

FusionSphere 6.3.1 Virtualization Suite Configuration Manual

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About This Document

Overview

This document describes the sales configurations, software specifications, and delivery configurations for Huawei FusionSphere 6.3.1 virtualization suite. It provides guidance for developers in quotation tool development, sales personnel in configuration quotation check, and the supply chains in software distribution and delivery.





Intended Audience


This document is intended for:

- Quotation tool development engineers
- Sales personnel
- Marketing personnel

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
 NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Issue 01 (2018-09-30)

This issue is the first official release.

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1 Sales Description

1.1 Overview

This document describes the FusionSphere sales mode and virtualization suite editions, which provide guidance for engineers to develop the quotation tool as well as sales personnel to make software quotation.

This document is used only as a supplement to *FusionSphere 6.3 Sales Guide*. For details about sales principles, see *FusionSphere 6.3.1 Sales Guide*.

1.2 Sales Mode

FusionSphere can be sold together as a solution or independently sold as a product. Huawei sells only FusionSphere software instead of its hardware.

FusionSphere can be sold in permanent license + SnS or subscription mode. The initial fee of the subscription mode is less than that of the license + SnS mode, but the renewal fee of the subscription mode is higher than that of the license + SnS mode. In permanent license + SnS mode, the user needs to purchase licenses and a certain period of SnS service upon initial use. If the user does not renew the SnS service before the SnS service expires, the user can only use the functions that come with the licenses, but cannot use the functions covered by the SnS annual fee. The license purchased in subscription mode is available only in the agreed duration. If the user does not renew the subscription when the subscription expires, the user does not have any usage permission of the software.

1.2.1 FusionSphere Virtualization Suite Editions: Standard, Advanced, Platinum/Operation

The virtualization suite can be sold by physical CPU in enterprise markets or carrier markets.

The number of FusionSphere licenses is calculated as follows:

Number of physical CPUs on servers where the FusionSphere management software is deployed + Number of physical CPUs on the servers where the FusionSphere computing virtualization engine (CNA) is deployed

Table 1-1 lists the FusionSphere virtualization suite editions.

Table 1-1 Products of FusionSphere virtualization suite editions

Product	FusionSphere Virtualization Suite Edition			
	Foundation	Standard	Advanced	Platinum/Operation
FusionCompute	★	★	★	★
FusionManager	★	N/A	★	★
eBackup	N/A	★	★	★
UltraVR	N/A	N/A	N/A	★



NOTE

- Foundation edition is a free edition that requires no license and supports a maximum of six physical CPUs. Huawei does not provide technical support for this edition.
- Standard edition and Platinum edition are marketable editions and are used in server virtualization scenarios. These editions require licenses and are sold by physical CPU.
- Operation edition provides the same function as Platinum edition, but Operation edition only applies to carriers.
- In a system, the components must be licensed with the same FusionSphere edition. For example, Standard edition cannot be used with Platinum edition. If a customer purchases two editions, the customer can handle the issue based on the following principles:
 - If a customer purchases two editions, for example, Standard edition and Platinum edition, the two editions must be used for two systems, respectively, and their quotations must be separately configured.
 - If the edition a customer purchases is different from that of the existing system, upgrade the earlier edition to the later edition, or deploy two systems. For example, if the in-use edition of a customer is Standard edition, but the newly purchased edition is Platinum edition, the customer can purchase an upgrade package to upgrade the Standard edition to the Platinum edition, or deploy the two systems.
- For the SBOM list of the FusionSphere 6.3 virtualization suites, see section 5.1 "Virtualization Suite SBOM List."

1.2.2 Independently Sold Product

Table 1-2 Independently sold product

Product	Remarks
FusionStorage Block	Optional Quoted by raw capacity (TB).
UltraVR	Optional Quoted by CPU.
Agentless antivirus	Resale: Rising <ul style="list-style-type: none"> • The software is sold with restrictions in this version. • For details about the supported OS types of user VMs, see the compatibility list.



NOTE

- The agentless antivirus software is sold by physical CPU. The physical server is the server that has virtualization software installed and on which the service VMs need the agentless antivirus software to ensure the security.
- The OS and database required for the agentless antivirus software need to be separately purchased locally. For details about the OS and database, see section 4.4 "Antivirus Virtualization Software."

1.3 Export Control

- Huawei products contained in the FusionSphere virtualization suite do not include embargoed components. Exporting of related products to US embargoed countries is constrained slightly (10%). Exporting to other countries is not constrained in any way.
- Due to security authentication issues, FusionSphere cannot be sold in the UK, and is restricted for delivery in projects that demand source code security tests, such as with Canadian carriers.
- Rising antivirus virtualization software can be sold only in China.

1.4 SBOM

For the SBOM list of the FusionSphere 6.3 virtualization suites, see section 5.1 "Virtualization Suite SBOM List."

2 Software Delivery Principles

2.1 Overview

This chapter describes the FusionSphere software encoding principles and software and product documentation delivery principles, which provide guidance for engineers to develop the quotation tool and supply chains to deliver software.

2.2 Encoding Principles

COA and PTO

Chart of accounts (COA) code:

- 6727553 for enterprises
- 6741507 for carriers

Pick to order (PTO) code: 01310016

2.3 Delivery Principles

Delivery Method

The FusionSphere software is provided in any of the following ways:

- Huawei delivers the software CD-ROM.
- Users can download the software from <http://support.huawei.com>.



NOTE

- The software CD-ROM can be delivered only when the quotation for the CD-ROM is listed in the Bill of Quotation (BOQ).
- Foundation Edition is free for trial and can only be downloaded from <http://support.huawei.com>.

Table 2-1 CD-ROM SBOM list

Code	Name	Remarks
05110FYB	Terminal Physical Software,FusionSphere,FS0S631FCCD01,FusionCompute 6.3.1 Software,CD	Two separate CDs are used.

2.4 Product Documentation Distribution Principles

The product documentation is not delivered with the software CD-ROM. Therefore, download it from the product website as required.

3 Hardware Configuration Principles

3.1 Overview

This chapter describes the configuration principles for hardware required by FusionSphere, which provides guidance for engineers to develop the quotation tool, as well as for sales personnel to check the hardware configuration.

3.2 Overall Guideline

Independently plan management servers based on the resource requirements of the management software.

Calculate the required numbers and specifications of compute servers, eBackup servers, and storage resources based on the customer's resource requirements for service VMs.

 **NOTE**

- This chapter only describes FusionCompute single-resource pool scenarios. For multi-resource pool scenarios, calculate cumulative values.
- If a disaster recovery (DR) site is available, the same resources are configured for both the production and DR sites. Calculate the resources required for the production site and use the same configurations for the DR site.

3.3 Management Software

The management software to be installed and the resource usage are shown in Table 3-1.

Table 3-1 Management software

Software	Node Name	Deployment Mode	Resource Usage	Remarks
FusionCompute	VRM	Deployed in 1 + 1 active/standby mode. It can be deployed on VMs or physical machines (PMs).	For details, see section 4.1.2 "VRM."	N/A

Software	Node Name	Deployment Mode	Resource Usage	Remarks
	CNA	Deployed on each compute node.	For details, see section 4.1.1 "CNA."	N/A
FusionManager	FusionManager	Deployed in 1 + 1 active/standby mode. It can be deployed on VMs or PMs.	For details, see section 4.2 "FusionManager."	N/A
BCManager eBackup	Backup server	N/A	N/A	For details, see the OceanStor BCManager V200R001 configuration manual.
UltraVR	UltraVR	It can be deployed on VMs (recommended) or PMs.	For details, see section 4.3 "UltraVR."	Required only when the VM backup is used. An UltraVR management node is required for a maximum of 3000 VMs.
FusionStorage Block	FusionStorage Block Manager	Deployed in 1 + 1 active/standby mode.	N/A	For details, see the FusionStorage Block configuration manual.
Antivirus virtualization software		Deployed on VMs.	For details, see section 4.4 "Antivirus Virtualization Software."	Only sold in China. Customers need to purchase the product from a third party. Only the Rising antivirus software is supported in this version.

 **NOTE**

- BCManager eBackup, UltraVR, FusionStorage Block, and antivirus virtualization software can be deployed based on site requirements.

3.4 Data Preparation

Table 3-2 shows the data required for calculating the hardware configurations.

Table 3-2 Data required for the virtualization suite

Mode	Data Item	Remarks
Virtual to virtual (V2V)	Specifications of each type of VMs	Include number of vCPUs, CPU usage, memory size, system disk capacity, data disk capacity, system disk input/output operations per second (IOPS), number of disks on each VM, data disk IOPS, capacity of the disk to be backed up (required when the DR function is enabled).
	Number of each type of VMs	N/A
	Target server type of each compute node	Includes the specifications, such as the number of CPU cores, CPU clock rate, and CPU usage.
	Number of backup VMs required for each type of VMs, capacity of the disk to be backed up (optional)	Required when the backup function is enabled.
	Number of service VMs that require DR (optional)	Required when the DR function is enabled.
Physical to virtual (P2V)	Specifications of each type of servers	Include the CPU clock rate, number of CPU cores, CPU usage, memory size, system disk size, data disk size, system IOPS, and data disk IOPS.
	Number of each type of servers	N/A
	Target server type of each compute node	Includes the specifications, such as the number of CPU cores, CPU clock rate, and CPU usage.
	Number of backup servers required for each type of servers, capacity of the disk to be backed up (optional)	Required when the backup function is enabled.
	Number of service VMs that require DR (optional)	Required when the DR function is enabled.

 **NOTE**

- Compute nodes can be configured according to the V2V scenario once you are clear about the VM specifications (CPUs, memory, disks, and NICs) and VM quantity after virtualization. You can determine the number of VMs of each VM type and their specifications.
- Compute nodes can be configured according to the P2P scenario (based on PM types) in the following situations: services are still running on physical servers but are scheduled to migrate to a virtualization platform; you are clear about the physical server configurations and the server resources occupied by services.

3.5 Server

Overall guideline: Combine the resources required by service VMs and management software and calculate the number of compute servers required based on CPUs. Then calculate memory size to be configured for each server.

Calculation formula: Total number of servers = Number of compute servers + Number of management servers + Number of FusionStorage Block servers + Number of eBackup nodes/servers

For the number of FusionStorage Block servers, see the FusionStorage Block configuration manual.



CAUTION

- Only x86 servers are supported.
 - When selecting the server type, reserve slots to meet future hardware (for example, memory, NIC, and disk) expansion requirements.
 - The calculation result is rounded up.
 - If FusionStorage Block is used, configure SSD disks as the cache. For details, see the FusionStorage Block configuration manual.
-

3.5.1 Management Server

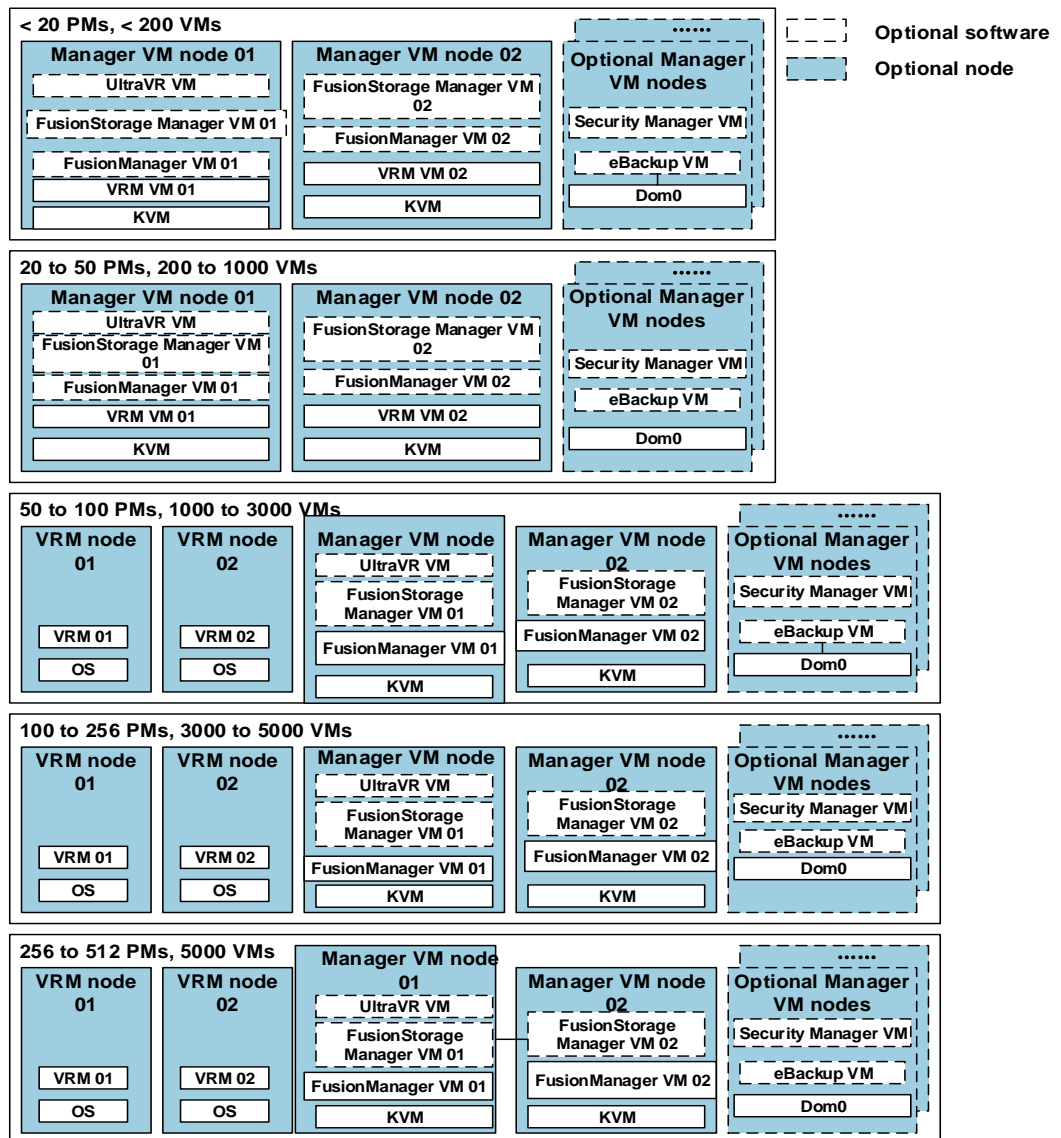
Number of management servers = Number of physical servers accommodating VRM (physical deployment) + Number of physical servers accommodating management VMs + Number of physical servers accommodating optional management VMs + Number of physical servers with eBackup deployed (physical deployment)

NOTE

- To deploy VRM on physical servers, two physical servers are required.
- The physical servers accommodating management VMs are used to deploy VRM VMs (for virtualization deployment), FusionManager VMs, FusionStorage Block Manager VMs, and UltraVR VMs.
- In this condition, two physical servers are required.
- The physical servers accommodating optional management VMs are used to deploy eBackup VMs (for virtualization deployment) and management VMs on which antivirus virtualization software is deployed.
- The number of eBackup VMs is related to the number and specifications of service VMs. The number of physical servers accommodating optional management VMs needs to be calculated.

The number of management servers is related to the PM and VM deployment scales. Figure 3-1 shows the relationship between management servers and PM and VM deployment scales.

Figure 3-1 Management server diagram



Typical Configuration for Physical Servers Accommodating VRM (Physical Deployment) and Those Accommodating Management VMs

Table 3-3 shows the typical engineering configuration principles for physical servers accommodating VRM (physical deployment) and those accommodating management VMs.

Management servers are recommended to be of the same type.

Table 3-3 Typical configuration principles for physical servers accommodating VRM (physical deployment) and those accommodating management VMs

VMs/PMs Supported	Node Type	Configuration Requirements per Management Server				
		Physical CPU Cores	Memory	Hard Disk Space and IOPS	Hard Disk Type and RAID Mode	NIC Type
Less than 20 PMs Less than 200 VMs	Two management VMs	Recommended: 24 Minimum: 10	Recommended: 128 GB Minimum: 80 GB	Space: 460 GB IOPS: 380	Total number of disks: at least four SAS disks or two SSD disks RAID mode: Four SAS disks form RAID 10 or two SSD disks form RAID 1 (the minimum available disk space is 460 GB).	At least four 10GE network ports or six GE network ports
20 to 50 PMs 200 to 1000 VMs	Two management VMs	Recommended: 24 Minimum: 14	Recommended: 128 GB Minimum: 96 GB	Space: 500 GB IOPS: 480	Total number of disks: at least six SAS disks or two SSD disks RAID mode: Six SAS disks form RAID 10 or two SSD disks form RAID 1 (the minimum available disk space is 500 GB).	At least four 10GE network ports or six GE network ports
50 to 100 PMs 1000 to 3000 VMs	Two VRM servers	Recommended: 24 Minimum: 6	Recommended: 128 GB Minimum: 32 GB	Space: 140 GB IOPS: 400	Total number of disks: at least four SAS disks or two SSD disks RAID mode: Four SAS disks form RAID 10 or two SSD disks form RAID 1 (the minimum available disk space is 140 GB).	At least four 10GE network ports or six GE network ports

VMs/PMs Supported	Node Type	Configuration Requirements per Management Server				
		Physical CPU Cores	Memory	Hard Disk Space and IOPS	Hard Disk Type and RAID Mode	NIC Type
	Two management VMs	Recommended: 24 Minimum: 18	Recommended: 128 GB Minimum: 112 GB	Space: 560 GB IOPS: 350	Total number of disks: at least four SAS disks or two SSD disks RAID mode: Four SAS disks form RAID 10 or two SSD disks form RAID 1 (the minimum available disk space is 560 GB).	At least four 10GE network ports or six GE network ports
100 to 200 PMs 3000 to 5000 VMs	Two VRM servers	24 (minimum: 16)	128 GB (minimum: 64 GB)	Space: 140 GB IOPS: 400	Total number of disks: at least four SAS disks or two SSD disks RAID mode: four SAS disks form RAID 10 or two SSD disks form RAID 1 (The minimum available disk space is 140 GB.)	At least four 10GE network ports or six GE network ports
	Two management VMs	24 (minimum: 20)	128 GB (minimum: 112 GB)	Space: 610 GB IOPS: 350	Total number of disks: at least four SAS disks or two SSD disks RAID mode: Four SAS disks form RAID 10 or two read/write intensive SSD disks form RAID 1 (The minimum available disk space is 610 GB).	At least four 10GE network ports or six GE network ports
200 to 1000 PMs 5000 to 10,000 VMs	Two VRM servers	24 (minimum: 18)	128 GB (minimum: 80 GB)	Space: 140 GB IOPS: 1000	Total number of disks: 10 SAS disks or two SSD disks RAID mode: 10 SAS disks form RAID 10 or two SSD disks form RAID 1 (the minimum available disk space is 140 GB).	At least four 10GE network ports or six GE network ports

VMs/PMs Supported	Node Type	Configuration Requirements per Management Server				
		Physical CPU Cores	Memory	Hard Disk Space and IOPS	Hard Disk Type and RAID Mode	NIC Type
	Two management VMs	24 (minimum: 20)	128 GB (minimum: 112 GB)	Space: 610 GB IOPS: 350	Total number of disks: four SAS disks or two SSD disks RAID mode: Four SAS disks form RAID 10 or two read/write intensive SSD disks form RAID 1 (The minimum available disk space is 610 GB).	At least four 10GE network ports or six GE network ports

 **NOTE**

- The SAS disks are required to reach at least 15,000 revolutions per minute (RPM).
- If less than 1000 VMs are deployed, deploy VRM nodes on management VMs and use local hard disks as storage devices. If more than 1000 VMs are used, deploy the VRM nodes on physical servers and use local hard disks as storage devices.
- If the minimum configurations rather than the recommended configurations are used, the management server CPU needs to be replaced and the capacity of the memory needs to be added for capacity expansion when the capacity is insufficient (because the number of users increases).
- The minimum configuration of the management nodes above is based on the CNA resource overhead (4 vCPUs and 22 GB), VRM resource overhead (for details, see 4.1.2 "VRM"), FusionManager resource overhead (for details, see 4.2 "FusionManager"), UltraVR resource overhead (for details, see 4.3 "UltraVR"), and FusionStorage Block Manager resource overhead (for details, see the FusionStorage Block configuration manual).

Physical Servers Accommodating Optional Management VMs

Calculate the number of eBackup nodes based on section 3.5.2 "Number of Nodes or Servers on Which eBackup Is Deployed" and determine the eBackup deployment mode.

If the agentless antivirus software is required, or backup is required and eBackup needs to be deployed on VMs, based on the specifications of eBackup VMs, number of eBackup VMs (nodes), and specifications of management VMs on which antivirus virtualization software is deployed (see Table 3-4), calculate the number of physical servers required for the VMs. The calculation method is the same as that for compute servers. For details, see section 3.5.3 "Compute Server."

If the management VM nodes have remaining resources (CPU and memory resources), preferentially deploy the management VMs with antivirus virtualization software deployed and the eBackup VMs on the nodes.

Table 3-4 vCPU and memory specifications of optional management VMs

Management Software	vCPUs	Memory
(Optional) eBackup	8 x Number of eBackup VMs	12 GB x Number of eBackup VMs

Management Software	vCPUs	Memory
(Optional) Antivirus management software	2	4 GB
Total	8 x Number of eBackup VMs + 2	12 GB x Number of eBackup VMs + 4 GB

3.5.2 Number of Nodes or Servers on Which eBackup Is Deployed

Calculating the Number of eBackup Nodes or Servers

Number of nodes or servers on which eBackup is deployed = (Maximum amount of data to be backed up per day/Backup window x Backup rate of a single node or server)/0.8

Maximum amount of data to be backed up per day = Total disk capacity of the VMs/Number of VM groups + [Total capacity of the daily changed VM disk data x (Number of VM groups - 1)]/Number of VM groups

Total disk capacity of a VM = \sum (Disk capacity of type-i VMs)

Total capacity of the daily changed VM disk data = \sum (Capacity of the daily changed disk data on type-i VMs)

Total disk capacity of type-i VMs = Number of type-i VMs x Disk capacity of a type-i VM

Total capacity of the daily changed disk data on type-i VMs = Number of type-i VMs x Total capacity of the daily changed disk data on a type-i VM



NOTE

- Number of VM groups: If the volume of data on the VMs to be backed up is large, group the VMs. Set different initial full backup dates for different VM groups to avoid performing the full backups for a large number of VMs on the same day. Otherwise, the backups may not be completed within the backup window.
- The VMs are divided into five groups by default.
- Formula for calculating the number of VM groups:
- Number of VM groups = [Number of VMs x Capacity of a single VM/(Backup system bandwidth x Backup window)]/0.8
- The calculation result is rounded up.
- Backup window: specifies the backup duration in seconds on each day. The default backup window is 8 x 3600.
- Total capacity of the daily changed disk data on a VM can be estimated based on the following formula:
- Disk capacity of a VM x 0.5%
- Backup rate of a backup server: The bandwidth of eBackup nodes or servers varies depending on networks. If the NIC rate on the backup servers is not limited, the backup rate can be calculated as follows:
- If eBackup is deployed on VMs, the backup rate on the GE network and 10GE network are 50 Mbit/s and 300 Mbit/s, respectively.
- If eBackup is deployed on physical servers, the backup rate on the GE network and 10GE network are 80 Mbit/s and 300 Mbit/s, respectively.
- Backup system bandwidth: If the backup server and backup storage have sufficient resources, estimate the total bandwidth of the backup system based on the transmission bandwidth of the production system.
- Backup system bandwidth = Number of compute nodes on the virtualization platform x Transmission bandwidth of a compute node
- The transmission bandwidth of a compute node varies depending on networks. The backup system bandwidths on the GE network and 10GE network are 80 Mbit/s (or 50 Mbit/s if the NIC rate is limited) and 200 Mbit/s (or 80 Mbit/s if the virtualization storage is used), respectively.

eBackup Node/Server Specifications

eBackup is required only when the VM backup feature is provided. If any of the following conditions is met, eBackup must be deployed on a physical server. If all the following conditions are not met, eBackup can be deployed on VMs:

- FC SAN storage is used at the production site, and LAN-free backup networking mode is used.
- FC storage is used as the backup storage.
- FusionStorage is deployed in converged mode at the production site.



NOTE

- If eBackup is deployed on a physical server, the OS needs to be purchased separately. The OS must be SUSE Linux Enterprise Server 11 SP3 64-bit, which needs to be upgraded to the 3.0.101-0.47.79-default kernel version.
- When FC SAN is used, the FC port must provide a throughput of 8 Gbit/s at least.
- High CPU and memory specifications can provide high backup performance.

Table 3-5 eBackup node/server specifications

Physical CPU	Memory	Hard Disk	Network Ports
<ul style="list-style-type: none"> • Standard edition: at least 4 cores, 2.0 GHz • Advanced edition (data deduplication supported): at least 8 cores, 2.0 GHz 	At least 8 GB	120 GB When deployed on a physical server, eBackup requires a RAID 1 array of two SAS disks, providing a valid storage capacity of 120 GB at least.	Minimum requirements for the network ports: <ul style="list-style-type: none"> • No FC SAN device at either the production site or the DR site: 2 GE ports (used for production and backup management) + 2 GE ports (used for internal communication) + 2 10GE ports (used for storage) • FC SAN devices at either the production site or the DR site: 2 GE ports (used for production and backup management) + 2 GE ports (used for internal communication) + 2 10GE ports (used for IP SAN storage) + 2 FC ports (used for FC SAN storage)



NOTE

- The specifications above are based on the capacity requirements for running eBackup alone.
- When FusionStorage is used at the production site, FusionStorage Agent and VBS must be installed on the eBackup server, in which case, CPU, memory, and disk storage resources needed for installing and running FusionStorage Agent and VBS must be reserved. (For detailed specifications, see the FusionStorage product documentation of the corresponding version.)

3.5.3 Compute Server

Based on resources required by service VMs, calculate the number of required compute servers and their specifications.



NOTE

- In formulas in this document, type-i VMs indicate a certain type of VMs.
- In formulas in this document, type-i servers indicate a certain type of servers.

3.5.3.1 V2V Mode

In V2V mode, the number of servers is calculated based on the number of CPU hyper threads.

- **Computing capability provided by a target server for VMs**

Number of CPU hyper threads provided by a target server for VMs = (Total number of hyper threads provided by the physical server – Total number of hyper threads consumed by virtualization software) x CPU usage of the target server

 **NOTE**

- Total number of hyper threads consumed by the virtualization software on a target server = Number of hyper threads consumed by the CNA software + Number of hyper threads consumed by FusionStorage Block + Number of hyper threads consumed by the antivirus agent
- Number of hyper threads consumed by the CNA software on a target server = Number of hyper threads provided by the physical server/10 (rounded up to an even number)
- At least four hyper threads are required.
- If FusionStorage Block is used, obtain the formula for calculating the number of hyper threads consumed by FusionStorage Block from the FusionStorage Block configuration manual.
- Calculate the total number of hyper threads consumed by the antivirus agent only when the antivirus virtualization software is used. The total number of hyper threads consumed by the Rising antivirus agent is 8.
- The recommended CPU usage rate of the target server is 70%.

- **Number of compute servers required by type-i VMs**

Type-i VM density on a target server = Computing capacity provided by a target server for VMs/(Number of vCPUs supported by type-i VMs x CPU usage of type-i VMs)

The calculation result is rounded down.

Number of target servers required by type-i VMs = Number of type-i VMs/Type-i VM density on a target server

The calculation result is rounded up.

 **NOTE**

- The maximum processing capability of a vCPU that can be made available is equivalent to that of a hyper thread provided by a physical CPU.
- The vCPU overcommitment rate is the reciprocal of the vCPU usage. If the overcommitment is 4, the maximum value of the average vCPU usage values is 25%.
- The physical CPU overcommitment rate is configured based on service requirements. A value not greater than 4 is recommended.

- **Total number of compute servers**

Total number of compute servers = Σ (Number of target servers required by type-i VMs) x (1 + Redundancy rate)

 **NOTE**

- The compute server redundancy reserves resources for HA or service scalability. HA reservation supports HA resource reservation and dedicated failover hosts. The number of HA resources reserved and that of dedicated failover hosts need to be converted into the redundancy rate.

If resources reserved for HA or service scalability are not required, set the redundancy rate to 0%. The recommended redundancy rate is 15%. The redundancy rate ranges from 10% to 20% in the industry.

- The calculation result is rounded up.

- **Memory size of a compute server**

Memory size of a compute server = MAX (Memory sizes of compute servers accommodating type-i VMs)

Total memory size required for type-i VMs on a target compute server = (Memory size of type-i VMs x Type-i VM density on a target server)/Memory overcommitment rate

Memory size of a compute server accommodating type-i VMs = (Total memory size of type-i VMs on the compute server + Memory consumed by the virtualization software + Memory consumed by antivirus agent)/Memory usage of the target server

 **NOTE**

- Total memory consumed by virtualization software = Total memory consumed by the CNA software + Total memory consumed by FusionStorage Block + Memory consumed by the antivirus agent
- Total memory overhead of a CNA node = [(Total memory space in GB required by service VMs on a single server) x 0.1] + 8 GB
- If FusionStorage Block is used, obtain the formula for calculating memory consumed by FusionStorage Block from the FusionStorage Block configuration manual.
- Calculate the memory consumed by the antivirus agent only when the antivirus virtualization software is used. The antivirus agent consumes 8 GB memory.
- You are recommended to set the memory usage of a server to 80%.
- The memory overcommitment rate ranges from 100% to 150%. When the VM memory overcommitment is enabled, the memory overcommitment rate is greater than 100%. The memory overcommitment can be calculated based on the following formula:
- Memory overcommitment rate = Total memory size of VMs on the host/Available virtual memory size on the host

- **Compute server hard disk requirements**

You are recommended to use two SAS disks with a size of at least 300 GB (available disk space is greater than 70 GB) to form a RAID 1 group.

You are recommended to configured two SAS disks to form a RAID 1 group for exclusive use of memory overcommitment. The disk space should be the size of the server memory × 60%. If no detailed SAS disks are configured for memory overcommitment, the total memory usage of the virtualization software and the actual memory usage of the VMs cannot exceed the total memory size of the physical server.

If service VMs use local storage disks, the local storage disks must be independently planned and are recommended to form a RAID 1 group.

3.5.3.2 P2V Mode

In physical to virtual (P2V) mode, calculate the number of servers based on the CPU clock rate.

- **Computing capability provided by a target server for VMs**

CPU clock rate provided by a target compute server for VMs = (Total number of hyper threads provided by the target physical server – Total number of hyper threads consumed by virtualization software) x CPU clock rate x CPU usage of the target server

 **NOTE**

- Total number of hyper threads consumed by the virtualization software on a target server = Number of hyper threads consumed by the CNA software + Number of hyper threads consumed by FusionStorage Block + Number of hyper threads consumed by the antivirus agent
- Number of hyper threads consumed by the CNA software on a target server = Number of hyper threads provided by the physical server/10 (rounded up to an even number)
- At least four hyper threads are required.
- If FusionStorage Block is used, obtain the formula for calculating the number of hyper threads consumed by FusionStorage Block from the FusionStorage Block configuration manual.
- Calculate the total number of hyper threads consumed by the antivirus agent only when the antivirus virtualization software is used. The total number of hyper threads consumed by the Rising antivirus agent is 8.
- The recommended CPU usage rate of the target server is 70%.

- **Number of target compute servers required by type-i servers**

Type-i VM density on a target compute server = Computing capability provided by this target compute server for VMs/(CPU clock rate of type-i servers x Number of CPU cores used by type-i servers x CPU usage of type-i servers)

The calculation result is rounded down.

Number of target compute servers required by type-i VMs = Number of type-i servers/Type-i VM density on a target compute server

The calculation result is rounded up.

 **NOTE**

- You are recommended to use the CPU usage during main service period. The burst peak CPU usage is reserved in the redundancy.
- The physical CPU overcommitment rate is configured based on service requirements. A value not greater than 4 is recommended.

- **Total number of compute servers**

Total number of compute servers = Σ (Number of target servers required by type-i VMs) x (1 + Redundancy rate)

 **NOTE**

- The compute server redundancy reserves resources for HA or service scalability. HA reservation supports HA resource reservation and dedicated failover hosts. The number of HA resources reserved and that of dedicated failover hosts need to be converted into the redundancy rate.
- If resources reserved for HA or service scalability are not required, set the redundancy rate to 0%. The redundancy rate ranges from 10% to 20% in the industry.
- The calculation result is rounded up.

- **Memory size of a compute server**

Memory size of a compute server = MAX (Memory sizes of compute servers accommodating type-i VMs)

Total memory size required for type-i VMs = Memory size occupied by a type-i server x Number of type-i servers

Total memory of type-i VMs on a target compute server = (Memory size of type-i VMs/Number of target servers required by type-i VMs)/Memory overcommitment rate

Memory size of a compute server accommodating type-i VMs = (Total memory size of type-i VMs on the compute server + Memory consumed by the virtualization software)/Memory usage of the target server

 **NOTE**

- Total memory consumed by virtualization software = Total memory consumed by the CNA software + Total memory consumed by FusionStorage Block + Memory consumed by the antivirus agent
- Total memory overhead of a CNA node = [(Total memory space in GB required by service VMs on a single server) x 0.1] + 8 GB.
- If FusionStorage Block is used, obtain the formula for calculating memory consumed by FusionStorage Block from the FusionStorage Block configuration manual.
- Calculate the memory consumed by the antivirus agent only when the antivirus virtualization software is used. The antivirus agent consumes 8 GB memory.
- You are recommended to set the memory usage of a server to 80%.
- Occupied memory refers to the memory actually used by evaluated services.
- The memory overcommitment rate ranges from 100% to 150%. When the VM memory overcommitment is enabled, the memory overcommitment rate is greater than 100%. The memory overcommitment can be calculated based on the following formula:

Memory overcommitment rate = Total memory size of VMs on the host/Available virtual memory size on the host

- **Compute server hard disk requirements**

You are recommended to use two SAS disks with a size of at least 300 GB (available disk space is greater than 70 GB) to form a RAID 1 group.

You are recommended to configured two SAS disks to form a RAID 1 group for exclusive use of memory overcommitment. The disk space should be the size of the server memory x 60%. If no detailed SAS disks are configured for memory

overcommitment, the total memory usage of the virtualization software and the actual memory usage of the VMs cannot exceed the total memory size of the physical server. If service VMs use local storage disks, the local storage disks must be independently planned and are recommended to form a RAID 1 group.

3.6 Storage

In general, the IP SAN, FC SAN, or FusionStorage Block is used.

System volumes and data disks of VMs pose storage requirements.

SAS disks are recommended to store system volumes, ensuring high I/O performance.

The required storage capacity is calculated based on both storage space and IOPS performance.

NOTE

- In formulas in this document, type-i VMs indicate a certain type of VMs.
- In formulas in this document, type-i servers indicate a certain type of servers.
- If FusionStorage Block is used, SSD disks must be configured as cache. For details, see the FusionStorage Block configuration manual.
- For details about the storage device models supported by FusionSphere, see the product compatibility list.

3.6.1 VM Storage Resources

3.6.1.1 Total Storage Capacity Required

Total storage space required = (Storage space required for the management software + Storage space required for the service VMs) x 130%

Storage space required for the management software

Table 3-6 lists the storage space required for all the management nodes.

Table 3-6 Shared storage space required for management servers in server virtualization scenarios

Management Software	Shared Storage Space Requirement	Shared Storage IOPS Requirement
(Optional) eBackup	120 GB x X	50 x X
(Optional) Antivirus management software	Rising: 500 GB	50
Total	500 GB + (120 GB x X)	50 + (50 x X)



NOTE

- X indicates the number of eBackup VMs. Calculate the number of eBackup nodes based on section 3.5.2 "Number of Nodes or Servers on Which eBackup Is Deployed" and determine the shared storage required by eBackup VMs when eBackup is deployed on VMs.
- eBackup and antivirus virtualization software can be deployed based on site requirements.

Storage space required for service VMs

- V2V mode

System disk capacity of type-i VMs = (System disk capacity of a type-i VM + Memory specification of a type-i VM + 1 GB) x Number of type-i VMs

Total system disk capacity required = Σ System disk capacity of type-i VMs + (Antivirus agent storage capacity x Number of compute nodes)

+ Data disk capacity of type-i VMs = Data disk capacity of a type-i VM x Number of type-i VMs

Total data disk capacity required = Σ Data disk capacity of type-i VMs

- P2V mode

System disk capacity of type-i VMs = (System disk space required by a type-i server + Memory specification of a type-i server + 1 GB) x Number of type-i servers

Total system disk capacity required = Σ System disk capacity of type-i VMs + (Antivirus agent storage capacity x Number of compute nodes)

Data disk capacity of all type-i VMs = Data disk capacity required by a type-i server x Number of type-i servers

Total data disk capacity required = Σ Data disk capacity of type-i VMs



NOTE

- Calculate the storage capacity of the antivirus agent only when the antivirus virtualization software is enabled.
- The antivirus agent of the Rising antivirus software consumes 16 GB storage space.

3.6.1.2 Total Storage IOPS Required

Storage IOPS required for the management software

For details about the IOPS of disks required for all the management software, see Table 3-6.

Storage IOPS required for service VMs

- V2V mode

Total system disk IOPS of all type-i VMs = System disk IOPS of a type-i VM x Number of type-i VMs

Total system disk IOPS required = Σ System disk IOPS of type-i VMs

Data disk IOPS of all type-i VMs = Data disk IOPS of a type-i VM x Number of type-i VMs

Total data disk IOPS required = Σ Data disk IOPS of type-i VMs

- P2V mode

Total system disk IOPS of type-i VMs = System disk IOPS of a type-i server x Number of type-i servers

Total system disk IOPS required = Σ System disk IOPS of type-i VMs

Total data disk IOPS of type-i VMs = Data disk IOPS of a type-i server x Number of type-i servers

Total data disk IOPS required = Σ Data disk IOPS of type-i VMs

3.6.2 Storage Resource Backup

- V2V mode

Backup storage capacity of type-i VMs = (Capacity of a full backup of a type-i VM + Capacity of an incremental backup of a type-i VM x Number of retained incremental data backups) x Number of type-i VMs

Total backup storage capacity required = (Σ Backup storage capacity of type-i VMs) x 120% + 78 GB

- P2V mode

Backup storage capacity of type-i VMs = (Capacity of a full backup of a type-i server + Capacity of an incremental backup of a type-i server x Number of retained incremental data backups) x Number of type-i servers

Total backup storage capacity required = (Σ Backup storage capacity of type-i VMs) x 120% + 78 GB

If the backup storage capacity exceeds 50 TB, use NAS as the backup storage.

NOTE

- The number of retained incremental data backups varies depending on the backup policy.
- If the backup policy is configured based on the number of retained data backups, the number of retained incremental data backups is the total number of retained data backups configured for the policy.
- If the backup policy is configured based on the time, the number of retained incremental data backups is as follows:
 - Retention duration/Backup duration
 - Capacity of an incremental backup of a VM = Capacity of a full backup of the VM x Daily data increase rate of the VM x Backup duration (day)
- Simply the calculation of the backup storage capacity of type-i VMs based on the following principles:
 - A full backup is performed on the first day.
 - An incremental backup is performed on the subsequent days (the backup duration is 1 day).
 - A total of seven backups are stored.
 - The daily incremental data of a VM is calculated as follows:
 - Capacity of a full backup of the VM x 0.5%
 - Backup storage capacity of type-i VMs = (Capacity of a full backup of type-i VMs + Capacity of a full backup of type-i VMs x 0.5% x 7) x Number of type-i VMs

3.7 Network

3.7.1 Configuration Principles for Server NICs

Table 3-7 describes configuration principles for management and compute server NICs. Figure 3-2 and Figure 3-3 show the system networking diagrams.

Table 3-7 Configuration principles for server NICs

Network Port Configuration	Network Port Configuration Principles	Remarks
At least six GE network ports or four 10 GE network ports are required.	<ul style="list-style-type: none"> • The management network uses two GE network ports. • The management network ports modes: <ul style="list-style-type: none"> - The management network independently uses two GE network ports. - The management network and service network share two 10GE network ports. • The NICs of storage network and service network are configured based on service requirements. 	

Figure 3-2 System networking (six GE network ports)

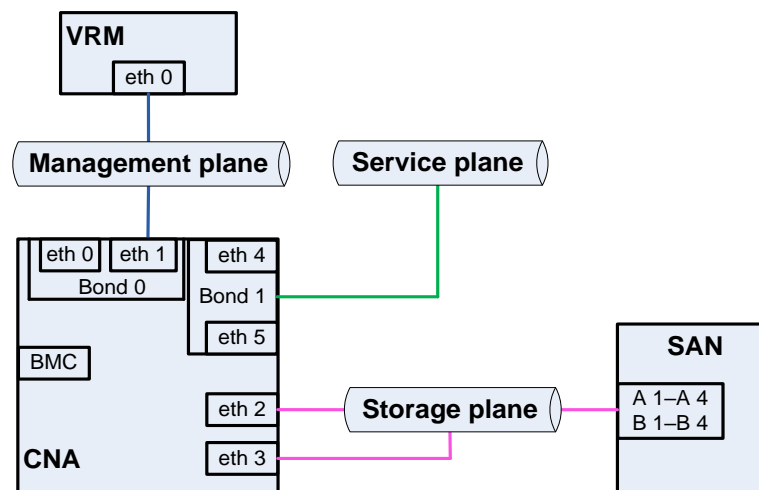
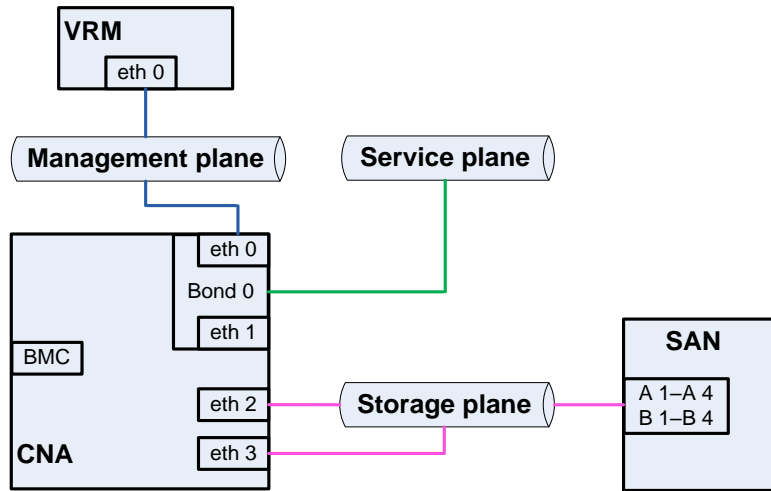


Figure 3-3 System networking (four 10GE network ports)



4 Appendix 1: Resources Required by Management Software

4.1 FusionCompute

4.1.1 CNA

CPU

Engineering formula: Number of hyper threads consumed by the CNA software = Number of hyper threads provided by a physical server/10 (rounded up to an even number).

At least four hyper threads are required.

 **NOTE**

- Number of hyper threads available to a CNA node = Total number of hyper threads of a CNA node – Number of hyper threads consumed by a CNA node
- Total number of CPU hyper threads provided by a CNA node = Number of CPUs x Number of CPU cores x Number of hyper threads provided by each CPU core

Memory

Total memory overhead of a CNA node = [(Total memory space in GB required by service VMs on a single server) x 0.1] + 8 GB

4.1.2 VRM

VRM can be deployed on VMs or physical servers. Select a deployment mode based on the management scale and server configurations. Deploy VRM in 1+1 active/standby mode. Table 4-1 lists resources required by a VRM node.

Table 4-1 VRM specifications in the virtualization suite

Node Type	VMs/PMs Supported	FusionSphere		Third-Party Specifications		Hard Disk	Storage IOPS	Remarks
		vCPUs	Memory	vCPUs	Memory			

Node Type	VMs/PMs Supported	FusionSphere		Third-Party Specifications		Hard Disk	Storage IOPS	Remarks
VRM	Less than 20 PMs, less than 200 VMs	4	5 GB	4	5 GB	140 GB	Virtualization deployment: 200	N/A
	20 to 50 PMs 200 to 1000 VMs	4	5 GB	8	8 GB	140 GB	Virtualization deployment: 300	N/A
	50 to 100 PMs 1000 to 3000 VMs	8	8 GB	12	16 GB	140 GB	Virtualization deployment: 400	N/A
	100 to 200 PMs 3000 to 5000 VMs	12	16 GB	30	40 GB	140 GB	Virtualization deployment: 1000 Physical deployment: 400	Physical deployment is recommended.
	200 to 1000 PMs 5000 to 10,000 VMs	30	40 GB	36	60 GB	140 GB	Physical deployment: 1000	Physical deployment is required.

4.2 FusionManager

FusionManager must be deployed in 1+1 active/standby mode. Table 4-2 lists the resources required by a single FusionManager node.

Table 4-2 FusionManager specifications in the virtualization suite

Node Type	VMs/PMs Supported	vCPUs	Memory	Hard Disk	Storage IOPS
FusionManager	Less than 200 VMs	4	6 GB	80 GB	100
	200 to 1000 VMs	6	18 GB	120 GB	100
	1000 to 10,000 VMs	12	24 GB	120 GB	150

4.3 UltraVR

- Array-based replication DR: uses the Huawei SAN device to implement remote data replication across sites.
Configuration description:
- In common scenarios, deploy an UltraVR management server at both production site and DR site.
- To reduce costs, users can deploy an UltraVR management server only at the DR site and ensure that the management server can interconnect with the management network of compute and storage network at the production site.
- You are recommended to use the UltraVR VM template to install UltraVR on a VM.

Table 4-3 lists the resources required for deploying an UltraVR system.

Table 4-3 UltraVR software specifications

Node Type	vCPUs	Memory	Hard Disk	VMs Supported	Management Network Bandwidth
UltraVR	4	8 GB	50 GB	3000 VMs or less	2 Mbit/s

NOTE

- The management network bandwidth is the bandwidth of the management network between the production site and the DR site.
- Network bandwidth for the host-based replication DR services = [(Total IOPS of system disks on the service VMs that require DR x Average block size of system disk I/Os) + (Total IOPS of data disks on the service VMs that require DR x Average block size of data disk I/Os)]/0.7

4.4 Antivirus Virtualization Software

FusionSphere antivirus virtualization feature is sold with restrictions.

4.4.1 Rising

Antivirus Software

Rising antivirus software includes management VM and security VM software.

Antivirus Software Specifications

- One management VM
 - Customers need to separately purchase the OS for the management VM.
 - Customers can purchase a database or use the MySQL database for free.

Table 4-4 Software specifications of the Rising management VM

Management VMs	vCPUs	Memory	Hard Disk
1	2	2 GB	500 GB

Table 4-5 Software required by the Rising management VM

How to Obtain	Software	Remarks
The OS can be purchased by the local Huawei branch or the customer.	Select one of the following OSs: <ul style="list-style-type: none"> Windows Server 2008 R2 32-bit or 64-bit (the 64-bit is recommended.) Windows Server 2003 SP2 32-bit or 64-bit or later Windows Server 2008 32-bit or 64-bit 	OS
The database may be obtained for free or purchased by the customer.	MySQL 5.0 or later (MySQL 5.6 or later is recommended.) <ul style="list-style-type: none"> Download free database software from dev.mysql.com, which is usually used. Customers can also purchase Oracle Enterprise Edition database software. 	DB

- SVMs
Customers do not need to purchase an OS for SVMs. The OS can be installed by importing the VM template.
One SVM is installed on each compute node to protect the service VMs on the node.

Table 4-6 Resources required by a Rising SVM

Protected VMs	vCPUs	Memory	Hard Disk
Less than 20 VMs	2	2 GB	16 GB
20 to 40 VMs	4	4 GB	16 GB
40 to 60 VMs	6	6 GB	16 GB
60 to 80 VMs	8	8 GB	16 GB

5 Appendix 2: SBOM List

5.1 Virtualization Suite SBOM List

Table 5-1 SBOM list

Code	Name	Category	Description
88033KRC	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Standard Edition License, per CPU, Electronic	License	
88033KRD	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Standard Edition, 1 Year Subscription and Support, per CPU, Electronic	SnS	
88033KRE	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Standard Edition, 2 Years Subscription and Support, per CPU, Electronic	SnS	
88033KRG	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Standard Edition, 3 Years Subscription and Support, per CPU, Electronic	SnS	
88033KRH	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Standard Edition, 1 Year Subscription Service, New, per CPU, per CPU, Electronic	New subscription mode	
88033KRJ	Software annual fee, FusionSphere 6.x, FusionSphere Virtualization Suite Standard Edition, 1 Year Subscription Service, Renewal, per CPU, Electronic	Subscription mode renewal	
88033KRL	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Advanced Edition License, per CPU, Electronic	License	FusionSphere Advanced edition will be provided in the third quarter of 2018.
88033KRM	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Advanced Edition, 1 Year Subscription and Support, per CPU, Electronic	SnS	
88033KRF	Software Charge, FusionSphere 6.x, FusionSphere Virtualization Suite Advanced Edition, 2 Years Subscription and Support, per CPU, Electronic	SnS	

88033KRN	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Advanced Edition,3 Years Subscription and Support, per CPU, Electronic	SnS	FusionSphere Platinum/Operation edition will be provided in the third quarter of 2018.
88033KRP	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Advanced Edition,1 Year Subscription Service, New, per CPU, per CPU, Electronic	New subscription mode	
88033KRK	Software annual fee, FusionSphere 6.x,FusionSphere Virtualization Suite Advanced Edition,1 Year Subscription Service, Renewal, per CPU, Electronic	Subscription mode renewal	
	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Platinum Edition License, per CPU, Electronic	License	
88033KRR	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Platinum Edition,1 Year Subscription and Support, per CPU, Electronic	SnS	
88033KRS	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Platinum Edition,2 Years Subscription and Support, per CPU, Electronic	SnS	
88033KRT	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Platinum Edition,3 Years Subscription and Support, per CPU, Electronic	SnS	
88033KRU	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Platinum Edition,1 Year Subscription Service, New, per CPU, per CPU, Electronic	New subscription	
88033KRV	Software annual fee, FusionSphere 6.x,FusionSphere Virtualization Suite Platinum Edition,1 Year Subscription Service, Renewal, per CPU, Electronic	Subscription mode renewal	
88033KRW	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Operation Edition License, per CPU, Electronic	License	
88033KRX	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Operation Edition,1 Year Subscription and Support, per CPU, Electronic	SnS	
88033KRY	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Operation Edition,2 Years Subscription and Support, per CPU, Electronic	SnS	
88033KSA	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Operation Edition,3 Years Subscription and Support, per CPU, Electronic	SnS	
88033KSB	Software Charge, FusionSphere 6.x,FusionSphere Virtualization Suite Operation Edition,1 Year Subscription Service, New, per CPU, per CPU, Electronic	New subscription	
88033KSC	Software annual fee, FusionSphere 6.x,FusionSphere Virtualization Suite Operation Edition,1 Year Subscription Service, Renewal,per CPU, Electronic	Subscription mode renewal	

A Terms

C

CNA Computing Node Agent

E

eBackup Huawei backup solution

F

FusionCompute Huawei virtualization software

FusionSphere Huawei infrastructure virtualization solution

FusionStorage Block Huawei distributed storage system

FusionStorage Block
Manager Management module of FusionStorage Block

FusionStorage Block
Agent Agent module of FusionStorage Block

U

UltraVR Huawei disaster recovery solution

V

VRM Virtualization management software of FusionCompute

B Acronyms and Abbreviations

V

VM Virtual Machine

S

SnS Subscription and Support

P

PM Physical Machine