, places of interests and specials from local restaurants including Indian cuisine which Kara is very fond of. While Kara walks the gallery on Saturday morning she gets interrupted by an instant notification. Two of her college friends happen to be in the same city and offer an evening in fancy local club. She gladly accepts the meeting and the offer for "all inclusive" ticket from the club, so the broker releases the theatre reservation which has been previously made for evening. At Kara's request broker asks Kara's social networking service to prepare a package of photos and films related to the friends Kara is going to meet tonight. Kara spends wonderful hour reviewing them before she departs for the club in the taxi ordered by her context broker. The week will end very, very well.