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Network Topology

A VM contains a set of files and has its own CPU, memory, network, storage, and BIOS resources. O perating systems and applications can run on VMs in the same way that they run on physical hosts. VM creation is the foundation of server virtualization and cloud service data centers. The complete V M creation process includes not only the allocation of compute, network, and storage resources but al so the installation of an operating system and applications.

UIS supports only one cluster. All hosts and VMs managed by UIS belong to this cluster. You can cre ate a VM in a cluster or on a host.

Cluster-based VM creation—The system creates the VM on the host with the lightest load. Load measurement criteria include VM quantity, memory usage, and CPU usage.

- Host-based VM creation—The system creates the VM on the host that you specify. After the VM is created, the VM runs on the host unless it is migrated by an HA, DRS, DPM, affinity, or anti-affi nity policy.

Table 1 Software requirements

Software	Version
H3C UIS 6.5	E0708 or later

Configuration Steps

Log in to UIS by using the default username and password admin.
 Figure 1 Logging in to UIS



Access the VM creation page by using one of the following methods:
 i Click VMs on the top navigation bar, and then click Add.

Figure 2 Accessing the VM creation page (method 1)

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WIN2000R2_000	long-longlonglong.		Running	4	4.00GB	0.001	74 500	Windows Server 2008 R2 Standard, 64-bit	
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WIN2008R2_010	mini for v. cvk		Running	1	128MB	11.58%	100.00%	•	
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5 WIN2008R2_014_kscl	mini for v cvk		Running	1	128MB	11.67%	100.00%		
10 WIN2008R2_017	mini for v cvk		Running	1	128MB	11.11%	100.00%		
10 WIN2008R2_019	mini for v cvk		Running	1	128MB	11.38%	100.00%		
100 WIN2008R2_020	mini for v cvk		Running	1	128MB	11.82%	100.00%		
 UIShost2 (47) 	mini for v cvk		Running	1	128MB	11.78%	100.00%		_
 UIShost3 (26) 	mini for v cvk		Running	1	128MB	12.02%	100.00%		
 UIShost4 (1) 			Running	1	128MB	11.48%	100.00%		
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♀ VM Policies	mini for v cvk		Running	1	128MB	-	400.00%	•	
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¡ Click VMs on the top navigation bar, select a host from the navigation pane, and then clickAdd. Figure 3 Accessing the VM creation page (method 2)

HCI Management	≡ 🔗	V1/ls Networks Sto	age Hosts	¢ Services	Alarms System		😤 Hat K	y • 53 ☎ 4 ⁸⁸ ≡ ⁹ Ⅲ •	💄 admin
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WINZOUGHZ_DUS	<u>VGPU-01</u>		Running	4	8.00GB	0.00%	0.00%	Windows / Ultimate, 64-bit	
win2006H2_006	WIN2008R2_001		Shutdown	4	4.00GB	0.00%	0.00%	-	
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K WIN2008R2 010	WIN2008R2_014		🛂 HA Error	4	4.00GB	0.00%	37.80%	Windows Server 2008 R2 Standard, 64-bit	
WIN2008R2 012	WIN2012R2test		Shutdown	2	4.00GB	0.00%	0.00%	Microsoft Windows Server 2012 R2 (64-bit)	
WIN2008R2_014_ksc	WIN2012R2 001		Running	2	4.00GB	2.00%	11.38%	Windows Server 2012 R2 Standard, 64-bit	
WIN2008R2_017	WIN2012R2 002		Shutdown	2	4.00GB	0.00%	0.00%	Windows Server 2012 R2 Standard, 64-bit	
WIN2008R2_019	WIN2012R2 004		Shutdown	2	4.00GB	0.00%	0.00%	Microsoft Windows Server 2012 R2 (64-bit)	
B WIN2008R2_020	WIN2012R2 005		Shutdown	2	4.00GB	0.00%	0.00%	Microsoft Windows Server 2012 R2 (64-bit)	
 UIShost2 (47) 	WIN2012R2 006		Shutdown	2	4.00GB	0.00%	0.00%	Microsoft Windows Server 2012 R2 (64-bit)	_
▼ B UIShost3 (26)	WIN2012R2 007		De Stutdown	2	4.00GB	0.00%	0.00%	Microsoft Windows Server 2012 B2 (64-bit)	
So vGPU-01	WW0012R2 008		Re Shutdown	2	4 00 GB	0.00%	0.00%	Microsoft Mindows Server 2012 P2 (64-bit)	_
WIN2008R2_001			De Obuddaur		4.0000	0.00%	0.00%		_
WIN2008R2_003	WIN2012R2 009		Ke shutbown	2	4.0008	0.00%	0.00%	windows Server 2012 R2 Standard, 64-0it	_
WIN2000H2_014	WIN2012R2 010		Support Support	2	4.00GB	0.00%	0.00%	windows Server 2012 R2 Standard, 64-bit	
Ro WIN2012R2 001	WIN2012R2_012		Shutdown	2	4.00GB	0.00%		Microsoft Windows Server 2012 R2 (64-bit)	
WIN2012R2_002	WIN2012R2 013		Shutdown	2	4.00GB	0.00%	0.00%	Windows Server 2012 R2 Standard, 64-bit	
WIN2012R2_004	WIN2012R2_014		🛃 HA Error	2	4.00GB	0.00%	0.00%		
100 WIN2012R2_005	WIN2012R2 015		Shutdown	2	4.00GB	0.00%	0.00%	Microsoft Windows Server 2012 R2 (64-bit)	
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 $_{\rm i}\,$ Click Hosts on the top navigation bar, select a host from the navigation pane, and then clickAdd VM

Figure 4 Accessing the VM creation Accessing (method 3)

HCI Management	≡ 🗟 🗳 🛢 🗮 Bashboard VMs Networks Storage Hosts S	🗘 🤱 🚇 iervices Alarms System	😩 Hot Key 🔹 💈 👚 🖉 🏁 🎫 ⁰ 🖽 🎽 🏂 admin
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ag onder management •	IP Address		100
	State		
	Data Balance	WIN200882,	
	Host Model	WIN2008R2	50 99%
	CPUS CPUS	WIN2008R2	7235 6296 6196 6096
	CPU Frequency	WIN200882	
	Memory		102008R 109-100 01208R 012008R 012008R
	Free Memory		An. a. An. An. An.
	Version	Compute Resource Monitoring	Network Throughput (Mbps)
	VMs		60
	Local Storage		
	Available Storage	40 60 CPU Memory	
	Host Time		
	Uptime	0 100 0 100	
	Storage Usage	◆ 13.96% ◆ ◆ 79.25% ◆	
	CPU Overcommit		11:13 11:14 11:15 11:16 11:17 11:18

3. Configure the basic settings as described in Table 2, and then click Next to configure advanced settings or click Finish to finish VM creation.

Figure 5 Configuring basic settings

Add VM						×
11	Basir Info	2 Hardware			Details	
					Alias	New VM_100
	Alias*	New \04_400			Description	
	Allas	New VM_100			Select Host	
Change Icc	Description			_	OS	Windows
	Select Host	C	2 ×	?	Version	Microsoft Windows Ser
	OS		BSD		CPUs	2
	Version	Microsoft Windows Server 2019 (64-bit)	•		Memory	4GB
	CPUs	2	*		Disk	80GB
	Memory	4 *	GB 🔻			
	Disk	80 🌲	GB 🔻			
		Hardware	Finish	1		

Table 2 Basic settings

Parameter	Description
Alias	Enter an alias for the VM. You can edit the VM"s alias aft er the VM is created.
Description	Enter a description for the VM. As a best practice to distinguish VMs with the same name, configure different des criptions for the VMs.
Select Host	Select a host for the VM. If you do not select a host, the s ystem creates the VM on the host with the lightest load. Load measurement criteria include VM quantity, memory usage, and CPU usage.

Parameter	Description
OS	Select an operating system type for the VM. The operatin g system that you actually install for the VM must be the same as the selected operating system in type and versi on.
Version	Select an operating system version. The operating syste m that you actually install for the VM must be the same a s the selected operating system in type and version.
CPUs	Specify the number of vCPUs for the VM, which cannot e xceed the number of CPUs on the host.
Memory	Specify a memory size for the VM. The maximum memor y size available for the VM depends on the physical mem ory size of the host.
Disk	Specify a disk size for the VM.

4. Click the icon next to CPU, and then configure the CPU parameters as described in Table 3. Figure 6 Configuring CPU parameters

Add VM				×
1 Basic Info	2 Harriware		Details	
			Alias	New VM_100
			Description	
▼ ● CPU*	2		Select Host	
CPU Cores*	1		OS	Windows
Operating Mode	Compatible 🔹		Version	Microsoft Windows Ser
Addressing Mode	64 bit 💌		CPUs	2
Schedule Priority	Medium 💌		CPU Cores	1
Reserve*	0 MHz		Operating Mode	Compatible
Limit	🚔 MHz 🔻		Addressing Mode	64 bit
I/O Priority	Medium 👻		Schedule Priority	Medium
Limit Sharing	Off		Reserve	OMHz
Online Scale Down	Off		Limit	
► Ø Memory*	4		I/O Priority	Medium
Add Hardware	Basic Info	Finish	Limit Sharing	No

Table 3 CPU parameters

Parameter	Description
СРU	Specify the number of vCPUs for the VM, which cannot e xceed the number of CPUs on the host. However, the tot al number of vCPUs of VMs on a host can exceed the nu mber CPUs on the host. In the H3C CAS CVK system, a VM is a process in the o perating system of the kernel. The kernel schedules processes through time slices. When the time slice of a process on a CPU runs out, the process will be suspended, an d the CPU is passed to the next process. Therefore, the more vCPUs you specify for a VM, the more vCPU time s lices will be allocated to the VM and the higher the VM"s performance will be.
CPU Cores	Specify the CPU cores for the VM. The number of CPU c ores of a VM cannot exceed that of the host.
Bind Physical CPU	Bind the vCPUs of the VM to one or multiple physical CP Us of the host. Then, the VM can use only the bound phy sical CPUs. This feature can reduce cache missings caused by CPU switchover, which improves the performance of the VM. However, this feature causes unbalanced load across th e CPUs in the symmetric multi-processing (SMP) system , which might decrease the scheduling efficiency of the w hole system. A vCPU cannot be bound to physical CPUs across NUM A nodes. To ensure successful VM operations (for exam ple, migration, clone, restoration, and import) between tw o hosts, make sure the source and destination hosts use the same NUMA architecture. To configure this parameter, you must select a host for th e VM.

Parameter	Description
Operating Mode	Select a CPU operating mode. Options include the following: Compatible—Virtualizes physical CPUs of different models into vCPUs of the same model. This mo de features high migration compatibility. Passthrough—Passes physical CPUs to VMs. Thi s mode features low migration compatibility but provides better performance than the Compatible mode. VMs usin g the passthrough CPU operating mode can be migrated only between hosts with the same CPU model.
Addressing Mode	Select a CPU addressing mode. A 32-bit operating system supports both the 32-bit and 6 4-bit addressing modes. A 64-bit operating system suppo rts only the 64-bit addressing mode. If you select the 32- bit addressing mode for a VM using a 64-bit operating sy stem, the VM cannot be started.
Schedule Priority	Select a priority for the processes on the VM to preempt physical CPU resources. When the physical CPU resources are insufficient, CPU t ime slices are allocated to VMs with the high, medium, a nd low priorities in the ratio of 4:2:1.
Reserve	Specify the guaranteed minimum CPU frequency for the VM.
Limit	Specify the maximum clock frequency of the VM, in MHz or GHz. If you leave this parameter empty, the clock frequency is not limited. The value range for this paramet er is 10 MHz to the clock frequency of the host.
I/O Priority	Select a priority for the processes on the VM to read/writ e disks. When multiple VMs on a host read or write the disk simultaneously, VMs with higher I/O priorities can achiev e better performance.
Limit Sharing	Select whether to enable limit sharing. For example, if yo u enable limit sharing for a VM that has 4 CPU cores and set the maximum host CPU frequency that a single CPU core of the VM can use to 2 GHz, the maximum host CP U frequency is 8 GHz for both the VM and a single CPU core of the VM.
Online Scale Down	Select whether to enable online CPU scale down for the VM.

5. Click the icon next to Memory, and then configure the memory parameters as described in Table 4.

Figure 7 Configuring memory parameters

dd VM		
1 Basic Info	2 Hardware	Details
		Alias New VM_100
		Description
► III CPU*	2	Select Host
▼ Ø Memory*	4 🚔 GB 🔻	OS Windows
Reserve*	0 🌲 %	Version Microsoft Windows Se
Limit	GB	CPUs 4
Resource Priority	Low	CPU Cores 2
Ballooning	Off ③	Operating Mode Compatible
HugePages	Off ⑦	Addressing Mode 64 bit
Network*	vswitch0 Q	Schedule Priority Medium
Disk*	80 🚔 GB 🔻	Reserve 0MHz
Floppy	Select floppy drive Q 🗙	Limit
CD-ROM	Q X	I/O Priority Medium
Add Hardware	Basic Info Finish	Limit Sharing No

Table 4 Memory parameters	
Parameter	Description

Parameter	Description
Memory	Specify the maximum memory size of the VM''s operating system, in MB or GB. The value range for this parameter is 512 MB to the maximum memory size of th e host. In the H3C CAS CVK system, memory resources are allo cated to VMs on an on-demand basis. Therefore, the total size of memory that you specify for all VMs on a hos t can exceed the physical memory size of the host. Howe ver, memory overcommitment is not recommended in act ual production environments because redundant memory resources are required if DRS, HA, DPM, affinity, or antiaffinity services are configured.
Reserve	Specify the memory to be reserved for the VM to the ma ximum memory of the VM in percentage. 0 indicates that no memory is reserved. When the load of the VM increas es and all the reserved memory has been used, the VM c an retain the reserved memory even if it is idle. The host allocates memory to VMs based on the actual memory usage of the VMs. You can reserve some memory for a VM in case the VM needs more memory after the host memory is exhausted.
Limit	Specify the maximum size of host memory that the VM c an use.
Resource Priority	Select a priority for the VM to request memory resources . When the VM requests more memory than its reserved memory, the host makes memory allocation decisions ba sed on the resource priority if memory contention occurs.
Ballooning	Select whether to enable ballooning for the VM. With ball ooning enabled, the system dynamically allocates host m emory to the VM without shutting down the VM.
HugePages	Select whether to enable the VM to use HugePages me mory of the host. You can enable this feature only if the HugePages feature is enabled on the host. HugePages memory is mutually exclusive with memory reservation, memory limit, resource priority, and ballooning.

6. Click the icon next to Network, and then configure the network parameters as described in Table 5.

Figure 8 Configuring network parameters

Add VM			×
1 Basic Info	2 Harriware	Details	
		Alias	New VM_100
		Description	
▶ (CPU*	2	Select Host	
► 🔗 Memory*	4 🚔 GB 🔻	OS	Windows
▼⊕ Network*	vswitch0 Q	Version	Microsoft Windows Ser
Port Profile*	Default Q	CPUs	4
Virtual Firewall	Q X	CPU Cores	2
NIC Type	High-Speed NIC	Operating Mode	Compatible
Bound IPv4		Addressing Mode	64 bit
MAC	If you leave this field empty, auto O	Schedule Priority	Medium
Fast Forwarding	On	Reserve	OMHz
Hot Swappable	On	Limit	
MTU*	1500	I/O Priority	Medium
Add Hardware	Basic Info Finish	Limit Sharing	No

Table 5 Network parameters

Parameter	Description
Network	Select a vSwitch for the VM. A vSwitch is a software-bas ed IP forwarding and control module. All traffic between VMs and the external network is forwarded through vSwit ches.
Port Profile	Select a port profile for the VM. The port profile defines t he VLAN, ACL, and network bandwidth settings for the V M.
Virtual Firewall	Select a virtual firewall for the VM. The incoming and out going data packets of the VM will be filtered based on th e firewall rules.

Parameter	Description	
NIC Type	Select a NIC type for the VM. Options include the following: · Common NIC—Provides a transmission rate of 10 0 Mbps. · Intel e1000 NIC—Provides a transmission rate of 1000 Mbps. · High-Speed NIC—Provides a transmission rate of 10000 Mbps. · High-Speed NIC—Provides a transmission rate of 10000 Mbps. High-speed NICs are driven by CVK. · SR-IOV Passthrough NIC—VMs use vNICs virtualized from physical NICs. SR-IOV passthrough NIC s provide the best performance but require the support of the physical NIC and VMs. This option is available only af ter you select a host for the VM.	
Driver Type	Select a driver type for the SR-IOV passthrough NIC. e value of this parameter is VFIO. This parameter is co gurable only when you select SR-IOV Passthrough NIC s the NIC type.	
VLAN ID	Specify a VLAN ID for the VM. This parameter is config able only when you select SR-IOV Passthrough NIC as he NIC type.	
Bound IPv4	Enter the IPv4 address bound to the MAC address of the VM's NIC. If the IP address that you actually specify for t he VM"s NIC is different from the bound IPv4 address, th e VM"s NIC cannot communicate correctly.	
MAC	Select a MAC address assignment mode.	
Fast Forwarding	Select whether to enable fast forwarding for the VM. Afte r you enable this feature, the high-speed NIC is simulated in CVK as an independent thread, which impro ves the network performance of the VM. This parameter is configurable only when you select High -Speed NIC as the NIC type.	
Hot Swappable	Select whether to enable hot NIC swapping for the VM. T his parameter is configurable only when you select High-Speed NIC as the NIC type.	
МТU	Specify an MTU for the VM"s NIC. This parameter is conf igurable only when you select Common NIC, High-Speed NIC, or Intel e1000 NIC as the NIC type.	

Click the icon next to Disk, and then configure the disk parameters as described in Table 6.
 Figure 9 Configuring disk parameters

Add VM			×
1 Basic Info	2 Harriwara	Details	
		Alias	New VM_100
		Description	
► III CPU*	2	Select Host	
► 🖉 Memory*	4 🚔 GB 🔻	OS	Windows
Network*	vswitch0 Q	Version	Microsoft Windows Ser
▼ ● Disk*	80 🚔 GB 🔻	CPUs	4
Туре	New File	CPU Cores	2
Storage Pool	Q X	Operating Mode	Compatible
File Name	Qcow2 👻	Addressing Mode	64 bit
Provisioning	Delay Zeroed 👻	Schedule Priority	Medium
Disk Cluster Size	256К 👻	Reserve	OMHz
Bus Type	High-Speed	Limit	
Cache Mode	Directsync	I/O Priority	Medium
Add Hardware	Basic Info Finish	Limit Sharing	No

Table 6 Disk parameters

Parameter	Description
Disk	Specify the size of the storage volume used as the disk o f the VM.

Parameter	Description
Туре	 Select a disk type. Options include the following: Block Device—A block device is also called a raw device, which does not have a file system, for example, a storage LUN on an IP SAN or FC SAN. Block devices ar e typically used in a virtualization environment that requir es high performance, for example, databases and high-p erformance I/O compute. New File—Create a new empty storage file as the disk of the VM. A disk file is created based on the file system and provides high manageability. Existing File—Select an existing storage file that is not used by other VMs as the disk of the VM. This parameter is configurable only after you select a hos t for the VM. If you do not select a host for the VM, the value of this parameter is New File.
Storage Pool	Select a storage pool for the new disk.
File Name	Enter a name for the disk file and select a disk format if a new file is used as the disk. The raw format provides high I/O efficiency but does not support snapshots or fast clone.
Provisioning	Select a storage volume provisioning mode. Options incl ude the following: Thin—Allocates only as much storage space as th e storage volume needs for its initial operations when the storage volume is created. If the storage volume needs more storage space later, you can allocate as much stora ge space as the volume requires based on the specified maximum storage size. This mode provides the lowest p erformance because it has a high metadata I/O cost. Lazy Zeroed—Allocates the specified maximum st orage size to the storage volume when the storage volume is created. Data remaining on the physical device is not erased during creation, but is zeroed out on first wr ite from the VM. This mode provides a low performance causes write amplification problems. The minimum data management unit of the file system is 1 MB. If only 4 KB data is written, the remaining 1020 KB data will be cleare d, which results in a high cost. Eager Zeroed—Allocates the specified maximum storage size to the storage volume when the storage volume is created. Data remaining on the physical device is zeroed out during creation. Creating a storage volume using this provisioning mode consumes more time than c reating a storage volume using other provisioning modes. This mode provides the highest performance but it does not allocate resources on demand, which wastes resourc es in virtualization scenarios.
Bus Type	Select a bus type. Options include the following: IDE—Applicable to IDE devices, such as CD-RO M drives. This bus type provides a low performance. USB—Applicable to USB peripherals. High-Speed—Provides the highest performance a nd is most commonly used. High-Speed SCSI—Provides a low system occupa ncy and a high transmission rate. To process special or fr equent SCSI instructions, select this type.
Cache Mode	Select a data caching mode for the VM. Different caching modes provide different read/write performance. The following options are available: • Directsync—Data[ge1] is written to the physical di sk and then synchronized to the disk file of the VM, whic h improves data security but reduces efficiency. If[ge2] t he VM uses local disks, select this mode to ensure data security. • Writethrough—Data is read from the host cache a nd written to the host cache and then to the physical disk. This mode provides the lowest write performance but the highest data security. • Writeback—Data is written to the VM cache, then t o the host cache, and finally to the physical disk. A write operation is completed as soon as the data is written to t he lowest data security. • None—Data is written to the VM cache and then t o the physical disk. This mode provides the highest everall performance in security and performance. Select whether to enable hot disk swapping for the VM. T
Hot Swappable	his parameter is configurable only when you select High- Speed as the bus type.

8. Select a floppy drive, and click the icon next to CD-ROM to configure the CD-ROM drive para meters as described in Table 7.

Figure 10 Configuring floppy drive and CD-ROM drive parameters

√M			
1 Basic Info	2 Hardware	Details	
		Alias	New∨M_100
		Description	
► III CPU*	2	Select Host	
► 🛷 Memory*	4 🚔 GB 👻	OS	Windows
► ⊕ Network*	vswitch0 Q	Version	Microsoft Windows Ser
▶ 🍔 Disk*	80 🌲 GB 🔻	CPUs	4
Floppy	Select floppy drive Q 🗙	CPU Cores	2
CD-ROM	Q ×	Operating Mode	Compatible
Connection Mode	Image File 👻	Addressing Mode	64 bit
		Schedule Priority	Medium
		Reserve	OMHz
		Limit	
		I/O Priority	Medium
Add Hardware	Basic Info Finish	Limit Sharing	No

Table 7 Floppy drive and CD-ROM drive parameters

Parameter	Description
Floppy	Select a floppy drive image. The system will automaticall y load a high-speed driver compatible with the selected o perating system version.
CD-ROM	Select a CD-ROM drive image.
Connection Mode	Select a CD-ROM drive connection mode.

To add hardware for the VM, click Add Hardware, and then select the corresponding option. 9. You can add NICs, disks, CD-ROM drives, floppy drives, GPU devices, USB devices, remote USB de vices, PCI devices, and watchdogs for the VM.

Figure 11 Adding hardware

Add VM			×
1 Basic Info	2 Hardware	Details	
		Alias	New ∨M_100
		Description	
► III CPU*	2	Select Host	
► 🛷 Memory*	4 🌰 GB 🔻	OS	Windows
► ⊕ Network*	vswitch0 Q	Version	Microsoft Windows Ser
► 🛢 Disk*	80 🚔 GB 🔻	CPUs	4
H Floppy	Select floppy drive Q 🗙	CPU Cores	2
▼Ø CD-ROM	Q ×	Operating Mode	Compatible
Connection Mode	Image File 💌	Addressing Mode	64 bit
Disk		Schedule Priority	Medium
CD-ROM		Reserve	OMHz
Floppy		Limit	
Watchdog		I/O Priority	Medium
Add Hardware	Basic Info Finish	Limit Sharing	No

Table 8 Hardware parameters

	Hardware	Parameter	Description
	GPU Device	Resource Pool	Select a resource pool. A resource pool contains all a vailable GPUs in the cluster.
		Service Templat e	Select a service template. The service template defines the priority for the VM to access the scarce re sources (such as GPUs and HBA cards) on the host.
		Drive Type	Select a driver type for the GPU device. The value of t his parameter is fixed at VFIO. For VMs using a Windows 7 professional operating sy stem, the GPU device's driver type can only be VFIO.
	USB Device	Connection Mode	Select a USB connection standard. This parameter is available only after you select a host for the VM.
	Remote USB Device	Connection Mode	Select a USB connection standard. This parameter is available only after you select a host for the VM.

Hardware	Parameter	Description
PCI Device	Driver Type	Select a driver type for the PCI device. This parameter is available only after you select a host for the VM.
Watchdog		Add a watchdog for the VM. Interrupt options include Reboot, Power Off, and Migrate.

10. Click Finish.

The created VM will be displayed on the VM management page, and the VM is in shutdown state. Figure 12 VM management page



Key Configuration