Huawei Cloud Data Center Network

Fabric Insight Refined O&M Solution

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Network O&M Challenges in the SDN Era

With the rapid development of cloud computing, traditional data center networks no longer satisfy the needs of IT services. Improving network management, operations, and maintenance capabilities has become the core focus of network architecture and technology transformation. As a technological innovation, SDN enables virtualization and flexible scheduling of network resources through centralized policy distribution and control. This technology, however, brings great challenges to network O&M. Compared to traditional networks, SDN networks have the following characteristics:

- Larger data center scale: Virtualization results in a linear increase in the number of managed nodes in a data center from thousands (physical switches) to tens of thousands (one virtual switch for each physical server). The SDN network must be aware of VM migrations, extending the scope of network management.
- Dynamic network status: SDN has changed network management objects from network elements to logical and physical networks. However, the status of a network changes constantly as massive numbers of tenant services are released or changed. Network quality and availability are difficult to measure. Once a problem occurs, it cannot be determined whether the problem lies in the network, storage, server, or application system sector. Administrators have to check all these sectors to locate the problem, which is inefficient.
- Real-time service response: As data center resources are consolidated and services are concentrated, users require shorter network response and fault recovery time. Microbursts will directly affect the network response time and quality, but traditional management tools cannot detect microbursts and therefore cannot optimize the network.

Fabric Insight DCN Refined O&M Solution

Huawei Fabric Insight, a next-generation O&M architecture, ensures real-time responses on large-scale, dynamic networks, helping customers cope with O&M challenges in the SDN era.

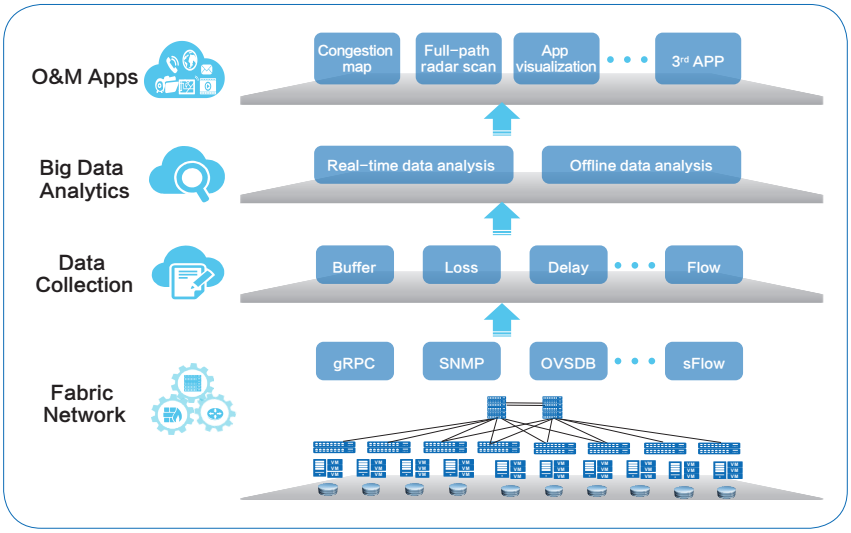

Figure 1. Fabric Insight architecture

The Fabric Insight architecture consists of the data collection, Big Data analytics, and O&M application layers:

- The data collection layer collects real-time performance data, including latency, packet loss ratio, and buffer.
- The Big Data analytics layer analyzes and correlates the collected data.
- The O&M application layer monitors system and service states across the entire network.

Based on these layers, Fabric Insight provides visibility into the physical, logical, and application networks, intelligent fault location, and proactive optimization to significantly improve the SDN network O&M efficiency.

Three-Network Visualization, Clearly Showing Network Quality

The Fabric Insight solution visualizes resources on the physical, logical, and application networks and provides mapping between the three networks. The solution shows all paths on the entire network and enables administrators to view network status clearly. Physical and logical objects are all visual, including nodes and interfaces (network element level), as well as links, logical paths, and application quality (network level). Additionally, Fabric Insight can detect instant events lasting for milliseconds (such as microbursts) and low packet loss rates (lower than 10-4), and identify elephant and mice flows. The full visibility of the network status and quality helps network administrators and tenants improve the management efficiency.

Big Data Analytics, Fault Location in Minutes

Fabric Insight provides full-path scanning. It periodically scans end-to-end paths on the entire network to discover network quality issues in a timely manner. The scan results help network and application administrators identify the failure point and determine whether the network is fault-free.

Fabric Insight monitors applications to supervise and regulate all service flows on a network. If the quality of a service flow degrades, Fabric Insight can quickly locate the forwarding path of the flow and correlate the application and network to identify the cause of the quality issue. This shortens the fault diagnosis time to a matter of minutes..

Proactive Optimization, Ensuring High-Quality Service Experience

The Fabric Insight architecture provides fault prediction, automatic analysis, and proactive optimization capabilities. It uses a Big Data platform to detect potential risks, such as unbalanced traffic distribution and congestion, before services are affected. Based on Big Data analytics, Fabric Insight identifies root causes of potential risks and provides specific fix suggestions. Big Data also helps to predict service traffic on the entire network so that dynamic load balancing (DLB) policies can be delivered to ensure balanced traffic.

Summary

Huawei Fabric Insight intelligent O&M solution uses a Big Data platform to implement high-definition visualization, intelligent fault location, and proactive optimization on large-scale networks. The service-centric O&M architecture helps to cope with network O&M challenges in the SDN era and promote commercial use of SDN.

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