Design of B2B E-commerce Platform Based on SOA Architecture

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Abstract: With the rapid development of information technology and computer networks, internet-based e-commerce has also emerged, and has achieved tremendous development in recent years. Most enterprise systems are developed based on heterogeneous platforms and different information standards. The interaction and integration between enterprises is very difficult, and the traditional distributed architecture can not solve the current needs. Service-oriented architecture is a new generation of distributed software architecture that solves the above problems. As a new generation of distributed software architecture, it not only improves the reusability of software, but also achieves good scalability. This paper uses the SOA architecture to design the e-commerce platform, and designs the interface service to realize the service composition of the e-commerce platform.

1. Introduction
At present, the e-commerce system can satisfy the simple functions of product information release, product browsing, selection and trading of commodities, such as Alibaba, Taobao, Chinese suppliers, and business treasures. With the development of demand, such as electronic negotiation, electronic signature and other service functions[1], the on-demand e-commerce operating environment enables businesses to transform to a fast-response, flexible, focused and flexible direction, and maintain these characteristics.

Most E-commerce systems are developed based on traditional distributed object technologies, which are once advanced software architectures. Its disadvantage is that the architecture is complex inside and the technology and standards are updated relatively slowly. Leverage ease of management and faster deployment, which helps achieve more asset reuse[2]. The purpose of the enterprise is to reduce its operating costs. In order to respond quickly to new customer needs, it needs to adjust the original service model to increase business flexibility, expand business scope, accelerate development, and improve inter-enterprise collaboration.

2. The architectural principle of SOA
A service-oriented architecture is an application consisting of a series of independent but cooperating subsystems or services. The interface is defined in a neutral manner, independent of the hardware platform, operating system, and programming language that implements the service[4]. The service is the core, and the participants are divided into three behavioral roles for the service in the system. Any service-oriented architecture consists of a service requester, a service provider, and a service registration agent[3].
2.1 SOA role composition
Any service-oriented architecture consists of a service requester, a service provider, and a service registration agent.

![Relationship between service-oriented architecture roles and behaviors](image)

(1) The service registration function is to advertise the service descriptions, which are published by the service provider and allow the service requester to search in the service description owned by the service registration agent.

(2) The service provider can create a service description and publish the service description to one or more service registration agents and receive service request information from one or more service registration agents.

(3) The service request function is to find one or more services, which are a service description published in the registration agent, and use the service description or the service provided by the service provider[8].

3. System requirements analysis
In order to manage and publish corporate letters and business transactions, the company has developed a management information system and e-commerce platform. However, because the sales agent's information system is on different platforms, it is a different system platform using different operating systems, and also have multiple communication protocols, communication between systems is difficult. The efficiency of solving the operation is low, and resource sharing between enterprises is difficult[10].

3.1 System Requirements Function Module:

![The major subsystems of the e-commerce system](image)

3.2 System main role and system composition
As can be seen from Figure 2, the main functions of the system are: login and role rights trading hall system, buyer member system, supplier member system, platform management system. After further refinement of these functions, which is the specific use cases of Figure 3, it can be decomposed.
4. System design

4.1 Architecture Design

The architecture is the design of the grand blueprint for the system and is a general plan. In order to achieve the overall planning objectives of the e-commerce system, highlighting the concept of service and the advantages of SOA integration and effective integration, the system will be designed in a “one platform, two centers, three levels” mode, with a business structure. And there is a technical architecture that can be considered as an effective integration of business and technology. The overall architecture of the system is shown in the figure:
The release of the service is realized by the platform. Based on the platform, the company engaged in sales reports provides report generation services according to different enterprise requirements. This business is convenient for the collection of statistical information. Relative to the agent, in the system and environment, it calls the production enterprise, and the service released by the sales enterprise is open to the production enterprise.

4.2 functional design

4.2.1 Order Management Web Service
Agents need to query, send, and receive orders. These functions are implemented by the order management service. In the process of implementing a system, a series of functions that accept orders and query orders are used to implement this service function. In the process of implementing the order management service function, the agent's identity authentication must also be considered. As described below, the function specific definition and code design accepts the order by obtaining the order information through the agent to obtain the agent order information.

4.2.2 Product Publishing Web Service
The agent can encapsulate the browsing and query request of the product catalog into the product publishing service function. When implementing a system, the product classification information release and product information release need to be considered[9].

The following is a complete product information publishing service:
- CategoryID: Get all subcategories of this category
- CategoryID: Get all subcategories of this category
- CategoryID: Get all subcategories of this category
- ProductID: Get product details

4.3 Combined service
For a slightly more complex business, multiple services are involved. At this time, the service can be encapsulated by the combined service. Therefore, the so-called composite service is a combination of two or more simple services to form a more coarse-grained service. The encapsulation method of the composite service is often used in the legacy system. It is combined with the services of other business systems based on the service of the legacy system. In the technical processing, the legacy service interface is usually standardized by using the adapter method, and the package is “packaged” into one.
The new service, also through the Web service, registers the basic description of the new service to the service directory or registry and publishes it[7]. In this way, third-party applications can retrieve specific composite services through the published WSDL, enabling calls to more complex business functions. For the call of the service, the design of the bus route is also involved. Specific modes include content-based routing mode, component-based routing mode, and based on the central router mode. Different modes have different applicable scenarios and different advantages and disadvantages. For example, content-based routing mode dynamically determines message flow, but at the same time only one message can be evaluated; component-based routing supports a highly decentralized computing model, but can result in large memory requirements; central router mode management and debugging is relatively simple, but can have a negative impact on scalability and performance.

5. Conclusion
Based on the service-oriented architecture, the system utilizes the advantages of SOA technology to encapsulate various functions in the e-commerce platform into components and services. In a specific business environment, services can be effectively combined to adapt to current changes on demand. The need for business processes reflects the flexibility of the system. At the same time, the design and development of the system are based on the analysis of the needs of the early stage. From the actual needs of the e-commerce platform, it is mainly to improve the efficiency of e-commerce services, mainly to provide effective services, such as commodity order inquiry and e-commerce services. Business queries such as combinations. Therefore, the development of the system is not purely for management, but the integration of management and services.

References:
[1] Huang Mingzhang. Design and implementation of networked management system based on SOA architecture [D]. Jilin University, 2016
[2] Zuoyuan. Design and implementation of e-commerce API open system [D]. Huazhong University of Science and Technology, 2013
[3] He Shengxuan. Research on online supply chain financial risk assessment based on B2B platform [D]. Jilin University, 2016
[4] Li Yingzhou. Design and implementation of e-commerce platform payment gateway [D]. University of Electronic Science and Technology of China, 2012
[5] Meng Xiangmei. Dunhuang Network B2B2.0 e-commerce model research [D]. Shandong University, 2012
[6] Xie Yijun, Yang Hewei. Design and Implementation of Distributed Service Architecture Based on Dubbox[J].Software Guide, 2016, 15(05): 13-15.
[7] G. JONES, T. NGUYEN, P. N. SAMBROOK, P. J. KELLY, C. GIIBERT, J. A. EISMAN. Symptomatic fracture incidence in elderly men and women: The Dubbo osteoporosis Epidemiology study (DOES) [J]. Osteoporosis International, 1994, 4(5).
[8] Yang Chao. Research and implementation of clustered server based on distributed service framework Dubbo [D]. Beijing University of Posts and Telecommunications, 2017.
[9] Yang Fengpan. Design and implementation of intelligent terminal cloud service platform based on SOA architecture [D]. Jilin University, 2017.
[10] Liang Chunquan, Zhang Yang, Dai Tao. Discussion on the Teaching Method Reform of "Middleware Technology" Course[J]. Heilongjiang Education (High Education Research) And evaluation), 2015(09): 46-48.
[11] KULKARNI, N., DWIVEDE, V.. The Role of Service Granularity in a Successful SOARelization A Case Study[C]. Services - Part I, 2008. IEEE Congress on,