



# Business Processes on the Web

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**W**hy have the issues and technologies of Web services-based business-to-business processes become important? With the advent of service-centric computing, the virtual enterprise (VE) is fast becoming a reality as businesses increasingly outsource various functions electronically. In the process, the businesses consuming these functions must expose service interfaces with their suppliers; when done recursively, a supply chain results.

The rationale for forming a VE is to reduce costs and time-to-market while increasing flexibility and access to new markets and resources. As much as possible, individual companies seek to focus on core competencies and mission-critical operations and outsource everything else. The strategic idea is to take advantage of the global infrastructure formed by a set of standards and conventions.

With the complex interrelationships among companies today, and the emphasis on added value, a supply chain might be better described as a "value network." Abstractly, a value network consists of dynamic assemblies of businesses electronically exchanging services in a perhaps recursive acyclic graph, rather than a simple chain. Such a network requires a distributed information system with standards-based descriptions of services, operations, and processes.

## The Ultimate Virtual Enterprise

The ultimate VE exists when a firm can dynamically select networks of suppliers to provide exactly what it needs, when needed, and in turn, provide the products and information requested by its own customers in the larger value network. Such VEs could provide custom products quickly, while improving quality and eliminating the overhead that would otherwise be associated with the outsourced tasks.

For value networks to operate well, they need common, interoperable, and executable representations of services, business transactions, global and local business processes, and service-level agreements. The important issues to consider are whether these representations can be standardized sufficiently to allow dynamic, seamless partner selection, and when businesses will adopt these practices.

A key premise is that a major portion of a VE's competitive advantage depends on the quality of its immediate partners. In the most flexible businesses, this would require dynamic selection of the best partners when services are needed. Flexibility in partner selection through standardized service descriptions requires several assumptions:

- Businesses will compete using standardized descriptions.
- The connection cost of selecting bet-

ter partners is worthwhile.

- Certification services can provide a sufficient degree of trust.
- Dynamic contractual agreements can be specified, and adherence to or violation thereof can be verified and adjudicated.
- The distributed business processes formed by dynamic value networks with changing partners can be monitored and controlled as needed.

The past 30 years have been testament to the difficulty of achieving even a preliminary commoditization of the work and process descriptions necessary to support seamless partner integration in such value networks. Recently, however, VEs involving reputed and trusted partners have started taking shape. The next step will be VEs comprising dynamically chosen partners.

John McCarthy published a proposal in 1982 (written in 1975) for a "common business language."<sup>1</sup> That paper, in turn, was inspired by an earlier paper in which Paul Baran envisioned a world where companies were connected by online computers and clerks could send each other electronic purchase orders.<sup>2</sup> As McCarthy said, "Eliminating both clerks by having the computers speak directly to each other was not mentioned. Perhaps the author felt that he was already straining the credulity of his audience."<sup>1</sup>

The idea of VEs in which partners are selected at times of need without preexisting contracts might strain our readers' credulity, but you should be able to imagine a point in the near future at which we can create trust services to ensure companies' service levels. It might be more difficult to imagine dynamic negotiation of legally binding terms and conditions, but even this is not inconceivable.

In any case, we have come a long way since 1975. We now have Web services standards – WS-Security, WS-Transaction, and the Web Services Definition Language (WSDL), for example – that make VEs increasingly practical.<sup>3,4</sup> Yet, Web services must interface with internal business processes, and this interchange causes new interactions among existing business processes and creates new distributed processes.

Several organizations have developed specifications, such as the Business Process Execution Language for Web Services (BPEL4WS) and ebXML, to manage these distributed processes. Because they presuppose the creation, execution, and control of designed processes, however, these emerging standards represent important, but incremental, steps toward the creation of fully dynamic value networks.

## The Articles

We received many submissions for this special issue addressing numerous technical challenges that remain to be solved. We wish we had space to publish more, but the three articles we selected offer novel solutions to important problems.

In response to existing technologies' fundamental lack of service-retrieval capabilities, Klein and Bernstein suggest a process-based approach to finding required services. Next, Jung and colleagues propose a method for choreographing the interaction among individual business processes by automating control of the superprocess. Finally, Benatallah, Casati, and Toumani propose a high-level conversation model for interacting services. Their framework goes beyond simply describing a possible sequence of messages and provides a model for automating Web service interactions. All three articles provide solutions that could become standards for the next step in the VE evolution. □

## References

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