SWWS

The Semantic Web Enabled Web Services **(SWWS)** project is a project from Framework V of the European Commission. It aims to connect computers and devices with each other using the Internet to exchange data and combine data in new ways. Web Services can be defined as software objects that can be assembled over the Internet using standard protocols to perform functions or execute business processes. The key to Web Services is on-the-fly software creation through the use of loosely coupled, reusable software components. This has fundamental implications in both technical and business terms. Software can be delivered and paid for as fluid streams of services as opposed to packaged products. It is possible to achieve **automatic, ad hoc interoperability** between systems to accomplish business tasks. Business services can be completely decentralized and distributed over the Internet and accessed by a wide variety of communications devices. Businesses can be released from the burden of complex, slow and expensive software integration and focus instead on the value of their offerings and mission critical tasks. Then the Internet will become a global common platform where organizations and individuals communicate among each other to carry out various commercial activities and to provide **value-added services**. There are important steps to take to bring web services and fully enabled E-commerce to reality. Anybody must be able to trade and negotiate with everybody else. However, such an open and flexible E-commerce has to deal with many obstacles before it becomes reality:

- Current web service technology around UDDI, WSDL, and SOAP does not yet provide a mature technology. Elements need to be added around document structures, semantics of data, business logics, message exchange sequences, and formalization. Combining Ontology technology with workflow approaches is required to enrich web service technology enabling their use in mission-critical applications. A comprehensive **Web Service Modeling Framework (WSMF)** has to be developed.
- Mechanized support is needed in **discovering services** and their offer is required. Currently, nearly all of this work is done manually which seriously hampers the scalability of electronic commerce. A Web Service discovery framework that goes beyond simple key-word-based registration means providing full-fledged Semantic Web-driven service discovery has to be defined based on approaches such as XML, XML Schema, RDF(S), DAML+OIL, and OWL.
- Means for **scalable mediation between different and heterogeneous services** fundamentally based on the P2P approach in order to provide direct connectivity between service requestors and service providers have to be developed. The mediation framework will substantially rely on the **semantics-driven descriptions of data and business logics**. This framework will also include means for configuration, composition and negotiation of Web Services.

Bringing Web Service for E-commerce to its full potential requires a **Peer-to-Peer (P2P)** approach combined with **Semantic Web** technology. The project tackles with the three bottlenecks in E-commerce introduced above. Therefore, the project will develop a methodological framework and tools that enable fully flexible E-commerce.

WSMF

The Web Service Modeling Framework (WSMF) is an european initiative to provide a fully-fledged modeling framework for describing various aspects related to web services. It is being designed as part of Semantic Web enabled Web Services (SWWS) project, an Information Society Techonologies (IST) - European Union funded project.

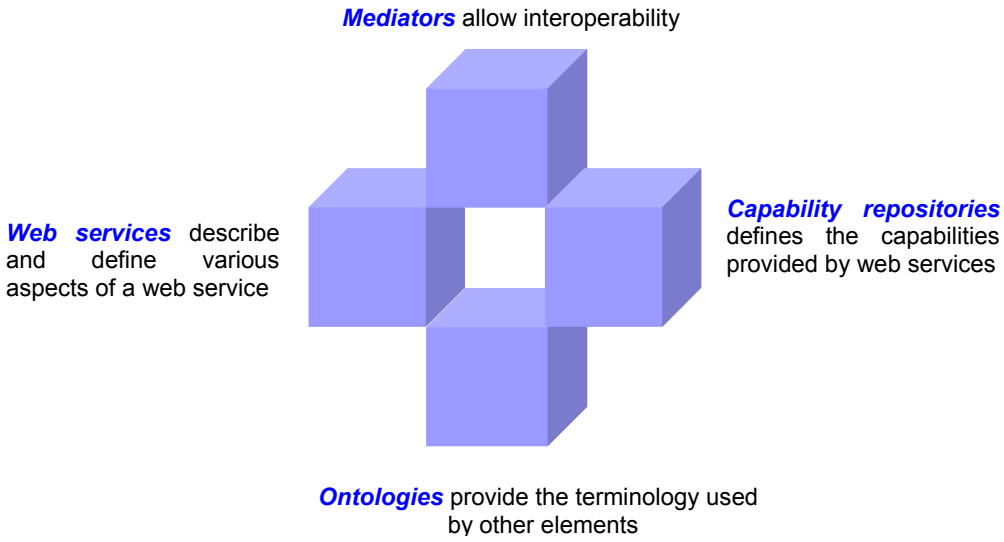
WSMF aims to provide a comprehensive framework to achieve automatic web service discovery, selection, mediation and composition into complex services, that is, to make semantic web services a reality and to exploit their capabilities.

WSMF two complementary principles:

- *Strong de-coupling* of the various components that realize an e-commerce application. This de-coupling includes information hiding based on the difference of internal business intelligence and public message exchange protocol interface descriptions. Coupling of processes is achieved via interfaces to keep the amount of interactions scalable.
- *Strong mediation* service enabling anybody to speak with everybody in a scalable manner. This mediation service includes the mediation of different terminologies as well as the mediation of different interaction styles.

WSMF elements

WSMF consists of four different main elements: ontologies that provide the terminology used by other elements, capabilities repositories which define the problems that should be solved by web services; web services descriptions that define various aspects of a web service; and mediators which bypass interoperability problems,



BPEL4WS

BPEL4WS (Business Process Execution Language for Web Services) provides a language for the formal specification of business processes and business interaction protocols. It was released by IBM, Microsoft and BEA. Business processes can be described in two ways.
Firstly**, Executable business processes** model actual behavior of a participant in a business interaction. On the other hand, business protocols, in contrast, use process descriptions that specify the mutually visible message exchange behavior of each of the parties involved in the protocol, without revealing their internal behavior. The process descriptions for business protocols are called **abstract processes.**