Small and Medium Enterprise ERP Platform Based on Windows Azure Cloud Computing

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Abstract: ERP is an important way and tool for enterprises to implement informatization construction, and it is an important foundation and strong support for enterprises to carry out e-commerce business. The purpose of this paper is to design an ERP platform for small and medium enterprises based on Azure Windows cloud computing. On the basis of in-depth understanding of the basic concepts and principles of cloud computing, e-commerce and ERP systems, the ERP platform of e-commerce cloud e-commerce system is designed and completed. Use cloud computing to reduce the cost of writing business information, reduce business risks, and provide personalized business services. And using the proposed reliability model in a cloud computing environment, the reliability value is 0.66, while exposure to high unprotected power sources triggers a reliability review. In the multi-tenant architecture area, the data between the application area and the tenants is separated to ensure that different tenants and different modules in the same tenant do not affect each other, and the security of the application system is ensured.

Keywords: Windows Azure; Small and Medium Enterprises; ERP Platform; Cloud Computing Technology

1. Introduction

Cloud computing is a new computing method that combines the characteristics of computers, electrical computing, the use of computer energy, and the use of computers [1]. The use of cloud computing technology in ERP construction is the first step towards the development of cloud computing [2]. Corporate identity is the development of information news through marketing technologies such as product management, demand management [3]. All business information can be used to make informed decisions about the development and management of productive assets, increase the profitability of business activities, and profit in the context of a competitive economy [4].

Foreign research pays attention to the risk of ERP implementation failure [5]. The model developed by Misra SC explores the factors of trust in the context of ERP development, implementation and control. First, based on a literature review, a theoretical framework is constructed to develop hypotheses. Next, a questionnaire was designed to examine 13 trust variables, and pre-tests were performed to validate these questions. Statistical analysis of survey data from 62 respondents across 11 different industry sectors showed that 9 of these 13 variables significantly influence the trust factor in ERP implementation [6]. Chaudhari A Y Considering the number of IEM data values and associated data types, additional data collection methods are very complex. Use Microsoft Azure to provide the performance needed to handle additional cluster analytics. The proposed Cloud4NFICA is a scalable platform based on proximity compression algorithms [7]. Taking the ERP digital maturity model as the baseline to conduct research can provide reference for the digital development [8].

The innovation of this paper is mainly reflected in the following two aspects: experts and scholars at home and abroad, in the related research on ERP, most of the evaluation of enterprise ERP focuses on performance evaluation, and the discussion on the success factors of ERP implementation process, and the focus of this paper is to evaluate the access control of the ERP digital platform by building an ERP digital platform, and to put forward improvement directions and suggestions to improve the ERP digital platform. Provides an overview of how e-commerce SMEs can implement ERP cloud and provides strategies for improving cloud-based ERP enterprise data.

2. Research on the Design of ERP Platform for Small and Medium-sized Enterprises Based on Windows Azure Cloud Computing

2.1. Windows Azure Platform

Windows Azure is a cloud computing platform for processing Microsoft data [9]. Including cloud computing and many development services. Programs developed by developers can run online or use accounting services. In contrast, Windows Azure continues to use Microsoft's legacy software to provide customers with a development experience, and many user applications can be downloaded from the site for better performance. In addition, Windows Azure software can also be extended to account requirements, saving time and development costs such as business development [10].

Windows Azure has three components, one is the computer that runs the application, another is the database service, and the third is the controller that manages and distributes cloud-based resources [11].

Computer services can run different applications simultaneously and support applications with a large number of users. Windows Azure provides computing services by simultaneously distributing computing services across multiple virtual servers as needed. Developers can start using the services provided by Altar by easily accessing the Windows Azure portal through a browser, registering and logging in with their Windows Live ID [12].

Windows Azure Repository is not a relational information system, the language in question is not SQL, it is primarily used to support applications built in Windows Azure. Provides simple, high-capacity storage where information can be used by storage software in a variety of ways.

Fabric Manager has high availability and distributed performance. Remove all parts of Windows Azure by listening where each session is. When the user tells him what type of service model he wants to define, he can find the right application, components and provide the right network settings and will compile all these details and monitor the performance of the application. Therefore, when the program is closed, the application can be restarted by the same session or a different session.

2.2. Cloud Computing Technology

2.2.1. Infrastructure As a Service

IaaS provides cloud services, manages and manages server farms using virtualization software, and helps users make available machines using their infrastructure. According to the vendor, it's possible to make a standard machine running Windows or Linux and install whatever the customer wants. Azure also provides the ability to set up normal pipelines, load and store, and consume many other infrastructure services.

2.2.2. Platform as a Service

Azure offers many PaaS computing, including Azure Websites and Azure Cloud Services (Job Integration and Job Responsibilities). In each case, the operator does not have to provide an available machine, log in to each machine using Remote Desktop (RDP), and install the application. At the click of a button (or near a button), the tools provided by Microsoft will provide standard machines for sending and installing applications.

2.2.3. Software as a Service

SaaS is software that is hosted in the middle and managed by the end user. It is frequently tested to ensure optimum performance anywhere. SaaS is at the top of the spectrum abstraction, with everything from hardware to end-user service software.

2.3. Demand for SME ERP Platform Construction

2.3.1. Personalized Needs

The information of SMEs varies due to factors such as different industries and business processes, especially enterprises of different scales and industries have different needs at different stages of IT development; different management methods also have individualized requirements. This requires small and medium-sized enterprises to be flexible and practical in their informatization construction. The standard application of traditional ERP systems to large enterprises is not suitable for small and medium-sized enterprises.

2.3.2. Rapid System Development

The development and implementation of traditional ERP systems require a lot of manpower, equipment and resources. For small and medium-sized enterprises without funds, their IT construction is aimed at short-term benefits.

2.3.3. Easy Maintenance

The employees of small and medium-sized enterprises have poor scientific and technological quality and cannot maintain and manage the system, and it is difficult to achieve obvious results in the short term in information training. This requires information systems that are easy to use and operate and require no maintenance.

3. Investigation and Research on the Design of ERP Platform for Small and Medium-sized Enterprises Based on Windows Azure Cloud Computing

3.1. System Architecture Design

The system adopts Windows Azure cloud service as the operating platform, and the whole system adopts the Web Service mode, that is, the B/S mode deployment, and the cloud service belongs to the platform-as-a-service (PaaS). In the development process, we only need to focus on our own applications and data, the rest are managed by the platform provider.

3.2. Module Design of E-commerce ERP Platform Based on Cloud Computing

According to the business dimension of traditional ERP system and e-commerce, the business services of cloud ERP system are divided. Supply chain management generally refers to the management of customer relations and supplier relations based on the integration of ERP resources within the enterprise. With the help of the corresponding information system technology, the entire business process of the enterprise from raw material supply to production and operation can be carried out. Sell finished products to users seamlessly. Warehouse management is a very important part of the ERP system, and its business processes are very complex, coordinated and so on.

3.3. Trust-based Access Control Model in Cloud Computing Environment

Definition 1: The reliability of this document refers to the credibility and reliability of the service provided by the ERP service at the user level at a certain moment.

Definition 2: User behavior refers to the specific function of the user in a program, application software or data. The user behavior in this document refers to the one-time behavior of the user using the cloud-based e-commerce ERP system service.

Definition 3: User behavior data in this document refers to the value of quantifying user trust that software or hardware service providers can obtain during the interaction between users and e-commerce ERP service providers. Evidence of user behavior based on cloud computing is objective.

In this paper, the improved AHP is used to determine the weight. After obtaining the weight W of each attribute, the user's trust value is obtained according to the formula:

$$TR = \sum_{i=1}^{m} W_i S_i + \sum_{j=m+1}^{n} W_j R_j + \sum_{k=n+1}^{r} W_k R_k \quad (1)$$

Among them, S safety feature, R reliability feature and P functional feature.

And determine the user level according to the amount of trust you have obtained. The level judgment method based on the user behavior value level is as follows:

$$S(TR) = \begin{cases} S_1, 0 < TR \le tl_1 \\ S_2, tl_1 < TR \le tl_2 \\ ... \\ S_k, tl_{k-1} < TR \le 1 \end{cases} \quad (2)$$

According to the decision-making method, the user level is taken, and the corresponding authorization is given to the user according to the user level.

4. Analysis and Research on the Design of ERP Platform for Small and Medium-sized Enterprises Based on Windows Azure Cloud Computing

4.1. Implementation of ERP Platform

The presentation layer mainly implements the appearance of the interface and the interaction with the user. User experience is the most important aspect of the presentation level, including the appearance of the interface, the friendliness of the operation, the fault tolerance mechanism and the smoothness of the operation. The presentation layer home page is written in a coding language such as HTML5 and referenced in a jQuery box.

The front-end interface needs to interact with the back-end frequently, using jQuery's built-in Ajax interface to pass values. The home page of this system mainly interacts with the background .ashx universal editing program file, is shown in Figure 1.
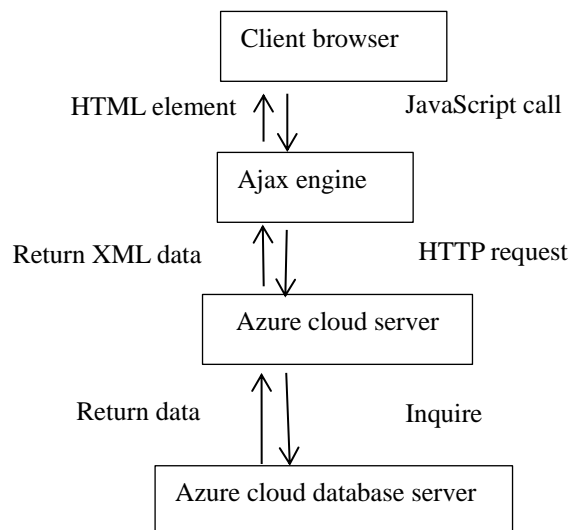

Figure 1: Front-end and back-end data interaction

Here, the process of generating data in the background, storing and processing data in the foreground is used to illustrate the realization of the logical business layer. The report is generated in the default table DataTable table, and the temporary table is automatically generated every time the Layer calls the class concrete class. After the Layer interface calls the DataTable, it can be directly displayed in the traffic component or other visual data components of the Layer interface.

If Echarts consumes data, the data in the DataTable needs to be saved into a single array and moved forward for consumption by Echarts components. If you want to use the Excel view to save and record the data in the DataTable to the Excel area, you can directly call the DataTable to record through the interface.

The program introduces the SqlHelper public data service class at the data access level, and the data set is placed in Web.config, which is convenient for later deployment and maintenance. If the data server address changes, just use Notepad to switch in the Web.config file, no code changes or compilations required. Web.config reads data addresses, usernames, passwords and other information.

4.2. ERP Platform Access Control

The tests compared the ground control model with source of effects (RBAC) to the input control model proposed in this paper. The trust conversion model obtained by the same method is shown in Figure 2, where 1 represents the initial state, 2 represents the safe access time, 3 represents that unsafe access does not trigger the confidence review, and 4 represents low security. Access rights trigger

reliable trust review, 5 means security entry triggers review review, Y-level rating:

Table 1: Comparison with role-based access control models

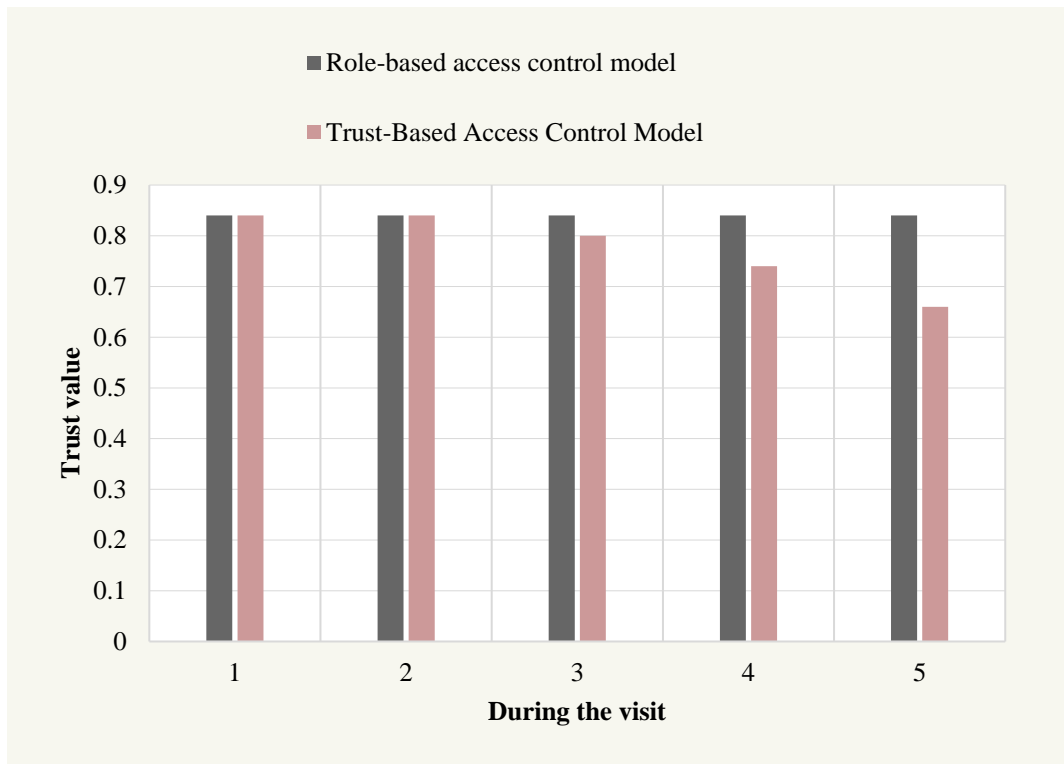|	Role-based access control model	Trust-Based Access Control Model
Initial situation	0.84	0.84
During safe visit	0.84	0.84
Unsecured access does not trigger trust reassessment	0.84	0.8
Insecure access with small permissions triggers trust re-evaluation	0.84	0.74
Unsecured access with high privileges triggers trust re-evaluation	0.84	0.66

Figure 2: Comparison with role-based access control model

During the secure login period, when the secure login is not reached, the user trust level will not change, as shown in Table 1. When the interface that leads to the trust level is reached, the user's trust value will change, and the user's permission value may change indirectly. Attributed to low-density security that has the least impact on reliability, unsecured high-gain access behavior has a large impact on reliability, which will lead to direct adjustment of user permissions. No personal adjustments have been made to this, so the trust value has not changed.

5. Conclusion

With the changes of market competition and the increasingly fierce market competition, enterprises must promote the integration of ERP and e-commerce to achieve success. By analyzing the necessity and value of informatization, it points out the urgent needs of small and medium-sized enterprises for ERP systems, and the difficulties of ERP implementation caused by lack of funds and IT talents. It shows that the use of cloud computing to build ERP is the development trend of information construction of small and medium-sized enterprises in the future. The research topic of this paper is the research on the digital transformation strategy and path of ERP. Through the construction of ERP platform, the paper puts forward suggestions for improving the existing ERP system in my country.

Acknowledgements

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