Chapter II

Applications of Agent-Based Technologies in Smart Organizations

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Abstract

This chapter introduces agent technology as a means of creating dynamic software systems for the changing needs of smart organizations. The notion of agency is introduced, and individual and collective agent architectures are described. Agent interaction methods and agent system design techniques are discussed. Application areas of agent technology are overviewed. The chapter argues that the autonomous and proactive nature of agent systems make them suitable as the new information infrastructure for the networked components of dynamically changing smart organizations.

Introduction

Nowadays the whole world is networked into the Internet and if an organization is not connected to the Internet, then it has serious competitive drawbacks. Private persons are using the Internet more and more as well, so organizations keep contact with their clients through e-mail and give them information on their products and services on information portals. Customers can do the shopping in electronic shops and get all the information they want from the portal server; they can even configure the product they want to order. In order to satisfy individual needs, smart organizations must feed online information from the Internet into their internal information system and then further to their internal production control, accounting, design, resource planning, and several other components. The organization can adapt to these requirements only if it requires the same type of information management from its suppliers, so the interorganizational communication must become part of this networked environment as well.

In this environment, we can less and less talk about individual software products, because software components are interconnected and sooner or later almost every software component must be capable to interoperate with other software systems. This way, the information system of smart organizations becomes part of the worldwide Internet, so individual solutions cannot be applied. The software technology of smart organizations means less and less the design and implementation of individual software systems; rather, we can talk about the development of the design and implementation of a single distributed worldwide information system. In this context, the designers of subsystems cannot apply individual solutions, they have to adapt to global practice and standards. At the time of the design of such a global information system, the designer does not have enough information and resources to make a complete solution, so the designed system must integrate into the worldwide system with the ability to adapt to unforeseen changes and requirements using incomplete information at run-time.

Satisfying these requirements is among the goals of several technologies, including the Web services technology characterized by SOAP[1], WSDL[2], UDDI[3] abbreviations (Web Services, 2004; UDDI, 2004), the semantic Web technology (Berners-Lee, Hendler, & Lassila, 2001), the grid (Foster & Kesselman, 1999) and maybe the most complete approach, which is agent-based computing (Wooldridge, 2002).

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