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Service Oriented Enterprise Based on Value-aware Service Engineering

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Abstract: As a new kind of enterprise, SOE (Service Oriented Enterprise) has received preliminary recognition of the market in recent years. Meanwhile, SOA (Service Oriented Architecture) and value-aware service engineering methodologies have been proposed and applied in many fields. But how to use them in building SOE is more concerned by enterprises. This paper explores the new approach to accomplish the SOE architecture and its business components through the considering of the two aspects about technology and management. An approach based on SOA and component technology has been proposed and applied which can help to realize business-goal-driven dynamic semantic integration of the business services of SOE. After analyzing the profit points and service requirements in the enterprise management value-chains in depth, it developed the service components for SOE and gave a solution to build the enterprise information systems and SOE based on value-aware service engineering methodology.

Key words: SOE, SOA, value-aware service engineering, service component

INTRODUCTION

With the development of SOA (Service Oriented Architecture), SaaS (Software as a Service), IOT (Internet of Things), Cloud Computing and other information technologies and applications, the ubiquitous information service environment is emerging (ChangFeng Open Standards Platform Software Alliance, 2009). Such an environment has resulted in the collaboration among enterprises which has changed from the whole production of value of traditional supply chain to service oriented networking model. New mode of business must be able to react quickly to the changing of market demands, but also flexible to adapt to dynamic organized business in the value networks. Therefore, enterprises are going through a new round of large-scale optimization and reorganization. It is on the whole industry chain optimization and reorganization commenced around the construction of core competence of enterprises which is different from the past. In this context, the enterprise with guidance of SOE (Service Oriented Enterprise) emerged at the right moment and has received preliminary recognition of the market (Janssen and Joha, 2008).

The systematic design method of the value-aware service engineering, by focusing on the services of software system for multiple value side and the dependencies between them, established software quality, software value individuality and difference links, software content and other aspects, to guide optimal design of software services. It is more important to connect the values in management activities with the services components. This is also the crucial factor to ensure service engineering and the implementation of SOE successfully.

THE DEVELOPMENT OF VALUE ORIENTIED SERVICE ENGINEERING

The intension and value characteristic of service engineering: Service engineering essentially belongs to system engineering. It carries through modeling, analyzing, optimizing and balancing on the key elements and the relevance of the service system to make a strategic decision in the whole service lifecycle (Xu and Wang, 2008). And regulate and control the design of service system through controlling the feedbacks. It has established connections between business and IT and then to bring a high customer satisfaction.

Service value and its creating process are focused on in service engineering. At first it forms the new service schemes by various kinds of service innovations to create new values expected by the supply and demand. Service scheme describes how to create values and to share risks and responsibility by coordinated operation between customers and service suppliers (Fig. 1).

Value-aware service engineering: VASEM (Value Aware Service Engineering Methodology) uses the model driven idea to transform from top to bottom and payes equal attention to service value and service function.
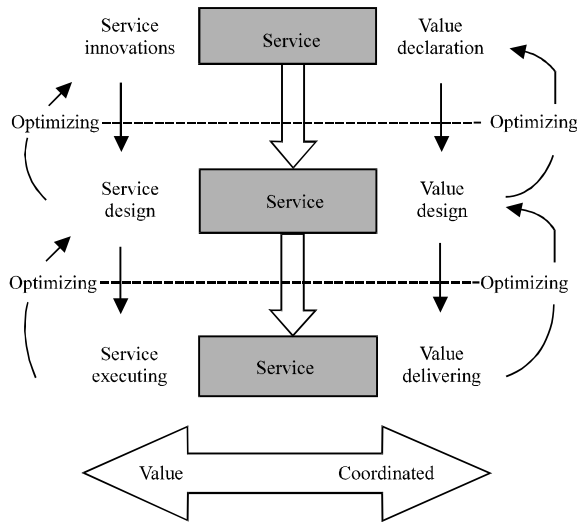
Fig. 1: Service and value in service engineering

In the transformation process, if existing more aspects to influence service values then make decision by the value-aware method.

Therefore, analysis and optimizing about service model can be done by the value oriented method. When all values can be fully supported by service models then enter the service system implementation process.

There are some kernel links in VASEM: value modeling, value tagging, value oriented analysis, value oriented model optimizing, feedback and redesign, value oriented combination and system implementation.

RESEARCH ON SOE

Proposing and defining SOE: Enterprises are going through a new round of large-scale optimization and reorganization. The processes of decomposition and recombination are required to implement by business components. Though, breaking the enterprise business in the value chains into business units and after a certain amount of analysis and optimization, business components formed with business units. Each business component is an independent unit within the enterprise, corresponds to the company specific business functions. Traditional businesses reap profit by providing products or services, but business components through the provision of business services to the rewards. Business services are the main characteristics of business components and are different from generally Web services involved in the SOA. A business service usually means enterprise service with some business value that can be perceived and measured in a certain business environments. It can achieve some or all of the business

processes and achieve business objectives in conjunction with other business services.

Construction of core competence of enterprises is through the analysis of the enterprise's business strategy; identify core and non-core businesses of enterprises. The core business builds enterprise business components, but non-core business through outsourcing by the enterprise in the form of external business components. So, it is not enough to implement agile of enterprise business operation only with business component, but also needs interaction between enterprise business component and other enterprise components; to support in real-time information flow and integrated information systems and to implement seamless integration across enterprise boundary of business components in entire value chains; to create business value by cooperation partners, customer and suppliers of various business component of collaborative operation. Service oriented technology is the core technology of seamless integration between business components and business interaction between components reflect the thought of service oriented, which means that each service component to the other business service components provide one or more of the business and when using the business component services, do not need to know how service components were developed. Service interactions among business components are defined with the constraint of SLA (Service Level Agreement). The agreement defined the evaluation standard of delivery service and enterprise can manage service function, service time and service cost through business layer protocol defined in this agreement.

The concept of SOE was proposed on the basis of business component and service oriented thinking, different enterprise business units or services between the dynamic combination and collaboration have formed the business ecosystem. For the SOE, there is no unified definition in academia. One definition is: SOE is a new kind of enterprise running with a way to provide services (Fan and Zhang, 2011). It provides various services by organizing enterprise business units in form of business service components. It realizes business collaboration in entire value chains, in the way of service providing and service consumption among internal enterprise with different business unit (service unit). And then in accordance with prior conventions of SLA on service quality management, it can fast and flexibly response market needs of changes, maximize the benefits of the enterprise and the entire value network.

Architecture of SOE: Architecture of SOE can be considered of the two aspects of organization design and implementation, operation and maintenance. Different
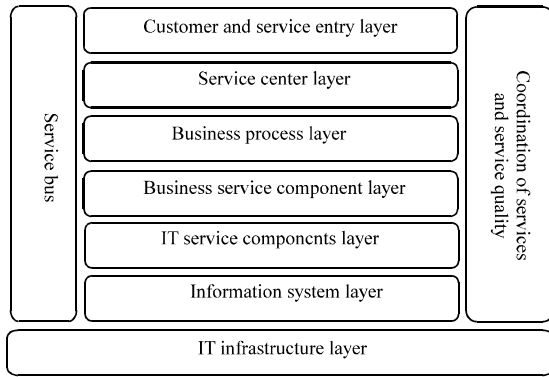
Fig. 2: The architecture of SOE

Fig. 3: Value chain of production, supply and marketing

from the tree structure and enterprise organization, SOE's organizational structure is flat, under the command of senior management, made up of a number of relatively independent service center, service center based on SLA, in the form of services provided and services consumption for business collaboration. Service centers can be divided into three classes:

- Functions service center, completed enterprise's support function, including service planning center, financial center, human resources center and IT service center
- Business service center, completed enterprise's business function of operation
- Service management and coordination center, is responsible for completed service agreement management and service quality management and contradictions of coordination among different service centers

So from the global implementation perspective and the aspect of IT service support, it is considered, reference SOA, the architecture of SOE can be divided from top to bottom into several layers (Fig. 2). Figure 3 shows the production, supply and marketing value chain in the refineries.

Customer and service entry layer (for customer and suppliers and other institutions providing access interfaces to access the enterprise services), Service center layer (containing various business service and functions service centers), Business process layer (in accordance with needs of business implementation logic, by selecting and matching and combining business service components to form various business processes of enterprise operations), Business service component layer (for internal and external users with a variety of business functions), IT service components layer
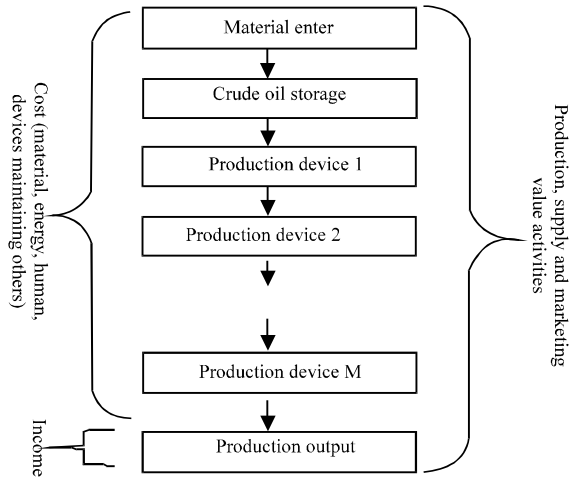
(for business service components providing the data, calculations, operations and storage services), Information system layer (including all kinds of application information systems for enterprise running) and IT infrastructure layer (a foundation for enterprise information system environment). Service bus provided interconnection between the different service support environment. Coordination of services and service quality management system are used to coordinate contradictions among different service centers and to evaluate and manage the service quality of the service centers.

ANALYZING THE VALUE CHAINS OF ENTERPRISE

How to use value aware service engineering methodology for SOE? How to connect the business values to the business services in the actual project implementation or enterprise management activities? The bottom example about the refineries' resource planning was showed.

Through, the analyzing and design of ERP (Enterprise Resource Planning) and other information systems in refineries for many years, many value chains in the management activities could be found. Just give some main attention value chains in refineries as follows (Li *et al.*, 2008).

The value chain of production, supply and marketing is the main activity in the refineries. The refinery is a kind of flow enterprise. The profit points are happened in the production value chains. They contain the costs and incomes. The aim of enterprise is to reduce costs and increase incomes. The design of information systems must consider these profit points carefully so that to

satisfy the requirements of enterprise. The decision-making, production working, production optimizing and other service requirements should be integrated in the information systems. It brings forth the KPI (Key Performance Indexes) of the production activities (Li, 2010).

CONCLUSION

The flat organizational structure of SOE consisted of service centers can improve operational efficiency and reduce management costs. Meanwhile, this business model based on business component and service oriented methodology is also able to promptly meet market demand and business requirements, to realize the seamless integration of business processes across the enterprise. SOA and value aware service engineering have provided technical support for this new type of enterprise forms. Therefore, it is an important way of enterprise restructuring to make change of organization of SOE in the new round of optimization and reorganization of enterprises. Although these issues are very complex and have a lot of challenges, however, driven by market demand and new technologies, traditional enterprises transform successfully to the SOE, thereby building the business ecosystems are the future trends in organizational change.

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