

TRIPCOM: project description and case study

The mission of TripCom is to take a significant move towards a new era of the Internet. The Internet was invented in the 1960's and provides a highly decentralized and scalable architecture for enabling large networks of computers beyond the boundaries of other communication protocols. The first major evolution step appeared around 20 years later with the wide-spread usage of email. Email changes the communication processes of humans significantly by providing instant communication over any geographical distances in an asynchronous fashion based on the message-exchange paradigm.

The second major evolution step appeared another 10 years later with the wide-spread usage of the World Wide Web. The Web changes communication processes of humans significantly by providing instant publication over any geographical distances in an asynchronous fashion. It is based on broadcasting via **persistent publication** of information. The two major asynchronous styles of human communication (directed communication via mail and undirected communication via publication) have been significantly improved through email and Web.

The next step for the Internet is likely to be the direct integration of applications and computers via Web service technology. This network no longer directly interlinks humans but interlinks applications and programs to provide integrated services to the human end-user. However, current Web service technology has only very little to do with the Web. It is based on the message exchange paradigm similar to email communication. Truly Web-enabled Web services will communicate via **persistent publication** of information.

Realizing this vision and a new technology is the mission of TripCom with the result of the integrating Tuple Space, Semantic Web (triple), and Web service technologies. To this end, we on the one hand plan to improve Tuple Space technology by adding semantics and means to structure and relate tuples in a scalable and linkable Triple Space architecture. On the other hand we plan to improve Web service technologies by adopting the flexible and powerful asynchronous communication model of Tuple Spaces. Furthermore we plan to improve business data exchange standards by use of our new technology and demonstrate the usefulness of this approach in several practical use cases. Finally, we plan to establish a proper security and trust model for the Triple Space to ensure safe communication and data handling, as well as distributed trust models. As the result of the project the combination of these building blocks could give ground to a novel Semantic Web service paradigm. Like the Web changed the networking of humans from email exchange to persistent publication, our plan is to revolutionize the networking of machines.

The project can be considered complementary to other projects in the Semantic Web service area like SWWS, dip, and KnowledgeWeb. It shares with these projects the approach to add machine-readable descriptions to data and processes. It complements them because it adds a new communication channel to existing efforts that is not covered

by current Web service technology. The alignment with these projects will ensure broad dissemination and usage of the results of TripCom.

There are two use case studies: on sharing health data among healthcare organizations and which is an EAI Prototype Application.

The healthcare organizational structure in all countries is naturally distributed, so the patient's health information is normally spread out over a number of different institutes. This makes it very difficult for clinicians to capture a complete clinical history of a patient. As a result tens of thousands of people die each year due to lack of information. An open challenge in eHealth is factually sharing health data among healthcare organizations providing the healthcare professionals with a complete array of patient information. HL7 CDA, GOM, ENV 13606 represents the state of the art in addressing this problem, leveraging a message-based communication paradigm. They can be used for a wide range of solutions that goes from building centralize patient records to completely decentralize solutions that exchange messages only when information is needed. All these solutions have several limitations that a semantic-aware Tuple Space as TripCom may overcome.

This work aims at evaluating the capacity of a semantic-aware shared memory paradigm to address the problem of providing a wide, trustable and confidential access to patient information distributed in a large number of heterogeneous records making effective usage of the TripCom paradigm.

Description of work

T8B.1 eHealth Requirements Analysis and State of the Art

T8B.2 Determination of indicators for performance, security, quality and impact analysis

T8B.3 Prototype of a TripCom application towards the eHealth scenario

T8B.4 Feedback report to architecture work package

T8B.5 Development of a “Best Practice Guide” for the development eHealth solutions

T8B.6 Evaluation and application of the Prototype in Use Case Scenarios

T8B.7 Prototype implementation refinement

Deliverables

D8B.1 State of the art and requirements analysis for sharing health data in the Triple Space

D8B.2 Prototype of TripCom application for sharing health data among healthcare organizations.

D8B.3 Assessment of the developed solution with regards to the detected indicators.

Milestones and expected result

M12 eHealth use case requirement analysis and evaluation indicator definition

M24 eHealth Prototype

M30 Evaluation and application of prototype for use case scenarios

M36 EAI Best Practice Guide, Validation and Recommendation