Powerful data centers Cloudification with the Huawei SD-DC²

Huawei's powerful cloud data center solution helps operators cloudify their data centers so that their IT infrastructure can meet the needs of the cloud era. The solution delivers integrated, end-to-end, full-tier data center architecture that creates value for customers through continuous innovation and collaboration.

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We stand on the cusp of change in the ICT industry. Traditional IT is being replaced, and new ICT capabilities are set to become the core driver of change.

The cloud computing era

We're now in a cloud computing era where data centers are increasingly important. ICT is transitioning from the second platform to the third platform. New technologies such as cloud computing, big data, mobility, and social media are accelerating ICT transformation and driving data centers to scale up, including those delivering internal services and external services.

Clouds – private, public, and hybrid – depend on data center architectures that are accessible, reliable, and flexible. Clouds also require fast deployment, flexible scaling, high density, energy-saving capabilities, and intelligent management.

SD-DC²

Huawei uses distributed cloud architecture to integrate the computing, storage, and network resources of multiple data centers to form a large unified resource pool.

Huawei's cloud data center solution is based on SD-DC² architecture with hardware and software layers. The hardware layer comprises servers, storage, and networking equipment. Based on its extensive experience in chip and hardware design, Huawei offers three powerful hardware solutions for multiple scenarios:

Scale-up: superior performance

Ordinary application requirements are satisfied by Huawei's mainstream servers and storage devices. But, for core application systems such as databases that require optimal computing and storage performance, Huawei provides the high-end server RH5885 and the high-end storage device OceanStor 18000.

Scale-out: powerful expansion

The design and architecture of traditional servers and storage hardware no longer meet the requirements of many Internet-era applications. Unlike traditional mini-computer applications, they feature distributed architecture and large data processing and storage volumes.

This is why Huawei has developed servers and storage with distributed multi-node architecture that support smooth expansion – such as the X8000 high-density rack server and the OceanStor 9000 mass storage.

Convergence for simplicity

Traditional loose coupling architecture is unsuitable for applications that need to process large amounts of user data quickly, and that require high data processing and throughput capabilities. This is because of insufficient processing bandwidth and latency issues, which affect scenarios like big data analytics applications.

Huawei solves these problems with the E9000 Converged Infrastructure Blade Server, a solution based on our experience in computing, storage, and networking.

At the software layer, Huawei provides the FusionSphere operating system and ManageOne unified management system, which is based on OpenStack – an open, compatible software platform that provides standardized access.

The system targets global operators with multi-regional business models. Huawei uses distributed cloud architecture to integrate the computing, storage, and network resources of multiple data centers to form a large unified resource pool.

Resources are allocated by service in virtual data center (VDC) mode. The cloudified resource pool is transformed into a Data Center-as-a-Service (DCaaS) service center, providing carriers with unified resource management and scheduling. The software layer's powerful capabilities are as follows:

Computing virtualization

Offers seamless connection to the OpenStack Nova service with Huawei's enhanced keyboard, video, and mouse (KVM) switch virtualization engine, thus expanding high-level virtualization features. These include virtual machine (VM) affinity scheduling and VM live migration. Capabilities include million-level VM deployment to ensure limitless cloud resource pool expansion.

Software-defined storage

Offers seamless connection to the OpenStack Cinder service through the Huawei distributed storage engine. Capabilities include a maximum of

128 physical servers in a single cluster and IOPS at three to five times traditional SAN/NAS storage.

Software-defined network

Provides programmable data center switches, virtual switches, virtual service gateways, a VxLAN channel, and SDN controller technologies. These seamlessly connect to OpenStack Neutron, realizing SDN capabilities across both physical and virtual networks.

Unified management system

Transforms the separate data center management model with four unified management functions: unified management of multiple data centers, cloud and non-cloud data centers, heterogeneous virtualization platforms, and O&M. These combine to drive up efficiency.

Software-defined power supply and cooling

Automatically adjusts power supply and cooling based on physical device load, and performs efficient cooling using multiple natural cooling and energy-saving devices. PUE can be as low as 1.2.

The benefits

Traditional data center construction is hampered by issues like insufficient overall hardware resource planning and uneven use of data center resources. Both problems, for example, affect the financial industry.

Demand for peak-load shifting in data centers is extremely high, with the resource occupancy of some application servers exceeding 60 percent during peaks in business, while resource occupancy of other application servers can drop to 5 percent for long periods.

Furthermore, the operation and management of IT systems during the informatization process is getting harder because of silos created by legacy system architecture, which increases equipment quantity.

Huawei's end-to-end solution for constructing cloud data centers provides users with full planning, design, product, consolidation, and migration services. It includes top-level framework planning for customers' businesses, unified delivery of equipment for shorter deployment cycles, quicker fault location, and guaranteed system compatibility.

Huawei's dual-active data center solution ensures service continuity and disaster recovery, both within data centers and between multiple cross-regional data centers.

The Active-Active design covers six layers: storage, security, database, applications, networks, and transmission. These deliver reliable and stable services at the architecture level.

The system can concurrently process services across data centers, enabling dual-active mode at the application level, while ensuring non-stop services and zero data loss. For complex applications containing both databases and files, the solution guarantees consistency between databases and files to ensure data integrity and consistency in services.

Huawei's cloud data center solution can help operators deliver data center cloudification for the cloud era. It provides integrated, end-to-end, full-tier data center architecture including storage, computing, networking, security, and data center infrastructure.

Huawei's powerful solution can help customers transform their traditional data centers into cloud data centers, and create greater value through continuous innovation and successful partnerships.