Design of Trust Model based on Cloud Computing

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Abstract: Cloud computing is a kind of burgeoning new business models and infrastructure, but the characteristic of openness, flexibility, and the public availability, to the application security has brought about many challenges. In this paper, by analyzing the current cloud computing, trust and trust management, and other technology, corresponding to the level of trust model based on behavior of cloud computing environment was given. According to user's behavior dynamically and trustworthiness of value, to determine the user's confidence level, further to control the corresponding behavior of users and permissions, it can guarantee the safety and reliability of the cloud computing system in order to standardize management and guide users.

1 INTRODUCTION

With the development of information technology innovations, computer industry has become a new variety and practical technologies, cloud computing technology is one of them. Cloud computing is based on Internet, using virtualization technology, a large amount of storage resources, software and computer resources come together, forming a giant warehouse shares IT resources for remote cloud provides users with information services that meet their needs. From another perspective, cloud computing makes IT much lower operating costs and costs of services, and accelerating the deployment of services and improve the convenience of the service.

Although cloud computing industry has a bright future, now the potential risks and safety issues of cloud computing have become the main problem restricting the development. At present, in the settlement of the security issues of cloud computing, have emerged in many ways and ideas. With the emergence of emerging trusted computing, trusted computing is used in information security more and more, use trusted computing to protect systems and hardware technologies have become more sophisticated, the traditional information security will be further developed as a service of trust and confidence between the parties and served on management. This paper aims to analyze the current technologies such as cloud computing, trust management, presented corresponds to a cloud computing environment based on behavior model of trust rank, to calculate the user's trusted values dynamically based on user behavior, which determines that the user's trust level, to further control user behavior and authority, to regulate and guide the user, improve the safety and reliability of cloud computing systems.

2 CLOUD COMPUTING

2.1 Putting Forward of Cloud Calculation and Its Development.

After computers, Internet, cloud computing is yet another wave of innovation in the field of information. Although cloud computing's time is not long, its sudden rise and network applications is related to the transition, many of its ideas were involved in grid computing, utility computing, clustering technology, distributed systems technologies are relatively mature technology. Therefore, from the other aspects of that cloud computing can be seen as the technology upgrades. Then, after a series of promotional development, mainly through mode in power plant, utility computing, grid computing and cloud computing four relatively mature stage of development to the present level. After following the change of the personal computer and the Internet, cloud computing is seen as another wave of IT, have great market

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prospects, it will bring people, mode of life and fundamental change in the business model. With the development of related technologies, cloud computing applications in business has become a reality. At present, the cloud computing industry is gradually growing, and its benefits is increasing day by day.

2.2 Information Safety of Cloud Computing.

In the Internet, security is the eternal topic. At present, many critical problems facing the development of cloud computing, and security issues first. With the growing popularity of cloud computing development, the importance of security issues on an escalating trend, more and more companies because of the security issues in cloud computing took a wait-and-see attitude. According to the IDC report, there are more than 74% users think the main causes of security problems is to limit the development of cloud computing. Thus, cloud computing security problems have been widespread concern in the industry, and in order to better develop cloud computing, many institutions, research groups and standardization organizations carry out appropriate research.

At present, cloud security products are many, mainly dominated by traditional IT antivirus enterprise. With the emergence of emerging trusted computing, trusted computing is used in information security more and more, using trusted computing technology to guarantee the security of systems and hardware technology is more and more mature. With the development of cloud computing, we have reason to believe that, in the near future, we will find a practical and highly effective way to make sure cloud computing security.

3 TRUST MANAGEMENT

3.1 Definition of Trust and Its Property

The definition of trust. Trust management can be divided into two kinds, one kind is based on the strategy of trust management, and the other is a trust management based on behavior. M.B laze trust management belongs to the former, it uses static authentication mechanism to determine authorization, the research focuses on the certificate authentication, encryption and access strategy, etc. The disadvantages of it can not be timely and effective way of dealing with entities trust relationship changes. Once the entity is endowed with a certain identity and authority, the entity in the process of access will have the authority, suddenly broken entity can use the authority to make illegal behavior, is not able to make a timely response system.

3.2 Content and Classification of Trust Managements

3.2.1 Contents of Trust Managements

Trust management (TM) this concept was started by M.Blaze and others for open distributed systems, distribution and dynamic characteristics, link between the trust and access control, used to resolve credibility, uncertain security in your environment. Trust management is defined as: adopt a unified method to describe and explain the security policy, security trust certificates and trust relationship . Its basic principle is to use scientific methods to describe, handling systems complex trust relationships. Common trust models are Sun'S model,Claudiu'S model .

3.2.2 Classifications of Trust Managements

Trust management can be divided into two kinds, one is policy based management, another is based on the behavior of trust management.

Submitted by M.Blaze trust management belong to the former, it uses static verification mechanism to determine authorization, whose research is focused on certificate authentication, encryption, and access policies. Its disadvantage is that you cannot trust relationships of the entities to respond effectively to changes in a timely manner. Once the entity has been endowed with a certain identity and permissions, then the entity during his visit will have that authority, suddenly broken entities may use this authority to make illegal, and the system is unable to make timely responses.

Behavior-based trust-management will be based on the entity's historical behavior dynamically adjusts its trust, trust relationships between two entities is updated in real time, to better adapt to the changing environment of cloud computing. Therefore, by using a trust model based on behavior to solve access issues between the entities in cloud computing.

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4 TRUST HIERARCHY BASED ON BEHAVIOR MODELING

4.1 The Basic Idea of Trust Model based on Behavior

Trust hierarchy based on behavior model's basic idea is through behavior, or is the result of an entity arising out of acts, the trusted values obtained from the General computing entity, and on this basis to determine or change the trust level of an entity, further changes to the current entity roles and permissions, in order to achieve a single entity or even the whole cloud computing systems are monitored and protected. Principle is shown in Figure 1.

4.2 Trust Model based on Behavior Management Strategies

This model in cloud server in the of entity of trust grade by a Trust Center to unified management, dang user login cloud server completed identity validation Hou, Trust Center will view user of current trust grade, if trust grade below minimum service grade (minimum service grade, that critical grade, if trust grade again declined, server on refused to the user using), is cloud server will refused to for user through cloud service; actual operations in the, dang user trust grade was reduced to minimum service grade Shi will received warned information If trust levels belonging to the service level, Trust Center will notify the cloud continues to provide cloud services. Cloud in cloud services to provide users in the process also will monitor and audit user actions, users of a variety of risk behaviors (such as entity attempts unauthorized operations) can be recorded, through analysis and calculations, changing the user's trusted, and has the potential to affect the trust level, and change the user role properties, permissions will be reassigned. Adoption of this model is the core of credible entity acts as well as changes in trust level, which affects the user permissions.

5 USER-TRUSTED VALUE CALCULATION METHOD

5.1 User Behavioral Evidence Acquisition

Credible terms in this article are based on entity behaviors, or is an entity acts as a result of the entity. Cloud services providers can be based directly on hardware and software detection method to obtain the user's behavior, to quantitative assessment of consumer confidence in the overall behavior of Foundation for cloud computing services value the result itself is objective, does not have the subjective characteristics of trust. Cloud computing service provider has the right to full control over cloud resources, trade secrets and privacy of users and cloud-based services as well as external purposes provided by considering the cloud service providers must not view the user's data content, are virtually impossible to vast amounts of data for detailed inspection. However, the huge monitor relies on user behavior characteristic of network traffic and find statistics of users ' behavior. Currently available for obtaining user behavior evidence there are main methods of the following kinds:

(1) use network traffic monitoring and analysis tools, such as the Bandwidthdl, each gateway protocols are available for more lP flow, view network status, such as: the rate of packet transmission and reception.

(2) use intrusion detection systems currently available, such as RealSecttr, can obtain access times, operating failures and delays.

(3) using the audit trail system to generate system event log and record user behavior, including system Ft log Ft log records, applications, network management, and audit logs capture user data packets, and accordingly records.

(4) according to the Protocol (for example, RMON,SNMP) of developed software.

(5) with hardware access to evidence, such as the NetScout2 company's hardware probe

(6) not detected evidence that other methods may be used for research, for example, can be based on evidence of previous users reasoning and prediction.

5.2 User Behavior Trust Hierarchy

Entity representation of the result mainly in the following three ways:

(1) percentages. Including user behavior and a similar level expressed as a percentage of the common attacks, less qualified, credible level percentage greater trust levels higher.

(2) a Boolean. Only two trust levels. Exists, then the trusted level 1 of the project; does not exist, then the project credible level of 0.

(3) specific value within a certain range. According to an action by a range of properties for ranking.

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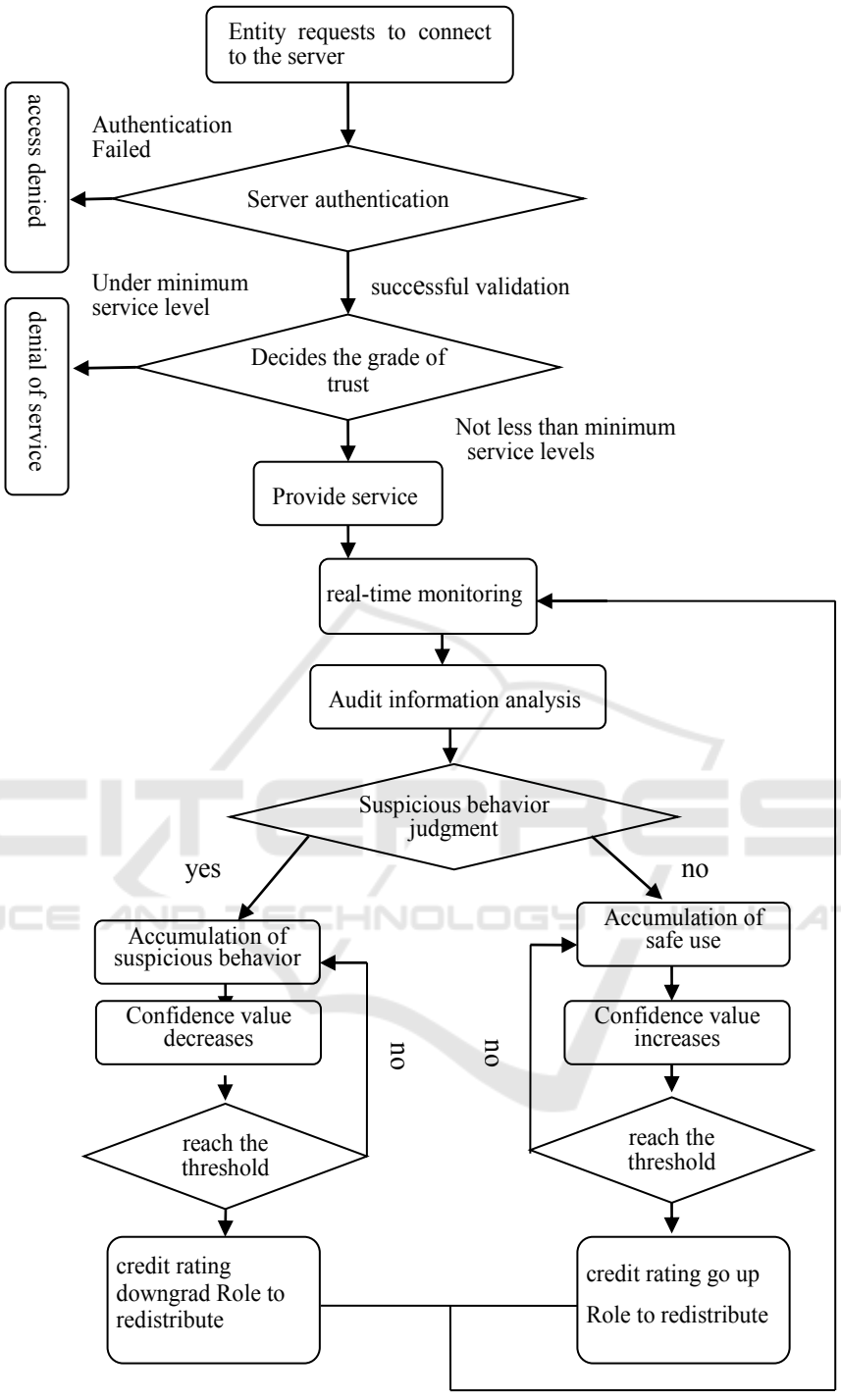

Figure 1: The level of trust model based on behavior principle diagram.

The entity behavior of above three kinds of forms result, can set trust grade of manifestation.It is 1 to can believe a value[0, 1] numbers, therefore, need to pass to return one the method for turning to acquire each trust grade to should of can letter value.Suppose original behavior result the Di assigned Ni reputation grade, but current behavior result reputation grade is Mi, then Di of can believe value Ti= $\frac{M_i - 1}{N_i - 1}$.

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Can believe the calculation method of value. The entity behavior that establishes to need an investigation is a Dl, D2 and D3.....Dn, the result of each behavior Di assigned Ni trust grade, the behavior result of current record is Mi:(Mi ∈ [0, Ni-1])Each power of behavior Di heavy coefficient is a Yi(Yi ∈ and), then can get the following calculation the entity can believe the formula of being worth the T:

$$T = \sum_{i=1}^{n} Y_i D_i = \sum_{i=1}^{n} Y_i \frac{M_i - 1}{N_i - 1}$$

Among them, the weight coefficient of Yi can be obtained by the analytic hierarchy process. Hypothesis requires investigation and collecting evidence for the Dl, D2, D3, ... Dn, we can use the comparison one by one, determined that n behavioral evidence, and any comparison of the two.

6 CONCLUSION

With the popularity of cloud computing technologies, and the openness and flexibility of cloud computing, virtual properties and public availability, brought many challenges to application security. Combining cloud computing security problems facing the proposed trust model based on behavior, and gives users confidence value calculation method.

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