ICE – Integrated Computing Environment - a self-organizing infrastructure for a flexible service management within supply chains

Optimal information processing is the key to optimize supply chains. Dense service networks can make the supply processes much more flexible but also increase the need for timely information processing. The ICE platform (Integrated Computing Environment) is a new, decentralized organized infrastructure that supports the information needs for suppliers as well as for customers. In addition, ICE should increase competition among different companies by enabling system wide searching and access to services without a high overhead.

Employees need IT infrastructure and application support to perform effectively; and key business processes must be automated and optimized within and across enterprises, in order to create sustainable competitive advantage [1]. Logistics network design can secure savings of up to 30% on supply chain management costs.

ICE provides an infrastructure allowing participants of a supply chain to bring together their business processes on IT level. (Figure 1) The concept of EAI (Enterprise Application Integration) makes it possible for the participants to keep their own software-solutions and let them communicate with the proprietary software of other participants of a certain supply chain. Sellers and distribution centres can offer their products and warehouse resources transparently by advertising them through ICE. Customers, like shop owners, can search for products and compare them to offers of other sellers.

Using the information of RFID Tag-labeled goods enables ICE to provide contemporary information about the availability of products and warehouse capabilities. Customers can track their orders and therefore get information about the state of an order.

ICE is developed to provide a system- and network independent, application-integrating, fault-tolerant and internet-wide accessible, service orientated integration platform. This can be achieved by using a 3-layer architecture, shown in figure 2. The middleware-layer implements a p2p-based network layer as an abstraction from the underlying communication network. The service-layer utilizes this middleware-layer to provide service-orientated access to resources. It uses SOA-concepts and therefore provides network-, location- and software-independent access to services and resources. The third layer, the application-layer, uses EAI concepts to pass information from the proprietary software to the service-layer and vice versa.