Operation, Administration and Maintenance Modes Based on Cloud Computing

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Abstract. The operation, administration and maintenance (OAM) mode based on cloud computing, cloud management for short, is the application of cloud computing in management. Compared to the traditional management mode, cloud management has an absolute advantage in cost. Besides, it is innovative in the deployment of business, and broke through the limitations of traditional management mode. For a huge amount of network data resources, cloud management can flexibly manage and utilize them. It is also an effective way to reliably deploy system. Cloud management is in itself applying the cloud computing in management. It can effectively support the operation, administration and maintenance and the construction of the network management support system. This essay will mainly introduce the emergence of cloud management, the establishment of cloud management mode, the initial progress achieved by cloud management, and the outlook of future OAM mode.

Introduction

The OAM mode based on cloud computing, cloud management for short, is managing and controlling in a unified manner the vast resources which are stored in computers and connect with each other through the Internet, in order to provide appropriate services to the customers.

Private cloud is more suitable to our ordinary users, which also provides more opportunities for network operators. The current private cloud services, especially the private cloud solutions based on open source technologies, can solve the bottleneck problems of excessive investment and slow deployment of business during the IT development for the operators at a lower-cost but more efficient way.

Main solutions include reducing the expenditures in buying information technologies, decreasing the cost in operation and maintenance.

Virtualize mid-range and high-end servers to provide services with a low utilization rate, which can largely reduce the cost of purchase and maintenance. This approach can dramatically reduce the chances of resources being idled, decrease power consumption of air conditioners and save space for the data centers by cutting the number of servers.

Through sharing and dynamically allocating IT resources, the idle resources can be fully used so that the utilization rate of resources will be improved. Private cloud can integrate servers and storage space, and keep efficiently integrating system architecture and business process during the operation, so as to achieve the purpose of saving cost.
Analysis and Establishment of Cloud Management Mode

The section headings are in boldface capital and lowercase letters. Second level headings are typed as part of the succeeding paragraph (like the subsection heading of this paragraph).

Analysis of Traditional OAM Mode

The traditional OAM mode has features as follows: inconsistent and low efficient management modes in different areas due to the relatively scattered management of equipment and people, and decline in normalization and standardization. The centralized OAM mode based on cloud computing can make up for what the traditional OAM lacks, and realize the centralized monitor, maintenance and administration of equipment. The cloud computing can allow experts to operate centralized, and interact with the hardware operators on the spot. It can meet customers’ demanding requirements of higher standardization, informatization and automation.

There are some unsatisfying places in the traditional OAM mode. First, the traditional OAM mode still uses centralized network management support mode, but the construction of network management support system is dispersed, which restrains the good system from being promoted and utilized effectively. Second, the barrier lake exists due to the asymmetry of information and lack of communication and exchange between prefectural cities.

We should change the current management mode from the passive type to the proactive one. In the meantime, we should push the integration of prefectural network management support system and follow the good system examples. Also, we should increase timely communication and exchange between prefectural cities, and break the pattern of delay in passing on information.

Cloud Management Mode

The Cloud management must be built on the basis of cloud communication. It should be considered, on the overall level, how to apply cloud computing in cloud management and then form a systematic management mode. It needs an Internet - high speed grid mode - complying with its own characteristics, if the OAM evolves to cloud management mode.

We must think on the overall level, not only the cloud communication level, how to interpret the current cloud management mode with the cloud computing theory in IT sector. Hence, it is not enough to build a cloud management mode in each area. We must consider the differences between areas to build an overall basic model.

An alternative is to form layered cloud management mode, that is, to form a layer by combining an advantageous node or a single area with areas consisting of other nodes. Differentiation is obvious between different areas but some similarities also exist so that the construction of mode based on layers should reflect differences first. Differentiation provides space for balancing different areas so that each area can concentrate on doing what it is good at with its advantages and forces. To look for experience using differentiation can avoid repeated use of resources and increase work efficiency.

For instance, there is a ZTE maintenance system in the east of Guangdong province and a Huawei maintenance system in the west of the province, but both of the two areas have ZTE and Huawei equipment. The eastern system is Huawei-based, and the other one is ZTE-based.
Differentiation and homogenization get along well with each other in these two areas. For different areas, we can optimize them respectively and share the results together.

First of all, to build information highways in prefectural cities, and provide conditions of cloud communication, which is the basis of building cloud management mode and the premier problem needs to be solved. Second, be clear about which network to be used. Specifically, we need figure out the network platform in which mode evolves if we want to form a cloud management mode. It will play an important role when Internet matches the cloud computing mode.

It is popular to build data centers in order to realize cloud management. The construction of a large data center needs to be initiated from physical basis, system platform and data pooling of each system.

Physical basis. Sharing and integration of the network management systems’ basic frameworks in data centers is the first step to build cloud computing. Automation and virtualization technologies of cloud platform can realize the separation of software and hardware in the management system of a data center, then realize the integration of physical resources in network management support system and create shareable resource pools, which let the entire architecture fast and flexibly meet the need of business development. Clustering of servers, for example.

System platform. It includes four topics of business framework, operating framework, data framework and technology framework. China Mobile Group Corporation gives the method and direction to achieve cloud system. First of all, improve the full-range operation and support ability by shifting the focus on equipment and network to client and business. Second, reflect the integration trend by moving from specialized network management to comprehensive network management, and play the resource-intensive effect through integrating support system.

Data pooling. It brings four public technical services and four public technology platforms, and emphasizes the separation of application framework and public technology service. It values the hardware configuration planning, and improves the ability of sharing resources through introducing new technologies such as virtualization and cloud computing. It facilitates the transfer of specialized network management to integrated one.

**Initial Progress Achieved by Cloud Management**

Applying cloud computing and virtualization technology in IT platform can help enterprises reduce cost sharply and improve the platform’s working efficiency. It is known to all that the thought on cloud computing management mode is still in the exploratory stage. But the cloud management has achieved the following preliminary achievements.

Based on centralized network collaborative management, cloud management establishes network security model, improves the reaction ability of detecting failures, standardizes the process of handling failures, provides accurate data and timely communication approach, and increases the efficiency of handling failures. Cloud management realizes safe and fast recovery of business, shortens interruption of business, and enhances customers’ perception, through useful integration of network resources, contingency plans and network management process.

Based on the intelligentized integration platform, cloud management realizes the functions of detecting, analyzing and handling failures, and further realizes the whole-process management
and control of the failure treatment. Cloud management makes the troubleshooting procedure explicit, simple and just in time.

Summary

We must initiate business in accordance with the OAM, in order to make OAM play to its utmost strength. It is crucial to set up a standardized mode and performance appraisal indexes that can not only reduce the unnecessary discussion and experiments during the OAM, but also improve the stability and availability of network equipment. It is predictable that cloud computing - a self-serving consuming model - will be further used in cloud service, mobile computing and SNS. Both enterprises and individuals may need to get IT resources and services at their requests. Now the tri-play is on the agenda, which is a powerful incentive for the development of cloud management. Cloud computing is more suitable for China’s national policy of encouraging service and high-tech industries. Supportive policies and huge government investment will fasten the establishment of cloud computing models. It will take a long time to build clouds, popularize cloud computing, and accomplish the fast growth of cloud services, even though cloud computing has great potential in China. Users still have concerns on data security and service reliability. Chinese cloud sector mainly provides low-valued services because it lacks mature cloud service platform and economic effects of cloud cannot be quantized.

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