

Web Services Platform Architecture Machine and SOA Model Design

LIANG Hongtao^{1,2}, XU Jianliang¹, LIU Mingtao¹, WANG Xiaohong¹

(1. Collage of Information Science and Engineering Ocean University of
China, Shandong, Qingdao, 266100

2. Qingdao University of Technology, Shandong, Qingdao, 266300)

Keywords: Web services platform; Architecture; SOA model design

Abstract. Service-oriented new software system development has gradually been proposed and gets rapid development with the emergence of Web services. Service oriented architecture (SOA) makes changes in creation and development of deployment application system, and will become the effective way to solve enterprise complex IT environment. This paper expounds the basic concepts of SOA, system structure, basic characteristics and relationship between SOA and Web Service technology, and probes into SOA system application architecture design based on Web Service.

In recent years, SOA, service-oriented software architecture, a software engineering method rises gradually. It provides an effective way to solve SOA scattered business and the application of cross-platform. It has characteristics like coarse-grain, loosely coupled, standard structure, and shared services, etc. But at the moment, in terms of Web Service's SOA structure design, there is still lack of in-depth research. This paper explores the basic concept, system structure, basic features of SOA and the relationship between SOA and Web Service technology, and studies SOA system application architecture design based on Web services platform architecture.

I. SOA AND WEB SERVICE TECHNOLOGY

A. The basic concepts of SOA

SOA, on the thought of software becoming services, puts forward new software integration and solutions of software reuse. SOA model can be more suitable for large-scale application scenario like across enterprise electronic commerce system or a cross-department e-government system and so on. Service-oriented software architecture is a component model. It contacts contract through well-defined interfaces between services. SOA uses a neutral way to define interfaces. This defining with neutral excuse characteristic is known as loose coupling between services.

Loose coupling system not only has good flexibility, but also is able to exist in each service internal structures' gradual changes for the application composition. SOA is an alternative model for object-oriented model. Compared with the previous object model and component model, service-oriented architecture (SOA) pays more attention to "business as the center" service entity, rather than "technology as the center" fine-grained entity. It seems that SOA is coarse-grained, loosely coupled services architecture, and it does not involve the underlying programming interface and communication model between services. It communicates only through simple and accurate definition interfaces. SOA can help enterprise system architectures more rapid and reliable entire business system, and can also help software engineer stand in a whole new level to understand various forms development of the enterprise architecture. In SOA, service is one of the critical concepts. Developers can understand the data from one or more data changes to obtain data. SOA organization is different from single application. It forms its own applications through direct services building by developers. SOA has a huge advantage, and is a kind of new solution for Web application system building. By analyzing the interaction between services, make the analysts and administrators optimize business process specifically.

B. SOA architecture

Service users, service provider and service registry center are the three roles in SOA architecture, as shown in Figure 1. Service providers pack available information or business process as a service, and then release them into the registry. Service registry will classify service issued by the service

providers, and provide information for service requester queries. Service users look up service in the registry. Once found what can meet the demand and services, invoke the service. Operations in SOA architecture mainly include release, discovery, binding, and invocation. Release can be mobilized by describing tasks and service requesters, and make services accessible. It is found that the method is to meet their standards through long training service registry services. Binding and calls are mobilized according to information call service description by service consumers. Service oriented architecture building includes service and service description, in which service description can be specified for service request and response formats.



Figure 1 SOA architecture

C. The basic characteristics of SOA

Services in SOA service architecture do not involve underlying programming interface and communication model, and make communication through simple and precise defined interface. The goals of SOA are to make IT systems become more flexible and elastic and make faster response to changing business needs. This structure has three characteristics mainly: first, coarse-grained service. Service granularity is generally divided into coarse-grained and fine-grained with fine grained services providing only a small amount of business process, whereas coarse-grained services providing high-level business logic. In SOA model design, as far as possible make coarse-grained model, but coarse-grained service can appear bad reuse problems. The reason is that coarse-grained services tend to be dedicated to solve business problems, coarse-grained service poor reuse and universality problems can be solved by allowing different coarse-grained level to create services. Second is loose coupling. Unlike other component architectures, SOA is a loosely coupled component service, which makes the service completed modification completely without affecting the service users at the same time. Third is standardized interface. Standardized description includes all interact details with service, and standardized interface hides the implementation details of the services. In recent years, the emergence of XML and Web Service greatly enhances the value of SOA, and pushes SOA to a higher level. Enterprises can adopt SOA in all deployed technology and applications, which is mainly due to the openness of XML and Web Service standardization.

Traditional IT systems make it difficult for enterprise to make quick response to market changes, while SOA can further reduce the cost of enterprise operation and can also reduce the workload of enterprise maintenance personnel as well as some of the potential risks. Overall, SOA has many advantages on IT and business: first, through the use of the service, reduce maintenance costs and complexity. Second, the use of the service can improve customer service. Third, give precise business process flexibility. Fourth, with the aid of easy management and safety integrated environment, become a powerful IT organization. Fifth, quickly create complex applications and business processes so as to timely adjust to changes in the market.

D. Web Service

Web Service is a very suitable technology for SOA. Essentially it is modular and self-describing application, and it can get simple object access protocol information exchange in a distributed environment. Web Service technology makes the old business more easy to implement, and is not a new business process. Web Service makes the distribution, as business application, more convenient. The success of Web Service project shows the feasibility of SOA, so the emergence of Web Service makes people believe the value of SOA. There is a close link between Web services and SOA, but Web services and SOA are not equivalent, Web Service is a good example of the SOA, Web services are technical specifications, and SOA is the design principle. Web Service is one of the ways to implement SOA. Web Service is a programmable application logic which fully combines the advantages of Web and component-based developers. Web Service can be used under the premise of standard service description, and realize the independence of platform and language in the true sense.

II. WEB SERVICES PLATFORM ARCHITECTURE SOA MODEL DESIGN

A. Service orientation analysis and design principle

Operation, service and business processes are the three main abstraction levels in SOA. Business process, located in the top layer of abstraction, usually includes multiple business calls. Service, located on the second floor of abstraction, represents logical grouping of operation. Operation, at the bottom of the abstraction layer, represents a single logical work unit. Object-oriented analysis and design, enterprise architecture, business process modeling provide the theoretical support respectively from the underlying design, architecture and business groups for SOAD, and it is shown in Figure 2.

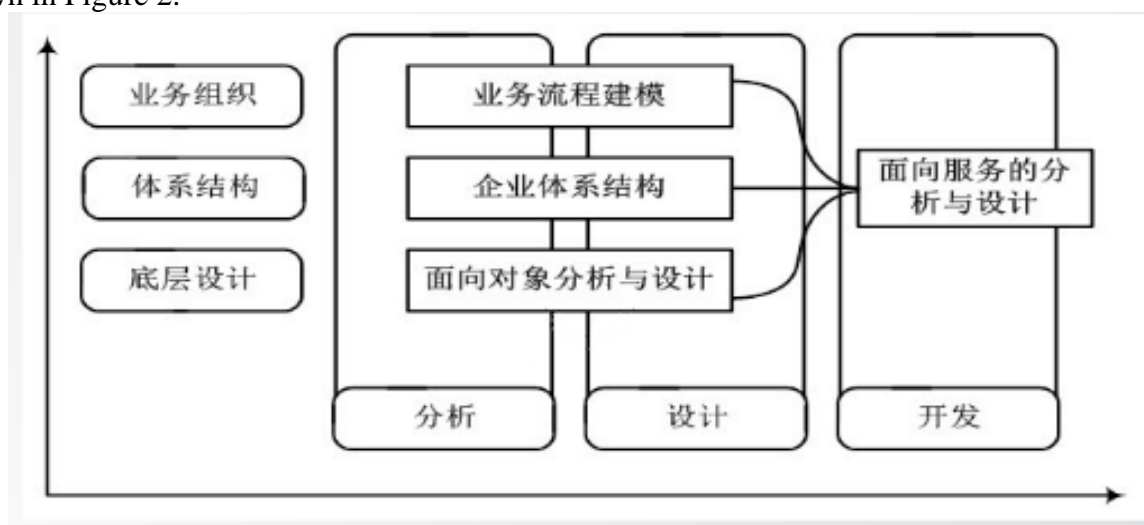


Figure 2 SOAD and its components

The first layer of SOAD is the underlying design. Its main purpose is to be able to quickly and efficiently design, develop and execute the underlying service components, and its main thought is object-oriented analysis and design. Architecture is the second floor of SOAD. The layer must take the logic component of business service as the center. Architectural layer adopts the theory framework of enterprise architecture. The third layer of SOAD is business organization. The business process modeling rules adopted are incomplete rules. It is a rule with a variety of forms, representation, and resources. The process modeling of SOAD must keep synchronous with the underlying design use case modeling. SOAD provides a set of theory methods for SOA analysis and design.

B. The practice principles of service oriented architecture

SOA can provide business agility, specifically, that is to make enterprises quickly and effectively respond to changes in the business and gain competitive advantage. To satisfy SOA business agility, and take advantage of this rapid change to get competitive advantage, we need to follow the two

principles: first, service is between business and technology. Business is in a dominant position, which needs to drive services by business, and then uses the service to drive technology. When designing SOA, on the one hand, understand the relationship between service and underlying technology; on the other hand, understand the dynamic relationship between business requirements and service providing. In addition, the core problem in service-oriented architecture is a well-designed service dynamic combination to cope with changing business logic. Second, the ability to response to changing needs is not the fixed demand on processing business, but dealing with the new demand. The whole architecture of the system must satisfy business agility requirements in order to reduce the influence of whole system flexibility. As much as possible deal with changing business needs with small amount of changes. That also is to face constant changes with no changing. Business agility theory should be through the whole system design.

III. CONCLUSION

SOA build way, based on Web service, is an ideal way of service-oriented realization. As a new developing technology, although there are some problems using service-oriented architecture SOA to build system, based on its own characteristics, SOA will be more and more widely used in software development, and gradually become the universal standard of software development.

REFERENCES

- [1] Cheng Jing. Technology trading whole process system interface components research and design based on SOA [J]. Computer and Information Technology, 2013, 21 (3): 42 to 45.
- [2] Wang Xianping, Zhang Yongfen. A distributed clustering algorithm Web services model study based on SOA architecture [J]. Journal of Digital Technology and Applications, 2014, 4 (4) : 136-137.
- [3] Ma Hebing, Wang Chunlian, Shi Yan, etc. Information integration convenient service system surveying and mapping based on SOA and Web Services [J]. Design and Implementation of Spatial Geographic Information, 2013, 36 (12) : 154-157.
- [4] Tian Nianzu. ISP - AEI integrated service model based on SOA and Web services [J]. Journal of Gansu Science and Technology, 2013, 29 (2) : 10-12.
- [5] Zhang Ying. Software development research based on SOA architecture [J]. Journal of Youth Issue of Science, 2014, (8) : 167-167.
- [6] Song Yibing, Xu Yuru. Web system hierarchical model based on SOA [J]. Journal of Naval Aeronautical Engineering Institute, 2013, 2 (2) : 217-220.
- [7] Tian Yonghong, Su Yila. Service model analysis and design based on SOA [J]. Journal of Inner Mongolia Normal University: Edition of Natural Science, 2011, 40 (02) : 182-186.
- [8] He Xiaofeng. The design and application of SOA database middleware model [J]. Journal of Network Security Technology and Applications, 2015, (3) : 16-16.