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E-BUSINESS INTEGRATION: E-SERVICES FRAMEWORK IN ENTERPRISE ARCHITECTURES

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Abstract

This paper expands the work presented in a previous paper (Nguyen, 2001) in which the concepts of enterprise business service and enterprise business policy that exist everywhere in an enterprise and across enterprises, define and govern the operations and behavior of the enterprise. Both concepts guide the formulation of e-services hierarchy and e-policy hierarchy that are naturally derived from the enterprise organization hierarchy created in response to business requirements, business needs, business strategies and subsequently, business changes. Essential to these two concepts is the concept of e-business harmony for ensuring the wealth and health of the enterprise business-IT operations. An example implementation is discussed.

Introduction

Enterprise architectures are formal documents at the topmost level of an enterprise, that link the business requirements to the design of systems, networks, and applications supporting the operations of an enterprise or business. There have been two main, widely used, systematic frameworks to enterprise architectures (EA) among others: Zachman framework and DeBoever EWTA (enterprise wide technical architecture). In Zachman (1996) framework, the W's (what, when, who, why, where) and the H (how) are formulated from a number of viewpoints. In DeBoever's (1997) EWTA, the various architectures, namely business architecture, application architecture, data architecture, etc., populate an overall 3-layer EWTA: business, data and technology. Both Zachman framework and DeBoever architectures have been increasingly used by government and large corporations. Recently, Service-Oriented Architecture (SOA) has emerged to address the service aspect of enterprise architectures. Each of the three schemes offers in its own way a systematic development of business strategies guiding lower-level business-IT operations (left box in Figure 1).

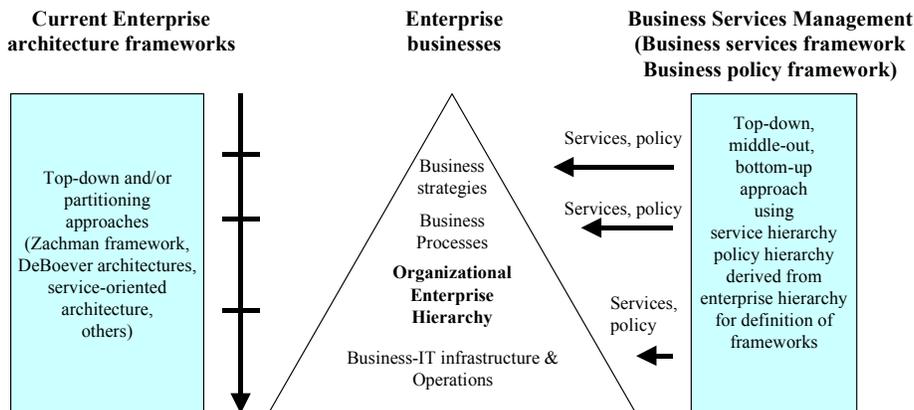


Figure 1. Enterprise Architectures versus BSM Framework

The triangle in the middle of Figure 1 represents an enterprise business, any business. Simply speaking, the business mission of the enterprise is supported by business strategies in response to business needs and business changes. The strategies are responsible by an organization. This organization is hierarchical in nature. Business processes for the enterprise organization across all organizational units (marketing/communication, finance, accounting, R&D, manufacturing, production/distribution, etc.) are defined. The business processes in turn drive all business-IT operations supported by the infrastructure of the enterprise.

This paper expands the formulation of service hierarchy and structures for e-services framework within an enterprise and across enterprises (Nguyen, 2001) in the context of business services management and the supporting products and tools (right box in Fig.1). The products and tools collectively can be used to assist practitioners in prescribing, formulating, defining, implementing and deploying enterprise integrated business strategies-IT operations.

E-Service and Service Hierarchy and Structures

The notion of service is global and applicable to any level of an organization in the sense that any relationship or interaction between two or more organizations can be described as services since by definition service is simply the act of doing some thing for some one. The notion of services in an enterprise is extended to cross-enterprises from functions and tasks that must be performed using predefined business processes. The services form a hierarchy or structures (Figure 2) that are basically derived from the organization hierarchy of a particular enterprise. The notion of enterprise business policy enjoys the same connotation as the notion of business service since policy also exists everywhere in an enterprise and can also be derived from organization hierarchy.

In an e-service hierarchy or structure, each organizational unit, as a component of the hierarchy, is created to fulfill a particular mission within the global enterprise mission which is visionary and measurable. Whatever the specific mission of each organizational unit is, one particular unit is to service one or more other units in the organization and the entire enterprise is to service some consumer or user, some group of consumers or some business.

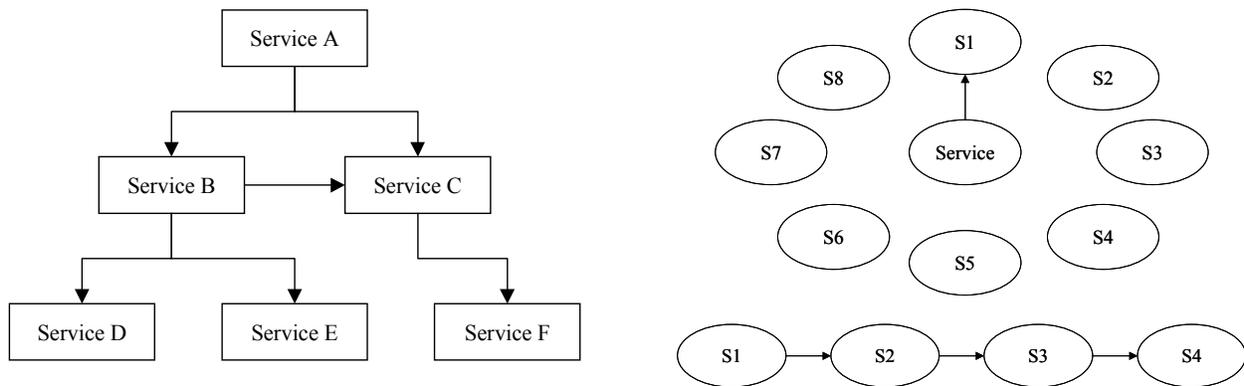


Figure 2. Service Hierarchy or Structures

Although the service hierarchy may be applicable to e-services among enterprises in business collaboration, one may find that other services structures also exist, such as the linear structure or the star structure. In the linear structure, a service may act as a server can be subsequently a client to the next service. In the star structure, one service may act as a broker of some kind. In some complex environment, e-services structure will have a combination of all basic structures: hierarchical, star or linear and others.

The e-service hierarchy or structure can be mapped into a collection of applications supporting the enterprise e-business or across enterprises. An e-order can be initiated from a customer at his/her web browser. The order is subsequently received at the web server and directed to different application servers and business applications. Each application serves a particular aspect of the order. One aspect could be a check credit. Another could be an inventory application verifying the availability of one or more ordered items. Back-ordered items could be sent to manufacturing applications for production. This production could involve a supply chain application among diverse and different suppliers in business collaboration with the enterprise. The order could then be placed and an invoice application could be triggered. The order could then be forwarded to a distribution application for

sending the goods to the customer. At any step of this e-service flow, notifications could be appropriately sent out to intended recipients by the applications according to the business process flow. These applications, old or newly created, written in different languages, can be at different locations, run on different platforms, access different data bases, and use different data and message formats and structures. They can be part of any client/server architecture, whether traditionally structured or object-oriented, or supported by COM/DCOM or CORBA. Thus, the e-service hierarchy or structure would best be mapped into a e-business integration scheme that allows both serial and parallel execution of e-service components servicing the e-business.

An Example Scenario: Verification of Academic Transcript

Imagine a student who wants to apply for a graduate program at a particular university. A part of his/her application for admission is the submission of official transcripts from the previous educational institutions. A request from the institution the student is applying to can be sent to other institutions for official transcripts to be reported directly to the originating university if student records services among these collaborating universities are integrated. Not only the transcripts are reported but also the courses previously taken by the students from different catalogues at different universities can be pulled to form a complete record on the student's curriculum for evaluation. Notifications on all aspects regarding the student's performance and behavior on files in different databases from the participating institutions such as financial aid, scholarships and grants, extracurricular activities and the like can also be pulled if these separate and disparate applications can be integrated. This scenario gives rise to a e-business integration of applications, user-interface, data and process.

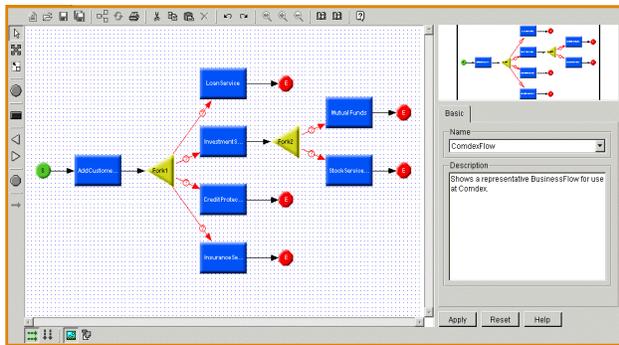


Figure 3. Business Services Composer GUI

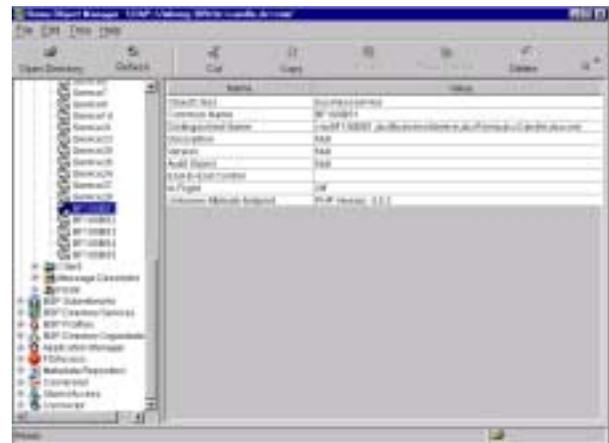


Figure 4. Specification of Business Services by CandleNet eBP ROM

As an example for prototyping BSM framework, we show the use of a product family by Candle Corporation to address enterprise business cases. In Figure 3, Candle Business Services Composer GUI (graphical user interface) shows a business flow as a collection of business services. Each of the blue boxes is described as a main entry in the Candle eBusiness Platform (eBP) ROM (Roma Object Manager) (Figure 4). Each description of business services is stored in a LDAP (lightweight directory access protocol) server, together with the description of related objects e.g. message types involved in the said business services, components of business services, transport mechanisms and the like. Business services defined here are linked to actual applications performing the services.

Concluding Remarks

In this paper, we have introduced a component framework for Business Service Management called **enterprise business service (e-services) framework for e-business**. The e-services framework facilitates the formulation of business strategies at the high-level and IT operations at the low-level, and the linking between strategies and operations. We will address the e-business policy framework in future research for the regulated behavior of e-services. The e-services framework and e-business policy framework

are derived from organizational hierarchy. These concepts and frameworks, together with the concept of business **harmony**, govern the health and wealth of e-business for success.

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