

Integrated End-to-end Logistics, Supply-Chain & Freight Transport Management System

Position Paper for FI-PPP Second Usage Area Workshop

We have already provided 3 other short position paper as ICT company except this one. This use case is going to address our own problems in logistics, supply-chain and freight transport management systems.

- (1) **What use case and scenario in your area would you consider the most appropriate and representative one for large-scale experimentation with the Future Internet platform to be built starting from 2013 (please refer to the documents referred to on the above websites for inspiration)?**

Arçelik is the consumer durables, consumer electronics and information technologies equipments design and manufacturing company and it is the 3rd biggest household appliances manufacturer in Europe. Arçelik has 10 production plants in Romania, Russia, Turkey and China and it has produced over 11 Million units of household appliances and consumer electronics products in these factories in 2009. Please see Figure 1 below. Arçelik is serving its customers with 12 sales and marketing companies worldwide in more than 100 countries. Thus, logistics plays a vital role in the day-to-day business of Arçelik for incoming components used in the production and outgoing products delivered to the customers. The demands on services are continuously increasing since customers; e.g. outside customers and own production facilities; want to be dealt faster and more flexibly. Thus, Arçelik is using all available transport system; e.g. multimodal; to deliver its products to this wide geographical area and to get components for its production facilities, using many partners in the chain to have an efficient, cost and CO₂ saving logistics management system (LMS) which is connected to warehouse management and production monitoring and control systems.



Figure-1 Arçelik's Global Network

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Arçelik's LMS includes many components covering off the shelf ERP package, some in-house, some 3rd party developed tools and packages. But, the present solutions are proprietary and there is no standard open solution covering the whole chain. Thus, any change or addition of one partner or component in the chain requires adaptation of the existing system or introducing of new interfaces due interoperability issues. Yet, there are time-slots in delivery chain in which products disappear and go into black-holes and there is no real-time information about the location and the status of the products that is sometimes necessary for dynamic re-routing due new incoming orders from different destinations. It is necessary to have interoperable open platforms, tools and devices covering the whole chain from production to shop floors for effective solutions which enable Arçelik to trace its products and transport in real-time for logistics management systems under current business conditions.

Thus, we consider the Logistics & Freight Transport use case(1) (2) and scenario addressing issues such as connection between "track & trace" of goods and their transport, real-time optimisation and rationalisation (cost & CO₂ savings); protection against counterfeiting and illicit trading; and intelligent fleet monitoring & management as the most appropriate and representative case to build up a large-scale experimentation with Future Internet platform.

- (2) **What innovative Internet functionality and technologies would you consider important for your suggested use case and scenario (e.g. context awareness, sensor networks, advanced real time processing capabilities handling huge volume of data, ad hoc service composition and mash-up, managed broadband connectivity and services, embedded media support for interfaces easing the interpretation of processed contextual data, etc.)?**

The use case described above is a highly distributed environment, multi-layer information technology infrastructure combining ubiquitous computing and networking connectivity technologies with embedded systems, sensors, markers and actuators attached to objects of the physical world. The main function of this system is to collect and provide data in real-time or near real-time about connected objects for the deployed applications.

Thus, different wireless communication means; e.g. GSM, WiFi, Bluetooth, ZigBee, sensor networks, GPS support, miniature sensors actuators, active and passive RFID tags, context awareness, real time delivery of data will be important in this use case. Some of the components will be either embedded to the objects or attached to the objects as labels to provide information about the object's identity and the rest of the platform components will be the surrounding system. This surrounding platform will provide real-time information about the objects to the customers whenever available or requested. It may be possible to develop new services and applications based on future business requirements after having such an open and interoperable platform.

- (3) **Which of the identified functionalities would you expect the Future Internet core technology platform to deliver to support your and other usage area scenarios?**

The physical objects will provide a set of functionalities as information storage, collection and processing with some communications capabilities. But, direct communication and data exchange between endpoints is not possible due current heterogeneity of endpoint technologies. Thus, one of the functionalities of the FI core technology platform is to provide a bridge between these endpoints for seamless connectivity. This requires a connection layer and it should support the exchange of messages between the relevant set of connected endpoints and the given application. So, function invocations, calls for services, answers for calls, or information messages in different frames have to be delivered back and forth between the endpoints and the application systems. There is no available standard for endpoint identification globally and thus the connection layer should keep a list of endpoints and should have an address mapping accordingly.

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In this use case the physical objects will change their location, owner and face different environmental and regulatory conditions during their lifespan. This will require changes, modifications or extensions of their own database/software information. Thus, it is necessary to have device management functionality which provides info about the present situation of the item.

As a result it is necessary to have device, connectivity and information management layers which will cover some or most of the following enablers⁽¹⁾

- Service-Device mapping,
- Device monitoring,
- Device versioning,
- Semantic analysis,
- Information discovery,
- Message routing,
- Cross-platform communication,
- Device to user communication
- Event / Data aggregation, transformation, correlation and Filtering
- Data classification
- Entities Naming Resolution (applicable to services, things, devices, nodes, resources, ...)
- Service Repository
- Application Communication Infrastructure
- Localization
- Context Management
- Identity and Access Management
- Confidentiality and data sharing
- User privacy management
- Dynamic adaptability of services / content
- Device Description Repository
- Generic rating, charging, billing
- Applications/Service marketplace
- Provision of shared Infrastructure (communication, computing, storage) as a Service
- Provision of Platform as a Service
- Lifecycle Management Support
- Usage accounting
- Real-time logging
- Tele-traffic analysis/servers
- Permanent and Non-permanent Connectivity Support

(4) What kind of experimentation environment would you consider necessary for broad large scale testing of the platform to be developed in your use area? What would be needed to experiment new services and applications cutting across use areas (services and application mash-up) and building a new services and application ecosystem around the prototype implementations of the platform?

We think that we need a very broad large scale testing environment which covers possibly the whole Europe. We can follow incremental testing for the system to be used and start with single organizations delivering or getting items within one country or one geographical area. After completing this step with multiple partners we can extend experimentation environment to cross-border areas and cover the whole Europe to test Logistics & Freight Transport use case scenarios.

It is necessary to include all the stakeholders in the supply-chain, logistics and production management systems including customers; participating in the experimentation environment to have an open, standardized and interoperable solution to be deployed worldwide.

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- (5) How do you see the potential role of your organisation in the FI-PPP, in the context of Usage areas taking a prominent role in the Initiative, to ensure an appropriate application driven approach?**

Arcelik is already working on with its partners, suppliers and service providers in national and international projects to optimize and rationalize the delivery of its products and getting necessary components for its production system. Thus, Arcelik has a broad range of expertise as well as many in-house developed and deployed proprietary solutions in Logistics, Supply-Chain and Production Management Systems.

Arçelik can play an important role in development and testing of these solutions. Arçelik can take part in this action either providing its existing proprietary solutions to the initiative to make an open solution or provide its know-how and development expertise in these areas to create open solutions. These ideas should be refined in discussion with all stakeholders.

Arçelik is operating 10 factories in 4 countries; has many regional and local warehouses and has about 4000 exclusive dealers in Turkey. It is extending exclusive dealers concept in the developing markets abroad, especially in the Eastern Europe, the Baltic countries and CIS. It has about 600 after-sale services in Turkey as well. Arçelik, with its wide network of dealers can play an important role in the broad large scale testing of the platform and tools to be developed in this initiative including the other stakeholders in the chain; e.g. multi-national logistics service providers, forwarders and suppliers.

References

- (1)** White paper on the Future Internet PPP Definition, EFII, The European Future Internet Initiative, January 2010
- (2)** Towards a Future Internet Public Private Partnership: Usage Areas Workshop, Final Report, Brussels, 3rd March 2010

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Short company profile

Arçelik is the consumer durables, consumer electronics and information technologies equipments design and manufacturing company of Koç Holding. Arçelik was founded in 1955 and it is the sixth largest household appliances manufacturer in the world and the third largest one in Europe. Arçelik has 10 production plants in Romania, Russia, China and Turkey and has 12 sales and marketing companies worldwide. Arçelik is serving its customers in more than 100 countries with its 10 different brands; Arçelik, Beko, Grundig, Blomberg, Elektra Bregenz, Arctic, Altus, Leisure, Flavel and Arstil, and has realized a consolidated turnover of EUR 3.5 billion in 2009 and produced over 11 Million units of products including white and brown goods.

Arçelik believes that sustainable achievement is not possible without investment in R&D. In keeping with this principle, it is investing in R&D and it has 7 R&D centres with over 650 personnel and fully equipped test laboratories; for consumer electronics, consumer durables and IT products, and Arçelik is Turkey's leading producer of technology and patents. Arçelik owns the 13% of the patents produced in Turkey over the last three years and it is the only Turkish company in the World Intellectual Property Organization's listing of the top- 500 patent applicants, where it took the 10th place in 2007. Arçelik collaborates with local and international universities, suppliers, research organizations and research institutes in carrying out its R&D activities and is actively participating in EUREKA Clusters and EU Framework Programmes since 1993.

Arçelik's product range covers full range of household appliances and consumer electronics products including Standard and High Definition, Digital and Analogue TVs, Personal Video Recorders, Personal Media Players, Set-Top-Boxes, PCs, Laptops, Audio Sets, Home Theatre Systems, Refrigerators, Freezers, Cookers, Dishwashers, Wash machines, Dryers, Heaters, Air conditioners, Electronic Cash and Cash Pump Registers.

Arçelik R&D centres have expertise on its own products as well as on the engineering disciplines that are related to product design functions, production and delivery systems as Supply-Chain, Production Management and Logistics Systems. Some of these areas are Audio, Video and TV signal processing, Embedded Systems Design (HW, SW and Middleware) implementation, testing, integration and manufacturing in Consumer Electronics, Electronic Media, Networking and ICT domains. These expertise areas can be extended to thermodynamics, fluid mechanics, vibration and acoustics, materials, electronic control and computer aided engineering in consumer durables domain.

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