Research on Network Communication Data Transmission Mechanism Based on Cloud environment

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Abstract: Traditional network communication quality and performance are low. In order to improve the quality of communication data transmission between network nodes, a reconfigurable communication data transmission model based on cloud computing environment is proposed. The cloud computing environment is built by layering the cloud bus protocol and building the cloud environment topology. The network communication data transmission flow, reconfigurable network communication transmission protocol and reconfigurable network communication data transmission bus structure are studied. The simulation results show that the proposed application mechanism can greatly improve the data transmission rate between network nodes and shorten the transmission. Transport waiting response time improves the reliability of communication data transmission.

1. Introduction

Traditionally, the nodes in the network mainly use Internet communication technology to complete communication and data transmission. Usually, they must have five modules: data source, transmitting device, transmission medium, receiving device and data terminal. This transmission model not only has complex structure, but also has low transmission quality. It can not guarantee the correct transmission of communication data between nodes. In order to solve this problem effectively, the concept of cloud computing environment is introduced and the traditional transmission model is improved. Cloud computing environment can be allocated according to the needs of the network to ensure that every user can get the desired Internet information [1]. The resources allocated according to the rules of cloud computing environment are easy to expand, replicable, and can change the mode of use, which is more in line with the needs of modern society. With the support of cloud computing environment, a new reconfigurable communication data transmission model is established. The original remote server model is used to improve and design the gateway protocol in a broad sense. The new storage network structure is built to fundamentally solve the problem of low quality of communication data transmission between traditional models.

2. Construction of Cloud Computing Environment

The construction of cloud computing environment is the first step to complete the reconfigurable communication data transmission model. The specific construction process can be carried out in the following steps.

2.1 Cloud Bus Protocol Layering

Cloud Bus protocol is layered to realize data transmission function of PCIe structure. The PCIe architecture consists of two terminal devices, each of which has three layers: transaction layer, data link layer and physical layer. In order to build an inter-communication cloud environment, the corresponding layers of each core device are connected by a specific transport protocol to ensure that data unpacking and packet Grouping operations can be carried out simultaneously. The layering principle of cloud bus protocol is shown in Figure 1.

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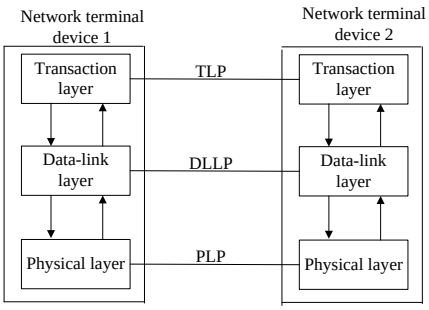

Fig. 1 Protocol Hierarchy Model

2.2 Cloud Environment Topology Architecture

The cloud environment topology structure is the key link to build the inter-communication cloud environment. The CPU sends instructions to the root consortium, which transmits instructions to memory and other display devices. The root consortium is directly connected to switch, endpoint device and PCIe-PCI bridge. In order to keep the cloud environment topology sTable, in general, the root consortium subordinate components contain multiple endpoint devices, but with and only one endpoint device, they can be directly connected to the root consortium [2]. The lower end of the PCIe-PCI bridge is connected with the PCI expansion slot, which is responsible for collecting the communication data in the cloud environment. The detailed cloud environment topology is shown in Figure 2.

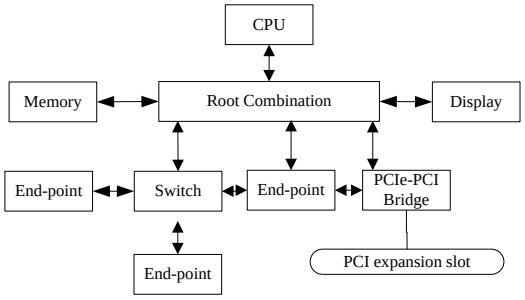

Fig. 2 Block diagram of system logic composition

3. Construction of Reconfigurable Communication Data Transmission Model

The above process completes the construction of inter-communication cloud environment. On this basis, the communication data transmission process, reconfigurable optical fiber communication and transmission bus structure are studied, and the reconfigurable communication data transmission model based on cloud computing environment is built.

3.1 Research on Communication Data Transmission Flow

In cloud computing environment, network data communication system can be divided into two parts: hardware transmission and software transmission. The hardware part mainly adopts the optical fiber transceiver module, which receives high-speed serial data stream and sends it to GIX transceiver [3] after collation and integration. GIX transceiver is directly connected with PCIe interface controller. When data stream is transmitted to this point, PCIe bus is the end point of hardware transmission process, which directly blocks the urgent transmission of data stream. The software transmission process starts with the driver, which enters the PCIe bus, extracts the blocked data stream, and then transfers it directly to the application program to ensure the smooth progress of high-speed storage of communication data. The specific transmission flow is shown in Figure 3.

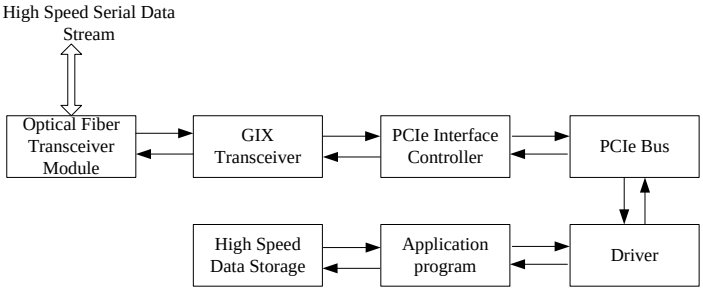

Fig. 3 Flow chart of communication data transmission

3.2 Research on Reconfigurable Optical Fiber Communication Transmission

In the cloud computing environment, reconfigurable optical fiber communication transmission, relying on Rosa structure to receive optical signal data, and then transmitted to the optical fiber processing core, after a short period of storage, part of the communication data is transferred to the second layer transmission equipment, and the other part is stored in the hard core equipment for a long time. After the communication data of the two-tier transmission equipment, one part enters the hard core equipment through the form of control signal, the other part transmits to the core transmission equipment. The core transmission device extracts part of the electrical signal data from the hard core device, integrates it with the communication data into the form of data signal, transmits it to the Tesa structure, and completes a reconfigurable optical fiber communication transmission.

3.3 Reconfigurable Communication Data Transmission Bus Architecture

In cloud computing environment, reconfigurable communication data transmission bus structure mainly controls the quality and speed of inter-communication data transmission. In order to ensure the stability of reconfigurable communication data transmission bus structure, through the structure of DMA communication data control module and interrupt control module, the sTable communication data transmission can be achieved. When the total amount of communication data accumulated at the interface controller is too large, the standard bandwidth can't guarantee the rapid passage of communication data in the shortest time. To solve this problem, 20% bandwidth coding is added on the basis of the original bandwidth to reduce the passage time of communication data. In order to avoid this situation, a new reconfigurable communication data transmission model is proposed, which uses IP communication centralized core to ensure the sequential passage of communication data. The structure of your transmission bus is shown in Figure 4.

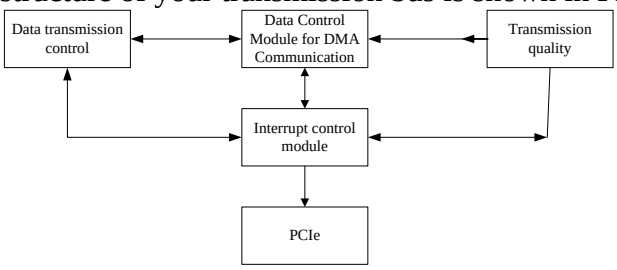

Fig. 4 Communication data transmission bus structure diagram

4. Experimental results and analysis

Through the above process, the reconfigurable communication data transmission model in cloud computing environment is built. In order to verify the practical value of the model, two computers with the same configuration are used as experimental objects. One of them is used as experimental group, carrying reconfigurable communication data transmission model in cloud computing environment, and the other is used as control group, carrying ordinary model. The communication between two nodes is simulated, and the comparative experiment is designed. The two computers transmit the same communication data at the same time. The data transmission rate and the

transmission waiting response time of the two groups are recorded respectively.

4.1 Data transmission rate comparison

In cloud computing environment, the reconfigurable communication data transmission rate between two adjacent nodes keeps the same trend as BCM index. Table 1 records the data transmission rate at different time points in 20 minutes when the experimental group and the control group transmit the same communication data.

Tab. 1 Data transmission rate contrast

Time/min	Transmission rate of the Contrast group(Tb/min)	Transmission rate of the experimental group (Tb/min)
5	3.2	5.66
8	4.31	7.93
12	6.82	9.45
15	9.65	12.52
18	13.32	17.54
20	16.79	21.31

Analysis Table 1 shows that the maximum BCM index of the experimental group is 21.31T/min, and that of the control group is 16.79 T/min, and the index of the experimental group is always greater than that of the control group. Therefore, it can be proved that the reconfigurable communication data transmission model can improve the data transmission rate between adjacent two sides in the application of cloud computing environment.

4.2 Transmission Waiting Response Time Comparison

In the experimental environment, two computers are used to transmit a piece of communication data with a total amount of 40T, and the waiting time of transmission response for two groups is recorded respectively, as shown in the following figure.

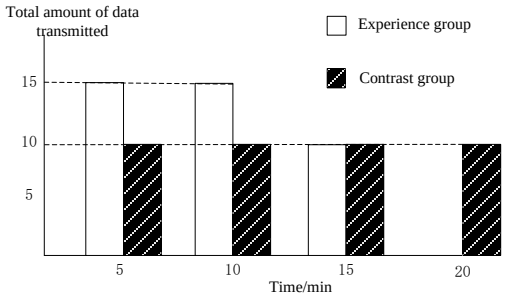

Fig. 5 Transmission time comparison chart

Analysis of the above figure shows that in cloud computing environment, the waiting response time of reconfigurable communication data transmission between the experimental group and the control group is 15 minutes, and the total amount of communication data transmitted between the two groups is 50 T. The proposed reconfigurable network transmission model in cloud computing environment can greatly shorten the transmission waiting response time.

5. Conclusion

Reconfigurable technology is one of the hotspots in the field of information processing. Its application has expanded from the field of electronic information processing to many industries. Introducing reconfigurable technology into communication network has great theoretical significance and practical value. In cloud computing environment, reconfigurable communication data transmission model mode is a powerful way to improve the quality of communication between adjacent two and shorten the transmission waiting time, which is worthy of vigorous promotion.

Acknowledgement

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