



GENIE - AN AGENT ARCHITECTURE FOR UBIQUITOUS
SERVANTS

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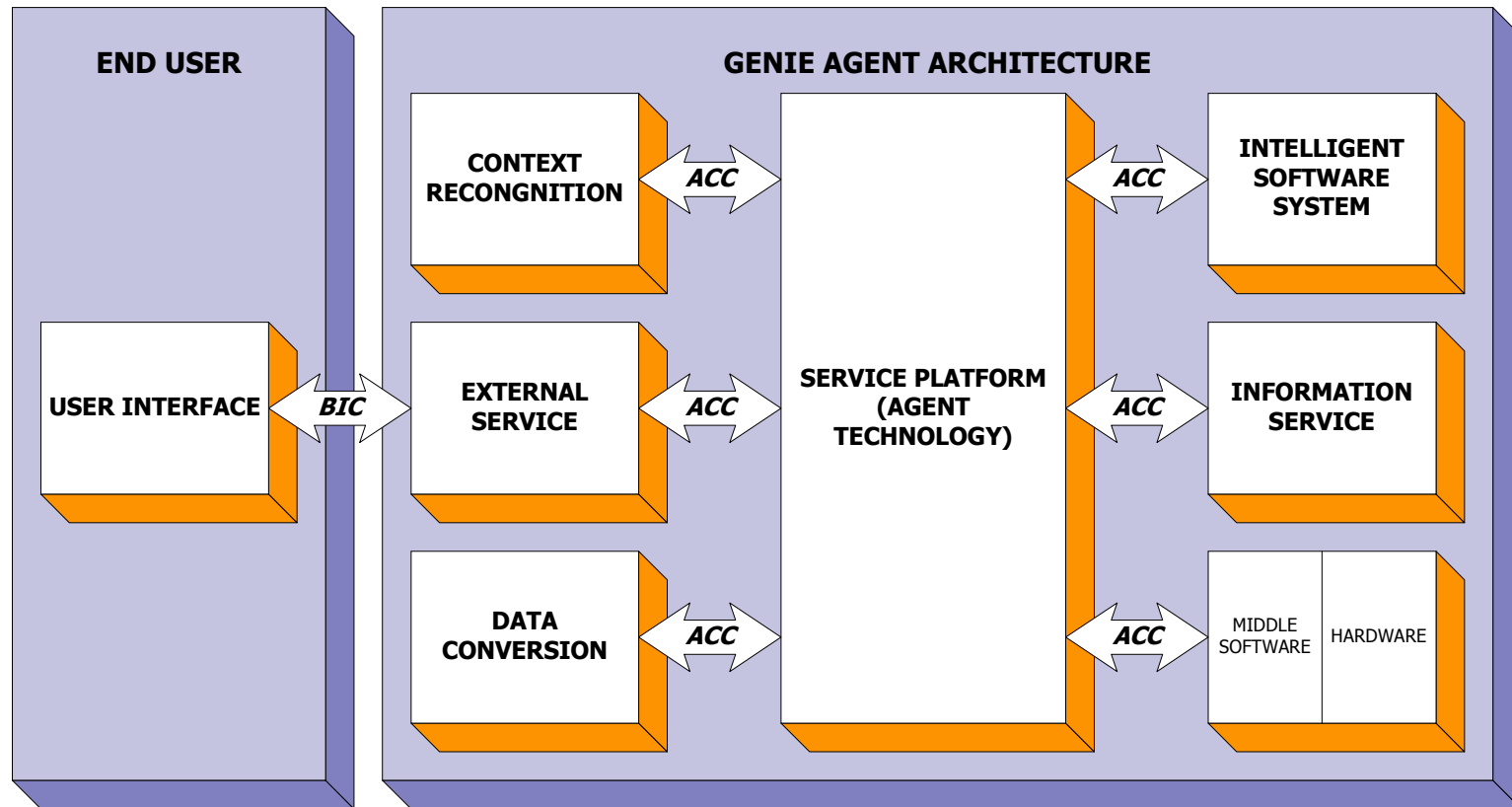


GENIE - AN AGENT ARCHITECTURE FOR UBIQUITOUS SERVANTS

- The Genie Architecture consists of autonomous and decentralized software modules:
 - Agent Platform (kernel)
 - Intelligent Software System
 - Identification System
 - Information Service
 - External Service
 - Web-based Graphical User Interface
- The number and type of modules can be customized on the basis of the current needs.
- Modules use agent communication language (FIPA ACL) and agent ontology on the base of their collaboration.

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ACC = Agent Communication Channel
BIC = Bidirectional Communication Channel

GENIE AGENT PLATFORM

- Controls the agent communication and data switching.
- Communication between agents is handled by RMI method (Remote Method Invocation), HTTP protocol and FIPA ACL agent communication language.

INTELLIGENT SOFTWARE SYSTEM

- Brings the problem solving capabilities into the agent architecture.
- The co-operation between the JESS Rule Engine (Java Expert System Shell) and an intelligent agent enables the wide variety of demanding tasks to be executed.

IDENTIFICATION SYSTEM (part of the external service)

- Identifies the user and ensures the safety of the network, only persons allocated to the system are able to use the system.
- Web-based module identifies the user with the web-based user interface by username+ password or fingerprint security system.

INFORMATION SERVICE

- Performs the transactions between the database and the Genie or directly with another agent.
- Decentralizes the information between the database instances; Knowledge, Ontology and Personal database.

EXTERNAL SERVICE

- Creates a standard, protected connection between the internal system of Genie and the outside world (Gateway to external services).
- Consists of web server and application server.

WEB-BASED GRAPHICAL USER INTERFACE

- Transmits the the information from the system to the user and vice versa.
- Access to the system is possible via web browser, independent of the used device (PC, mobile phone, PDA).

CONTEXT RECOGNITION

- A gateway for interchange and reporting of context information.
- Can utilize the commercial software and tools or results of the research projects (Smart-Its).
- Will be implemented later.

DATA CONVERSION

- Handles the information stream coming from the sensors and actuators.
- Parses the FIPA ACL - and XML-messages into the suitable form for the agents.

MIDDLE SOFTWARE / HARDWARE

- An autonomous broker software between the actuators/sensors and agent platform.

GENIE - FUTURE DEVELOPMENTS (APRICOT & PEACH projects)

- AN INTELLIGENT PERSONALIZATION SYSTEM
 - Neural nets (SOM)
 - Personal Agents give highly personalized relevant information (in right time, right place)
- Constructing an ADK (Agent Development Kit) toolkit for the Genie- architecture (APRICOT project)

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FUTURE DEVELOPMENTS...PEACH -PROJECT

- INTEGRATION OF THE GENIE PLATFORM TO A MULTICHANNEL SERVICE PLATFORM
 - the portal platform is provided by the Finnish operator DNA
 - 3G network channels , MMS messages (send/receive)
- DEVELOPMENT OF A LANGUAGE FOR CONTENT AND ONTOLOGY DEVELOPMENT
 - integration to the Genie platform (RDF, DAML/OIL...)

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APRICOT - Agent Platform for Applications Serving Mobile Users

- Research partners: VTT Electronics, University of Oulu
- Supporting companies - Nokia Mobile Phones, PPO (local telecom operator), Esmo Oy, Neurotuotanto Oy
- Duration 1/2002 - 12/2003
- Based on the Genie Agent Architecture

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APRICOT Vision

- The vision is to develop a comprehensive service platform based on the agent technology. The service platform is a development kit for building intelligent applications for internet and mobile services.
- The Apricot service platform personifies the user and internet services by using neural networks. Based on this information the Apricot will collect only the needed services and information for the user.

APRICOT Objectives

- to further develop The Genie Agent Architecture by increasing the intelligence of the platform and constructing a comprehensive agent development toolkit (agent frame and ontology tools)
- to develop an application-wide ontology for the basis of the agent communication
- to explore dynamic agent ontologies
- to develop methods to personify the service user (neural networks)
- to investigate context recognition methods location-based services

FURTHER INFORMATION

- Available at the <http://www.iie.fi/genie/>
<http://www.iie.fi/apricot/>
- Journal article in Computer Communications, special issue in Ubiquitous Computing, “Genie of the Net, an Agent Platform for Managing Services on Behalf of the User” to be published in the Fall 2002
- Agentcities testing at
<http://www.agentcities.net/globalapd.jsp>
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