Huawei FusionCloud Desktop Solution

HUAWEI TECHNOLOGIES CO., LTD.

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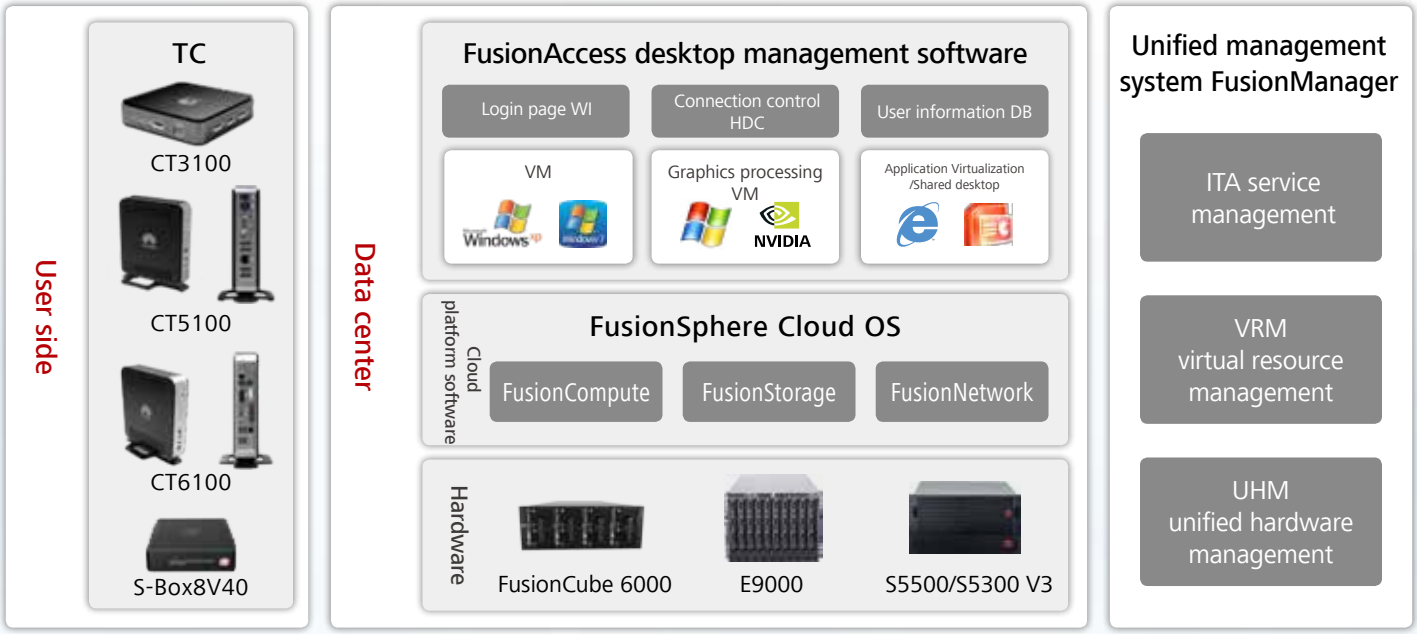
Huawei FusionCloud Desktop Solution

— High Security and Reliability, Superior User Experience, High Agility and Efficiency



The Huawei FusionCloud desktop solution delivers virtual desktop applications based on the Huawei cloud platform. Huawei desktop access software is deployed on the cloud platform, enabling users to access cross-platform applications and even the entire desktop using thin clients (TCs) or any other device connected to the Internet.

The Huawei FusionCloud desktop solution is an end-to-end solution covering cloud terminals, cloud hardware, cloud software, network and security, and consulting and integration design services.

The Huawei FusionCloud desktop solution is highly secure and reliable, and delivers an agile, efficient and superior user experience. Huawei currently has more than 2,200 partners worldwide, provides services for about 400 institutions in 42 countries, and has deployed over 200,000 desktops. Based on extensive project implementation experience, the Huawei FusionCloud desktop solution is widely deployed in sectors such as government, healthcare, finance, education, telecom, energy, transportation, media, and manufacturing.

Solution Highlights

High Security and Reliability

The Huawei FusionCloud desktop solution adopts a systematic multi-layered cloud-pipe-device-control security design covering terminals, networks, the cloud platform, and management. The security design focuses on prevention to ensure enterprise information security. At the same time, providing customers with reliable protection from the terminal to the platform.

- Terminal security measures: terminal certificate; fingerprint; ,USB Key multi-factor authentication; desktop system without the active directory (AD); integrated port and peripheral management
- Network security measures: VM security group isolation; secure VPN connections; encrypted transmission; secure Internet access
- Cloud platform security measures: distributed and hierarchical storage; data disk encryption; traceless data processing
- Management security measures: rights- and domain-based management; separation of rights; administrator behavior management; bastion hosts
- Desktop system high reliability: desktop connection diagnosis and recovery; port negotiation for desktop connections; desktop agent software protection; virtual desktop backup; Service disaster recovery.

Superior User Experience

Based on different application scenarios, the Huawei FusionCloud desktop solution optimizes high performance desktops to meet users' personalization requirements and provide a superior user experience.

- The SoftClient-split and TC-based SoftClient solutions ensure that the perceptual evaluation of speech quality (PESQ) averages 3.8.
- The system supports highly efficient image encoding and decoding. Lossless compression is used for non-natural images, repeated image data is not transmitted, and the display frame rate is auto-adaptive. These technologies

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are used to smoothly display high-definition images with less bandwidth.

- The system supports intelligent video scenario recognition, dynamic video data auto-adaptation and dynamic frame rate adjustment, multimedia redirection and video hardware acceleration redirection technologies, as well as TCs with strengthened video decoding capabilities, providing smooth HD video experience.
- GPU passthrough, GPU sharing, and GPU hardware virtualization technologies meet the performance requirements of professional drawing applications, such as AutoCAD, and ProE.
- Server-based computing (SBC) implements centralized deployment and remote releasing of applications as well as mobile office.The system supports mainstream application software and is compatible with 1800+ service systems, 200+ peripherals, and 20+ TCs.

High Agility and Efficiency

The Huawei FusionCloud desktop solution supports integrated hardware and software optimization, simplifies operation and maintenance (O&M), and balances enterprise IT O&M cost and efficiency

- Service deployment can be reduced to only 2 hours, achieving rapid service rollout and capacity expansion. Additionally, resources can be flexibly scheduled to meet service scalability demands. These features improve IT service support capabilities and response speeds.
- Huawei FusionCloud desktop solution provides a unified cloud computing O&M management platform , to achieve unified management of physical and virtual resources, and desktop cloud business management, unified alarm and fault management.
- The system provides automatic management tools to automatically collect and analyze enterprises' office environments (such as CPU, memory, and disk information), optimize user experience, migrate user data, simplify maintenance, and improve O&M efficiency.
- Automatic, flexible, rapid capacity expansion and automatic hardware power-on detection are supported.
- Linked clone and full memory desktops improve user experience and management efficiency.
- Desktop self-service feature enables desktop operating scenarios for efficient self-management of enterprises.
- Huawei's core software has independent intellectual property rights. Standard interfaces are opened to flexibly adapt to various industry applications, and solutions can be rapidly customized to meet industry requirements

Main Features

Feature	Description
High Security	
Terminal security	■ TCs are verified to prevent unauthorized access. ■ Terminal's ports are under control, such as USB interfaces, serial ports, and parallel ports. Some ports can be disabled. For example, USB reading/writing can be disabled to prevent illegal copying of data. ■ TCs have no hard disk to store data. Data is stored in the data center to prevent information security breach.
User access security	■ Fingerprint login authentication is supported. ■ USB key login authentication is supported. ■ Dynamic password login authentication is supported. ■ Binding between TCs and user accounts is supported. After binding, users can log in to virtual desktops only in specified places. ■ Desktop System Without the Active Directory (AD).
Transmission security	■ Portal over HTTPS is supported. All transmission from the portal is encrypted. ■ HDP over SSL is supported. To ensure information transmission security, the FusionCloud desktop system uses the SSL-based encryption and authentication mechanism for transmitting information from clients to servers and between internal components.
Network security	■ The internal network is physically isolated from external networks. ■ Remote access is secure. Employees on business trips can access their enterprise's data and application over SSL-VPN. ■ The secure Internet access solution is provided to ensure that data cannot be transmitted from the intranet to the Internet. ■ Cloud terminals with dual network ports for network isolation are provided. Working with the dual-screen display feature, the cloud terminals with two physical NICs isolate two virtual desktops and can display virtual desktops delivered by physically isolated networks.
Cloud platform security	■ The desktop cloud system is hardened, and the Linux operating system is customized and hardened. ■ Security patches, patch delivery, and upgrades are centrally managed. ■ VM live migration is supported to enable seamless handover of services when a VM becomes faulty. ■ Distributed storage and automatic backup are supported for data. Large files can be fragmented and stored in different physical areas. When one physical storage is damaged, the data can be restored using the backups stored somewhere else. ■ VM snapshots can be provided based on the storage virtualization capability of the computing side. The snapshot function is independent of storage devices.
Data security	■ Data disks are encrypted to prevent data loss. ■ Data is completely removed from the disks of a reclaimed VM to prevent malicious users from using data recovery software to restore data. ■ Virtual desktop isolation: Each virtual desktop user has logically independent VMs. Each VM has independent virtual CPUs (vCPUs), virtual memory, and virtual network resources. Users can access only the VMs that are assigned to them. ■ Virtual desktop antivirus security：User VMs are compatible with various antivirus software to protect user VMs against virus attacks. ■ Support virtualization layer antivirus feature.
Management security	■ Security hardening for the management system OS and database ■ Antivirus protection ■ Management System Certificate Authentication ■ Administrator operation log audit ■ Rights- and domain-based management

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Feature	Description
High Reliability	
Redundancy of management nodes	■ Major management nodes work in active/standby mode. The standby node detects the health status of the active node through the heartbeat signal over the management plane in real time. When detecting that the active node is faulty, the standby management node immediately takes over services from the active node
VM HA mechanism	■ The desktop cloud system monitors the VM operating status in real time. When detecting that a VM or the PM is faulty, the system automatically re-creates the VM on a server that is running properly. This HA mechanism ensures quick recovery of faulty VMs.
Storage data reliability mechanism	■ User data is stored on SAN devices. The SAN devices provide high reliability by using the redundant array of independent disk (RAID) technology and two hot spare disks for data backup.
Rapid detection of BSOD faults	■ When detecting a BSOD in the VM OS, the FusionManager O&M System automatically restarts the VM.
Service performance fault monitoring	■ The automatic hardware diagnosis function enables the desktop cloud system to monitor hardware status in real time. When detecting a fault of a hardware component, the system automatically isolates the component, performs a switchover, restarts the component, and reloads software to it.
Migration of disks on a faulty VM	■ If a VM is faulty and cannot start, you can mount the disk to a temporary VM and access the disk from this VM to copy the data on the disk. ■ The system automatically reclaims the disk to release disk resources after a user backs up the data on the disk.
Excellent Experience	
Various terminals	■ Users can use a variety of terminals to access virtual desktops. The terminals have a wide choice for the OS, such as Windows, iOS, Linux, and mobile platforms such as Android, iOS, and BlackBerry.
Carrier-class speech quality	■ SoftClient-split and TC-based SoftClient solutions are supported, providing high speech quality and low delay. The delay is less than 500 ms, and the PESQ averages3.8. ■ Mainstream IP call center software, such as CosmoCall Universe ™ and Avaya ™ are supported.
Professional graphics processing	■ The Huawei FusionCloud desktop solution provides GPU Pass-through, GPU Sharing and GPU hardware virtualization to support high-performance 2D/3D graphics processing and be compatible 2D/3D graphics software such as AutoCAD, Revit,3DS MAX, ProE, and Allegro.
120 Mbit/s HD video editing	■ The HDP-based GPU passthrough solution supports 120 Mbit/s HD video editing.
Multimedia playing	■ Multimedia redirection and video hardware acceleration redirection are supported to provide users with smooth multimedia experience over the desktop cloud system. ■ The contents in the Flash can be redirected to clients for processing.
SBC	■ Shared desktops are released based on SBC. ■ Remote applications are released based on SBC.
VIP desktop	■ CPU and memory resources are guaranteed and monitored in real time for VIP desktops to provide better user experience for VIP users.
Multiple peripherals	■ Device mapping and port mapping modes can be used to support multiple dedicated peripherals, control virtual desktops, and share local resources. ■ More than 200 peripherals are supported, including USB flash disk, USB printer, scanner, USB key, and fingerprint reader.
Full-memory desktop	■ System disks of VMs reside in the memory so that the VM disk read/write operation transfers to memory operations, which improves user experience, supports shutdown restoration, and improves management efficiency.
Efficient O&M	
Virtual desktop task management	■ Tasks for periodically creating, starting, restarting, stopping, waking up, and hibernating VMs in batches can manage VMs in the system in an unattended manner. ■ Scheduled tasks, periodical tasks, and task policies can be configured.
Resource monitoring	■ The desktop cloud system monitors the CPU, memory, and network resource usage of VMs, and allows administrators to query VM status, unused VMs, and user login information so that the administrators can reclaim idle resources in a timely manner., and exports reports to provide northbound interface to achieve self-monitoring.
Unified user interface (UI) management	■ The cloud management system FusionManager incorporates desktop cloud service management, virtualization platform O&M management, and hardware management, and provides a unified management portal to improve management efficiency.
User experience optimization tool	■ The desktop user experience optimization tool provides various functions, including the risk check, system optimization, voice quality optimization, historical case library, and software compatibility check.
Branch office management	■ The branch office networking supports local deployment of remote modules. The VMs of branch offices can be provisioned and maintained in a unified manner, includes hardware management and monitoring, virtual resource management and monitoring, centralized alarm and operation log management, single sign-on (SSO), and TC management.
Unified Virtual Desktop Agent (HDA) upgrade	■ The desktop cloud system provides the HDA automatic upgrade function, which enables administrators to manage software in a centralized manner. ■ The desktop cloud system supports multiple upgrade modes, such as silent upgrade by using the PV driver, AD group policy upgrade, TSM software pushing, and upgrade by updating the linked clone parent volume.
User self-help console	■ If the VM login fails due to VM system faults, a user can rectify the faults on the self-help console conveniently. This reduces the workload of system administrators.
O&M management tools	■ Complete tools are provided to collect the desktop system planning information. ■ A log analysis tool is provided to analyze FusionAccess logs. ■ A health check tool is provided to check the health of a system, display the check results, and generate health check reports.
Resource Reuse	
Memory Overcommitment	■ The hypervisor scheduling implements memory over commitment, which improves memory usage and VM density without deteriorating user experience.
Linked clone	■ A shared read-only parent volume is used to provide the original VM OS, which reduces the used system disk space and system disk capacity configuration.
Storage thin provisioning	■ The thin provisioning allows more virtual memory space to be allocated than the physical memory available. The physical memory space is allocated only for the virtual memory space where data is recorded. The virtual memory space where no data is recorded does not occupy the physical memory space.
Smart cache (iCache)	■ In linked clone virtual desktop scenarios, iCache technology is used to dynamically identify and cache user shared storage resources in the memory, which greatly improves the data access performance.

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Feature	Description
Load Balancing Scheduling	■ The system will migrate some VMs to other computing servers with low CPU load, if the CPU load of a computing server exceeds the scheduling threshold. This ensures CPU load balancing between computing servers.
Dynamic power management	■ If only a few VMs are used in a cluster, the VMs can be aggregated to a few hosts in the cluster and the other hosts can be stopped. This helps achieve energy conservation and emission reduction. When more VMs are required, the system must dynamically power on hosts to provide sufficient VMs.
Elastic Resource Reuse	■ Elastic resource reuse allows services to use system resources of the cloud computing platform at different time periods, which maximizes the usage of cloud platform resources. Users use virtual desktops for work in daytime and release the computing resources at night. The system can use the released resources for other service tasks (such as image rendering and supercomputing) and release the resources after the service tasks are done.
Backup and Disaster Recovery	
Virtual desktop online backup	■ Individual users can manually or periodically back up the important data to the backup system. If virtual desktop data is lost due to faults, such as disk damage and unexpected deletion, users can restore data using the data in the backup system. ■ Three backup modes, network attached storage (NAS) backup, VM HyperDP Backup and VM snapshot backup, are supported.
Service disaster recovery	■ Two remote desktop cloud system sites working in active/standby mode can be constructed. If the desktop cloud system on the active site is faulty and unavailable, the users of the active site can be automatically switched to the desktop cloud system on the standby site, achieving virtual desktop service disaster recovery.
Open Interfaces	
Operations support system (OSS) interface	■ With the FusionManager OSS interface, enterprises can use their operation and maintenance (O&M) system to provide O&M services for the desktop cloud system. This facilitates centralized management of the cloud platform and allows for optimal use of cloud platform resources.
Service provisioning interface	■ Users can customize service provisioning portal by using the virtual desktop service provisioning interface provided by the FusionAccess.
Enterprise self-service interface	■ In the desktop rented scene, FusionAccess provides enterprise self-service NBI. The enterprise platform can integrate this feature, complete service provisioning and billing;

Technical Specifications

VM Specifications	
VDI OS type	• Windows XP 32-bit • Windows 7 32-bit/64-bit • Windows 8.1 32-bit/64-bit • Windows Server 2008 R2 64-bit • Windows Server 2012 R2 64-bit
APS server OS type	Windows Server 2012 R2 64-bit
Memory size supported by a VM	1GB-4GB(32bit) 1GB-512GB(64bit)
Number of virtual network interface cards (NICs) per VM	1 to 12
Number of attached volumes supported by a VM	1 to 11 (1 system volume and 0 to 10 user volumes)
System disk capacity supported by a VM	5 GB to 2 TB
User disk capacity supported by a VM	1 GB to 2 TB
Desktop color depth	24 bit/32 bit
Desktop maximum resolution	2560*1600
System Specifications	
Maximum number of users supported by a set of FusionAccess	Reference Architecture :20,000 FusionCube :5000 ①
Maximum number of users supported by an HDC	5,000
Maximum number of concurrent users supported by an HDC	10 users per second
Number of desktop groups supported by a set of FusionAccess	600
Number of VMs supported by a desktop group	600
Maximum number of clone volumes supported by a linked clone base volume	128
Maximum number of VMs with GPU hardware virtualization (Nvidia Grid K1)	4 pGPUs/32 vGPUs
Maximum number of VMs with GPU hardware virtualization (Nvidia Grid K2)	2 pGPUs/16 vGPUs
50 full memory VMs On a single server startup time	<5 minutes

Note:

①: If FusionCube is deployed, a set of FusionAccess supports a maximum of 5,000 users. FusionManager centrally manages multiple sets of FusionCube, and therefore a maximum of 20,000 users are supported.

Success Stories

By the end of 2014, Huawei FusionCloud Desktop solution is serving around 400 customers in 42 countries with over 400,000 users. Customers include government and public utilities, telecom, energy, finance, transportation, healthcare, education, media, manufacturing and other industries.

Typical Industries	Success Stories
Government	African Union International Conference Center, CETC (China Electronics Technology Group Corporation)
Finance	Shenzhen Stock Exchange, Chongqing Rural Commercial Bank, Bank of China South Africa Branch
Telecom	Zhejiang Mobile, Shandong Unicom, Jiangsu Mobile
Education	TVTC (Technical and Vocational Training Corporation , Saudi Arabia) , Ethiopia schoolnet, Huazhong University of Science and Technology, Philippines APC University, Nigeria Obafemi Awolowo University
Healthcare	Spain Madrid Hospital, Fujian Longyan People Hospital, Hebei Qianan People Hospital
Media	CCTV, Phoenix CNE
Large enterprises	Hong Kong Airlines, Dagang Oilfield Group Co., Chilean copper company Codelco

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