

Research on Data Center Network Architecture Based on SDN

Jingjing Fan^{1, a, *}, Jianguang Zhao^{1, b} and Wenjie Yang^{2, c}

¹*Department of Computer Science, Hebei Institute of Architecture and Civil Engineering, Zhangjiakou, 075000, China*

²*School of Science, China Agricultural University, 100083, China*

^a565134037@qq.com, ^b472225330@qq.com, ^c7774884004@qq.com

*Corresponding author: 472225330@qq.com

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Abstract: when the amount of mobile Internet data is exploding, users need to be able to enjoy high-quality mobile Internet services at any location and at any time. With the characteristics of massive and high-density connections, it is urgent to study new network architecture optimization theory. New cloud wireless access network architecture theory and optimization research based on software-defined network. Decoupling the network data plane, control plane and management plane. Data plane, responsible for data transmission related operations, such as data forwarding; Control plane is responsible for network control related operations, such as call control, routing control, error control, flow control, etc.; Management plane is responsible for network management, monitoring data plane and control surface.

1. Introduction

The concept of Software Defined Networking (SDN, Software Defined Networking) was first proposed by Nick McKeown, a professor at Stanford University in the United States, and published an article at the ACM SIGCOMM conference in 2008, introducing the concept of SDN in detail for the first time, that is, the data plane and control of traditional network equipment. The two functional modules of the plane are separated, and various network devices are managed and configured through a centralized controller with standardized interfaces. SDN has three characteristics: separation of control forwarding, centralized logic control and open network programming API, which brings programmable features to the network and provides more possibilities for the management and use of network resources.

Under the background of rapid development of wired networks, telecom operators introduced the idea of Software Defined Networking (SDN, Software Defined Networking) into the mobile network to obtain a new type of mobile network solution-Software Defined Mobile Networks (SDMN, Software Defined Mobile Networks). Reduce operating expenses and improve network performance. Because the current mobile network architecture is static, the data plane and the control plane are tightly coupled, making these mechanisms and strategies difficult to deploy. The

core feature of SDMN is also the separation of control and forwarding. Through SDMN network operators can manage mobile network resources more efficiently. Through SDMN's Network Function Virtualization (NFV) technology, operators can deploy new services more conveniently and quickly. SDMN decouples the control and forwarding in the mobile network, so that new network services can be quickly deployed in the mobile network, and the mobile network connection can be quickly confirmed. Compared with the traditional mobile network architecture, the SDWN network architecture is more flexible and more effective in management and control.

2. Research ideas and methods

A key to deploying an SDN architecture is to control mobile devices through standardized interfaces, and standardized interfaces can be implemented through corresponding communication protocols. Through a specific communication protocol, to standardize the interface between the control plane and the data plane in the SDMN architecture has become an important work realized by the SDMN architecture. This work has been carried out. Recently, the Internet Engineering Task Force IETF has begun to standardize the control and provisioning of wireless access points (CAPWAP, Control and Provisioning of Wireless Access Points), which can centralize the control in the mobile network and control the mobile network. The plane is stripped from the data plane. In a way, it is equivalent to OpenFlow being deployed in the controller, and CAPWAP in SDWM is equivalent to OpenFlow in SDN.

Current mainstream research content:

(1) New cloud wireless access network architecture theory and optimization research based on software-defined network.

Decoupling the network data plane, control plane and management plane. Data plane: Responsible for data transmission related operations, such as data forwarding; Control plane is responsible for network control related operations, such as call control, routing control, error control, flow control, etc.; Management plane is responsible for network management, monitoring data plane and control surface.

(2) Research on key technologies of data forwarding.

OPENFLOW-based data forwarding requires table look-up, which brings a lot of overhead to network equipment, directly affects network performance, and becomes a bottleneck in improving network performance. This project intends to propose a new network architecture to avoid a lot of look-up tables and reduce network overhead.

(3) Research on data forwarding and multi-path routing.

Olympic venues have complex terrain, high connection density, and low single-path data transmission reliability. The project intends to use multi-path routing strategies to improve network reliability.

Technical key:

(1) Research on the theory and optimization of a new cloud wireless access mobile network architecture based on SDN.

(2) Research on cloud wireless access network performance based on user access selection.

(3) Improve the data forwarding method based on SDN cloud wireless access network.

3. Conclusion

Through the research of this project, it is planned to reduce the cost and energy consumption of the existing network, improve the throughput rate of the existing network, and reduce the network delay to provide a more reliable network guarantee for the Winter Olympics.

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