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Electronic Enterprise Support

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Abstract

We are designing a long-term research project to develop a standard-based, customizable, integrated tool set called the Support Environment for Enterprise Engineering (SEEE), enabling organizations to manage and evolve all technological and organizational processes effectively; integrate and manage all enterprise information electronically; and empower knowledge workers at all levels with broad decision support capabilities. This paper presents the SEEE architecture and shows how it supports these goals.

Introduction

The drive towards electronic commerce is pushing companies to move more and more of their operations on-line. Organizations must deal with clients and customers on-line, handle telecommuting and workgroups distributed across the country or world-wide, deal with government agencies and other organizations with whom they have relations on-line, and so on. Certainly many companies have moved some mission-critical portions of their operations on-line, and many have made great strides towards workflow management and on-line communication. Yet even the most advanced companies are neither as fully integrated as they could be, nor we argue, as they should be. Furthermore, most companies are looking for ways to operate more efficiently and effectively. We are designing a long-term research project to develop a standard-based, customizable, integrated tool set called the Support Environment for Enterprise Engineering (SEEE), enabling enterprises---companies, educational institutions and non-profit organizations, governmental agencies, etc.---to (1) manage and evolve all technological and organizational processes effectively; (2) integrate and manage all enterprise information electronically; and (3) empower knowledge workers at all levels with broad decision support capabilities. We believe that implementing these three goals within in the SEEE infrastructure will enable enterprises to operate more effectively in this new era of electronic commerce.

An Integrated Architecture for EEE
Figure 1 presents a high-level conceptual overview of our proposed Support Environment for Enterprise Engineering (SEEE) architecture. In practice, components can be distributed across networks of different machines and platforms. To all extents practical, SEEE will employ existing software and integrate in existing enterprise applications. SEEE, however, will require much innovation. The process manager guides, executes and analyzes the enterprise's processes (see §3). The view builder constructs integrated interfaces tailored to user tasks and preferences. The hypermedia engine manages sophisticated navigation. It also provides users with direct access to meta-level hypermedia relationships among and across all processes, tools and information. Intelligent analysis tools provide a comprehensive and innovative set of decision analysis features. Traditional MIS tools refer to most of an enterprise's "legacy systems." Coordination tools provide processes and other tools with a rich collaboration support. The digital library manager provides sophisticated document management and digital library features [WC96], extending these where appropriate to the entire electronic information base. The repository maintains the system's data, including its metaknowledge and processes. Users interact with SEEE through the user interface tools. These couple familiar environments such as spreadsheets and word processors with sophisticated navigation techniques and World Wide Web access, so users can telecommute and otherwise work remotely.

SEEE's architecture builds upon the following research projects, among others: the BHTE hypermedia engine, the TEXPROS document management system, and the DIBNR digital library project.

Supporting Process Management and Evolution

Integrated process support constitutes one of our program's key contributions for enterprises. We go beyond current workflow analysis and process description software to actively support designing, implementing, simulating, executing, guiding users within, managing and analyzing all of an organization's processes---organizational, analytical and technical. Examples of processes include: placing and receiving a purchase; managing a hospital patient from admission to discharge; forming an (inter-organizational) team to find a cure for a new disease; designing and manufacturing a new product; adjusting each of the enterprise's existing processes, which affects employee confidentiality within workgroups, to comply with a new law on privacy; and handling electronic requests for information.

We want enterprises to manage all of their processes electronically. This means being able to execute and control every process that is currently performed within an organization, and coordinate and integrate all the people, software and hardware involved. We need a way to represent processes, to design and encode them, to test and simulate them, to store and retrieve them, to execute and provide guidance for them, as well as to analyze, reason about and evolve them.
Current process representations are limited in scope and do not describe the full impact of processes on organizations and people. We shall develop a canonical representation—a full (set of) logical specifications, comprehensive enough to represent all possible processes and actions employed in an organization. This language will allow multiple views for searching, presenting and analyzing processes.

**Integrating Enterprise Information**

Integration constitutes the second key SEEE contribution. Integrated process support requires a way to both model and manage information, tools and user access in an integrated way. Our core proposition is that most information is interrelated. Building upon research results from our TEXPROS document management environment [LN96], we shall develop a full graph-based data model for representing heterogeneous types of process, multimedia and meta-level information. Its strong structural focus will facilitate versioning, navigation, search and analysis (e.g., knowledge discovery) and collaboration.

The architecture's view builder will build integrated interfaces, employing context preservation and navigation techniques developed by the hypermedia and user interface design communities to minimize user disorientation and cognitive overload (i.e., overwhelming the user with options). Before sending information to the user interface tools for display, the view builder passes it to the hypermedia engine. The hypermedia engine will determine possible links and the navigational techniques that best supplement the information to be displayed. SEEE's hypermedia engine is based on our current research and prototypes providing automated hypertext support for third-party analytical applications [BK95], and providing sophisticated navigation support for the World Wide Web.

**Empowerment through Broad Decision Support Capabilities**

Empowerment constitutes SEEE's third key contribution. Providing an entire integrated environment gives analysts, managers and other employees access to the information they need, to a sophisticated array of tools to analyze this information, and to process guidance in conducting the appropriate analyses. Users will be able to perform analyses over the entire organization's information base. Coordination tools will empower formal and informal teams to work together effectively. We intend to both integrate existing analysis, MIS and coordination tools, and develop new intelligent analysis and coordination tools.

**Conclusion**
Organizations will need a comprehensive electronic support environment to compete effectively over the coming years. Our SEEE project presents a potential means for organizations to cope, and excel as society, industry and the marketplace evolve.

References

