Chapter 18

Web-Based Cooperative Information Systems Modeling

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This chapter presents a modeling for the Web-Based Cooperative Information Systems (WBCISs). This modeling considers the WBCISs as support of the unavoidable interactions among multiple existing heterogeneous subsystems of the information system and external information sources that share business objects and processes. The WBCIS is considered as an artifact that firstly and mainly allow information exchange, coordination and cooperation among these sources; and secondly data restructuring and processes reuse or reengineering. The main concepts are Knowledge Sources and Interaction Component. A knowledge source represents a subsystem of the information system (Personal IS, Workgroup IS, or Enterprise IS); or any external information source. The modeling considers the knowledge source as a UML package that presents an interface definition (business objects schema and processes). An interactions component is a kind of Web-based broker of business objects and processes. It is a support for communication services and user-oriented semantic services of the knowledge sources. It is based on the Web so that it deals with semi-structured data and accesses any knowledge source (willing to interact) having its URL. It uses a metadata that describes the knowledge sources as UML package. The modeling specializes interactions components according to the interaction situations of the knowledge source namely interactions for coordination that deal with the consistency of the
shared business objects, interactions for cooperation related to the coupled processes’ activities or interactions for transmission that deal with informal and unstructured information exchanges. A Coordination Component allows knowledge source location, access, integration, global view and restructuring of the business objects. A Cooperation Component allows process’ activities invocation, reuse or reengineering activities. This methodologic specialization allows easier implementation and reuse of the interaction components. An interaction component is modeled as a UML package.

INTRODUCTION

Work Organization and Information Technology are increasing more and more the heterogeneity of the components of the enterprise information system (IS), that is the enterprise IS is not central and unique. It is rather characterized by the existence of heterogeneous subsystems such as personal IS and workgroup IS which co-exist with the so-called enterprise information system. These subsystems are running on different platforms. Furthermore, these subsystems share business objects and processes with external sources.

This motivates the interactions not only among these subsystems but also among these subsystems and external sources representing the business partners. The interactions are necessary for the consistency of the business objects and the synergy of the processes.

A general issue concerns with architecture and a modeling for an artifact that supports the interactions among the distributed subsystems of an information system (IS) and the environment. This artifact is considered, in this chapter, as new kind of IS so-called cooperative information system (CIS). This CIS co-exists with the different existing subsystems such as personal information systems (PISs), workgroup information systems (WISs), enterprise information system (EIS) and external sources of information. The CIS deals only with interactions among the existing subsystems of the IS and the interactions inter-organizations. It mainly provides these subsystems with communication services and user-oriented semantic services (in heterogeneous environment). By supporting interactions, a CIS will support coordination and cooperation and therefore collaborative human work (De Michelis, Dubois, Jarke, Matthes, Mylopoulos, Papazoglou, Pohl, Schmidt, Woo and Yu, 1997; Papazoglou and Schlageter, 1997).

Although, the existing communication methods, means, tools and technologies such as Computer-Supported Cooperative Work (CSCW) (Schmidt, 1994), GroupWare (Greif, 1988), Workflow Systems (Casati, Ceri, Paraboschi and Pozzi, 1999), Object Technology, Intranet, Internet, Client/Server and Middleware (e.g., COBRA, DCOM, RMI, ODBC, JDBC) (Umar, 1997) implement cooperation between heterogeneous systems. We need a more abstract level (logical) that
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