



The Leader in Digital Solutions

H3C CAS Virtualization Platform

Overview

H3C CAS (Cloud Automation System) is a self-developed virtualization platform for the next generation cloud data center. H3C CAS, by adopting a brand new virtualization kernel, which can provide carrier grade stability and performance, such as fault detection within a second and kernel latency in millisecond. H3C CAS integrates virtualized resources including computing, storage, networking and security bringing an efficient converged data center infrastructure in order to help customer ready for the next generation cloud data center solution.

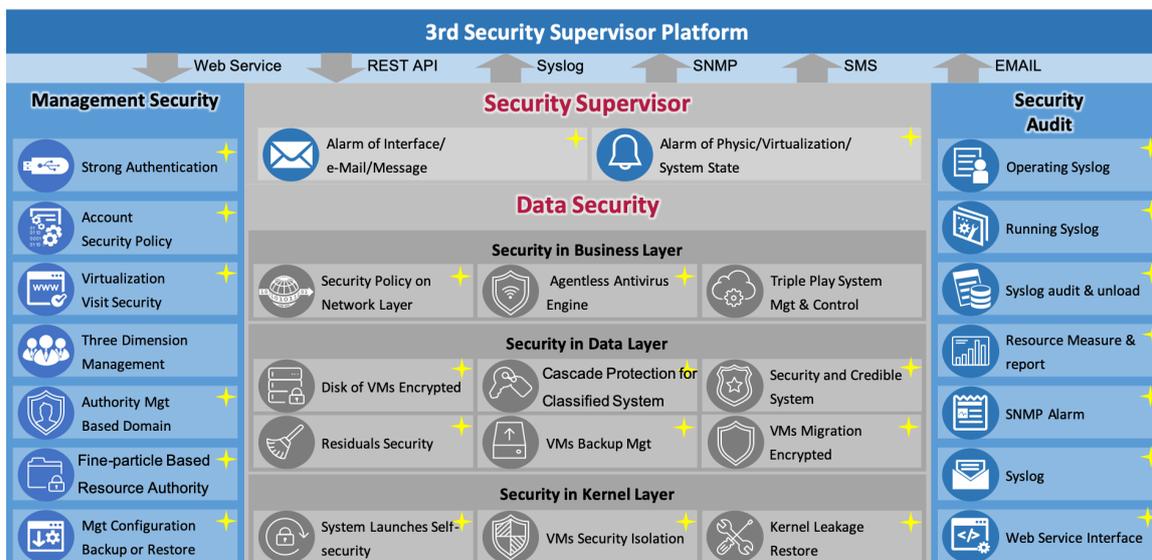
Highlights

Carrier Grade Stability

- H3C CAS upgrades the virtualization kernel system to a real time operating system, ensure computing validity and at the same time guarantee the virtualization platform stability with kernel latency within millisecond and fault detection within a second. H3C CAS supports disaster recovery solutions for datacenters and provides HA technology from physical, virtual machines or even to application layers to prevent services interruption due to failure of physical devices. H3C CAS provides an all-round integration to support the stability and reliability of the business system.

Comprehensive Security and Protection

- H3C CAS provides security and protection for the kernel layer, data layer, business layer as well as management layer to meet security and compliance requirements. It creates an all-round security and protection system for virtualization environment. The kernel of H3C CAS integrates the security and protection engine supporting agentless antivirus and deep packet inspection (DPI) to achieve highly efficient security and protection for virtual kernels and virtual machines.



Virtualization Security System

Easy and Highly Efficient Maintenance

- H3C CAS is based on the graphical management control platform of B/S architecture. It builds a healthy system model and can show overall operation status of the whole virtual system in one screen. It can display key resources, such as CPU, memory, I/O of disk or network and support key resources information export by one key. Operators can plan resources reasonably since it can display and export key resources by one key. H3C CAS also offers plenty of alarm policies, and support sending notifications via emails or messages to operators. The exclusive one-key O&M and visual topology support one-stop operation and management for operators.

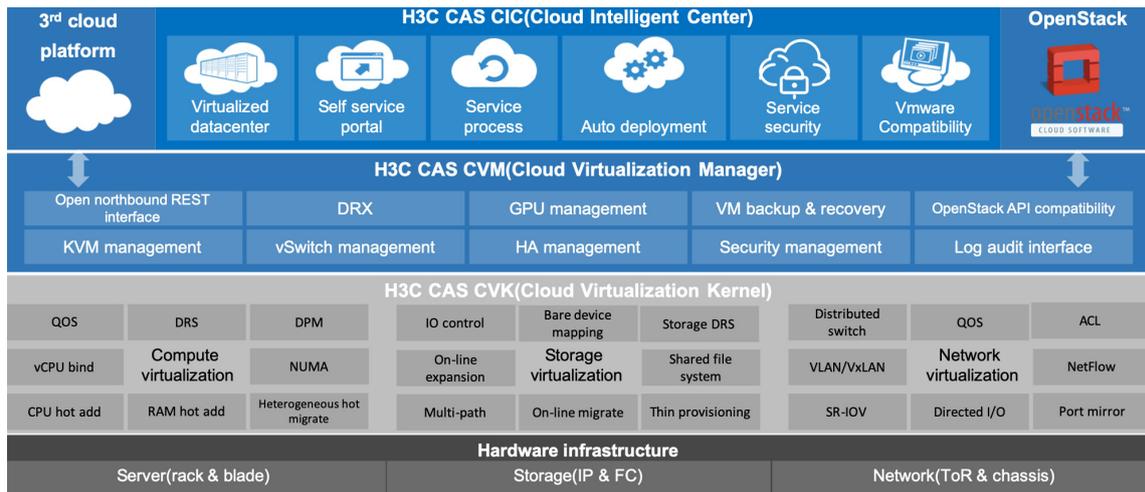
Fully Converged Virtualization

- H3C CAS integrates virtualization of computing, networking, storage and security, serves better for upper application layers with resilient resource pool and automatic dispatch. VMs are separated from each other with independent CPU, memory, I/O of disk and network, when any VM is down, there is no influence on other VMs in the same physical device, also the operating systems between VMs is heterogeneous.

Wide Compatibility & Open Cooperation

- H3C CAS is open and compatible with 3rd party software and hardware platform, including x86 servers of mainstream manufacturers, storage arrays, original operating systems, NIC, HBA and etc. It can connect with 3rd party Openstack cloud platform via customized northbound REST API. H3C has published a series of all-round integrated solutions partnering with Asialnfo Security, Qihoo 360, MacroSAN, EISoo, and etc.

Architecture



H3C CAS platform is based on bare-metal framework and includes three core components,

- **CVK: Cloud Virtualization Kernel**
 CVK is a virtualization kernel software which runs between network infrastructure and customer’s operating system. For hardware resources access by customer operating system, CVK shields the underlying differences among heterogeneous hardware; and eliminate the dependency of customers’ operating system on hardware devices and drivers. Above all, CVK enhances hardware compatibility, reliability, availability, scalability and performance of VMs (virtual machines).
- **CVM: Cloud Virtualization Manager**
 CVM provides automatic services for upper layer applications and manages computing, network, storage and other hardware resources in a data center through virtualization software; manageable resources including virtualized computing, virtualized network, virtualized storage, HA(High Availability), DRS(Dynamic Resource Scheduler), DRX(Dynamic Resource eXtension), GPU resource pool, VM recovery & backup, carrier-grade KVM virtualization management, carrier-grade vSwitch management, carrier-grade reliability management, virtualized security management, log audit interface and etc. Since CVM provides open northbound REST interfaces and plug-in interfaces which are compatible with OpenStack, it can connect with 3rd parties’ cloud management platform and the standard OpenStack cloud platform, including Havana, Juno, Kilo, Liberty, Mitaka and etc and at the same time shields the complicated and heterogeneous virtualized infrastructure.
- **CIC: Cloud Intelligence Center**
 CIC consolidates infrastructure resources (computing, network & storage) and corresponding policies into a data center resources pool. CIC can also build a multi-tenant hybrid cloud and let tenants to order the resources on demand. On demand resources includes: organize, multi-tenant data & security, cloud business workflow, cloud security workflow, self-service portal, VMWare-compatible virtualization platforms and etc.

Features

Cluster-based Centralized Management

H3C CAS forms cluster using server hosts and VMs. H3C CAS provides clear hierarchical view, and demonstrates relationships of Data Center, host pools, cluster, hosts and VMs to simplify workload of resources management.

The benefits are:

- The administrator can organize, monitor and configure all IT elements via a unified interface to reduce management cost.
- The cluster, providing a share resources pool and converged with multiple standalone hosts, not only reduces complexity of management but provides the instinct high availability. H3C CAS can instantly restart the influential VM on another host in the cluster or migrate the VM manually when a host breaks down. It also supports online migration of storage and cross-storage-generate and cross-vendor migration of VMs, which means that a running VM can migrate from one storage site to another one without business interruption. The function proposes a cost-effective and highly available solution.
- H3C CAS supports dynamic resource allocation to adjust VM resources, such as CPU, memory, disk, NIC and etc on-line or offline dynamically.

Full Lifecycle Management of VM

- Support VMs establishment, modification, start, suspend, restore, sleep, reboot, shutdown, clone, migration, snapshot and etc; and at the same time support remote connection to VM through the management console. All operations are based on GUI.

HA (High Availability)

- H3C CAS HA monitors VMs in the resources pool consistently and maintains heartbeat between VMs uniquely. When a VM loses its heartbeat, CAS will try to reboot the failed VM on another server, CAS HA shall guarantee the influential VM reboot on other servers when its previous server breaks down and at the same times ensure there is enough hardware resources in the resources pool. CAS HA utilizes the optimized high performance cluster file system and allows different servers to visit the same storage file via different storage protocols, like SAN/iSCSI/NFS.

DRS (Dynamic Resource Scheduler)

- In the virtualization environment, when users integrate applications to physical hosts with less resources, the resources on VMs will become bottleneck and resources required will exceed the available resources on the physical hosts. DRS introduces an automatic mechanism to balance capacity continuously and migrate VMs to a host with more available resources to ensure each VM at any nodes has enough resources in any time. Even though there are VMs running SQL, once using DRS, there is no need to monitor the availability of CPU and memory. The automatic resource allocation and load balance can also reduce the cost of Data Center and cost of operations.

The heartbeat mechanism can help CAS to monitor the utilization ratio of critical resources such as CPU and memory. The function can also decide whether a host needs more available resources according to users' customized rules. If necessary, it will migrate the VM to another server which owns

more available resources or move out other VMs on the server to ensure enough resources for the key VMs.

DPM (Dynamic Power Management)

- H3C CAS migrates VMs and shut idle servers dynamically to reduce consumptions in Data Centers via monitoring resources utilization ratio, such as CPU, memory, connections of physical hosts in the cluster. When service load increases, H3C CAS will wake up shutdown host and migrate VMs dynamically for load-balancing.

Flexible Resource Allocation

- H3C CAS can allocate computing resources, networking resources, storage resources based on business demands. The allocation of computing resources is based on the quota and reservation of VM CPU and memory; networking resources is allocated based on QoS setting in vSwitches while storage resources is allocated based on disk IOPS (Input and Output Per Second) and the throughput speed limitation. SLA (Service-Level Agreement) is satisfied and to ensure high-priority VMs running with better capability of computing, networking and storage, as well as to avoid adjacent interferences.

RDM (Raw Device Mapping)

- H3C CAS can support mapping between LUN in SAN (FC or iSCSI) and VM. VM can access raw device and the VM data can be stored in LUN directly when building cluster file systems.

VM Security Protection

- H3C CAS can support complete security protection solutions in virtualization environment together with 3rd parties' antivirus software or security software, such as 360 or AsialInfo, and H3C CAS can secure VMs without agents.

Cost-effective Disaster Recovery

H3C CAS can support transparent scheduled backup and instant backup. H3C CAS provides fast and simple data protection for VMs via deleting duplicate data.

The values are as below:

- Backup based on snapshot, no influence on businesses on-line.
- No backup for agents, simplify complexity of installation.
- A fully automatic scheduled backup or instant manual backup to satisfy different applications.
- Support a variety of VMs backup, such as total contents backup, differential backup and incremental backup.
- Support 3rd parties' backup software to achieve centralized backup.

Performance and Status Monitor

- **Performance and Status Monitor of Physical Servers**
H3C CAS can provide graphic reports of physical servers' computing resources like CPU and memory; and also the TOP 5 reports of servers' VM utilization ratio. Those detail information helps administrator's resources planning.
- **Performance and Status Monitor of VMs**
H3C CAS can provide comprehensive performance monitor of CPU, memory, disk I/O and network I/O of VMs.
- **Status Monitor of vSwitches**
H3C CAS can provide traffic statistics of virtual interfaces on vSwitches and graphic display of vSwitches interfaces.

• Performance and Status Monitor of Virtual NICs

H3C CAS can provide graphic traffic in real time on virtual interfaces.

Customizable Dashboard

- H3C CAS can directly and abundantly display the key performances and resource status through a full screen. In enterprise versions, users can customize the display information according to their requirement, which includes but not limited to host performances, VM performances, shared storage performances, system health status, host health status, CPU usage, memory usage, storage usage, system alarms, CPU and memory utilization ratio of Top5 VMs, status statistics of hosts and VMs.

Convenient Resource Statistics and Management

- H3C CAS can provide rich report on management of VMs, such as TopN network traffic, network traffic statistics, TopN I/O throughput, I/O throughput statistics, TopN performances, performance statistics, and various inquiry methods based on clusters, hosts, VMs and time. In addition, it is convenient for administrators to overview, audit and save host and VM information since CAS can export host and VM lists in CSV format gathering from cloud resources; as well as host pools and cluster information.

Intuitive Virtualization Topology

- H3C CAS displays relationships between cluster, hosts, VMs, network and storage in GUI, include virtual topology based on computing resources; virtual network topology based on vSwitches and virtual storage topology based on storage LUN.

One-Click functions

- H3C CAS can support One-click operation, such as one-click health inspection, one-click resource analysis, one-click storage clean, one-click VM restore, which can easily complete daily and complicated operation. For example, one-click inspects the condition of virtualization platform, which can dynamically generates inspection report and optimize suggestion and at the same time provide one-click clearing of invalid storage volumes in the shared storage to release storage space and increase storage efficiency.

USB Redirection Based on Network

- H3C CAS can support USB redirection technology based on network. It will not affect communication between VMs and USB when hosts migrate. The service system can operate USB seamlessly without 3rd party support.

Network Virtualization Based on VxLAN

- H3C CAS can support distributed vSwitches based on the standard VxLAN encapsulation technology, which decouples vNetwork from physical network. VMs can migrate across L3 physical network, accompanying with security policy synchronized. Moreover, customers can create maximum 16M isolated vNetwork, which breaks the limitation of 4K VLAN and creates a secure multi-tenant virtual network.

DRX(Dynamic Resource eXtension)

- H3C CAS can support DRX based on traffic loads. H3C CAS can dynamically clone or delete VMs according to parameters such as CPU, memory and connections to satisfy the dynamic business requirements. When there is burst traffic on users' service, CAS can detect the high loading VM and will rapidly

clone more VMs, with the cooperating of Load balancer to increase services capabilities; when the peak traffic is over, CAS will delete the redundant VMs. In such case, computing resources are distributed on demand.

Online Migration Across Data Centers

- H3C CAS can realize the interconnection of separated resource pools in different data centers and ensure business continuity via online VM migration across different data centers, which breaks the limitation of IT resources can only be deployed in local and provides global IT resource management for enterprises.

Comprehensive Fault Recovery Mechanism

- H3C CAS can support a highly reliable fault recovery mechanism. Same VM runs on different hosts, and when the master fails, the backup will take over businesses immediately, which realizes zero downtime to guarantee no interruption on critical businesses in real time.

Unified Management on Multi-virtualization Platforms

- H3C CAS is compatible with VMware vCenter Server, H3C CAS can manage VMware vCenter Server via the open API interface provided by VMware to achieve unified management on multi-virtualization platforms.

One-stop Delivery of Virtual Resource

- The H3C CAS self-service portal can provide a secure, multi-tenant and self-serve IaaS. IT department can abstract physical resources such as computing, storage and network into elastic virtual resources pool via the self-service portal and provide services the format of (organization or vDC). And IT department can provide users with vDC, infrastructure (including VMs and OS image and etc.) and application templates. The self-service portal realizes agility, controllability and high efficiency of cloud computing, and greatly improves the service response capability.

Business Process Customization

- H3C CAS can support business process customization. User can customize approval procedures and approval roles for cloud hosts, cloud disk, user registration, policy backup and etc. H3C CAS also can support a variety of approval modes such as single-sign, multiple-sign, option-sign and half-member-sign and etc.

Centralized Protection and auditing for Data Center

- H3C CAS can protect configurations and remote access authorization via flexible user access control. And major operations are recorded in audit logs for auditing and tracking.

Operating Environment

Description	Configuration Parameters Recommended	Models Recommended
H3C CAS CVM Management Server	Quantity: 1 pcs CPU: 2GHz and above Memory: > 4GB Disk: > 120GB NIC: >= 2*GE	H3C UniServer series H3C UIS-Cell series HCI
H3C CAS CVK Service Server	CPU: support Intel-VT or AMD-V DRAM: > 16GB Disk: > 300GB NIC: >= 4*GE	H3C UniServer series H3C UIS-Cell series HCI

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