AWcloud Delivers Agility to China Network Television (CNTV) with a Software-Defined Infrastructure (SDI)

An OpenStack* SDI solution enables internal and customer facing infrastructure-as-a-service (IaaS) and platform-as-a-service (PaaS) solutions for application and media delivery.

Executive Summary

China Network Television (CNTV), China's leading television broadcaster and media company, was rapidly outgrowing its IT infrastructure. The complexity of managing a large number of physical servers and the rising costs of infrastructure-as-a-service (IaaS) solutions were hindering CNTV's ability to be agile. The company also wanted to follow China's Internet Plus initiative—a countrywide initiative that aims to accelerate modernizing IT and its underlying infrastructure.

CNTV realized it needed a more agile and scalable infrastructure and a more efficient way to manage the distribution of applications and media. Rather than lose the time required to address its needs internally, CNTV turned to one of China's leading and trusted providers of enterprise OpenStack* solutions, AWcloud. The result is a more efficient, easier-to-manage software-defined infrastructure (SDI) for CNTV, along with a media delivery catalog and billing solution—all based on the OpenStack platform run on Intel® technologies.

From a Slow Legacy Infrastructure to an Agile Open Source SDI

CNTV runs a web-based TV news channel. In addition to daily worldwide news, it broadcasts several specialty channels, including news channels for sports, start up and entrepreneurial endeavors, travel, and local happenings. CNTV makes media content available in six Chinese languages, including Mandarin, and six foreign languages. It also makes its distributed content available to affiliated regional media outlets in provinces throughout China.

CNTV's traditional network infrastructure was making it increasingly cumbersome, time consuming, and costly to provide users and affiliates who manage multiple channels in multiple languages with access to needed applications and up-to-date media. The existing infrastructure relied on large numbers of physical servers, but continuing to add servers and staff was not sustainable. CNTV needed a more efficient infrastructure and a more agile way to develop and distribute applications and media content. Ideally, it needed a way for its various users to quickly and easily self-serve.

CNTV knew that moving to software-defined, cloud, and open source solutions would help it automate, scale, add agility, comply with the Internet Plus initiative, and more easily meet future needs. Rather than lose the time that would be required to develop internal expertise on open source integrations, CNTV contracted with AWcloud, the leading provider of enterprise OpenStack platform–based IaaS solutions for public, private, and hybrid cloud solutions in China.

AWcloud put its team of experts to work designing an SDI solution, using OpenStack and Intel technologies, to provide CNTV with private cloud, IaaS, and platform-as-a-service (PaaS) capabilities. The implementation uses OpenStack compute, storage, and network virtualization technologies. The implementation also enables a comprehensive content distribution, service analytics, and billing solution that supports both internal DevOps activities and external media requests. And the solution does all of this with fewer servers running an SDI that includes virtualization for added efficiency.

From Internal Operations to External Consumption with Open Source Software Running on a Leading Architecture

The project enabled DevOps users to use the PaaS solution to develop and operate applications and services for internal and external consumption. This capability had to be in place to distribute media content externally. Next, the solution was rolled out to external affiliates, allowing regional users to access media content and applications at any time. Regional affiliates can also easily upload their own local media content for use by other affiliates and for national coverage.

AWcloud additionally developed an analytics and billing utility that allows CNTV to see both media and app usage metrics. The utility was rolled out in the first phase of the deployment and was used to monitor internal usage. In the second phase, it will be used to bill users for services.

The PaaS solution makes use of multiple OpenStack project sets, including those for compute, networking, virtualization, virtual machine image services, identity (authentication) services, and block and object storage. The software runs on Intel® Xeon® processor–based Lenovo* rack servers that use Intel® Solid-State Drives (SSDs) and Intel® Ethernet Converged Network Adapters for a large-scale OpenStack deployment as a consolidated and scalable SDI.

Powering an OpenStack SDI Cloud with Intel® Technologies

The AWcloud deployment provides a hardware-efficient, scalable solution that enables rapid, agile development and deployment of applications and services. In addition to the OpenStack platform, powered by Intel technologies for the implementation, AWcloud used Intel SSDs as the distributed storage solution. The SSDs have enabled CNTV to serve a higher number of business applications with a greater number of concurrent read/write operations for greater efficiency and agility than is possible with traditional hard disk drives.

The Intel SSDs work in coordination with Intel Xeon processor–based Lenovo System x3650 M5* rack servers, which support the high read/write capabilities of the SSDs. The Intel Xeon processor–based Lenovo System x3650 M5 rack servers also provide greater consolidation of virtualized

China's Internet Plus Initiative

In 2015, China announced an initiative to integrate mobile Internet, cloud computing, big data, and the Internet of Things (IoT) with modern manufacturing. The goal was to fuel development of e-commerce and industrial networks. Today, the goals of the initiative have expanded to help drive technological innovation by encouraging enterprises to develop and implement open source solutions that address technological bottlenecks and strengthen risk controls.

The SDI project that AWcloud implemented for CNTV is a reflection of the Internet Plus initiative. The implementation meets the initiative's goals by creating a more agile, robust solution built on the OpenStack* platform and other open source tools and APIs. AWcloud and CNTV plan to roll out the implementation to regional media affiliates, a move that will further support the important initiative.

resources and easily support the complex demands of modern workloads compared to other servers with less powerful processors.

The Intel SSDs and rack servers are further supported by Intel Ethernet Converged Network Adapters. The adapters help reduce bottlenecks, provide strong read/write performance, and deliver fast response times.

On the OpenStack side of the implementation, CNTV has realized increased agility. DevOps staff can now sandbox and implement custom and template-driven service and application deployments at a pace that was not possible with the previous infrastructure. And AWcloud used an OpenStack Murano* application catalog to develop a media content catalog that enables internal and external users to self-serve.

AWcloud also developed an analytics and billing solution for the media-distribution side. The solution can be used both internally and externally to monitor media content and application usage. Externally, usage will be monitored to determine exact charges. This will give CNTV better insight into what media affiliates do and do not consume, allowing it to bill more precisely. Rather than billing all affiliates for general usage on a monthly basis, usage can be based on actual media consumption, which will result in a more efficient, automated billing outcome for both CNTV and its affiliates.

The entire solution is seamlessly managed though a web portal that AWcloud designed for the project. OpenStack resource and application management is accomplished through OpenStack API calls as part of the overall PaaS solution, which helps CNTV manage its new SDI cloud efficiently.

Figure 1. The administrative dashboard developed as part of the administrative web portal designed by AWcloud

OpenStack Platform Solution Details

To deliver CNTV's SDI and content-distribution solution, AWcloud started with 85 nodes in one data center. Additional nodes will be added to accommodate affiliate use and future growth with the phase-two rollout and as needed thereafter. The 85 initial nodes are distributed as follows:[2]

- 17 nodes for management
- 43 nodes for compute
- 19 nodes for storage
- 6 nodes for networking

Underlying the nodes are:

- 43 Lenovo System x3650 M5 servers with the Intel Xeon processor E5-2650 v4
- 20 Lenovo System x3650 M5 servers with the Intel Xeon processor E5-2630 v4
- Three Lenovo System x3650 M5 servers with the Intel Xeon processor E5-2630 v4 and the Intel SSD DC S3710 Series
- 16 Lenovo System x3650 M5 servers with the Intel Xeon processor E5-2630 v4, the Intel SSD DC S3700 Series, and the Intel SSD DC S3710 Series
- Three Lenovo System x3650 M5 servers with the Intel Xeon processor E5-2650 v4 and the Intel SSD DC S3700 Series
- The 10 gigabit Ethernet (GbE) Intel Ethernet Converged Network Adapter X540 product family

Software driving the solution includes:

- OpenStack Mitaka* release project sets for Keystone*, Nova*, Neutron*, Glance*, Cinder*, Horizon*, and Swift*, in addition to the Murano application catalog

- RabbitMQ* as the open source message broker
- Kubernetes* and Docker* container solutions
- Tencent Cloud* platform for cloud compute services and the application and media pay-per-use model
- Ceph* OSDs and RADOS Gateway* for network access to objects stored on a local file system and an interface to the OpenStack Swift API

Intel's Support for the OpenStack* Platform and the Intel® Builders Program

Intel is a Platinum Member of the OpenStack Foundation* and is a major code contributor to the OpenStack community.[1]

Intel developers work with the community to expose Intel® technologies to OpenStack software modules and to extend OpenStack technology to improve security and compliance, high availability, manageability, performance, and the end-user experience. These efforts help to ensure that users experience the best possible results when using OpenStack with Intel technologies.

The Intel Builders program brings together multiple companies and technologies, including Intel technologies, to find innovative solutions to address real-world data center needs.

Effective DevOps Capabilities and Service Chain Delivery Using a Private Cloud

The success of AWcloud's initial implementation for CNTV demonstrates the viability of the OpenStack SDI platform run on Intel technologies. It shows the value of the implementation for DevOps capabilities and service chain delivery via a private cloud—value enhanced by the reliability and scalability of an OpenStack platform–based solution. It also shows AWcloud's proficiency in implementing solutions that comply with China's Internet Plus initiative. The solution, and similar variations, can be implemented for other organizations and state suppliers in China and throughout the world. The success of the implementation was maximized due to AWcloud's contributions to the OpenStack platform, its OpenStack expertise, its partnership with Intel, Intel's contributions to the OpenStack platform, and the OpenStack platform's interoperability with Intel solutions.

About AWcloud

As a contributing member of the OpenStack Foundation*, AWcloud continuously works to advance the adoption of the OpenStack platform as the prevailing cloud computing platform in China and globally, and it is among the top contributors to China's Internet Plus initiative.

See how AWcloud is helping companies like yours implement OpenStack solutions: **awcloud.com/en/**.

Connect with AWcloud on WeChat* by searching for 海云捷迅**AWcloud**.

Learn More

See how Intel architecture is helping other businesses deploy open, hybrid clouds built on the OpenStack platform: **https://01.org/openstack**.

Learn which Intel Xeon processor is best suited to deliver an SDI for your business by visiting **intel.com/xeon**.

Find reference architectures, white papers, and solution briefs like this one that can help you build and enhance your data center infrastructure in the Solutions Library on the Intel® Builders home page: **https://builders.intel.com/solutionslibrary**.

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[1] Stackalytics. "Code Contribution." May 2017. http://stackalytics.com/?release=all.

[2] Based on the AWcloud proof of concept conducted in 2016 and 2017.