

Design and Analysis of Wisdom Wealth Cloud Service System

Gao Wang^{1, a}

¹School of Beijing University of Technology, Beijing 100124, China

^awanggao0624@gmail.com

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Abstract. The development of cloud computing has brought new vitality to the combination of information technology and traditional financial wealth planning industry. Under this circumstance, this paper studies the wisdom wealth cloud service system based on SOA framework by analyzing and designing the system frame design, as well as, replacing the traditional offline mode with distributed system. It is believed that under the advanced SOA cloud services framework, there will be a new revolution on the development of the field of wealth planning.

Introduction

With the accelerated expansion of Internet information in our country, the concept of cloud came into being. All walks of life are trying to walk into this emerging technology field, and hope to get the latest resources from it and achieve mastery through a comprehensive study of this industry to reach a new level. For the traditional financial wealth planning, the introduction of cloud computing and cloud services is an important technological innovation, which can effectively allocate the hardware and software resources of financial facilities, and realize the data sharing and the synergistic need among different departments.

Relevant technical concepts

SOA Framework:

In fact, SOA is not a new concept. As early as 1996, Gartner Group put forward the SOA prediction that was only as a “prophecy”, and the development level of software and information is not enough to support such a concept to go to the substantive application stage. Until recent years, the realization of SOA technology has become mature. For SOA, there has not been a united, widely accepted definition in the industry yet. It is generally accepted that the SOA service-oriented framework is a component model that links the different functional units (service) of the application, by the good interface and contract among services. The interface is defined in a neutral way and independent from the hardware platform that is available for specific service of realization, operating system, and programming language. The services built in such a system can communicate in a uniform and standard way. This feature with a neutral interface definition (which is not bound to a particular implementation) is called a loose coupling [1] between services.

Cloud Application Services:

With the continuous development of computer technology and the Internet, a new software delivery model came into being. This model includes infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS). Cloud application service is a platform-based software as a service. As a new mode of software deployment, operation and maintenance, and use, the application can be hosted in the cloud platform in the form of services by the software as a service. The biggest novelty of this model is that users do not need to buy software, but lease and use only through the network according to their needs from software service providers. With “on-demand” delivery model, cloud application services can combine software and hardware and software support and pre-deployment, post-maintenance are bundled together to charge [2] during the use. Compared to traditional software, cloud application service is of low cost, low risk, and low threshold and so on.

Cloud Computing:

Cloud computing was dated back to the vision of *network computer* put forwarded by Sun Microsystems in earliest 1983, followed by Amazon introduced resilient computing cloud services in 2006; Google officially firstly put forwarded the concept of Cloud computing in August the same year and this concept comes from the project engineer of the project *Google 101* made by the engineer of the company Christopher Bichia. And China's cloud computing industry began around 2008 and has developed so far [3]. The core technology of cloud computing is parallel computing that refers to the process of simultaneously using multiple computing resources to solve the problem of computing the process and an effective way to improve speed and processing capacity of computer system. The main features of cloud computing are: 1. Dynamicity of resource allocation; 2. Automation of demand service; 3. Relying on network as the center; 4. Quantified service; 5. Pooling and transparency of computation resources.

Design of Wisdom Wealth Cloud Platform Framework

This paper aims to propose and build a new wealth planning management platform, with the help of cloud computing, SOA and other emerging Internet technology that includes a series of service measures into the wealth planning cloud platform proposed in this article such as the traditional offline wealth planning talent training, financial information exchange, financial industry-related knowledge analysis, financial investment risk warning, Personal financial planning and management through summarizing from the Internet on a variety of financial information data, using SOA technology to analyze different business process and financial data of financial wealth planning field, filtering the cloud platform services, determining the service boundary, service definition, service development, releasing a series of SOA technology standards based on the development of elements, in order to achieve the expansion of wealth platform and satisfy needs of different User groups or their customized services according. At the same time with the virtualization technology, the system can achieve multi-tenant and multi-service model, and ensure that tenants focus on the understanding and using the service provide by system itself without worry of hardware storage, server volume and other issues. According to the design level of cloud computing system, the wisdom wealth planning cloud platform is divided into three levels including cloud platform layer of infrastructure as a service layer (IaaS), cloud service layer of platform as a service (PaaS), and cloud platform layer of software as a service (SaaS).

Wealth Planning Cloud Platform Layer of IaaS.

Infrastructure level of wealth planning cloud platform includes a variety of basic IT equipment, such as computers, storage devices, network environment, and other related hardware and software facilities. The main role of IaaS layer is to provide users with a variety of necessary basic hardware resources and achieve a higher level of service content through these resources. The tenants are handed over to the cloud platform IaaS service provider by entering the number of users to the system. The providers provide tenants with the basic resources according to their needs. This paper presents The IaaS layer of cloud platform presented in this paper is adopted with the two-layer design of logic resource blocks and basic hardware. The infrastructure hardware layer integrates various physical device resources and serves as the bottom layer of the IaaS layer and even the entire cloud service system framework, providing the necessary infrastructure hardware for the entire system. The virtualization layer is above the physical resource where the necessary resources are chosen from the hard ware facilities and integrated to form a virtual machine for tenants to use in accordance with the needs of tenants. The virtualization layer integrates the original hardware into a logical resource view in order to provide virtual operators with virtual operating systems, virtual computing capabilities, and functional services such as memory resources and storage space.

Wealth Planning Cloud Platform layer of PaaS.

The PaaS layer of the wealth planning platform mainly provides not only services of platform functional component including design, development, integration and management, but also services of platform service component that has been developed and integrated into the mature level for tenants to use. There are three functions in the wealth planning cloud platform PaaS layer

including service delivery, service management, and operational support.

There are roughly six modules in the wealth planning cloud platform PaaS layer presented in this paper including background data resource management service, cloud resource storage management service, financial model analysis and processing service, terminal application availability analysis service, network centralized monitoring and management service and finance Data calculation pooling management service.

The service management function of the platform mainly includes control service component container, operation security support frame, the service resource management and so on. The service resources here are mainly platform component service resources, DataBase resources and integration of related hardware resources underlying IaaS. At the same time cloud platform PaaS layer also needs to provide delivery services for the SaaS platform for users to use and monitor the resource allocation of platform in real time, and manage the component service resource of underlying IaaS platform hardware resources. The management business includes business process management, basic management, service design management; the basic management refers to service catalogue, service level, service evaluation, service access control etc. The components are packaged into services through the development of component and component deployment on the platform, and SaaS platform provides the necessary services through service re-development and service deployment. The function supported by operation of PaaS platform is expressed by supporting the application required by the platform itself such as the development of service components required for the operating system, development environment, service testing environment, all kinds of application middleware and distributed database etc. so that developers can freely carry out the development of service components, packaging, delivery and a series of operations.

Wealth Planning Cloud Platform Layer of SaaS.

For wealth planning cloud platform application and software system layer, its main service is characterized by providing tenants with various related application service related to wealth planning and financial management through web. Cloud tenants only need to use the web-based wealth planning cloud system through a rented model without purchasing all the application services. Tenants can create many users. Here we need to pay attention to the difference between tenants and users. In view of the cloud service financial planning system proposed in this paper, the tenants mainly aim at financial institutions, wealth planning training institutions, personal financial management and so on who satisfy the relevant business needs by renting the relevant resources of wealth cloud platform. However, the users are mainly for users targeted on the resource rented by tenants such as office workers needed financial management, users with the intention to learn how reasonably plan the personal wealth and so on. Different users under the tenants enter into the platform through different access with the use of different web service. At the same time, tenants can also tailor their services for providers according to their different needs such as analysis data of major stock and bonds required by financial website, relevant financial model for students to learn etc.

Multi-Tenant Model Design of Wealth Cloud Platform.

There are three main modes of multi-tenant technology realization: physical isolation, virtualization isolation and application isolation, as shown in Figure 3.1.

First, the physical isolation model is embodied in one-to-one, that is, a single application instance corresponds to a single tenant, which is easy to meet the individual customization needs of each tenant. Data storage of each user and web applications are physical isolation and they are exclusively enjoy their own unique physical resources, because basic resources of tenants will not have the interaction, with higher security. However, this model also has some drawbacks, due to the physical isolation of facilities resources, which cost the application developers higher cost in software development, training, maintenance, publishing and other hardware and software, and lower hardware and software sharing. This physical isolation model is mainly suitable for large and medium-sized enterprise tenants large and medium-sized enterprise tenant.

Virtual isolation mode is to share physical resources through virtual machine technology. It can

simulate physical mainframe by virtual machine to meet the individual need of tenants and provide isolation among tenants that refers to logical isolation. It is obvious that the cost of hardware and software investment in this mode is relatively smaller compared with physical isolation with relatively increase in sharing. But the isolation declines among tenants due to the logical isolation and the sharing rate of resources is not high with support limit on the number of tenants.

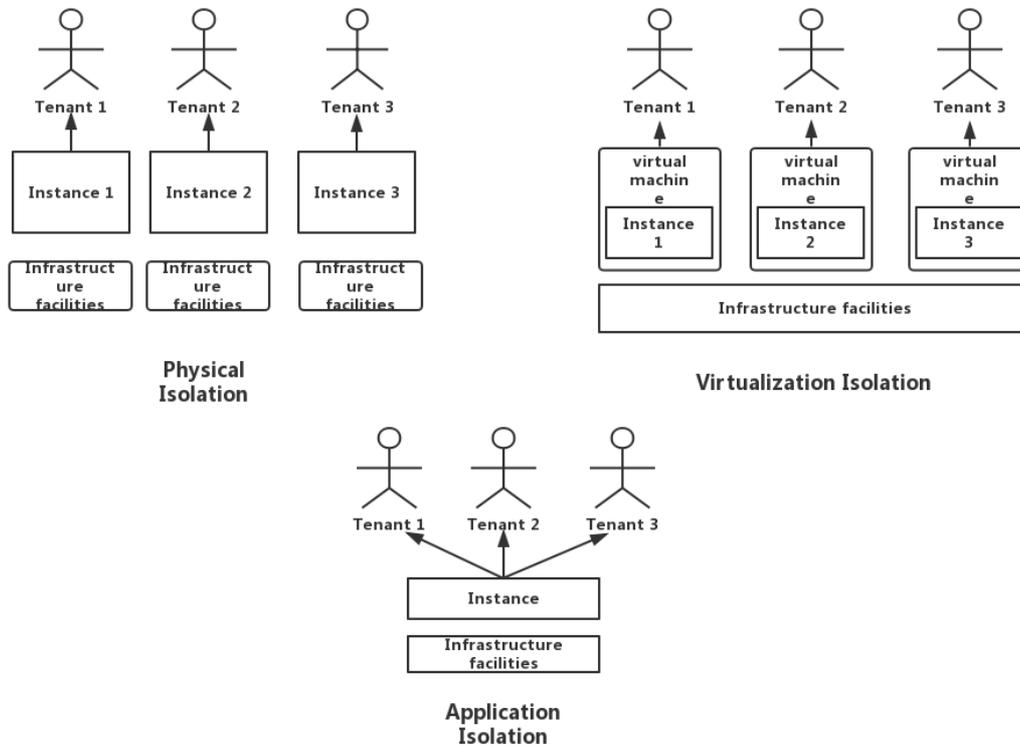


Figure 3.1

The third application isolation model is mainly for the single-instance multi-tenant model, that is, providing service for a number of tenants through an instance of the sharing. This model is to meet the individual needs of tenants the tenant's ability by application-level tenant customization and ensure tenants can share storage and hardware level resources by designing the multi-tenant's data storage, performance assurance, etc. One of the major advantages of this isolation model is that the degree of sharing of resources is greatly improved, while the cost of hardware and software is declined. However, the corresponding degree of isolation declines a lot among tenants. So this model is more suitable for small and medium enterprises tenants [4].

The wealth cloud platform studied in this paper is adopted with the multi-tenant management model based on the application isolation model, which logically realizes the isolation among tenants by sharing the data framework and instances. The tenant management mode is divided into four modules: registration, rental, customization and billing. A tenant can create several user attributes at the same time when registering this platform. The concept of tenant ID and user ID are introduced to realize the isolation among data tuples and maximize the sharing of resources and improve the efficiency of resource use. For each tenant ID, it has a different attribute value with specific definition such as pending review, review confirmed, enablement, unavailability and cancel. When a tenant logs on, the system automatically determines the status of tenant and allows the tenant with the "enabled" status to login.

There are different pricing strategies for tenants to rent platform services in different way. The platform allocates servers, infrastructure hardware, network bandwidth, service components, data storage space and other resources according to the number of users included in the tenants. Each resource has a different billing mode. The platform has three billing modes including rental time billing, number of rental billing and data flow billing. When a tenant rents one or several services, the system generates a rental record for the tenant that is used to record the billing strategy for

utilizing resources, duration of service, number of services and other data. The tenant can access the system to check the record at any time.

Tenants also can use the platform to customize the personalized service. The service is mainly based on analyzing the business needs of the tenant and combining the original service of the platform in order to generate a new service suitable for the tenants. For this new service, in principle, only tenants who apply for customization are allowed to use, that is to say, other tenants who do not have this service are not entitled to use the service.

Wealth cloud platform is adopted with water billing mode where the service circumstance of resources are recorded and aggregated into a document log to generate reports and bills. For different rental models, there are different billing standards that are available for tenants to check in the generated bill.

Design of Multi-Tenant Database Storage Model.

There are three main modes of multi-tenant database storage model in SaaS applications including independent database, shared data, independent framework, shared database and shared framework.

The independent database approach allows each tenant to use a single database to store its business resource data separately with respective independent database system. This advantage is to meet the individual needs of different tenants and the high isolation among data is of a better level of security. But the number of tenants supported by the system is limited and the sharing rate of resources is the lowest at this time due to limited database carried by sever.

Different modes of shared database means that all tenants of platform use a database, but each tenant has a different set of logical schema tables, and the data of each tenant is stored in his own data sheet, that is, tenants use the same database but with different data sheets. Under this mode, the service application instance will create an exclusive data sheet for each tenant to meet personalized data needs. This model improves the rate of sharing resource, and has certain logic isolation with better security, while the number of tenants supported also greatly increased compared to the previous one. However, this kind of storage also is of certain limitation, because the number of tables supported by the database is limited, resulting in the increase of tenant number supported by application examples compared with independent database with relative limitation. When the tenant data sheet reaches a certain number, it will lead to a sharp decline in systematic performance. It is difficult to solve this problem by increasing the hardware.

Shared database and shared mode refers to the same database shared by all tenants, data sheet structure, multi-tenant data stored in the same data sheet. In this mode, the isolation of data tuples depends on the tenant ID setting and allocation. It can be seen that this approach can maximize the sharing of resources, but the security of tenant's data declines in certain degree due to the shared data sheet of tenants, which is of lowest security among these three kinds of database storage mode. And customized personalized data is also more difficult because of the shared of data sheet.

The platform is adopted with the database storage framework of "shared database, shared data storage mode" according to the actual situation. By designing the specific data storage system based on the metadata-driven method, all the data related to service developers and tenants are presented as metadata (Metadata). Through the description of object from metadata, the application service of platform is packed from object one by one. The tenant's business data is saved, mainly through the establishment of a data sheet where all business data of tenants is saved. This metadata-based data storage makes customization of personalized data patterns easy to realize. But the system for the tenant's query becomes more inconvenient because all business data of tenants are saved in the same sheet. In order to figure this out, a series of Pivot tables will be designed for the system. Although there are certain burdens for maintenance and management, this design can satisfy various functional features of this platform under comprehensive consideration.

Conclusion

The development and maturity of cloud computing technology has brought a series of cross-industry joint model. There are certain advantages and feasibilities for the use of cloud

computing cloud service technology design and realization of the wealth planning cloud platform mentioned in this article. Under this circumstance, SOA-based technology system architecture combined with related technological summary data of cloud computing, gathers massive financial information in the platform and satisfies different business requirements from a large number of users accordingly. It is believed that this model will become more and more widely in the future in the industry of application. The concept of Cloud is to share, serve and combine traditional financial management industry with cloud services so that more users understand the importance of reasonable wealth planning and can easily learn financial management knowledge through the platform in their steady life.

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