OpenStack Powers Data Center Transformation

The OpenStack cloud operating system offers an open-source approach for virtualizing data centers to handle today’s biggest IT challenges — from Big Data to the Internet of Things (IoT). Many enterprises and service providers are looking to OpenStack to help transform their data centers into scalable, automated fabrics of physical resources and virtualized services. These heterogeneous data centers, controlled by software automation and Application Program Interfaces (APIs), help reinforce the DevOps model of software delivery for innovating mobility, social media, and many other types of applications that rely on Network Functions Virtualization (NFV).

By Anni Lai, Data Center Solutions, IT Product Line, Huawei Technologies, Inc.

Huawei is using OpenStack to help transform data centers to deal cost effectively with growing numbers of users, application services, devices, and traffic.

Parts That Work Together
OpenStack is designed to meet the needs of public and private clouds of any size by being simple to implement and massively scalable.

OpenStack is supported by a global community of developers that is managed by the OpenStack Foundation, a non-profit corporation established in 2012. More than 800 companies have joined the project, including AT&T, Ubuntu, HP, IBM, Intel, Rackspace, Redhat, SUSE, Huawei, Aptra, CCAT, Cisco, DreamHost, EMC, Ericsson, Hitachi, Juniper, Mirantis, NEC, NetApp, Symantec, Yahoo, Odin, and recently Google. The community includes more than 18,000 individual members from 140 countries.

The OpenStack software is written as a group of related projects for controlling large pools of computing, storage, and networking resources throughout a data center. These resource pools are managed through a web-browser dashboard or via the OpenStack API. OpenStack consists of the following modules:

- Compute (Nova).
- Image Service (Glance).
- Object Storage (Swift).
- Dashboard (Horizon).
- Identity Service (Keystone).
- Networking (Neutron).
- Block Storage (Cinder).
- Orchestration (Heat).
- Telemetry (Ceilometer).
- Database (Trove).
- Elastic Map Reduce (Sahara).
- Bare Metal Provisioning (Ironic).
- Multiple Tenant Cloud Messaging (Zaqar).
- Shared File System Service (Manila).
- DNS as a Service (Designate).
- Security API (Barbican).

Ideal for heterogeneous infrastructures, OpenStack works with other enterprise and open-source technologies. Because OpenStack APIs are compatible with Amazon’s Elastic Compute Cloud (EC2) and Simple Storage Service (S3), client applications written for Amazon Web Services can be ported to discrete OpenStack environments.

Why OpenStack?
OpenStack offers several advantages over proprietary solutions:

- Fast Innovation: The OpenStack platform has made tremendous progress in just three years with contributions from a large developer and user community as well as leadership and support from sponsoring companies. Going forward, the OpenStack community shows every promise of developing and refining functionality faster than possible by any single company working on a proprietary solution.

- Better Quality Assurance: As an open-source project, OpenStack has a large population of users and developers testing the software and working on bug fixes in different environments. Many vendors help with interoperability testing.

OpenStack Plays a Central Role in the FusionSphere Cloud OS

OpenStack is designed to meet the needs of public and private clouds of any size by being simple to implement and massively scalable. The FusionSphere cloud operating system, built on OpenStack, is a demonstration of Huawei’s commitment to the entire OpenStack ecosystem.
The Huawei SD-DC is a reference architecture for converged data centers. The architectural goal of SD-DC is the consolidation and virtualization of computing, storage, and networking resources across one or more physical data centers.

Huawei and OpenStack
The FusionSphere 5.0 cloud operating system, built on OpenStack, is a demonstration of Huawei’s commitment to the entire OpenStack ecosystem. In 2014 and 2015, Huawei’s contributions to OpenStack code releases have placed it among the top ten companies in the OpenStack community. Currently, a Gold member of the OpenStack Foundation, Huawei intends to continue the company’s contributions to the foundation, as well as its developer and user communities.

Investment Protection: OpenStack supports all hypervisors, software applications, and hardware products certified for OpenStack. Contributions from Huawei include enhancements for improving performance, reliability, security, ease-of-use, compatibility, automation, and management of OpenStack in commercial-use environments. Implemented on native OpenStack plug-ins and drivers, Huawei’s enhancements have made no changes to the OpenStack trunk code, assuring that third-party hardware drivers are easily integrated into FusionSphere.

FusionSphere Reference Architecture
The Huawei Service-Driven Distributed Cloud Data Center (SD-DC) is a reference architecture for converged data centers. The architectural goal of SD-DC is the consolidation and virtualization of computing, storage, and networking resources across one or more physical data centers.

Investment Protection: OpenStack supports all hypervisors, software applications, and hardware products certified for OpenStack. Contributions from Huawei include enhancements for improving performance, reliability, security, ease-of-use, compatibility, automation, and management of OpenStack in commercial-use environments. Implemented on native OpenStack plug-ins and drivers, Huawei’s enhancements have made no changes to the OpenStack trunk code, assuring that third-party hardware drivers are easily integrated into FusionSphere.

Virtualized Networking
FusionSphere virtualization uses a network component overlay based on Software-Defined Networking (SDN) and Virtual Extensible LAN (VxLAN) to construct full-mesh Layer 2 networks.

Carrier Optimization
The FusionSphere hypervisor includes communication performance technology optimized for carrier-class applications. The virtualized cloud resource scheduling engine allocates resources based on the “affinity” between network elements. Performance-priority policies can be invoked to ensure that Virtual Machines (VMs) working to provide any particular service function are within the same physical cluster to minimize latency.

FusionSphere also includes High Availability (HA) and Fault Tolerance (FT) features for minimizing application and system downtime, including resource redundancy, fault detection, and automated fault recovery.

Going Forward
OpenStack will continue to evolve and add new services with each release. Many solid OpenStack use cases have already emerged from Fortune 100 enterprises ranging from Disney and AT&T to RackSpace and Comcast. The main drivers of OpenStack adoption are the continuing efforts to avoid vendor lock-in, enable faster innovation, improve scalability, and increase cost effectiveness. OpenStack is playing a significant role in driving data center transformation.

The main drivers of OpenStack adoption are the continuing efforts to avoid vendor lock-in, enable faster innovation, improve scalability, and increase cost effectiveness. OpenStack is playing a significant role in driving data center transformation.