

# Research on Network Performance of Data Center Based on SDN

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## Abstract

As a new type of wireless access network architecture, the software-defined cloud wireless access network is used to satisfy users in extreme residential areas, offices, open-air gatherings, and wide-area coverage. The need for business experience. New cloud wireless access network architecture theory and optimization research based on software-defined network. 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.

## Keywords

Software-defined network, Data center, Data forwarding, SDN.

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## 1. Introduction

In 2011, companies such as Deutsche Telekom, Facebook, and Google established the Open Networking Foundation (ONF, Open Networking Foundation) to develop and promote SDN-related standards, such as the OpenFlow standard. Currently, more than 100 companies have joined the ONF, such as NEC, Huawei, and Cisco. In 2013, Google first deployed a B4 network based on OpenFlow technology in its data, accelerating the implementation of SDN technology. In 2016, Huawei participated in hundreds of cloud computing center SDN network construction projects, and the actual deployment has reached thousands.

Under the background of rapid development of wired networks, telecom operators introduced SDN ideas to mobile networks to obtain a new type of mobile network solution-Software Defined Mobile Networks (SDMN) to reduce operating costs and improve network performance. 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 that in SDN OpenFlow.

## 2. Research ideas and methods

Cisco recently proposed a more effective, brand-new mobile network interface solution that supports multiple programming. In this scheme, the wireless node runs "MAClets" (MAClets is a programmable MAC protocol) by designing a wireless MAC processing process. In this way, the mobile network central controller can perform dynamic protocol switching at a certain point in time according to the current actual network conditions. For example, when the traffic load increases, the central controller can use carrier sense multiple access/collision to avoid CSMA/ The CD dynamically switches to access based on time division multiple access TDMA.

Up to now, some researchers have applied the SDN idea to mobile networks and proposed a specific SDWN southbound interface protocol, MobileFlow. Although SDN is currently mainly used in wired networks, similar ideas must be applied to wireless access networks and backhaul link environments. The control plane in the mobile network is more complicated than the control plane in the wired network, so the separation of the control plane and the forwarding plane through the idea of SDMN will be more challenging. If the separation of control and forwarding plane is successful, the flexibility of the mobile network management and control will be greatly increased.

## 2.1 Main implementation content:

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

The network is composed of three dimensions: data plane, control plane and management plane. Data plane: Responsible for data transmission related operations, such as data forwarding, to achieve high-speed and simple data forwarding in the network according to the network; the control plane is responsible for network control related operations, such as call control, routing control, error control, flow control, etc.; management The plane is responsible for managing the network, monitoring the data plane and the control plane.

(2) Research on key technologies of network and data forwarding.

The exchanged addresses in the network use the network, which has only partial meaning, and the forwarding device relies on the network to forward data. In the network, the output ports of each forwarding node are numbered, and they are sequentially numbered starting from 1 using Arabic numerals and are called port numbers. In the data transmission path, the output port numbers of all the nodes from the source node to the destination node form a sequence, and this sequence is the network. The network is a finite sequence. Each component in the sequence represents an output port, called a component address. The first component represents the output port number of the source node, and the second component represents the output port of the next hop node. The N components represent the output port of the Nth hop node, which constitutes the output forwarding port sequence from the source node to the destination node. The sequence is the path information from the source node to the destination node.

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

In the network, when the source node has data to send, it sends a path request to the controller, and the controller returns the network to the destination node. After receiving the network, the source node packet forwards the data according to the network, and finally reaches the destination address.

## 3. Conclusion

Today, 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.

## Acknowledgements

This work was financially supported by Zhangjiakou City's 2018 municipal-level science and technology plan financially-funded project. Project name: Research on Cloud Computing Data Center Network Architecture Optimization of Olympic Stadiums. Project Number: 1811009B-19, and the "Three, Three, Three Talents Project" of Hebei Province in 2018, the project name: Software-Defined Wireless Sensor Network Data Forwarding Research Project award number: A201803005. Hebei Technological Innovation Guidance Plan Project: Project Title: Research on High-precision Location Technology of Snow and Ice Accidents in VR Scene Based on 5G. Project Number: 20470302D.

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