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Procedia Environmental Sciences 10 (2011) 875 – 880

**Procedia**

Environmental Sciences

**2011 3rd International Conference on Environmental  
Science and Information Application Technology (ESIAT 2011)****The Research of Supply Chain Information Collaboration  
Based on Cloud Computing**CHEN JUN<sup>1, a</sup>, MA YAN WEI<sup>2, b</sup>

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**Abstract**

Cloud computing is a rising information technology; it appears which make supply chain information collaboration easy and feasible. The essay summarizes the influence factors of supply chain information collaboration; the core technology of cloud computing in supply chain information collaboration; constructs supply chain information management mode, supply chain information transfer mode and the supply chain information collaboration system model bases on cloud computing technology. Finally, it poses research the problems of supply chain information collaboration under cloud computing environment.

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Selection and/or peer-review under responsibility of Conference ESIAT2011  
Organization Committee.

Keywords: Cloud Computing; Supply Chain; Information Collaboration; Model

**1. Cloud computing***1.1 The definition of cloud computing*

Cloud computing is the development of Distributed Computing, Parallel Computing, Grid Computing, which is a super calculating model based on internet. In a remote data center, thousands of computers and servers connected to a computer cloud. The definition of cloud computing is that cloud computing distributes computing tasks into a large number of resources pools of computer constitute, making different application system according to the requirements to acquire computing power, storage space and all kinds of software service. Special cloud computing refers to the manufacturers through distributes computing and virtualization technique building data center or the super computer, to provide data storage, analysis and scientific computing etc. services by free or on-demand renting methods to technical developers or enterprise customers.

*1.2 Development of cloud computing*

In 2010, cloud computing has developed fast, according to the study of relevant departments showing, in 2010, domestic cloud computing application market scale will reach 11.9 billion yuan, which is an increase of 29.5%. Research shows that the rapid growth will still be the main thematic of Chinese cloud computing application market in next few years, the direct motivating of growth comes from the national industrial revitalizing project pulling, the demand of constantly derivative of customer and the increasing popularity of cloud computing applications. Gartner Cearley once said, if there exists an IT technology list in the world, cloud computing will be on the top.

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At present, cloud computing has been accepted by most of enterprises, cloud computing applications also began popularization at home and abroad, cloud computing can be seen in each industry. By the end of 2010, eight hundred domestic computing clouds manufacturers have been already succeed in applying cloud computing to seven categories and 20 sub-sectors, the officially users also have more than 10,000 home, which can be found that cloud computing boom is bigger and bigger, and affected scope is more and more widely.

## **2. Supply chain information collaboration**

### *2.1 The definition of Supply Chain Information Collaboration*

"Supply chain information collaboration" is through technology information system to realize collaboration during supply chain partners, and sharing and exchange when the ones that realize operation data, market data such these information. Finally realize supply chain partners faster and better collaborate and response to the terminal customer needs.

### *2.2 The decisive factors of supply chain information collaboration*

#### *2.2.1 Interface collaboration*

Interface collaboration is the collaboration between supply chain enterprises refers to the way and the operation system interface ways, to improve the user and the whole system environment information interaction efficiency and effect.

#### *2.2.2 Data collaboration*

The goal of data collaboration is ensuring conformity in the whole system environment that all the information individual definition, regardless of problems that this information is produced by which subsystem or any transmission. [1]

#### *2.2.3 Control collaboration*

The goal of control collaboration is making some function combine together flexibility in the supply chain system environment to finish each kind of program join in a common effort.

#### *2.2.4 Program collaboration*

The goal of program collaboration is ensuring that subsystems can effectively interaction to support certain procedures, namely all related systems combined in order to achieve a particular program operations can coherent and easy. [2]

## **3. The core technology of supply chain information collaboration under cloud computing environment**

Cloud computing system is using a lot of technology; the key is among them with standardization technology, virtualization technology, data management technology, platform management technology in supply chain information collaboration.

### *3.1 Standard technology*

#### *3.1.1 Service interface:*

Supply chain enterprises can use standardization interface access cloud service providers, and relate to supply chain alliance master formed real information interchange. The unified regulations in cloud computing time use the computer various standards cloud computing service all sorts of standard etc, client and cloud computing interoperability entrances, which can complete the users' services for enrollment, registered customization and use etc.

#### *3.1.2 Service management middleware:*

Supply chain is using service management of cloud computing services provider to solve the problem of collaboration between different systems to control collaboration. Middleware is located in service and server cluster, provide management and service namely computing clouds system structure of management system. Authentication and authorization for marking, security services, catalog

standardization and operation is applied to provide uniform standardization program interface and agreement, hidden underlying hardware, operating system and network unified management heterogeneous network resources including load balance, resources monitoring and fault detection, etc; safety management including identity authentication and authorization, safety audit and comprehensive protection, etc; image management including image creation, deployment and management etc. [3]

### *3.2 Virtualization technology*

Cloud computing service provider of virtualization technology can put supply chain enterprises of different systems of different interface into the same system software virtual, in order to achieve the same interface between supply chain enterprise supply chain enterprise within the system with enterprise system, data collaboration, program collaboration and interface collaboration. Through virtualization software application can be realized with underlying hardware, it includes separated by sending a single resource divided into multiple virtual resources the crack of point's mode, or multiple resource integration into a virtual resource polymerization mode. Virtualization technology according to the object can be divided into storage virtualization, calculation of virtualization, network virtualization, and virtualization and divided into system level calculated virtualization, application level virtualization and desktop virtualization.

### *3.3 Data management technology*

#### *3.3.1 Mass data distribution and storage technology:*

Cloud computing services provider for supply chain enterprise provides mass data distribution and storage technology. Cloud computing services providers through the existing network technology and parallel technology, distributed technology to be dispersed in the supply chain enterprises can provide super computer constitute a function of clusters used for calculating and store data, and use their data in the hardware equipment such as expensive server and disk arrays with redundant storage equipment, the way to guarantee the reliability of the data in the supply chain management. [4]

#### *3.3.2 Mass data management technology:*

Cloud computing can process, analyze and store supply chain enterprises distribution and mass data, and meet the requirements of supply chain management which needs necessary and efficient management of large quantities of data. [5]

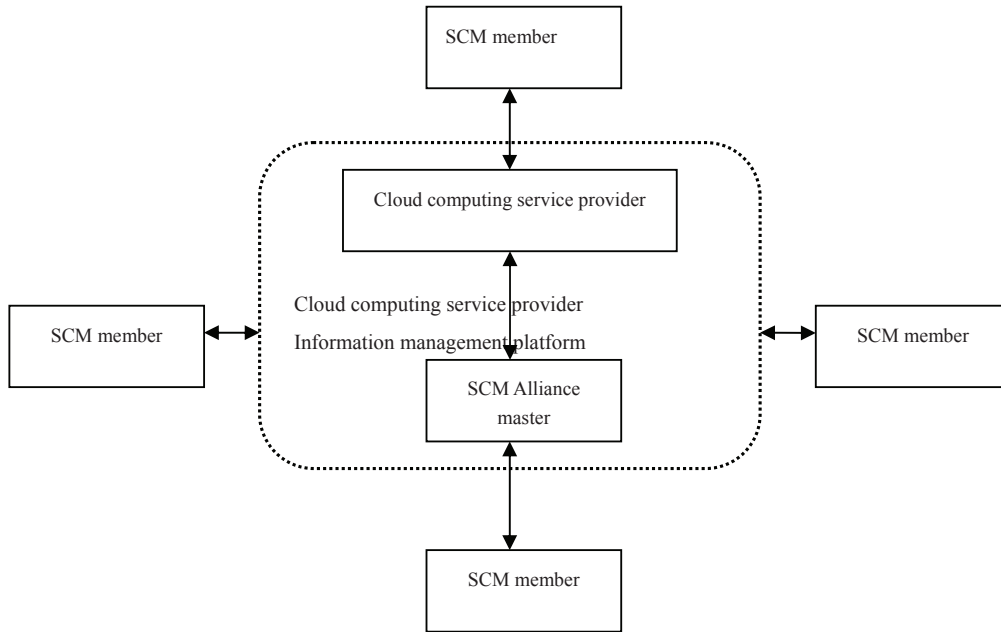
### *3.4 Platform management technology*

Due to cloud computing service providers' mass resource size, server numerous, so as to put a few server distribution in different geographical position nearby the supplier chain enterprises, and meanwhile running the different application of supply chain enterprise. Cloud computing system platform management technology can make a lot of server collaborative work, convenient for supply chain enterprise business deployment and opening, quickly found and recovery system fault, by means of automation and intelligence of supply chain management information system of large-scale reliable operation.

## **4. Supply chain information collaboration system construction under cloud computing environment**

### *4.1 Supply chain information collaboration management mode*

Supply chain should adopt what kind of mode for cooperation, which becomes a particularly important problem, cloud computing service provider is the third party information management of supply chain, is a kind of new management mode. The graph 3.1 shows supply chain information collaboration management structure put forward supply chain information collaborative structure model. Analyzing the whole structure in the following:

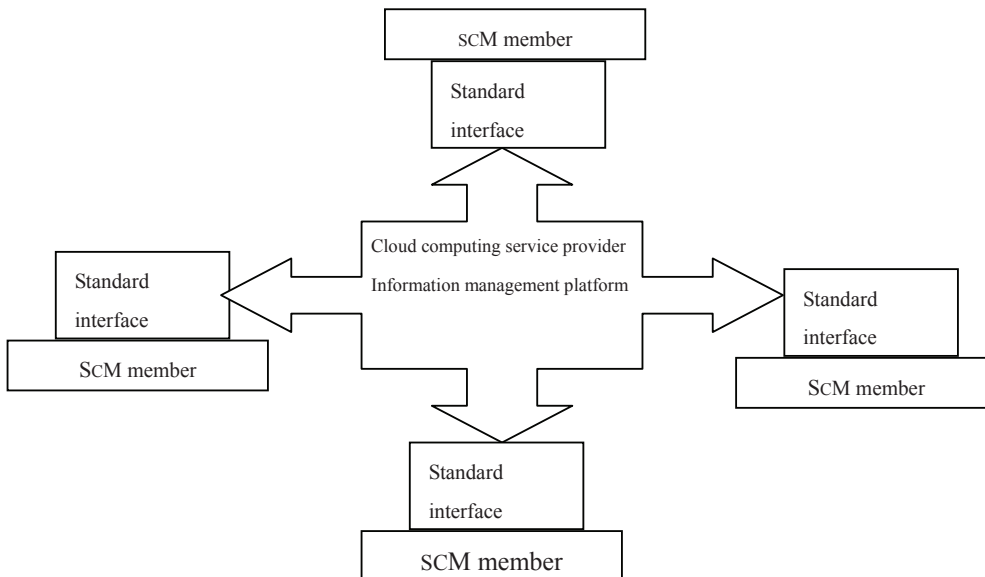


3.1 Supply chain information collaboration management structure

Cloud computing service provider as the third party information management of supply chain, which is responsible for information collection, information processing, information deployment, and finally reach the entire supply chain information collaboration.

4.2 Supply chain information transfer mode

In the supply chain management mode of information collaboration, information in what way transmission between cloud computing service provider and supply chain enterprise members is a relatively key problem. The most commonly used in information transfer mode in the supply chain management is using EDI line delivery, using LAN data transmission, using Internet network data transmission, etc. [6] In the supply chain management mode of information collaboration, as shown in figure 3.2 which shows that we are using internet to data transmission of supply chain, the reasons are:



3. 2 Supply chain information transfer mode

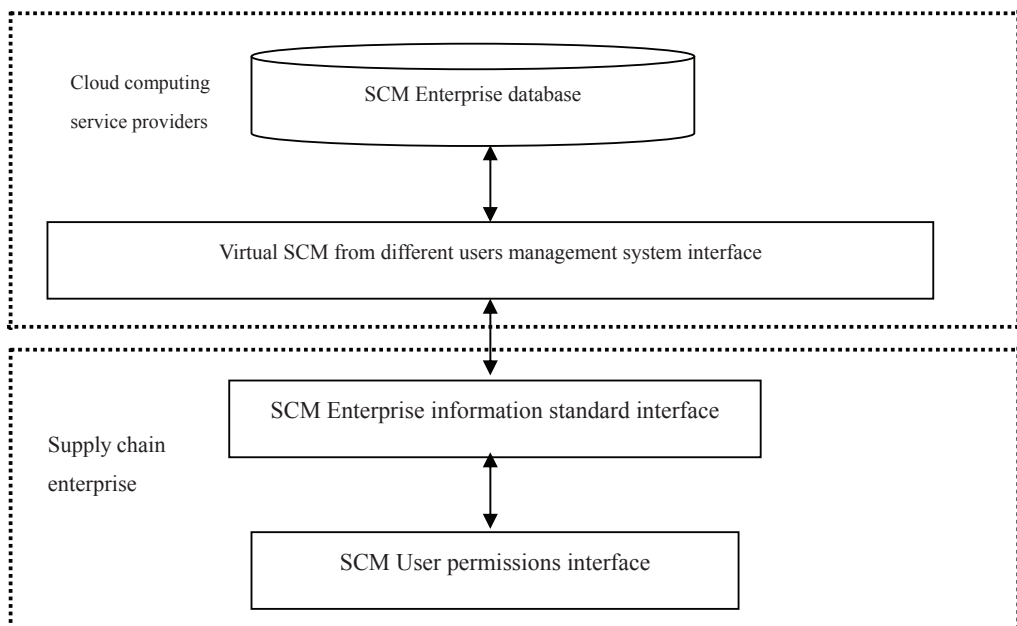
Along with the development of information technology, internet network transmission technology is mature gradually, its security, stability, compatibility is constantly improved, and all application range is expanding continually, become a kind of the universalization of transmission.

Compared to the EDI, LAN transmission, internet transmission cost is far lower, the enterprise only need to open web service which can enter into the internet world, that without having to acquire additional equipment and increase the professional management staff.

In the supply chain management mode of information collaboration, supply chain is a dynamic organization system, information service object is also constantly changing, the dynamic changes of the supply chain members quit from information services at any time, also constantly have new members join in the supply chain or join ranks, customer service, for such a dynamic form of organization, only the internet is simple, convenient, low cost and other characteristics can satisfy supply chain information collaboration management features. Meanwhile cloud computing service provider for all the supply chain enterprises provides access internet standard interface.

4.3 Information collaboration system structure model

Cloud computing service providers use virtualization technology to virtual into unity systems and unified interface by different systems (such as: ERP, CRM, etc), if the supply chain as an enterprise, then cloud computing service provider visual system is equivalent to enterprise ERP system, various members of the league of each functional departments equivalent of enterprise, enterprise with ERP system to allocate each department's resources, the arrangement of the department work plan, causes the enterprise the resource utilization rate achieve maximum, enterprise efficiency is at the highest; using the mass storage technology for supply chain enterprise database can provide mass storage space; using the platform management techniques to collaborative distribution in different locations of running with no system of data between enterprises; meanwhile, in the supply chain, which cloud computing service provider of virtual system also play allocate information resources, in order to reduce supply chain information distortion, accelerate information transmission speed and accuracy, improve the overall competitiveness of supply chain's role. Supply chain information collaboration system structure model establishment likes figure 3.3 shown. Supply chain enterprise through information standard interface access internet and supply chain information center cloud computing service provider to be connection and according to different user permissions on cloud computing service provider to make the virtual management system data processing.



3.3 SCM Information collaboration system structure model

## 5. Conclusion

Supply chain information collaboration under cloud computing environment still faces the following questions: (1) supply chain alliance master (the core enterprise of supply chain) with cloud computing service provider (the third party information management) how to the depth of cooperation and collaboration is worth deeply thinking. (2) Supply chain enterprise data in cloud computing service providers' storage security and confidentiality, integrity, and availability, supply chain collaboration information response speed that research are extremely important and full of challenge.

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