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Cloud Data Center Network Construction Based on Virtualization Technology

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ABSTRACT. *With the continuous innovation and research and development of various new technologies, network virtualization technology and cloud computer technology have also emerged. The core issue of the new round of technological revolution is the development and transformation of the cloud data center network. This paper summarizes the characteristics of network virtualization technology, and analyzes the composition of network virtual systems and how to implement cloud data CITIC network virtualization technology.*

KEYWORDS: *Virtualization technology; Cloud data center; Network construction*

1. Introduction

1.1 Network Virtualization Technology Concept

Network virtualization technology refers to applications and operations that enable users to implement different businesses on the same host[1]. At first, a large number of software development companies paid great attention to network virtualization technology, but they were constrained by the processor function and adversely affected the development of network virtualization technology. With the development of software development companies such as Intel, server functions have been significantly improved. At the most critical point, server virtualization expands the density of use of the same physical space in the data center, while the data for logical servers grows.

1.2 Network Virtualization Technology Features

In the era of information technology, network virtualization technology has been upgraded, and a computing pool with powerful computing power has been initially formed, which can eliminate the differences between different servers. In general, a single cloud computing data center is composed of a large number of physical servers, and this physical server can run virtual machines and even run a large number of virtual machines at the same time. With the development of science and technology and the expansion of cloud computing data centers, cloud data centers

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can use hundreds of thousands and hundreds of thousands of virtual machines to use and operate.

2. Cloud Data Center Network Architecture

2.1 Traditional Data Center Network Architecture

The traditional data center network architecture is based on the CIOQ switching architecture, including one or more parallel working uncached chips, and each chip can realize the connection between the FA port of all inputs and the FA port of the output through the switching network port. The service scheduling generally connects the FA chips of all input and output terminals with the switching chip through a centralized puncher[2], and the FA chip reports the congestion of the port outlets to the centralized puncher. Traditional cloud data centers are mainly composed of networks, storage, and servers. Generally, operators use FCOE to implement network storage. The three-layer network of data centers mainly consists of access layer, aggregation layer, and core layer network. There is also a cross-data center network that enables data interaction in the data center. The data center network architecture is the access layer in the bottom-up order. The access layer is mainly responsible for accessing the terminal equipment and accessing the aggregation layer equipment to the upper level. The aggregation layer is responsible for accessing multiple service switching devices to the lower access layer, and interconnecting the switching devices at the core layer. The core layer is the aggregation of the switching devices in the lower layer aggregation layer, and ensures that the switching devices at the aggregation layer in the network implement high-speed switching and access the network egress. The role of cross-data center is mainly reflected in the emergence of cloud computing virtual technology, data interaction is very important in the era of big data.

2.2 Cloud Data Center Network Architecture

At the same time as the era of big data, cloud computing has been applied in data centers. Under the influence of factors such as technology and equipment, the traditional network architecture has gradually evolved from a three-layer network architecture to a two-layer network architecture, namely the access layer[3]. And the core layer. The main reason is that the cloud computing server mainly accesses the Gigabit or 10 Gigabit network. The aggregation layer is mainly used as the link of the access layer device. It lacks certain significance under big data and gradually reduces the adoption of the aggregation layer. The network architecture of the new generation cloud data center is a switching architecture based on dynamic routing. The switching architecture is also a multi-level architecture, in which the switching units in each level are connected to the next-level switching units. As a typical three-level switching architecture, it is mainly defined by two parameters, the parameter k is the number of intermediate-level switching units, and the parameter n is the number of switching units of the first-level and third-level, then the first-level

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and third-level It is composed of n K*k switching units, and the intermediate level is composed of k n*n switching units, forming a k*n switching network, that is, having k under the network. *n input ports and output ports[4]. The network switching architecture of the next-generation cloud data center can be scalable, reconfigurable, and non-blocking, supporting the expansion of switch port system capacity, port speed, and number of switch ports.

3. Cloud Data Center Network Virtualization Technology Implementation

3.1 Control Platform Virtualization

According to the control plane structure, it can be divided into vertical and horizontal directions. Vertical virtualization refers to the use of virtual technology to combine different levels of devices into one, similar to downstream is an interface expansion of upstream switch devices. After being virtualized, the control plane and the forwarding plane are centralized on one upstream device, while the downstream device is mainly responsible for some simple synchronization processing, and the upstream device is also responsible for packet forwarding, so this virtual technology can be regarded as one[5]. A centralized forwarding switch. Horizontal virtualization is the virtual integration of the same type of switch devices in the same level. The control plane work is regarded as a vertical process, which is implemented by one main body, but all the boxes and frames in the forwarding plane are Local forwarding and processing of traffic can be implemented, which is a typical distributed forwarding structure.

3.2 Data Platform Virtualization

Both the control plane and the data plane are data communication dimensions, wherein the data plane is also the data forwarding plane. The implementation of data plane virtualization is implemented by two protocols, SPB and TRILL. These two protocols are used as a control protocol. The topology path is calculated in the device. When forwarding, the outer layer of the original packet is encapsulated, and the different destination labels are forwarded in the protocol area. The virtual technology of the data plane is multi-discrete in a broad sense. When the Layer 2 network is forwarded, the scale range can be effectively extended. In the case where multiple nodes in the network node are virtualized as one node, the control plane is virtual. Theization still only stays at the ones or tens level, while the data plane virtualization has reached the hundredth level. At the same time, its shortcomings are particularly obvious. Packet processing for the control protocol is introduced in the data plane virtualization, which undoubtedly increases the complexity of the network. In the forwarding process, the data packets are also encapsulated and unpacked. Network forwarding efficiency is reduced.

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3.3 Control Plane is More Than One

IRF and VSS are a widely used control plane multi-virtual technology. The key to the two technologies lies in the following points[6]:

First, based on the engine's active and standby mode, the main control engines of the two technologies are on one master engine, and the other engines are used as backups. Work items such as table synchronization and protocol learning are independently completed in the main control engine. Virtual switching devices are usually distributed switching, and data forwarding is mainly done independently by the switching board.

Second, double live detection processing. After the link fails, two virtual physical devices with the same configuration have dual active nodes in the network, which causes IP gateway confusion on the upstream and downstream devices. If there are cross-device link aggregations on the network, VSS will extend the packets through LACP and perform mutual detection and notification. For example, if there are rich interfaces in the virtualized physical devices, they can be separately wired for monitoring. In the case of a dedicated link failure, the operation of the IRF and VSS is that the physical device is in the backup state, and all interfaces are closed until the link is restored and renegotiation is performed. It is important to note that the two virtualized technologies need to restart the physical device of the backup role to complete the virtual deployment.

3.4 Data Plane is More Than One

The data plane is more imaginary. The packet of the Layer 2 network is encapsulated with a layer of identifiers, and then addressed and forwarded. Based on the outer identifier, multipath load balancing and loop avoidance can be performed. The current public standard protocols are mainly SPB and TRILL. The SPB is a static planning forwarding path, which is difficult to be used for large-scale Layer 2 network expansion. The traditional network forwarding is still used in the SPB network. To ensure unicast load balancing and looping acyclic broadcast[7], the related software algorithms need to be performed. definition. TRILL, also known as transparent multi-link interconnect, is a technology developed for data centers that solves multipath problems in large networks.

4. Conclusion

With the improvement of China's science and technology in recent years, the level of network communication is also constantly improving, ushered in the era of big data. In the era of big data, the realization and application of cloud data center network virtualization technology is the key research content in the industry, which not only helps to achieve data sharing, improve resource utilization rate, but also creates a certain economy for related industries and enterprises. Benefits drive the development of the industry. At the same time, in the application of network

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virtualization technology, many problems have been highlighted, and a series of measures are needed to ensure the security and reliability of the cloud data center network and safeguard the social interests.

References

[1] Guo C, Lu G, Wang H J, et al (2010). Secondnet: a data center network virtualization architecture with bandwidth guarantees. Inproceedings, no.24, pp.620-622.

[2] Bari M F, Boutaba R, Esteves R, et al (2013). Data Center Network Virtualization: A Survey. IEEE Communications Surveys & Tutorials, vol.15, no.2, pp.909-928.

[3] Tekade A P, Varshapriya J N (2013). Virtualized Data Center for CLOUD Based Network Architecture and Environment. Journal of Engineering Computers & Applied Sciences, vol.2, no.6, pp.85-86.

[4] Nan C, Yongbing F, Xiaowu H,et al (2014). Research on the Technology of Application-Oriented Cloud Data Center Network. Telecommunications Science, pp.89-90

[5] Chen C, Li D, Li J, et al (2016). SVDC: A Highly Scalable Isolation Architecture for Virtualized Layer-2 Data Center Networks. IEEE Transactions on Cloud Computing, no.1,pp.1-2.

[6] Chen Z, Dong W, Li H, et al (2014). Collaborative network security in multi-tenant data center for cloud computing. Tsinghua Science and Technology, vol.19, no.1, pp.82-94.

[7] Yang Y, Chang X, Liu J, et al (2017). Towards Robust Green Virtual Cloud Data Center Provisioning. IEEE Transactions on Cloud Computing, no.99, pp.168-181.