Developed a group communication protocol stack in SDL, the Specification and Definition Language

This research specified and developed a group communication protocol stack in SDL, the Specification and Definition Language.

Group communication provides primitives to communicate with a group of processes. These primitives implement higher-level abstractions that facilitate the development of complex, fault-tolerant applications. As an example, database replication can be built using group communication primitives.

Group communication is an instrumental building block for the development of replicated fault-tolerant applications. The implementation is based on the REMUNE platform and uses the subset of SDL defined in the context of REMUNE. The group communication protocol stack provides reliable and totally ordered message delivery to all the participants in a particular group. It consists of a layered structure that composes multiple micro-protocols that together provide this quality of service in message delivery. To achieve high modularity, each layer n should rely only on layers n-1 or lower (lower neighboring layers) to provide the services it needs. Its services should only be used by layer n+1 or higher (upper neighboring layers). The protocol is event driven. Events map directly onto the signals defined in SDL. Whenever an event or message is received by one of the blocks, an event is triggered and a handler will take some appropriate action.

The project consisted of thirteen partners from the European Union, Switzerland, and the United States.