

## Chapter 1.4

# Semantic E–Business

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### ABSTRACT

We define Semantic eBusiness as “an approach to managing knowledge for coordination of eBusiness processes through the systematic application of Semantic Web technologies.” Advances in Semantic Web-based technologies offer the means to integrate heterogeneous systems across organizations in a meaningful way by incorporating ontology—a common, standard, and shareable vocabulary used to represent the meaning of system entities; knowledge representation, with structured collections of information and sets of inference rules that can be used to conduct automated reasoning; and intelligent agents that collect content from diverse sources and exchange semantically enriched information. These primary components of the Semantic Web vision form the foundation technology for semantic eBusiness. The challenge for research in information systems

and eBusiness is to provide insight into the design of business models and technical architecture that demonstrate the potential of technical advancements in the computer and engineering sciences to be beneficial to business and consumers. Semantic eBusiness seeks to apply fundamental work done in Semantic Web technologies to support the transparent flow of semantically enriched information and knowledge—including content and know-how—to enable, enhance, and coordinate collaborative eBusiness processes within and across organizational boundaries. Semantic eBusiness processes are characterized by the seamless and transparent flow of semantically enriched information and knowledge. We present a holistic view of semantic eBusiness that integrates emergent and well-grounded Semantic Web technologies to improve the current state of the art in the transparency of eBusiness processes.

## INTRODUCTION

The Semantic Web vision (Berners-Lee, Hendler, & Lassila, 2001) provides the foundation for semantic architecture to support the transparent exchange of information and knowledge among collaborating eBusiness organizations. Recent advances in Semantic Web-based technologies offer means for organizations to exchange knowledge in a *meaningful* way. This requires *ontologies*, to provide a standardized and shareable vocabulary to represent the meaning of system entities; *knowledge representation*, with structured collections of information and sets of inference rules that can be used to conduct automated reasoning; and *intelligent agents* that can exchange semantically enriched information and knowledge, and interpret the knowledge on behalf of the user (Hendler, 2001). It is increasingly clear that semantic technologies have the potential to enhance eBusiness processes. The *challenge* for research in information systems and eBusiness is to provide insight into the design of business models and technical architecture that demonstrate the potential of technical advancements in the computer and engineering sciences to be beneficial to business and consumers.

EBusiness is “*an approach to achieving business goals in which technology for information exchange enables or facilitates execution of activities in and across value chains, as well as supporting decision making that underlies those activities*” (Holsapple & Singh, 2000). Inter-organizational collaborations are effective means for organizations to improve the efficacy of their eBusiness processes and enhance their value propositions. Inter-organizational collaborative business processes require transparent information and knowledge exchange across partner firms. Businesses increasingly operate in a dynamic, knowledge-driven economy and function as knowledge-based organizations. *Knowledge* is defined as the highest order in the continuum of data and information, as having utility and

specificity in its context domain. Functionally and in systems, the lines between useful information and knowledge are blurred (Grover & Davenport, 2001). For this research, we define knowledge as “*information, in the context of a specific problem domain, upon which action can be advised or taken.*” Knowledge management includes facilities for the creation, exchange, storage, and retrieval of knowledge in an exchangeable and usable format, in addition to the critical facilities to use of knowledge to support business activity (O’Leary, 1998). It is important for eBusiness to explicitly recognize knowledge along with the processes and technologies for knowledge management.

We define Semantic eBusiness as “*an approach to managing knowledge for coordination of eBusiness processes through the systematic application of Semantic Web technologies.*” Semantic eBusiness applies fundamental work done in Semantic Web technologies, including ontologies, knowledge representation, multi-agent systems, and Web-services, to support the *transparent* flow of semantically enriched information and knowledge, including *content* and *know-how*, and enable collaborative eBusiness processes within and across organizational boundaries. In this article, we present an overview of the Semantic eBusiness vision, with emphasis on the conceptual foundations and research directions in Semantic eBusiness. In our view, Semantic eBusiness is founded upon three primary streams of research literature: *Semantic Web technologies*, including ontologies, knowledge Representation and intelligent software agents; *knowledge management*, including the creation, storage and retrieval, and the exchange of machine interpretable and useful information upon which action can be taken or advised; and *eBusiness processes*, including process automation, enterprise systems integration, and the coordination of workflows and activities within and across organizations. We provide a conceptual schematic of this grounding in Figure 1.

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