Huawei's Open Cloud Strategy

Open-Source Cloud Computing Is the Future

Openness is an inevitable trend in IT development. Since the times of specialized, close-source platforms, the industry has firmly devoted itself to the opening-up and standardization of various IT resources, including computing, storage, and network resources.

Since the birth of x86 processors in 1970's, the x86 open architecture has been constantly improving with the support of industry partners in order to meet user requirements. Almost all aspects involved in the industry, ranging from personal computing systems, to massive data processing on the Internet, and even public cloud services, are based on this open computing architecture.

Similarly, the development of Internet is also open sourced. The open-source implementation mechanism of the TCP/IP protocol stack is embedded into UNIX systems, which drives Internet development and allows it to prosper. Therefore, today's Internet developmental achievements are attributed to openness. Now, almost all Internet technologies have employed the open-source implementation mechanism.

Openness embodies the essence of the Internet and is also an inevitable trend of cloud platforms. In the current Internet era, existing closed IT architecture, modes, and software platforms can hardly address the requirements of forward-thinking industries. For a long time, enterprises' virtualization resource pool and cloud system were built by some proprietory technology vendors, which causes resource isolation among the silo resource pool and cloud, and that has been increading enterprises' OPEX as well as management difficulty.

The Significance of Cloud Openness

Openstack has brought an opportunity to converge multiple virtualization pools and clouds. Currently OpenStack has become the mainstream opensource cloud OS. In terms of benefit of opensource, firstly the industry can share the software as well as relevant optimization of functions and features in the opensource community and meanwhile the community participators would feecback contributions so as to complete OpenStack. Secondly

opensource can accelerate software development and product time-to-market (TTM). Finally, the product based on opensource would reduce customer's purchase cost.

With OpenStack the ISV can establish open architecture cloud OS, for instance, converge heterogeneous virtualization resource pool. And by means of OpenStack cascading solution developed by huawei, multiple clouds can be converged, which will benefit customers to manage multiple resource pools and cloud data-centers so as to improve operation efficiency and significantly reduce OPEX. Meanwhile open architecture can avoid vendor lock-in and reduce purchase cost.

Currently, around OpenStack the mainstream IT vendors have collaborated to build an open ecosystem, which completes the entire cloud blueprint based on OpenStack and make the cloud industry prosperous, and that would lay a solid foundation for customers' business transformation.

Huawei's Open Cloud Strategy

Huawei's open cloud strategy involves the open source, open architecture, and open ecosystem.

Open Source

Huawei is devoted to promoting the development of open cloud platforms. Huawei has also made active contributions to the influential international open-source communities. It has joined multiple communities and projects successively.

In 2011, Huawei became a Silver Sponsor of the Apache Foundation. In 2012, Huawei became a Gold Member of the Linux Foundation. In 2013, Huawei successively became a Silver Member of the OpenDaylight Project and a Gold Member of the open cloud computing organization, the OpenStack Foundation. In 2014, Huawei became a Silver Member of the Open Compute Project. It is worth pointing out that Huawei is the only Chinese and Asian representative in the OpenStack Foundation.

Huawei has contributed a large number of manpower and materials resources to open-source projects and has been rewarded through its participation into the projects.

In the Juno version of OpenStack, Huawei operated two framework incubator projects, Compass (management automation) and OpenStack Cascading oriented towards cloud data centers and Network Functions Virtualization (NFV) scenarios. Huawei collated over 150 IT/ICT features and incorporated dozens of carrier-focused NFV features, including NUMA

affinity, VM NIC bandwidth scheduling, and CPU affinity into the Juno version by collaborating with Red Hat.

By December 1, 2014, Huawei had submitted 116 blueprints (ranked second) to the OpenStack community. Among these blueprints, 25 have been accepted (ranked sixth). In addition, it has submitted 91 resolved bugs (ranked ninth), 133 commits (ranked tenth), 1068 reviews (ranked tenth), and 12,424 lines of code (ranked sixteenth).

The huge contributions made by Huawei to the open-source community have seen substantial returns. Huawei has officially rolled out FusionSphere, the industry-leading cloud operating system (OS) based on the OpenStack architecture.

Open Architecture

Based on the OpenStack architecture, Huawei has rolled out the enterprise-level cloud OS, FusionSphere, which is enhanced with automatic installation and deployment and high availability (HA). FusionSphere upholds OpenStack's value of openness and a completely open architecture.

The following figure shows the southbound and northbound capabilities of FusionSphere.
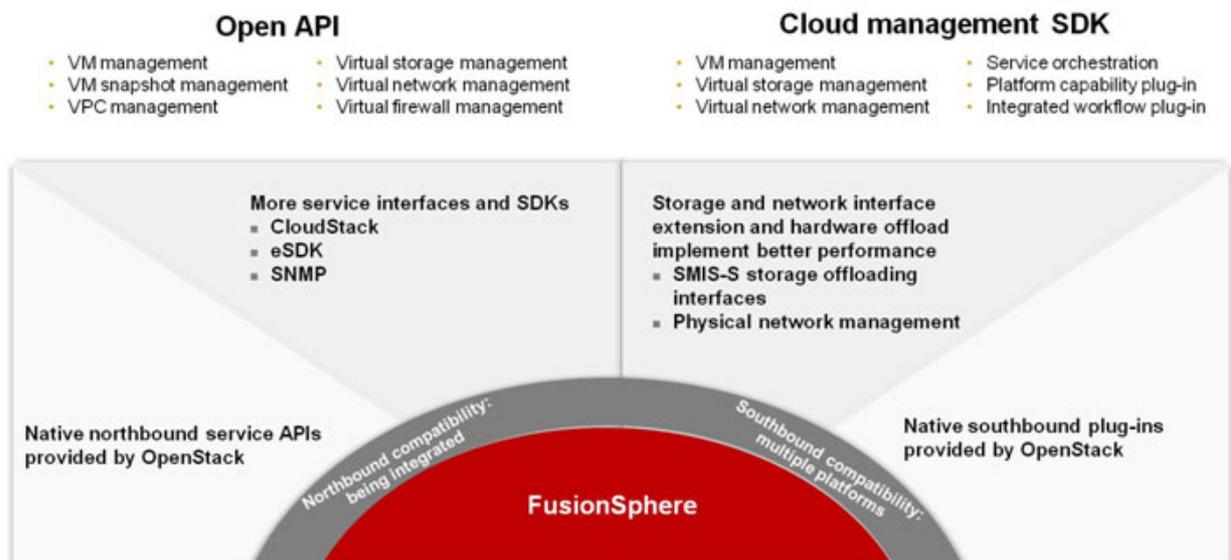
FusionSphere uses standard OpenStack plug-ins for southbound integration. Computing, storage, and network devices can be easily integrated into FusionSphere using standard OpenStack plug-ins. FusionSphere also supports mainstream hyperviors, such as VMware

vSphere, KVM, XenServer, and Hyper-V. In addition, FusionSphere supports the SMI-S interface, which allows FusionSphere to better interwork with heterogeneous storage devices. FusionSphere provides standard application programming interfaces (APIs) for northbound communication. Upper-layer applications can flexibly schedule computing, storage, and network resources based on service requirements. Apart from APIs, FusionSphere provides interfaces for interworking with the CloudStack interface, OpenStack-integrated eSDK interfaces for developers to invoke, and SNMP interfaces for network management. FusionSphere also supports hybrid cloud services and is compatible with OpenStack private and public clouds and Amazon public clouds.

Huawei FusionSphere achieves a fully open architecture and lays a firm technical foundation for customers to build a cloud computing ecosystem.

Open Ecosystem

Huawei has launched the "Yunfan" plan to build a comprehensive cloud ecosystem. This plan consists of carrier partnerships, enterprise partnerships, technology partnerships, and educational development.

● Carrier partnerships

Backed by its leading position among global carriers, Huawei has initiated the inTouch Partnership Program. In this program, Huawei offers marketing and technical support and helps its partners enter the carrier market using three business models, namely, revenue share, recommendation, and resale. From the standpoint of carriers, Huawei provides them with matchmaking and application quality assurance services.

Huawei has also proposed the NFV development plan, and FusionSphere is a core NFV product. Based on its open architecture, Huawei actively performs compatibility tests, ensuring that FusionSphere is interoperable with the products of the industry's mainstream NFV solution providers. This also helps prevent vendor lock-in.

● Enterprise partnerships

Huawei has strengthened collaboration with independent software vendors (ISVs), channel sellers, service integrators (SIs), and service providers from across the industry.

In 2014, Huawei focused on a wide range of industries, including governments, public utilities, transportation, safety, energy, media, and finance. Huawei has developed a strategic

relationship with at least one ISV from each industry to promote the application of cloud computing in these industries.

Huawei's channel service strategy will further improve partnership regulations, building an equal, trustworthy, open channel. When expanding the scale of its partnerships, Huawei is also helping its partners improve sales expansion and after-sales service capabilities. Huawei service providers offer various professional cloud computing services for customers, such as consultation, service operation, basic virtualization, key service virtualization, management, and technical account manager services.

Huawei employs ecologically designed solutions to bring profits to its partners and achieve win-win scenarios by sharing risks and rewards with partners.

● Technology partnerships

Huawei's cloud computing technology partnership consists of the following:

Three levels of technology partners: professional, elite, and global

One set of standard APIs: open FusionSphere APIs based on a centralized software development kit (SDK).

One open, remote laboratory: This gives Huawei partners remote access for development and commissioning.

Three types of certifications: HCNA-Cloud, HCNP-Cloud, and HCIE-Cloud.

Six types of Huawei Ready compatibility certifications covering application software, virtual appliances, server storage, management, and network & security.

Educational development

Huawei's education partnerships consist of the following:

Found a personnel training alliance with partners for cultivating on cloud computing technicians and recommending jobs for the cultivated technicians.

Set standards for cloud computing technicians and outline the career and professional certification systems for these technicians.

Provision ample teaching resources for cloud computing, reinforce the training and certification of instructors to jointly develop training classes and perform certification with partners, and provide a complete ICT laboratory and e-learning platform.

Improve the operation management of personnel training to expedite the organization and process construction of personnel training by carrying out ICT skill competitions and Huawei certification journeys while launching the "dandelion project" and regularly holding summits.