Research and Implementation of New Distributed Information Interactive Platform

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Abstract. The new distributed information interaction platform is based on the information system that is already in existence or under construction (or even to be built), so that the design and construction of the system can better meet the needs of various information (data) interactive processing in the future. In order to deal with the personalization problems that exist in various information systems, it provides custom means for the customization of event (business flow, workflow, data flow, etc.) processes and realizes a process automatic execution mechanism that is completely transparent to the operator.

1. Introduction
For more than 30 years, it has developed from a stand-alone and simple application to a networked and large-scale information system. However, due to the limitations of a certain period of time, the level of technological development, the ability of developers to use technology, business, management requirements, and the form of computer applications. In the information system that is already under construction (or even to be built), there will be problems that the information resources are not good, full, convenient and flexible.

In order to deal with the personalization problems that exist in various information systems, it provides custom means for the customization of the process of events and realizes the automatic execution mechanism of the process that is completely transparent to the operator; Considering the information security problem in the current global information system, the paper also considers the information security problem that the platform brings to the information acquisition, integration, interaction and use after cooperating with the information system already or under construction (even to be built).

2. Content Analysis
The control system of the new distributed information interaction platform is a modern management method that uses advanced technology to ensure the realization of technology. In the design, full consideration is given to the individual problems of various information systems and the common problems to be solved by improving the ability of information interaction. Specifically implement the following functions:

- To enhance and enhance the information interaction and information security management capabilities of existing or ongoing information systems (or even pending) in conjunction with existing or ongoing information systems of institutions.
As the basic component of the information system under construction (reconstruction or even to be built) of the institution, it enhances and improves the information interaction capabilities and information security management capabilities of the system.

Provides an ideal platform for high-quality and high-level information interaction and information security management for the construction (including reconstruction) of government departments’ e-government systems.

Provides an ideal platform for high-quality and high-level information interaction and information security management for the construction (including reconstruction) of enterprise electronic commerce (e-business) systems.

Provides an ideal platform for high-quality, high-level information interaction and information security management for the organization's WEB website construction (including reconstruction).

3. Thoughts and Framework of System Implementation

3.1. Product Technology Framework
The platform completely adopts object-oriented technology from design to development, and Java technology is used extensively in actual development. For example: Servlet, JSP, JavaBean, JDBC, JavaMail, XML and other technologies. The overall architecture fully follows Sun's proposed MVC model, making the entire architecture consistent with the development trend of e-era enterprise applications. The specific design scheme is shown in Figure 1.

![Figure 1. Product technology architecture of the new distributed information interaction platform](image1)

3.2. Multi-layer distributed architecture
The platform adopts a multi-layer distributed architecture, and its specific design is shown in Figure 2.

![Figure 2. Multi-layer distributed architecture of a new distributed information interactive platform](image2)
As can be seen from Figure 2 above, the advantages of multi-layer distributed architecture are extremely obvious.

4. Key Technologies of System Implementation

4.1. Distributed Structure Design, Distributed Storage and Computing
First, the system uses the connection pool technology to access the data in the relational database. With this method, the data table can be simply placed in different databases when the system data volume is large, and even compatible with heterogeneous databases. Secondly, with the system's hierarchical modular architecture and EJB technology, each module can be deployed on different application servers. Similarly, with the help of the J2EE platform, these modules can be deployed in heterogeneous server groups. In addition, because the J2EE platform is very well integrated with XML, SOAP, and other technologies, it is very convenient to describe mature modules in the system with WSDL and provide services to external systems in the form of Web Service; Finally, in advanced application server environments and database environments (such as Oracle) that the system can adopt, it provides distributed technology for computing and data storage.

4.2. Completely based on the J2EE specification
The application body exists in the form of JSP, Servlet, EJB, etc., which conforms to the MVC application mode; Connect to relational database through standard JDBC interface and use connection pool technology to improve performance and reduce database usage costs.

4.3. XML-based Interaction
The system adopts hierarchy, modular architecture, and supports distributed deployment. There are certain functional calls and data exchanges between remote modules. Many parts of the system itself provide data import and export mechanisms based on XML standard formats; In the cross-module access section, RMI technology is used to realize cross-module calls in order to ensure application performance. Under the requirements of some security policies, the system can also be used with SOAP technology for inter-module, inter-system function or data interaction.

4.4. Workflow engine
In a powerful and technologically advanced workflow engine, you can customize various business processes such as document flow, work reporting, and application approval, and you do not need to write complex procedures to adapt to different needs and changes in work procedures. The rapid development of the system is realized.

4.5. Cross-platform safe internal nuclear technology
In I-KEY, eKEY and other encrypted hardware, security chips are used to implement identity authentication, data addition/decryption, data signature, data security storage, and other functions. Secure computers are used to implement user access security management. Implement local users 'mandatory identity authentication, digital signature and identity authentication, secure computing environment, and implement hierarchical permission management.

5. Steps and methods to be implemented

5.1. Unified information security management system
In order to build a comprehensive application security system, we must consider the use of access control security, system security, user security, information encryption, security transmission and management security. Our security management system provides a multi-directional, three-dimensional solution to achieve user access security management and system security management based on hardware support.
The platform's information security management system can use hardware (electronic keys, secure computers) support options, or it can use hardware support options and be selected by customers.

5.2. **Hardware support programme**
- Can use electronic keys to achieve identity authentication, data addition/decryption, data signature, data security storage and other functions.
- In order to support the higher level of information security requirements, we can configure the security computer developed by our company and approved by the National Security Office. The security computer uses a multi-level CPU and operating system, a computer motherboard architecture based on the latest password technology, and a highly integrated computer motherboard architecture. Through mandatory identity authentication, mandatory permissions management, and the management of I/O ports, a secure computer system that starts from within the user organization is built. The security computer can realize the functions of local users' compulsory identity authentication, digital signature and identity authentication, safe computing environment, and hierarchical permission management.

5.3. **User security access management**
In this platform, various management authority adopts hierarchical authorization mechanism. The platform allows daily maintenance in the system, and information, data collection, processing, and auditing are scattered in the corresponding processing process of the system. The interaction between the data or text information of the original system and the platform is completely distributed. Through user security access management, the platform guarantees that the completely distributed interactive processing with the platform information center database is safe. Its overall user access model is shown in Figure 3. The security administrator monitors the user's login process through an authorized database. The entire login process includes two main components: identity authentication and access control.

![Figure 3. Overall user access model structure](image)

5.3.1. **Identity authentication model**
The user's authentication process includes seven basic processes, as shown in Figure 4. Its specific seven steps are:
- Users request identity authentication before connecting.
- Identity authentication system provides users with a authentication interface.
- The identity authentication system requires the security model to authenticate the user.
- The security model returns the user's authentication information to the identity authentication system.
- If it passes the authentication, the identity authentication system requires the platform to give the user a connection interface.
• Users get the interface that has been connected and enter the platform.
• Users use their own permissions to operate on the platform.

![Identity authentication model structure diagram](image)

**Figure 4. Identity authentication model structure diagram**

5.3.2. Access control model
The access control module consists of three parts: access control monitoring, access control decision-making and audit database. Its specific visit process is:
• The user submits a request for access.
• The access control system starts the decision module to respond.
• Users can only enter the platform's operating goals after auditing through the decision module.

5.4. System security management
The system security management in the platform is embodied in the definition, authorization and maintenance of user framework, permission unit. The managed permission unit is refined into the various objects of the system. Each object has its own properties, defining the collection of some attributes of some objects as roles, Realize the user's access control list by mapping the role to the user, and constrain the user interface and what it can do on the platform by restricting the access control list.

6. Conclusion
The platform comprehensively embodies the guiding ideology of information(data) as the core, and solves the common problem of flexible, interactive, convenient and efficient use of information(data) by the system; In order to deal with the personalization problems that exist in various information systems, it provides custom means for the customization of the process of events and realizes the automatic execution mechanism of the process that is completely transparent to the operator; Taking fully into account the problem of information security in the current global information system, and considering the information security problems that the platform inevitably brings to the acquisition, integration, interaction and use of information after organic cooperation with existing or even under construction information systems.

Acknowledgments
This article is supported by the Scientific Research Program of Hubei Provincial Department of Education in 2020, "Dynamical evolution of ultrashort soliton pulses in nonlinear optics materials" <No: B2020243>.

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