SANGFOR

VMware Virtual Machine Data Migration Solution

Part 2: Online Migration Technical Practice

Make Your Digital Transformation Simpler and Secure

Sangfor Technologies

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Content

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1 Introduction

In today's digital age, the migration of data and assets has become a critical link in the continuous development of enterprises. VMware virtual machine migration is not only a technical task but also a systematic project involving multiple aspects. It requires us to thoroughly sort out existing asset information, carefully plan the path of data migration, execute specific migration operations, and ensure seamless business transition during the migration process. The success of this process not only depends on the support of cutting-edge technology and meticulous planning but also on a deep understanding and insight into business processes and data architecture.

This article will delve into VMware virtual machine data migration strategies, tools, processes, and best practices, aiming to provide readers with a comprehensive guide to help enterprises successfully complete this critical task. Let's explore how to lay a solid foundation for the future development of enterprises through carefully planned data migration.

Sangfor provides four migration methods for VMware data migration users to meet the migration needs of various scenarios:

- **VMware Managed Migration:** Use Sangfor cloud/virtualization platform to manage vCenter for data migration.
- **SCMT Agentless Point-to-Point Migration:** Use Sangfor migration tools to connect to vCenter for data migration.
- **SCMT Agent-based Point-to-Point Migration:** Use migration tools to connect to agent plugins for data migration based on data replication.
- **SCMT Agent-based Hot Backup Migration:** Use migration tools to connect to agent plugins for migration based on CDP technology.

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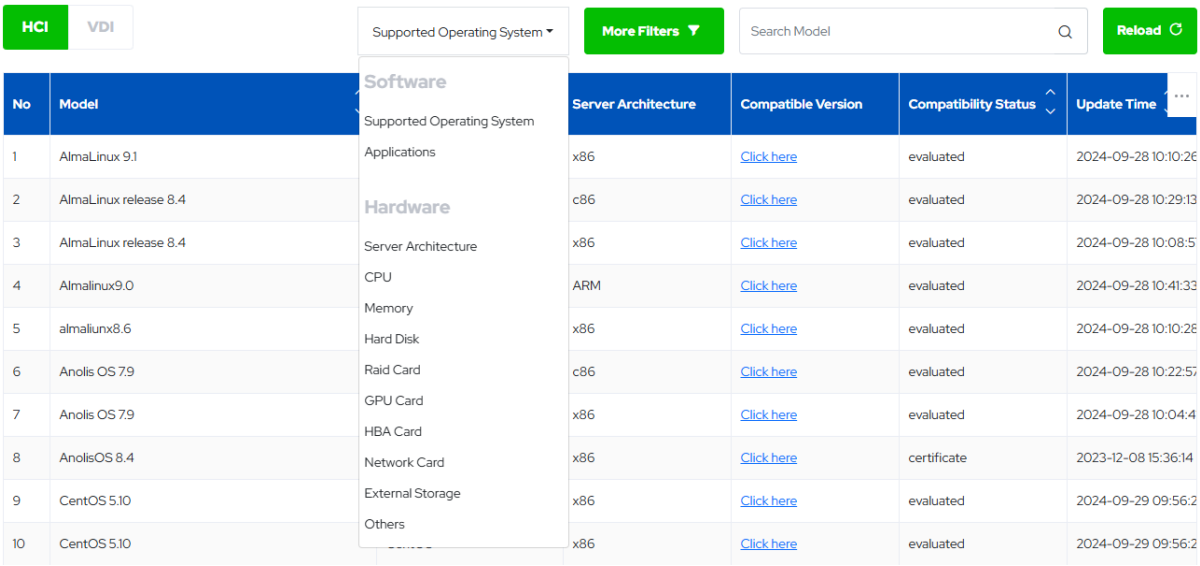
2 Key Information Collection and Assessment Before Migration

Before performing VMware virtual machine migration, detailed information collection should be conducted to determine the migration plan, including:

- **Models of physical servers, external storage, network equipment, etc.:** Assess the support for existing physical storage and network equipment. If the existing equipment reaches its service life expectancy or is incompatible with the new platform, consider adopting a new resource pool for support.

  For the compatibility list of Sangfor cloud/virtualization platform hardware and software, please refer to the following link:

  https://www.sangfor.com/cloud-and-infrastructure/products/hci-compatibility-chart



No	Model	Server Architecture	Compatible Version	Compatibility Status	Update Time
1	AlmaLinux 9.1	x86	Click here	evaluated	2024-09-28 10:10:26
2	AlmaLinux release 8.4	c86	Click here	evaluated	2024-09-28 10:29:13
3	AlmaLinux release 8.4	x86	Click here	evaluated	2024-09-28 10:08:5
4	Almalinux9.0	ARM	Click here	evaluated	2024-09-28 10:41:33
5	almaliunx8.6	x86	Click here	evaluated	2024-09-28 10:10:28
6	Anolis OS 7.9	c86	Click here	evaluated	2024-09-28 10:22:57
7	Anolis OS 7.9	x86	Click here	evaluated	2024-09-28 10:04:4
8	AnolisOS 8.4	x86	Click here	certificate	2023-12-08 15:36:14
9	CentOS 5.10	x86	Click here	evaluated	2024-09-29 09:56:2
10	CentOS 5.10	x86	Click here	evaluated	2024-09-29 09:56:2

- **vCenter/ESXi version:** Assess whether it supports connecting to VDDK using agentless migration mode. If not, adopt an agent-based approach for migration. The following table shows the versions of Sangfor-supported agentless migration.

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VMware platform compatibility list (for agentless method)	
VWware	ESXi 5.5/6.0/6.5/6.7/7.0/7.0.2
	vSphere 5.5/6.0/6.5/6.7/7.0/7.0.2

- **Types of business applications, bearing pressure, downtime window:** Assess the acceptable downtime for business and determine the suitable migration method for each application virtual machine. The actual environment may vary due to network and storage performance differences. The following table provides laboratory test data for reference only.

Operating System	Migration Method	Switch Time
Windows Server	Managed Migration	7 minutes 8 seconds
	Point-to-Point Migration (Agentless)	5 minutes 7 seconds
	Point-to-Point Migration (Agent-based)	3 minutes 27 seconds
	SCMT Hot Backup Migration	1 minute 22 seconds
Linux	Managed Migration	8 minutes 22 seconds
	Point-to-Point Migration (Agentless)	2 minutes 51 seconds
	Point-to-Point Migration (Agent-based)	4 minutes 6 seconds
	SCMT Hot Backup Migration	1 minute 13 seconds

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- **Operating system version:** Avoid using outdated versions that are not supported. If not supported, consider adopting a migration path that involves replacing the operating system. The following table shows the compatibility support for some operating systems.

Operating System	Version	32 bit or 64 bit	Boot Method	SCMT Supportability	Virtualization Platform Support Status
Windows	Windows xp sp2	32/64	BIOS	√	√
	Windows 7	32/64	BIOS	√	√
	Windows 8	32/64	BIOS	√	√
	Windows 10	32	BIOS	√	√
	Windows 10	64	BIOS/UEFI	√	√
	Windows 11	64	BIOS/UEFI	√	√
	Windows server 2003 SP1	32/64	BIOS	√	√
	Windows server 2003 R2	32/64	BIOS	√	√
	Windows Server 2008	32/64	BIOS	√	√
	Windows Server 2008 R2	64	BIOS	√	√
	Windows Server 2012	64	BIOS/UEFI	√	√
	Windows Server 2012 R2	64	BIOS/UEFI	√	√
	Windows Server 2016	64	BIOS/UEFI	√	√
	Windows Server 2019	64	BIOS/UEFI	√	√
	Windows Server 2022	64	BIOS/UEFI	√	√

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Operating System	Version	32 bit or 64 bit	Boot Method	SCMT Supportability	Virtualization Platform Support Status
SUSE	SUSE Linux Enterprise 11 SP3	32	BIOS	√	√
	SUSE Linux Enterprise 11 SP3	64	BIOS/UEFI	√	√
	SUSE Linux Enterprise 11 SP4	32/64	BIOS	√	√
Redhat	Red Hat Enterprise Linux 5.6	32/64	BIOS	√	√
	Red Hat Enterprise Linux 5.7	32/64	BIOS	√	√
	Red Hat Enterprise Linux 5.8	32/64	BIOS	√	√
	Red Hat Enterprise Linux 5.9	32/64	BIOS	√	√
	Red Hat Enterprise Linux 5.10	32/64	BIOS	√	√
	Red Hat Enterprise Linux 5.11	32/64	BIOS	√	√
	Red Hat Enterprise Linux 6.0	32/64	BIOS	√	√
	Red Hat Enterprise Linux 6.1	32/64	BIOS	√	√
	Red Hat Enterprise Linux 6.2	32/64	BIOS	√	√
	Red Hat Enterprise Linux 6.3	32/64	BIOS	√	√
	Red Hat Enterprise Linux 6.4	32/64	BIOS	√	√
	Red Hat Enterprise Linux 6.5	32	BIOS	√	√
	Red Hat Enterprise Linux 6.5	64	BIOS/UEFI	√	√
	Red Hat Enterprise Linux 6.6	32	BIOS	√	√

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- **Virtual device format and file system type:** Assess the support for data migration. General file systems are basically supported, and bare disk media does not need to be migrated and can be remapped for use. The following table shows the support list for disks and files by the Sangfor migration tool.

Disk and file system support list	
File	ext2, ext3, ext4, xfs, FAT, FAT32, NTFS, Refs
Device format	Ivm, GPT, MBR, Dynamic volume, Spanned volume, Striped volume

- **Network port policy:** Check the network port policy and open the management and data transfer ports between the migration source and target as needed to prevent migration failure. The following table shows the port communication conditions for each migration method as an example.

Migration Method	Source IP	Destination IP	Destination Port	Protocol	Port Service Description
VMware Managed Migration	Sangfor Platform	vCenter	443	TCP	Issue Management Platform Command
	Sangfor Platform	ESXi	902	TCP	Perform Virtual Machine Data Transfer
SCMT Migration Task Management	Management PC	Server	22	TCP	Access Migration Server Backend
			80,443	TCP	Access Server's Web Service
SCMT Point-to-Point Migration (Agentless)	SCMT Server	vCenter	443	TCP	Issue Management Platform Command
	SCMT Server	ESXi	902	TCP	Perform Virtual Machine Data Transfer

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Migration Method	Source IP	Destination IP	Destination Port	Protocol	Port Service Description
SCMT Point-to-Point Migration (Agent-based)	Source/ Target	SCMT Server	80	TCP	Download Agent Plugin (Manual Import Possible)
			20000 ~ 20047	TCP	Agent Connect to Server
	Source	Target	20000 ~ 20047 (Any)	TCP	Synchronize Data Transfer Port
	SCMT Server	Target	26000 ~ 26600	TCP	Transfer Control Information During Point-to-Point Switch
SCMT Live Backup Migration (Agent-based)	Source/ Target	SCMT Server	80	TCP	Download Agent Plugin (Manual Import Possible)
			20000 ~ 20003	TCP	Agent Connect to Server
	Target	SCMT Server	20000 ~ 20003	TCP	Backup/Hot Backup Migration Data Transfer

- **Migration network information:** Evaluate the impact on the business network based on the network bandwidth during migration transfer and calculate and arrange the overall migration work time. The following table provides examples for some system migrations.

Business System Data Type	Compression Ratio (Compressed /Original)	Effective Data of the Whole Machine	Compressed Data Volume (Full data)	First Data Increment	Second Data Increment	Pre-Switch Data Increment	Source Outbound Bandwidth	Target Outbound Bandwidth	System Processing Redundancy Factor	Data Transfer Time (Unit: Minutes)	Switch Time (Minute)	Business Interruption (Unit: Minutes)	Total Migration Time (Unit: Minutes)
OA Type Applications	0.6	500GB	300GB	0.3GB	0.1GB	0.02GB	300Mbps	300Mbps	1.20	164	5	5	169
Web Application Middleware	0.7	200GB	140GB	0.3GB	0.05GB	0.01GB	300Mbps	300Mbps	1.20	77	5	5	82
Database Scenario	0.6	150GB	90GB	0.5GB	0.1GB	0.02GB	300Mbps	300Mbps	1.20	50	5	5	55
ERP (10 Gigabit)	0.7	1TB	717GB	2GB	0.5GB	0.1GB	2000Mbps	2000Mbps	1.20	59	5	5	64

- **System resource configuration and occupancy rate:** Assess whether the operating system needs resource and configuration adjustments after migration. Considering the impact of application binding, it is a principle to only expand and not reduce.

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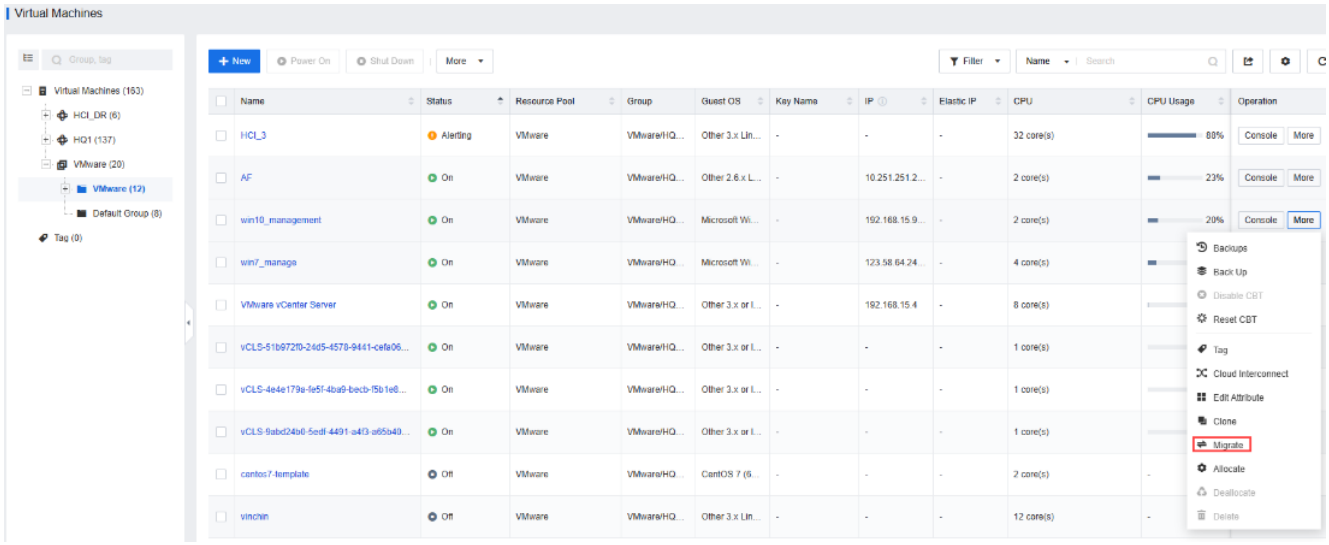
3 VMware Managed Migration Based on Agentless Technology

Sangfor's cloud/virtualization platform has built-in capabilities to manage VMware, supporting the migration of VMware virtual machines to a new platform while running through the management of vCenter by invoking the VDDK interface. It allows for batch system migration in the powered-on state, and during the final phase of migration, the source virtual machine is shut down to complete the migration. The overall process adopts a method similar to vMotion, simplifying and efficiently completing the migration action.



Key steps for VMware managed migration are as follows:

1. Sangfor's cloud/virtualization platform connects to vCenter, needing to open the 443 and 902 ports between the Sangfor platform and vCenter, compatible with vCenter versions 5.0 ~ 7.0.2.

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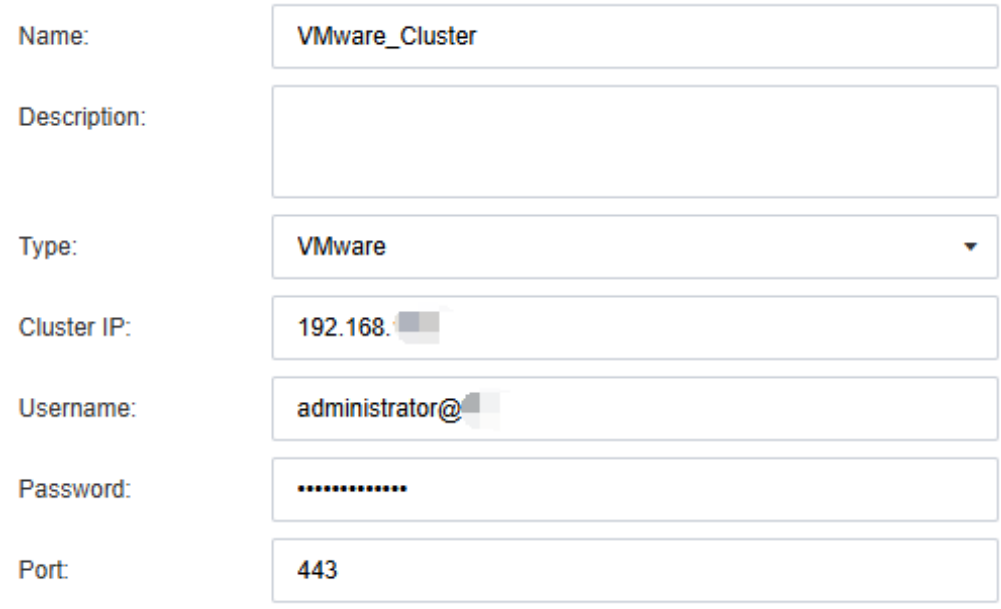
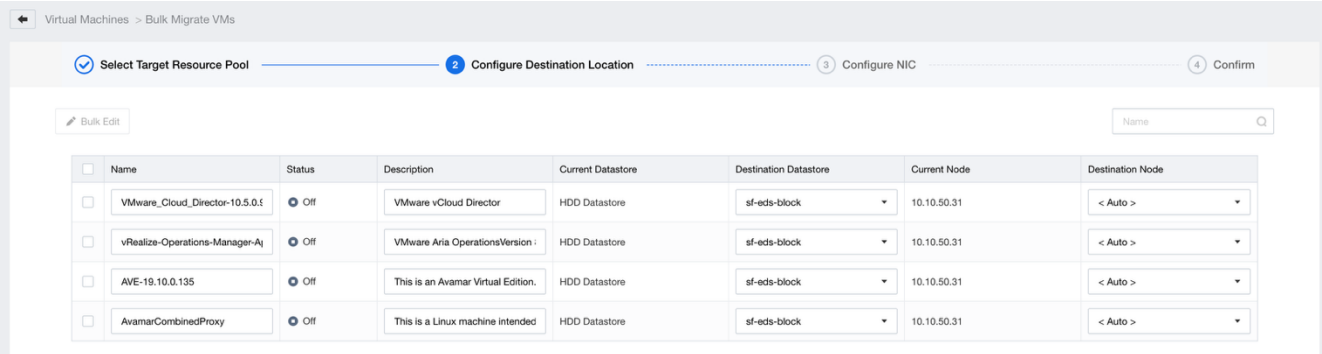


2. After the managed connection is completed, select multiple business virtual machines for batch migration. During the migration process, a maximum of two virtual machines are migrated concurrently, while the rest are queued in order. The overall migration rate depends on network quality and storage rate.

3. In Sangfor's cloud/virtualization platform, configure the migration tasks, determining the running location, network connection, migration speed limit, compression transmission, etc., for each virtual machine after migration, and initiate the virtual machine migration task.



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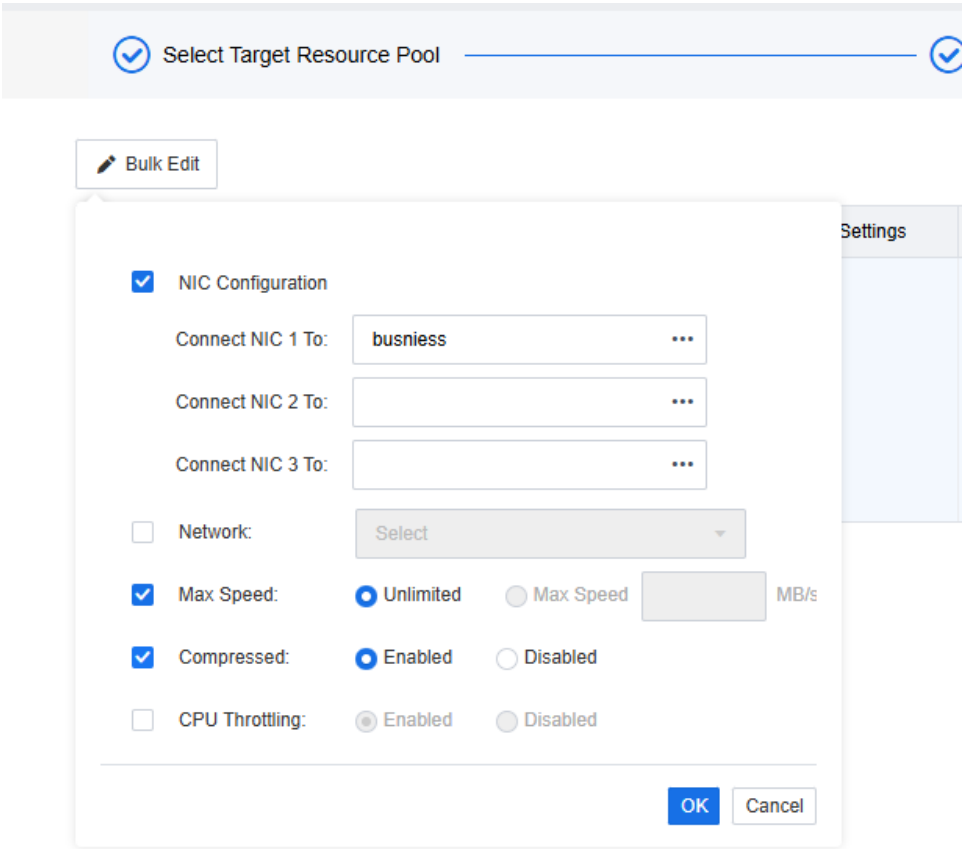
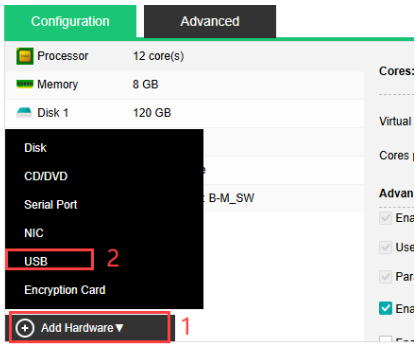
4. During the final stage of migration, after the virtual machine image format conversion is completed, the platform will automatically start the virtual machine for driver injection and configuration optimization, while the source end virtual machine is shut down (not deleted), and the business is switched to the target virtual machine access.

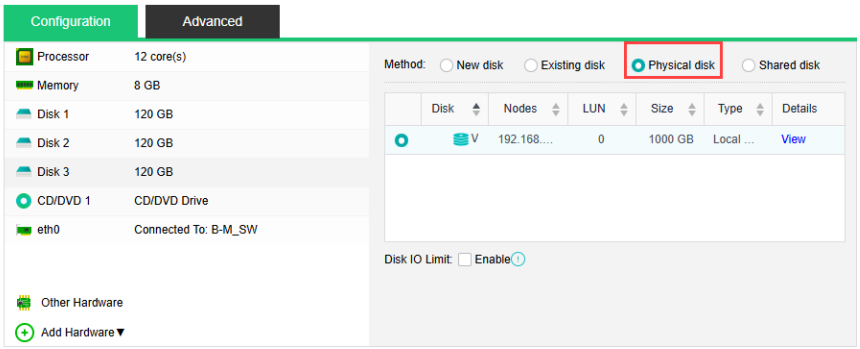
5. Initiated by business and operations personnel, verify that the business system access is normal, indicating that the migration is complete. If business access is abnormal and needs to be rolled back, you can shut down the target end and restart the VMware virtual machine to restore business.



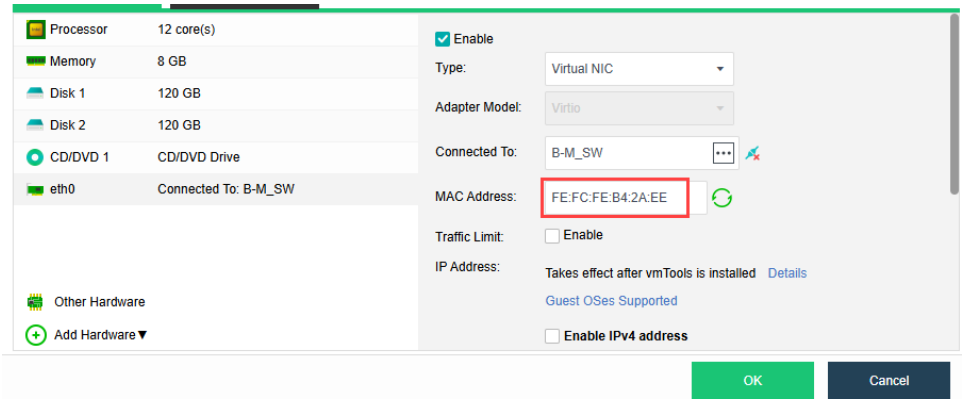
Precautions for VMware managed migration:

- **Unmigratable scenarios:** VMware virtual machines mounted with external storage LUNs, bare disk mapping RDMs, USBKEY mappings, etc., cannot be captured by VDDK snapshots and cannot be migrated to the Sangfor platform through managed migration. It is recommended to unmount before migration and manually remount/map to the new virtual machine after migration.





- **Migration configuration changes:** The effect of managed migration is to completely replicate the source virtual machine to the new platform, including CPU, memory, IP, hostname, storage, and other resources, which will not change. If modifications are needed, please manually configure during business launch. The MAC address and UUID of the virtual machine after migration will change. If some applications rely on MAC and UUID for authorization or function binding, please modify the configuration on the platform after migration.



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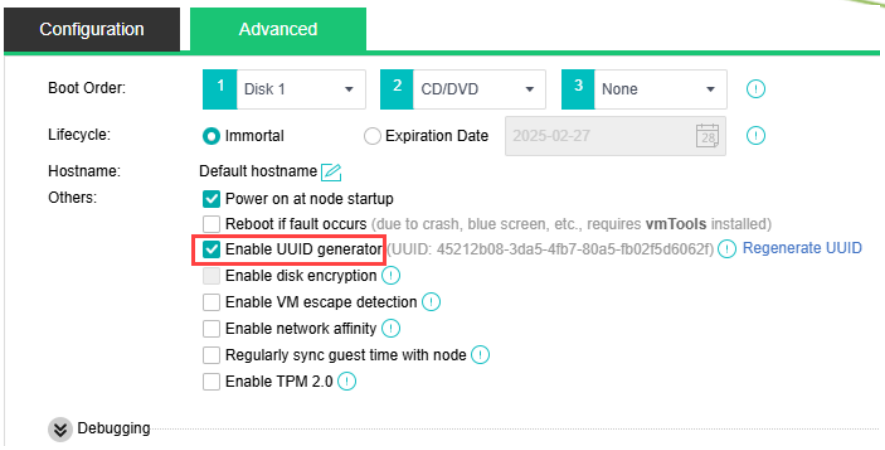
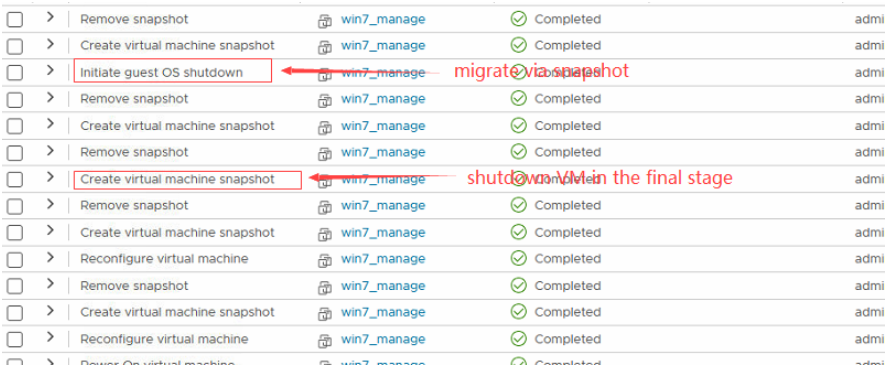


- **Avoiding snapshot effects:** Managed migration is based on snapshots to capture and compare the data differences of VMDK. During the entire migration process, multiple snapshot actions are performed, which have a significant impact on business performance. Therefore, high-load business migration work needs to apply for a specific business downtime window to proceed.



- **Migration shutdown switching:** The entire managed migration process is fully automated. After the migration task starts, including data transfer, target startup, and network switching, all are automatically realized by the system. Apart from manual shutdown and business verification, no human intervention is required. The advantage is that the migration operation is simple, but the disadvantage is that configuration changes are uncontrollable, and there is a shutdown risk at the source end. If business applications are very sensitive to continuity or need to control the switching process details, please use the SCMT tool for migration.

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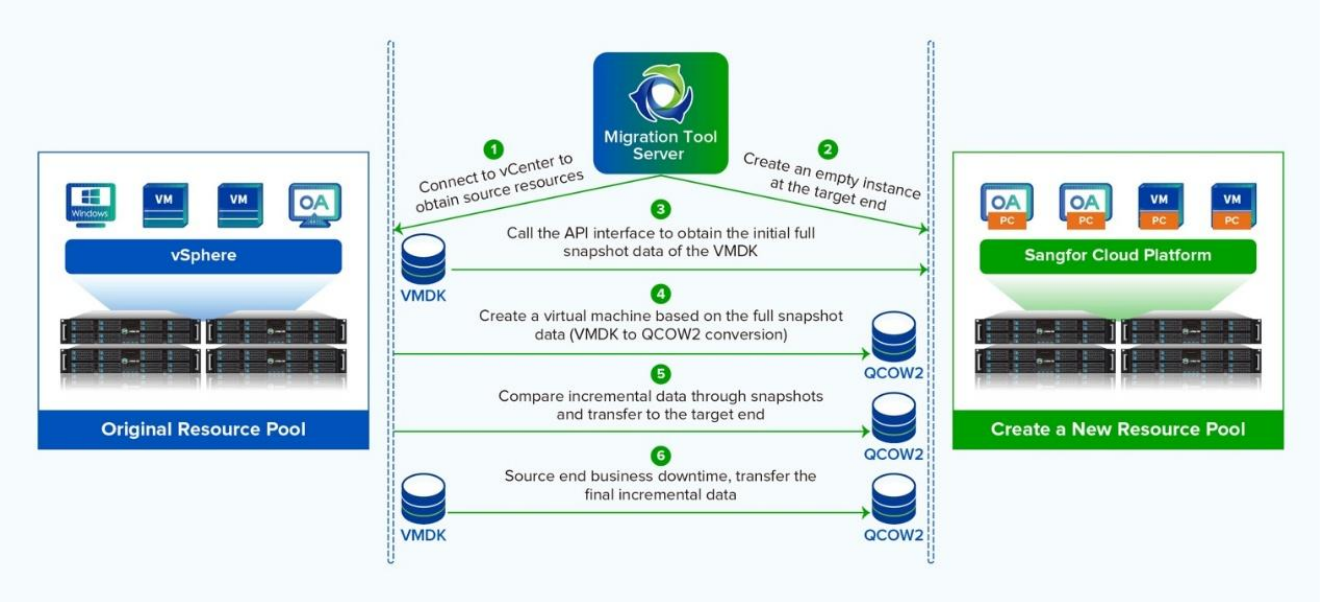
4 SCMT Point-to-Point Migration Based on Agentless Technology

Sangfor provides the Sangfor Cloud Migration Tool SCMT to achieve data migration based on agentless technology, similar to managed migration technology. SCMT connects to the vCenter interface to obtain resources and issue transmission instructions. Compared to managed migration, SCMT enriches the migration process with more functions, allowing migration changes, scheduled switching, virtual machine verification, etc., making the entire migration work applicable to more scenarios.



Key steps for SCMT agentless point-to-point migration are as follows:

1. Use Sangfor's migration tool SCMT to connect to the vCenter management platform. After successful connection, VMware's virtual machine list and status information are automatically obtained through vCenter. Refer to the migration assessment to determine compatibility.

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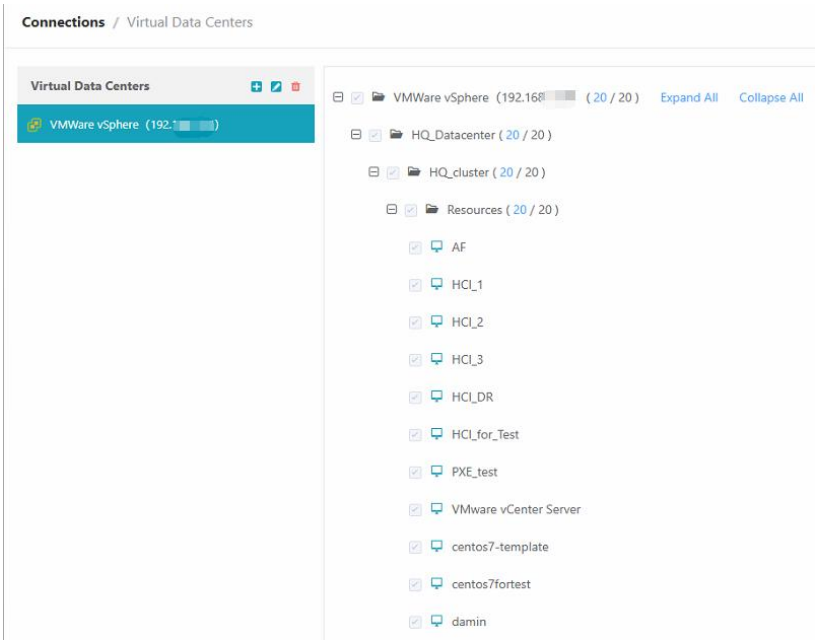
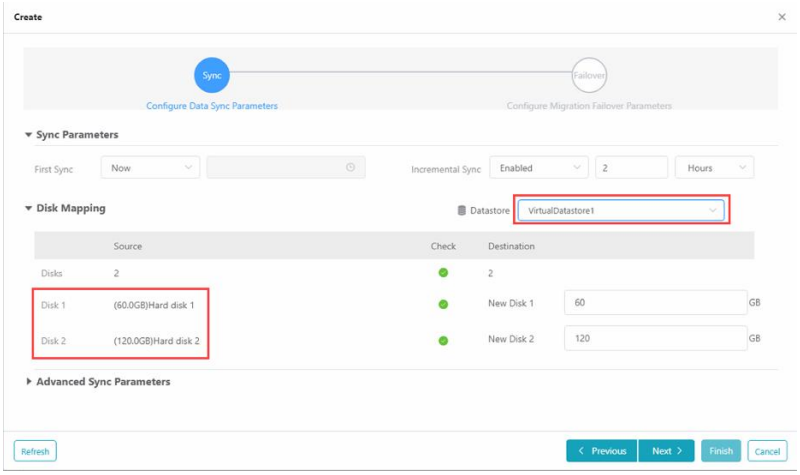
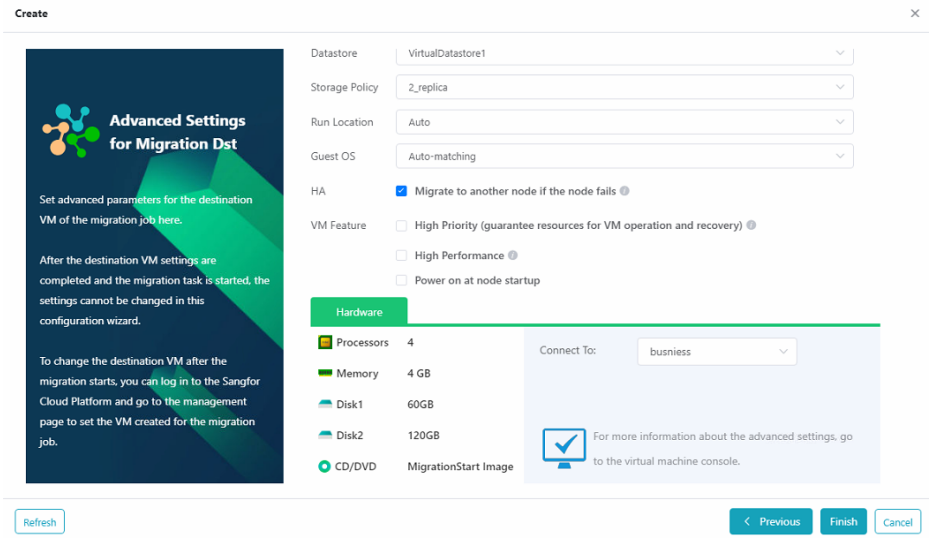


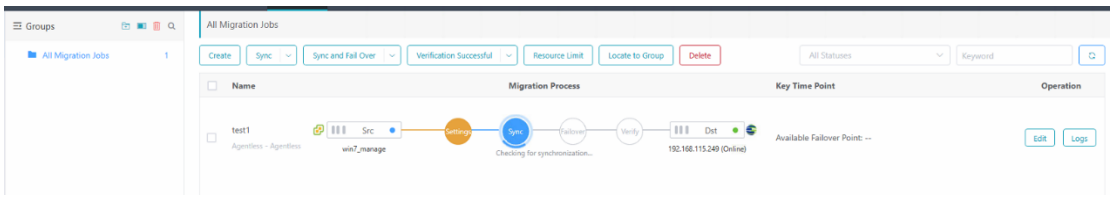
2. After the connection is completed, select the virtual machines to be migrated in SCMT and create a point-to-point migration task. This step selects the source virtual machine's CPU, memory, disk, network card, and other resources for migration, allowing modifications to resource size, type, and configuration during the migration process, and allows configuring data synchronization frequency and transmission bandwidth limit according to network conditions.



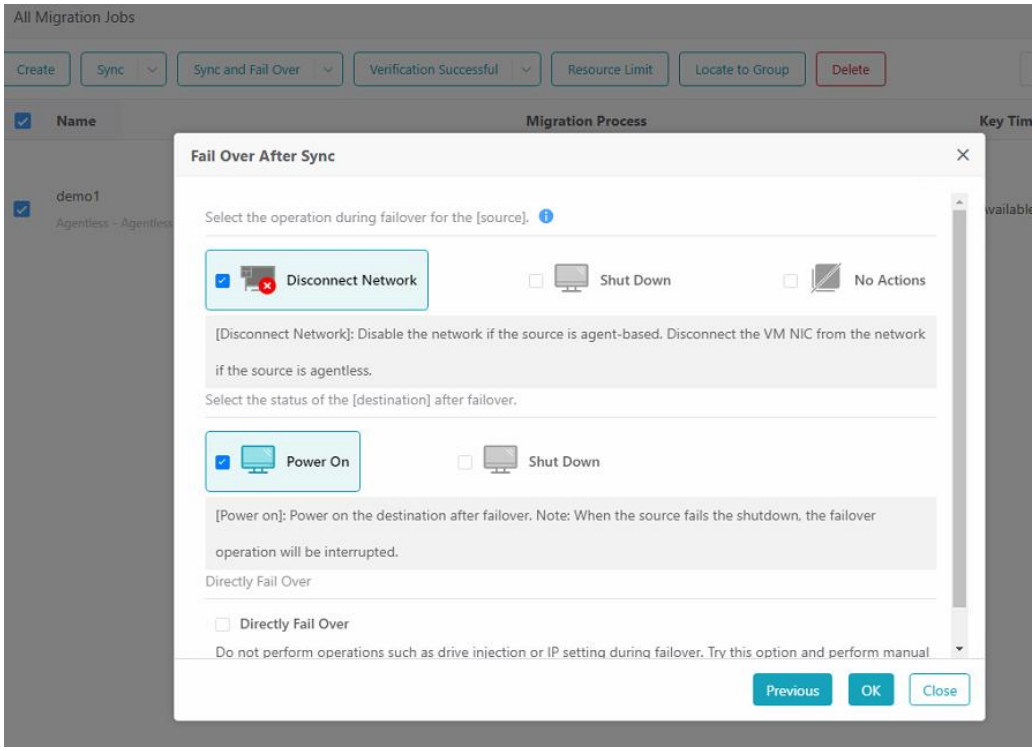
3. During the creation of the migration task, embed the Sangfor cloud/virtualization platform's new virtual machine function, allowing the selection of detailed configurations for the target end virtual machine after migration. If modifications, policy changes, or advanced feature configurations are needed for the virtual machine after migration, these can be completed before migration, automatically taking effect on the target end without consuming time during the business downtime switching process, potentially shortening the business downtime window.



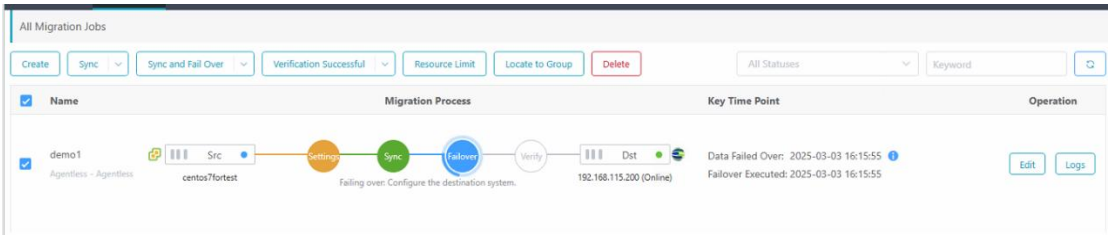
4. After the migration task is created, SCMT will automatically follow the above steps to create a virtual machine on the target end and connect. Once connected, it enters the data transmission phase, with the first data transmission transferring all data, and subsequent transmissions according to the set frequency for incremental data transfer. The entire transmission process allows the source end business to operate normally, but each snapshot will cause a performance drop of about 40%.

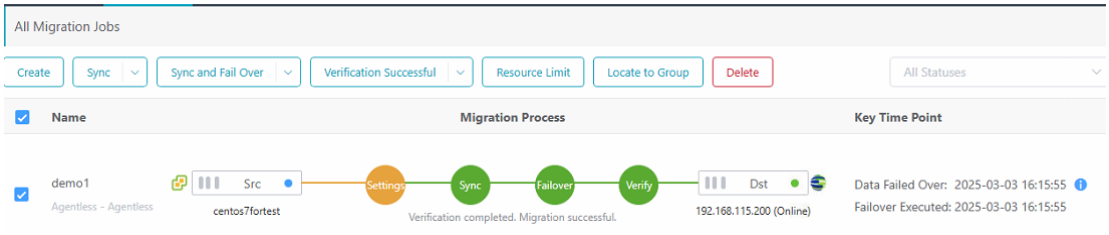


5. When reaching the business switching window or business off-peak period, enter the downtime switching process, making selections for the source and target end states during the switching process. It is recommended to choose "disconnect network" for the source end and directly start the target end to verify the business.



6. After the switch starts, SCMT will follow the configured policy to shut down the source end network card to stop business, then synchronize the last incremental data to the target end, and simultaneously start the target end virtual machine for format conversion and driver injection work. Once the switch is completed, the target end virtual machine takes over the business.





7. Initiated by business and operations personnel, verify that the business system access is normal, indicating that the migration is complete. If business access is abnormal and needs to be rolled back, you can shut down the target end and restart the VMware virtual machine to restore business.

Explanation of SCMT agentless point-to-point migration:

SCMT agentless point-to-point migration cannot handle scenarios where external storage LUNs, bare disk mapping RDMs, USBKEY mappings are mounted, and similarly cannot avoid the impact of snapshots. However, compared to managed migration, SCMT adds rich orchestration and verification capabilities to support more scenarios during the entire migration process:

- When it is necessary to expand specifications and optimize configurations for the virtual machines to be migrated, these can be completed during the creation of the migration task, without consuming time during the business downtime switching process, potentially shortening the business downtime window.

- When it is necessary to migrate cluster-type application systems (Redis, Zookeeper), migration tasks can be created simultaneously for multiple virtual machines. Once all node data synchronization is completed, a unified migration switch is performed.

- In unattended scenarios, migration tasks can be created for application virtual machines on the first evening, with the migration system automatically performing data transfer overnight. Before business launch the next day, a unified application switch is performed.

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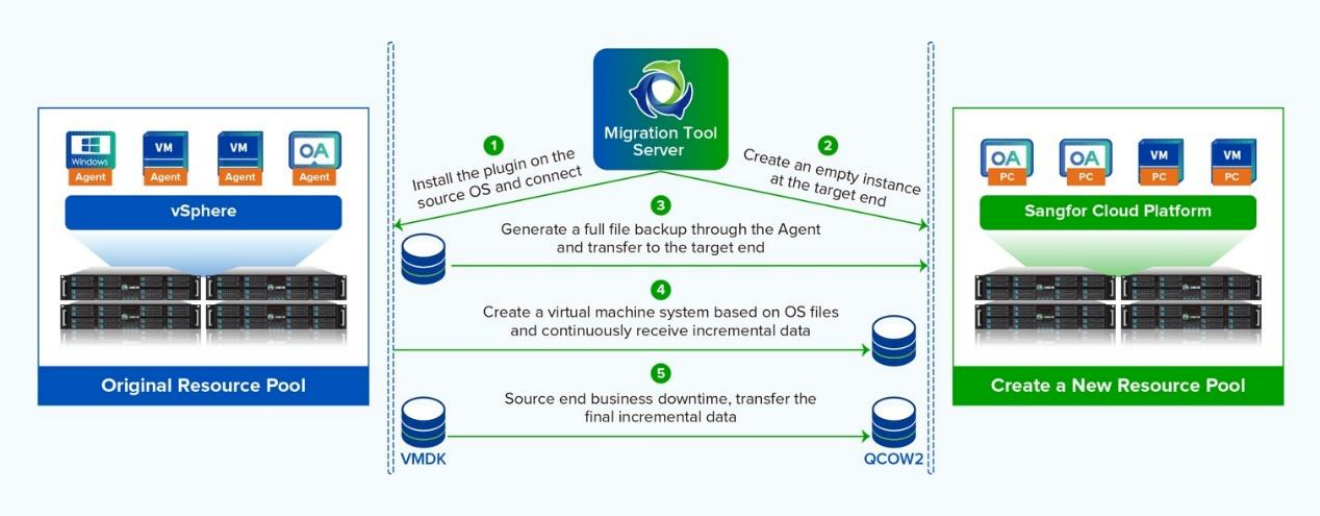
5 SCMT Point-to-Point Migration Based on Agent Technology

Sangfor's migration tool SCMT supports data copy migration through the agent plugin mode. After installing the agent plugin on the source end operating system and connecting to the SCMT server, it receives migration tasks and data transmission instructions issued by the SCMT interface, simultaneously reading the disk blocks in the operating system to achieve full and incremental data transfer. With the help of the agent plugin, the impact on the source system can be reduced, and migration efficiency can be improved.



Key steps for SCMT agent-based migration are as follows:

1. Install the agent plugin on the source end operating system to be migrated, requiring the total memory of the source end operating system to be greater than 2G, free memory greater than 1G, and access to relevant network ports of the SCMT server. Refer to the migration assessment to determine the environment and compatibility.

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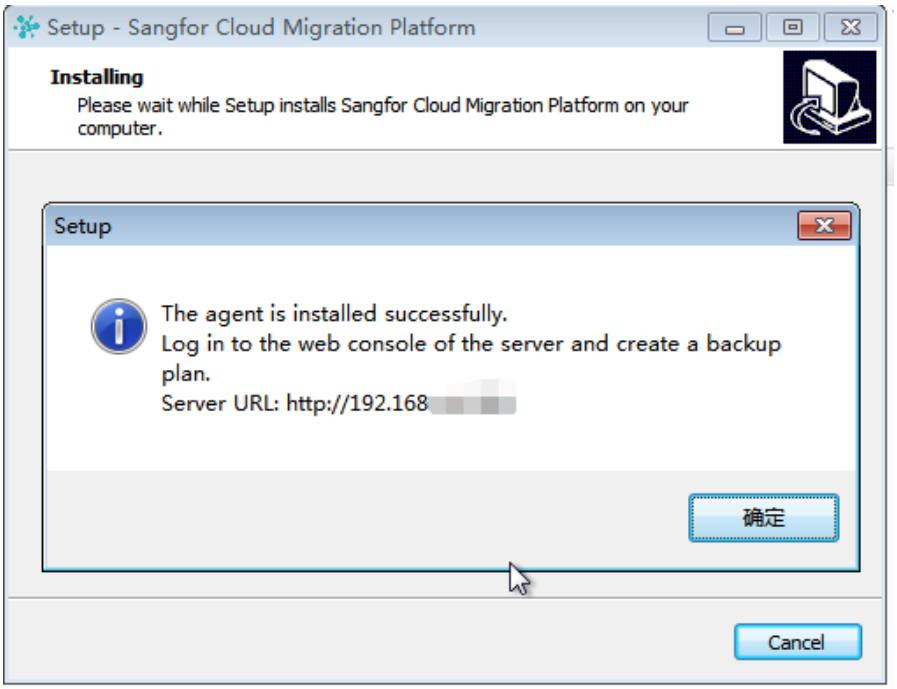
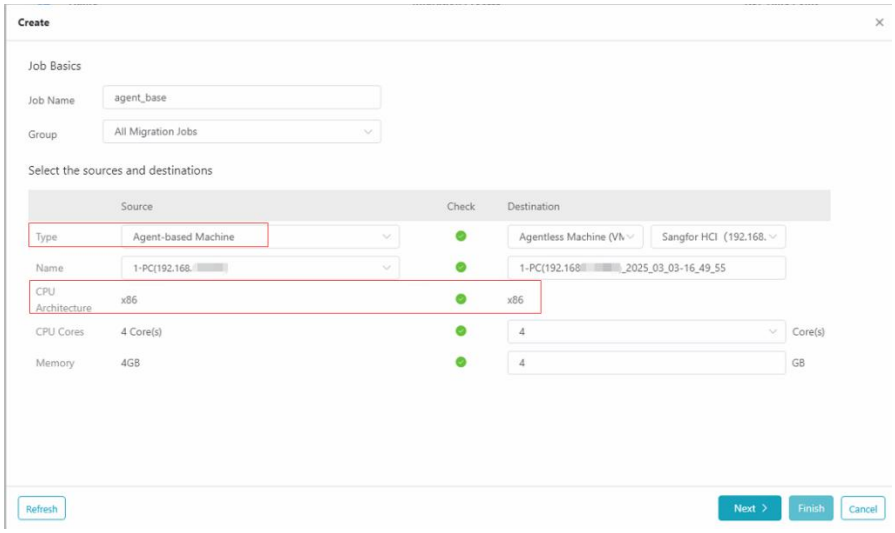


2. After the connection is completed, select the virtual machines to be migrated in SCMT and create a point-to-point migration task. The steps of this solution are different from SCMT agentless migration in terms of transmission technology, but the page operation is completely the same.



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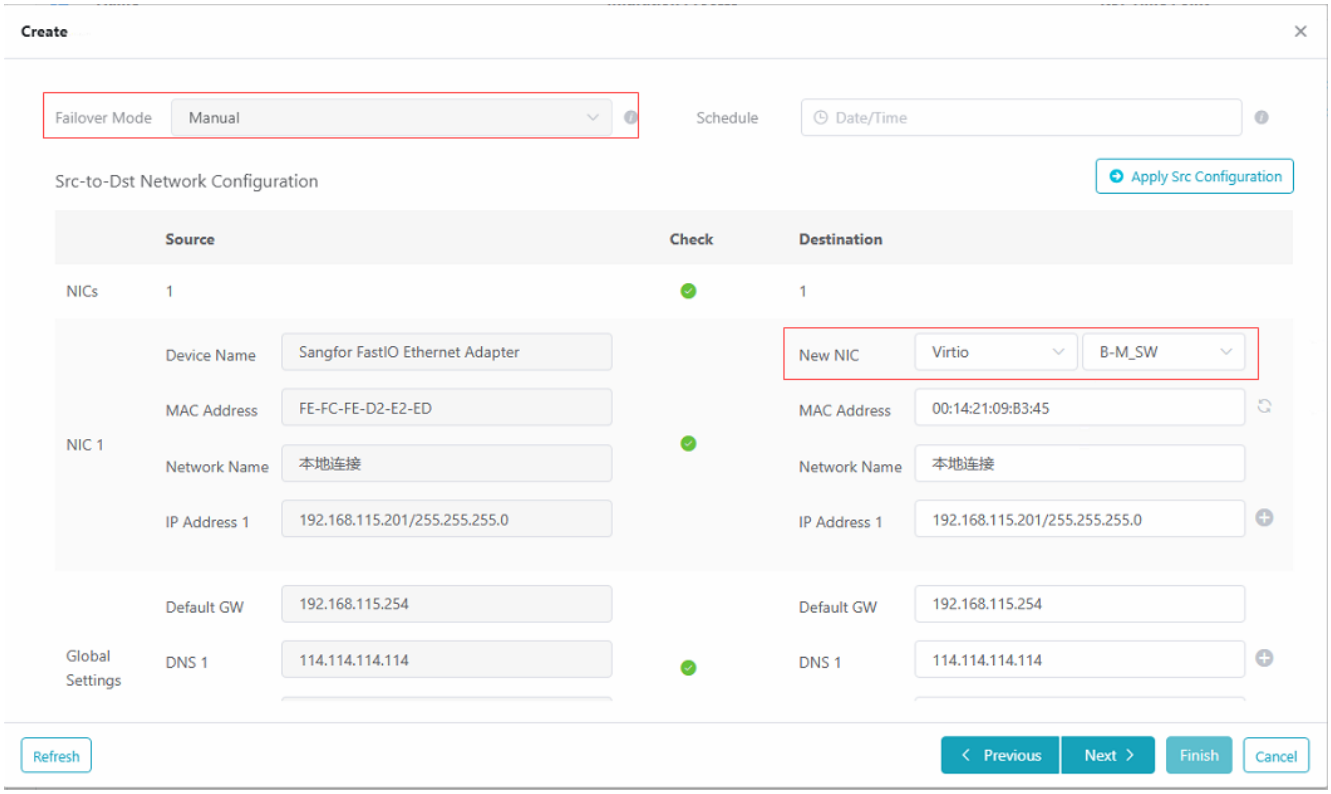
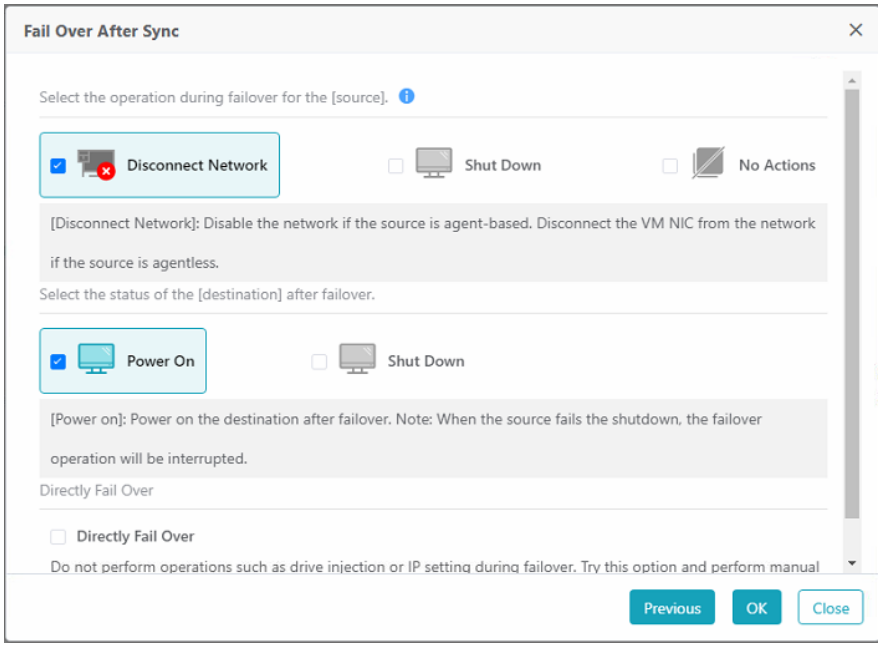
3. During the creation of the migration task, you can simultaneously select detailed configurations for the target end virtual machine after migration. If modifications, policy changes, or advanced feature configurations are needed for the virtual machine after migration, these can be completed before migration, automatically taking effect on the target end without consuming time during the business downtime switching process, potentially shortening the business downtime window.

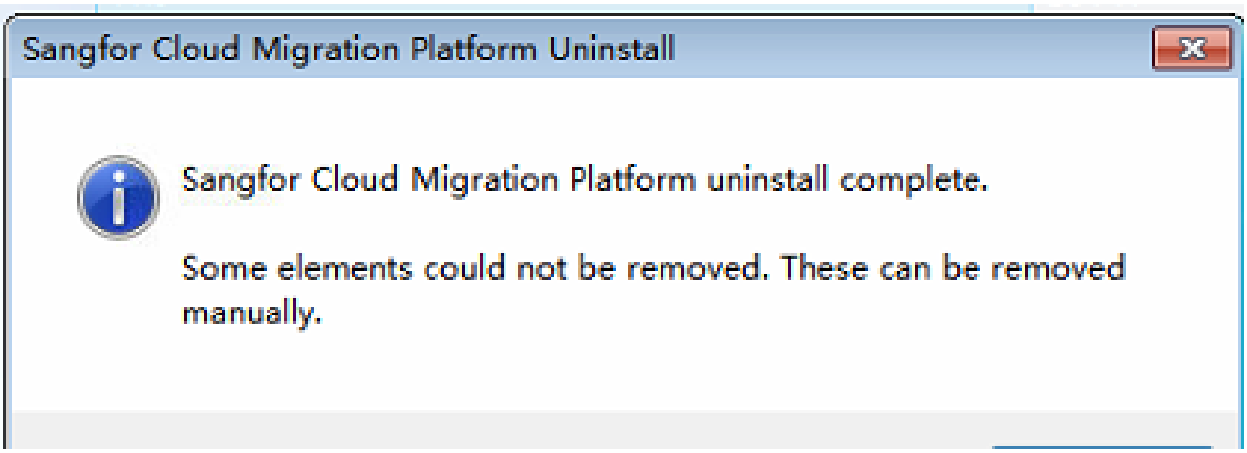


4. After the migration task is created, SCMT will automatically follow the above steps to create a virtual machine on the target end and connect. During the transmission process, the agent's CPU resource consumption is less than 3%, memory consumption peaks at less than 260MB; default storage performance consumption is 30%, read queue depth is 4; default network bandwidth consumption is 300Mbps; storage and network limitations can be manually adjusted.

5. When reaching the business switching window or business off-peak period, enter the downtime switching process, making selections for the source and target end states during the switching process. It is recommended to choose "disconnect network" for the source end and directly start the target end to verify the business.



6. After the switch starts, SCMT will follow the configured policy to perform the last incremental data synchronization, then start the target end virtual machine for driver injection and configuration tuning and take over the business after the target end starts. Once the target end starts, manually uninstall the migration agent plugin.



7. Initiated by business and operations personnel, verify that the business system's access is normal, indicating that the migration is complete. If business access is abnormal and needs to be rolled back, you can shut down the target end and restart the VMware virtual machine to restore business.

Explanation of SCMT agent-based point-to-point migration:

Whether agent-based or agentless, the process and steps of point-to-point migration are largely the same, and they are also applicable in unattended scenarios, with only differences in migration technology principles. Additionally, when using the agent-based migration method, pay attention to the following matters:

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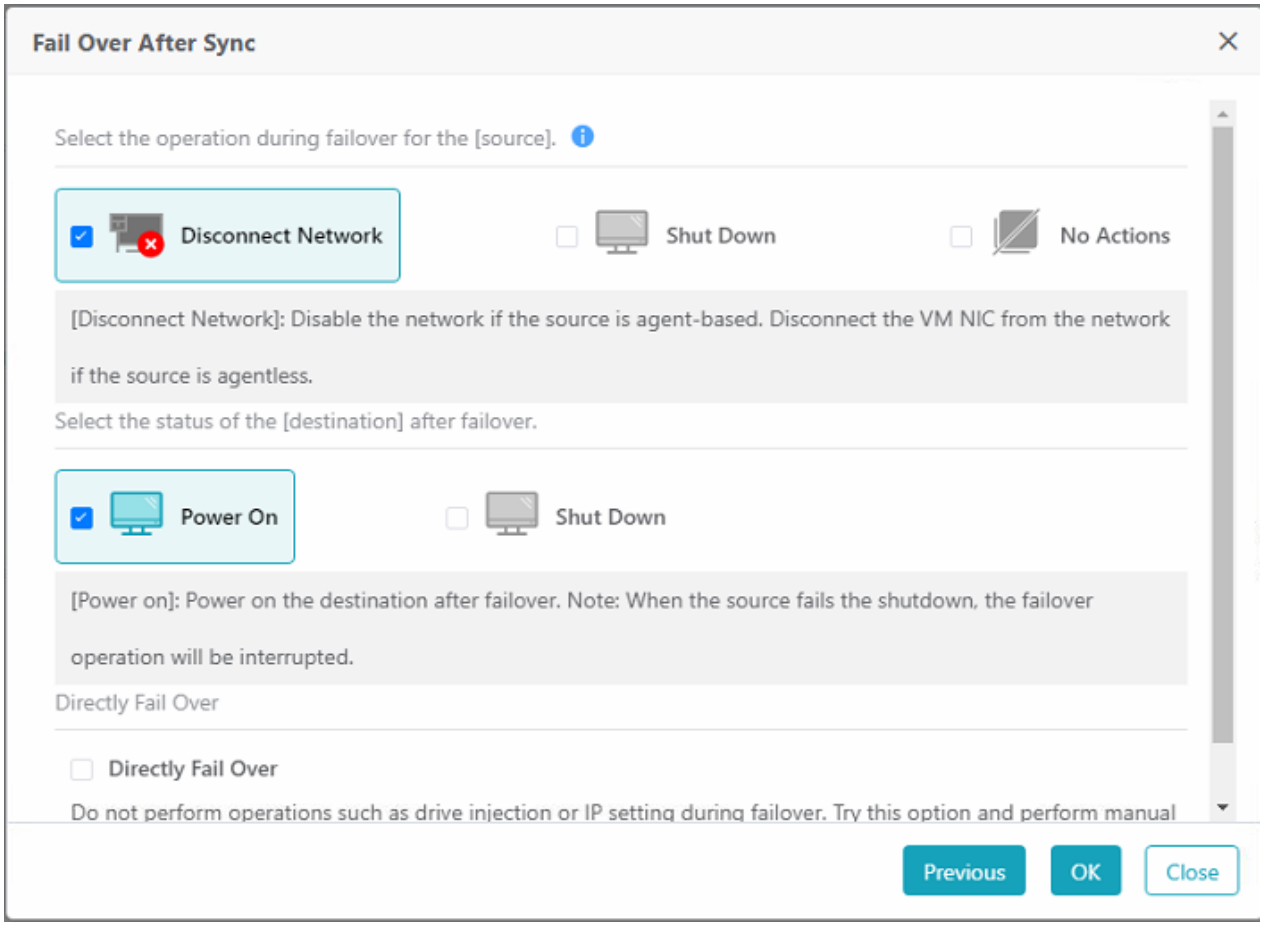
- **Downtime switching method selection:** During the final stage of migration, to ensure complete data transfer to the target end, it is necessary to shut down to prevent new data from being generated on the source end. For single-machine applications during shutdown, it is preferable to use the disconnect network/disable network card method to avoid business service failures during startup, which also facilitates rollback. For cluster-type applications during shutdown, disconnecting the network card may cause cluster service abnormalities, so it is recommended to use the shutdown service method. At this time, select "no operation" on the interface and shut down the services within the operating system. Try to avoid shutting down the source machine.



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- **Downtime interruption time:** Based on agentless point-to-point migration mode, the interruption time during business switching is between 5~10 minutes. Downtime includes the last incremental transmission, target startup, application configuration check, and business system verification time, four steps. The first two steps are automatically completed by the system, while the last two steps require manual intervention by operations and business personnel, so time for manual work should be reserved when estimating downtime.
- **Business exception handling:** During the application system verification process, if the target end cannot start normally or the application cannot run normally due to environmental issues, coordinate operations repair within an acceptable downtime range. If the assessment exceeds the downtime range, disconnect the network of the target end, restore the source end access state, and **switch the business back to the original resource pool system, which can be completed within 1 minute.**

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6 SCMT Hot Backup Migration Based on Agent Technology

Sangfor's migration tool SCMT provides hot backup migration based on CDP (Continuous Data Protection) technology. With the help of the agent plugin, full data and per-second data change volumes are backed up to the SCMT server, then pushed to the target end virtualization platform through the hot backup plan. After the target end receives the full data, it creates a brand-new business virtual machine, completes driver injection and configuration modifications, and enters a semi-started running state to synchronize per-second differential data volumes with the migration source end. During business downtime switching, the semi-started virtual machine on the target end can quickly complete IP migration and business takeover, further shortening the downtime switching time.

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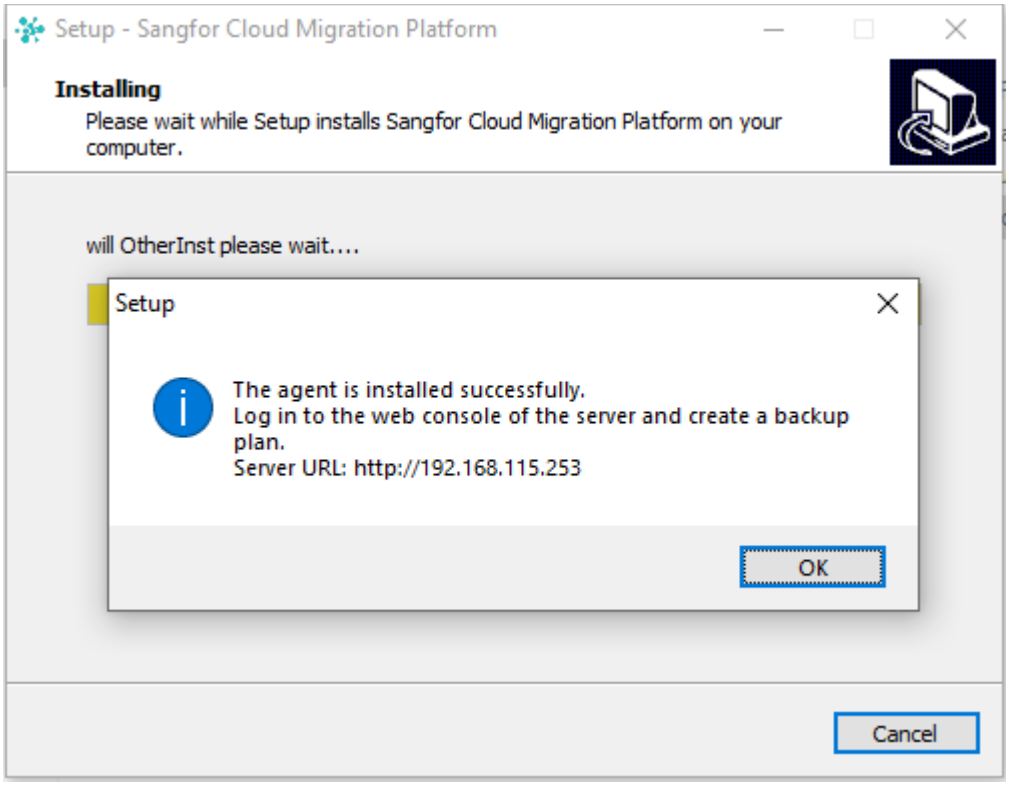
Key steps for SCMT hot backup migration are as follows:

1. Install the agent plugin on the source end operating system to be migrated, requiring the total memory of the source end operating system to be greater than 2G, free memory greater than 1G, and access to relevant network ports of the SCMT server. Refer to the migration assessment to determine the environment and compatibility.



2. After the connection is completed, select the virtual machines for hot backup migration and create a CDP backup plan. In the backup plan, select a business priority policy for asynchronous data migration, with the smallest backup time granularity reaching microseconds, and high-frequency data transmission. Support setting performance limits on network and storage. After the backup plan is created, execute it to back up data to the SCMT server.

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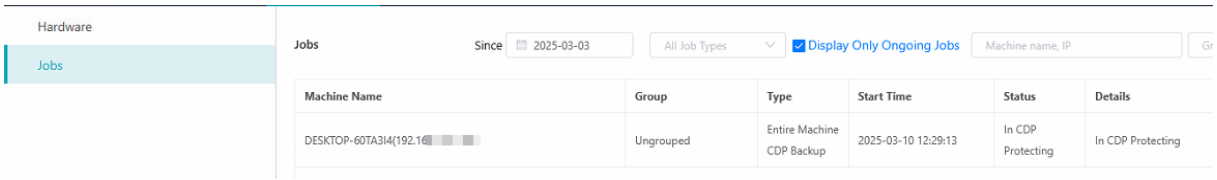
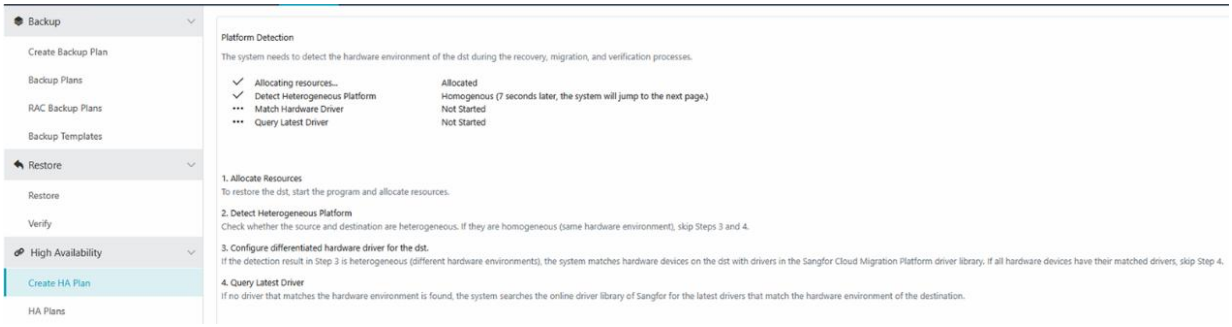


3. After the CDP data backup starts, create a hot backup plan to transfer CDP data flow from the server to the target end. Recover the whole machine on the target end, build a new virtual machine, and start transferring data. During the establishment of the target end virtual machine, platform detection, driver injection, and system startup processes will be conducted.



4. Once the target end virtual machine is created, the system enters a semi-started state, indicating that the target end system is ready and is synchronizing real-time data with the source end, waiting for the final switch.

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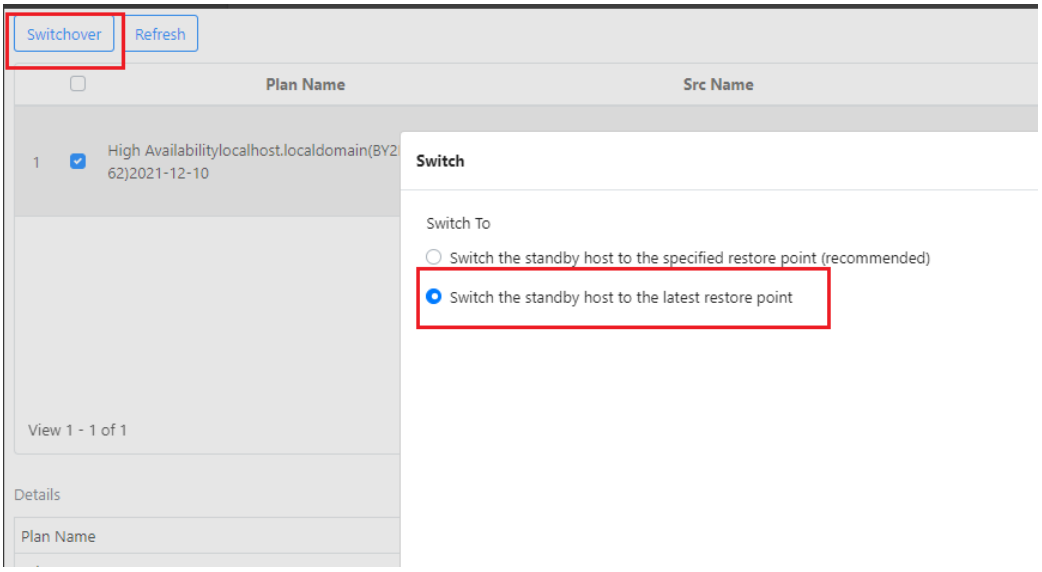
5. When reaching the business switching window or business off-peak period, enter the hot backup switching process. Find the corresponding hot backup plan and switch it, choosing to switch the backup machine to the latest data. During the switching process, automatically modify the source end network configuration, switching the business to the target end.



6. After the switch is completed, initiated by business and operations personnel, verify that the business system access is normal, indicating that the migration is complete. If business access is abnormal and needs to be rolled back, you can shut down the target end and restart the VMware virtual machine to restore business.

Explanation of SCMT agent-based point-to-point migration:

- **Data space preparation:** The working process of hot backup migration mode is to transmit source end data to the SCMT server through CDP backup, and then establish a virtual machine on the target end through the hot backup plan. During the entire process, data needs to be saved on the SCMT server, so it is recommended to configure storage space on the server to be 1.5 times the data volume of the source end.

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- **Downtime interruption time:** Hot backup migration mode shortens the downtime switching time to about 1 minute (specific interruption time depends on business service startup time) through CDP data transmission, semi-started state synchronization, and other technologies, meeting the migration needs of business systems with higher reliability requirements.

- **Business exception handling:** After switching through hot backup migration, the source business system does not change except for network information. During the application system verification process, if repair assessment fails and business rollback is needed, disconnect the network of the target end, restore the original business system network access state, and switch the business back to the original resource pool system, which can be completed within 1 minute.

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7 Sangfor VMware Migration Technology Summary

Applicable Scenarios	Migration Method	Migration Description	Differential Comparison
Large-scale single-machine applications Not concerned with migration process	Managed Migration	System batch migration without installing plugins or deploying tools	After migration, the source end virtual machine is automatically shut down to complete business switching. The migration process cannot modify configurations, and manual unified switching is not possible.
Large-scale single-machine applications Non-database cluster applications With certain migration process demands	SCMT Agentless Point-to-Point Migration	System batch migration without installing plugins requires deploying tools	The migration process interface is visual, and after switching, the source end does not shut down, which is safer. Supports migration configuration modifications, supports unattended scenarios.
Some single-machine database systems Non-database cluster applications Migration process sensitive to performance Downtime within 5 ~ 10 minutes	SCMT Agent-based Point-to-Point Migration	Deploy tools and plugins to avoid snapshot performance impact	The migration process interface is visual, and after switching, the source end does not shut down, which is safer. Supports migration configuration modifications, supports unattended scenarios. Plugin running consumes CPU<3%, memory consumption is less than 260MB.

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Applicable Scenarios	Migration Method	Migration Description	Differential Comparison
Some single-machine database systems Non-database cluster applications Migration process sensitive to performance Downtime requirement around 1 minute	SCMT Agent-based Hot Backup Migration	Deploy tools and plugins to avoid snapshot performance impact tool paired with 1.5 times storage	The migration process interface is visual but more complex compared to point-to-point migration. Supports migration configuration modifications, supports unattended scenarios. Plugin running consumes CPU<3%, memory consumption is less than 260MB.

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