

## Research Article

# Food Safety and Network Resource Optimization under the Environment of Cloud Computing

Jian He

School of Computer Engineering, Jinling Institute of Technology, Nanjing 211169, China

**Abstract:** Since the development of cloud computing technology has accelerated the speed of information sharing and utilization. Thus, in this study, it takes the definition of cloud computing as a starting point, with the analysis on data center network design and data processing technology and programming model, to explore the construction of the credit files of food safety system, together with the analysis on the strategy of food safety information network resource optimization.

**Keywords:** Cloud computing, food safety information network, resource optimization

## INTRODUCTION

The history of "cloud computing" is not long, but in recent years, it has been got rapid development, in 2007, Google officially proposed this concept in IT industry, thus, the concept of "cloud computing" Caused great concern in the industry. With IBM, Amazon, Google launching their own cloud computing platform, products and services, it has prompted the majority of ordinary users to experience the power of cloud computing. Thus, we can see from the above, the cloud computing industry has a huge development prospects in our country. Moreover, in the past 20 years, Internet technology has changed human life greatly and cloud computing technology is starting another revolution, its development has accelerated the speed of information sharing and utilization, which can play an important role in promoting the transformation of the national economy. At the same time, it has caused great attention from all the countries in the world (Michael, 1977).

## MATERIALS AND METHODS

**Interpretation of cloud computing technology:** As a major innovation in the information industry, once the cloud computing model has been proposed, it was got widely concerned by the industry and academia. Among them, Amazon and other companies can provide cloud computing platform with the rapid deployment of virtual servers, which can achieve the required distribution of infrastructure. MapReduce and other new parallel programming framework can simplify the mass data processing model. The development platform of App Engine provided by Google company with its cloud computing can provide the interface for the application service providers to develop and deploy cloud computing services.

The researching field of cloud computing is widely, which is closely integrated with the actual production and application. Cloud computing is a kind of distributed computing, which is the integration and development of Internet technology, large-scale resource management technology (Fig. 1) thus, its research and application is a kind of systematic project, covering the following important problems such as: Data center management, resource virtualization, massive data processing and computer security.

As for cloud computing, it draws on the idea of the traditional distributed computing. Usually speaking, the cloud computing adopt the cluster of computers to constitute a data center, with the form of service delivery to the users, so that users can use it like water, electricity, who can buy cloud computing resources as they wanted. From this perspective, cloud computing is very similar to the goal of grid computing (Randall, 2002). But cloud computing has obvious difference with the grid computing or some other traditional distributed computing methods: firstly, cloud computing is elastic, which can make cloud computing work according to the load size as well as the dynamic allocation of resources, at the same time, the application platform of deployment of cloud computing should adapt itself to changes in resources according to the changes to give response. Secondly, compared with the grid computing that emphasized the heterogeneous resource sharing, cloud computing put more emphasis on resource sharing pool in a large scale, through the sharing, it can improve the reuse rate of the resources. At the same time, it can reduce the operating cost by using the economies of scale; finally, cloud computing should consider the economic costs, therefore, the design of hardware, software platform should no longer pursue high performance blindly, which should consider the following factors such as: Cost, availability, reliability and so on.

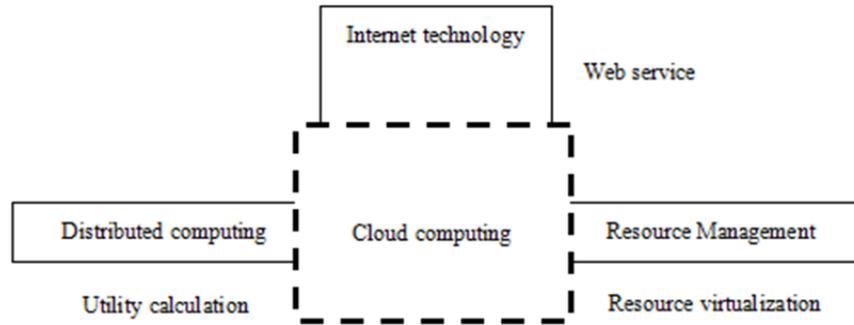


Fig. 1: The relationship between cloud computing and the related technologies

Table 1: Classification of access control model

Classification of access control model		
Whether the accessing subjects can control the authority	Relationship between subject and authority	Distribution of the model
Autonomous access control model	Direct access control model	Centralized access control model
Mandatory access control model	Indirect access control model	Distributed access control model

Cloud accessing control mechanism can have a pivotal role, which can be in the status of core services among the cloud environment security system, through the research on cloud computing environment, combined with the control based on the accessing property, by specifying the user accounts and property, configuration properties and permissions, which can make the cloud environment accessing control achieve the desired security requirements (Table 1). Security managers can define various attributes according to the demands, at the same time, it can configure the appropriate accessing rights, according to the responsibility of the customer to assign different properties to fine-grained accessing control, so as to simplify the cloud storage permissions management, ultimately, it can improve the effectiveness of accessing to reading and writing and realize the safe and controllable accessing control mechanism under cloud computing environment (Wang *et al.*, 2009).

**Establishment of food safety credit file system:** Because the food safety credit file is a costly information reproduction activity, therefore, it is of great importance to dig its scope of application from multiple levels and maximally realize its use value to optimize the proper meaning of the system. Thus, it should be based on cloud computing environment, so as to set up food safety information network system, moreover, the food safety credit files should not only include the departments of banking, insurance, tax departments of the information system for docking, but also should include the establishment of credit information with high speed circulation inter-working sharing mechanism. When the food safety credit rating is below a certain level or the major food safety accidents records appeared, it should take "one vote can deny everything" system, so as to cancel and deny the

relevant field qualification of the producers and business operators, playing its deterrent effect from multiple levels.

## RESULTS AND DISCUSSION

**The design of data center network:** At present, the cloud computing data center in large scale is composed of tens of thousands of nodes and the number of nodes is in increasing trend. It has brought great challenges to calculate the large scale of computing nodes for the fault tolerance and scalability of the data center network.

Taking PortLand as an example to illustrate the network topology. PortLand draws on the idea of Fat-Tree topology, which can be connected with  $5 \times k/4$  K-interface, connecting with  $k^3/4$  nodes. PortLand is composed of edge layer, convergence layer and core layer. Among them, the edge layer and aggregation layer can be divided into several pods, each pod can contain K switches, which belongs to the boundary layer and aggregation layer (each layer has  $k/2$  switch). The interior of Pod is connected with the structure of complete two graphs. The edge layer switch is connected with the computation node, each Pod can be connected to  $k^2/4$  node (Lan *et al.*, 2013). At the same time, sink layer switches are connected with the core layer switches, each Pod can be connected to  $k^2/4$  can core layer switches. Based on the PortLand, it can maintain multiple paths between any two points, thus, the computing nodes between each pair of any moment can have non-blocking communication, so as to meet the requirements of cloud computing data center with the demand of high reliability and high bandwidth. At the same time, PortLand can use the small switch to connect the large scale computing nodes, which can bring good scalability and reduce the construction cost of the data center.

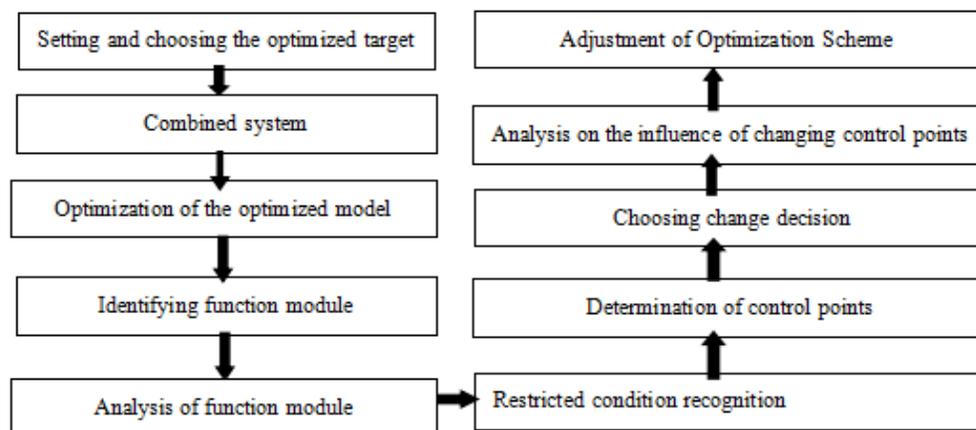


Fig. 2: Flow charts of the material selection

**Data processing technology and programming model:** PaaS platform can not only achieve massive data storage, but also can provide analysis and processing function to deal with mass data processing. Due to PAAS platform is deployed in large-scale hardware resources, therefore, the analysis of massive data processing needs the process of abstraction, which requires its programming model support scale should be expanded, so as to shield the details from underlying layer with simple and effective effect (Celesti *et al.*, 2010).

**Strategy of food safety information network resource optimization:** Based on the optimization management model, it can only have distribution for the resource as a whole with a relatively meso level, thus the resource allocation should be specific to the various departments as well as the investment aspects of each project. Therefore, it is very critical to choose and set the resource allocation scheme (Fig. 2):

- **Plan and choose the optimization objectives:** The goal of optimization generally regard the overall goal as the top, then the overall goal can be subdivided into smaller targets from the top down
- **Combination system:** According to the optimized target, the target can be further refined
- **The optimization of optimization model:** After the selection of the target, the existed resources of food companies should be collected, researched and organized
- **The analysis of functional modules:** Analysis of the functional module is the formation of the support system in the formation of the front face; some of the original various resource portfolios can be re-viewed and set position
- **The analysis of functional modules:** The function module of the combination should be made analysis from its function, composition and related factors of the changes for this module

- **The restriction on the identification of conditions:** The analysis and comparison of the above function modules should be available after these function modules with all aspects of the constraints, the restrictions which should be quantified, so as to produce a quantitative constraint equation and constraint condition
- **The determination of control points:** The time varying of the optimal selection of the target is different and the optimization process should be limited
- The choice of the decision making is based on the analysis of the relationship between the factors and the relationship of the factors and then the sensitivity analysis on the control points should be carried out.

## CONCLUSION

The analysis on the impact of the change of control points. Predicting the changes of control points, as well as the results that the control points brought, having regularly or irregularly monitor on the changes and having timely adjustment to the bad changes. Monitoring changes and adjusting the optimization scheme. Taking the dynamic changes into account, it is necessary to carry out regular or irregular monitor on the control points, so as to adjust the actual value of the deviation from the actual value of the optimization scheme.

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