Technology Overview

Mastering the complexity of large-scale distributed applications with decentralized smart agents.

ScalAgent Distributed Technologies enables enterprises to face the challenge of implementing complex large-scale distributed services and applications, with a high level of flexibility, manageability and evolution. The ScalAgent Distributed Technologies component framework and tools help integrators in the design, configuration and deployment of added-value services to be integrated with business applications. The technology is 100% Java and is available on a wide range of equipments (from servers to Internet appliances).

Evolution of distributed applications and services

The growing use of networking technologies and embedded mobile systems has led to the emergence of complex distributed applications that require next generation technologies to be fully usable and manageable. The deployment and operating of Internet applications remains difficult and expensive for multiple reasons such as the overall complexity inherent in distributed heterogeneous environments, user mobility, integration of legacy software, scalability issues, etc.

ScalAgent Distributed Technologies provides the technical foundations for helping integrators and end-users in building, deploying and managing distributed applications. The primary target applications are those which are built by assembling distributed software components that are related to each other by tightly coupled functional relationships within a loosely-coupled physical context (wide-area networks with variable QoS, intermittent connection due to transient failures or disconnected mode for mobile users).

Design Principles for Distributed Adaptable Applications

The **ScalAgent Distributed Technologies** infrastructure combines three advanced features which together provide an efficient and reliable way of building large-scale distributed systems.

- *ADL – Architecture Description Language.* Applications are specified as a set of interacting software components. ADL allow components, their interfaces and properties to be specified, as well as typed connections between them. This overall description is used during the whole application life-cycle to provide a complete and consistent view of what is the distributed application. It is thus possible to exploit this formal representation to pilot the deployment process, to monitor the application components and, later on, to reconfigure the application in order to adapt it to evolving user requirements or to changes of the run-time environment.

- *Asynchronous messaging system* to implement communication channels between distributed application components. It is recognized today that message-oriented middleware are better suited to face the challenges of reliability and scalability.

- *Distributed programming model* based on a combination of agent-based and object-oriented paradigms for the construction of application components. This approach differs strongly from existing products in the area of software buses where APIs usually are software libraries.

Technical Components

Middleware

The ScalAgent Distributed Technologies MOM (Message-Oriented Middleware) provides an asynchronous messaging service that guarantees message delivery and causal ordering of messages. This MOM can be used in two ways. One is compliant to the JMS™ standard (*Java Messaging Service*). A more sophisticated API, based on the agent paradigm, is also provided to application designers (see below). The MOM is 100% java, so that it can run on a wide spectrum of stations and servers including embedded appliances. Lightweight versions, dedicated to the smart card and to Internet appliances are under way. The MOM and its JMS™ API are available today as an open-source package (called *JORAM*) on the ObjectWeb site (**http://www.objectweb.org/**).

Programming model

The MOM can be favorably compared to other Java-based message buses available on the market. In addition, the use of an object-oriented agent-based programming model is a key advantage as it allows a modular and reliable way of building distributed applications on top of a MOM. Agents are distributed Java objects that conform to an atomic execution model and that use the underlying MOM to achieve a reliable event/reaction communication model.

Development and administration tools

A comprehensive set of tools use the ADL approach. They greatly assist the user in the configuration, deployment, monitoring and reconfiguration of the application. Tools are used through a friendly graphical user interface and rely on a set of administration services provided as an extension of the MOM. The tools currently available include:

- *ScalAgent Distributed Technologies Builder*, a component description tool to specify the application architecture: basic components (agents and/or legacy software components), and the composition and cooperation rules between components.

- *ScalAgent Distributed Technologies Designer,* a component assembling tool to define and customize a particular instance of an application.

- *ScalAgent Distributed Technologies Deployer,* an application deployment tool to install the actual components on their target environment and to set up the links between them. At the end of the deployment stage, the application is ready for execution.

- *Monitoring* : additional tools for the run-time monitoring of the application components and for the control of reconfiguration operations are under way.

ScalAgent Distributed Technologies Solutions

Deliver immediate benefits to your Enterprise Applications

ScalAgent Distributed Technologies solutions enable the deployment, management and dynamic reconfiguration of highly distributed applications. Thanks to the promising assembling technology, distributed applications can be described as a single unified system. Our unique tools provide a visual architecture definition and configuration environment. This synthetic vision enables both application developers and administrators to capture complex distributed services. The runtime framework transparently supports distribution heterogeneity and deployment.

- **Short time-to-market**

- **Reduced exploitation costs**

- **High level of scalability**

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