

vSphere Troubleshooting

ESXi 5.0
vCenter Server 5.0

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About vSphere Troubleshooting

vSphere Troubleshooting describes troubleshooting issues and procedures for vCenter Server implementations and related components.

Intended Audience

This information is for anyone who wants to troubleshoot virtual machines, ESXi hosts, clusters, and related storage solutions. The information in this book is for experienced Windows or Linux system administrators who are familiar with virtual machine technology and datacenter operations.

Updated Information

This *vSphere Troubleshooting* publication is updated with each release of the product or when necessary.

This table provides the update history of *vSphere Troubleshooting*.

Revision	Description
EN-000606-01	<ul style="list-style-type: none">■ Added a new chapter with troubleshooting topics for licensing issues. See Chapter 5, "Troubleshooting Licensing," on page 55.■ Added the topic "Recover Orphaned Virtual Machines in the vSphere Client," on page 14.■ Added the topic "Cannot Copy Data From an ESXi Host to a USB Device That Is Connected to the Host," on page 14.■ Added the topic "Cannot Configure vSphere HA When Using Custom SSL Certificates," on page 18.■ Added the topic "Unable to View Performance Charts for Datastore," on page 40.■ Added the topic "Cannot Enable Storage I/O Control on Datastore," on page 40.■ Added the topic "Applying Storage DRS Recommendations Fails," on page 45.
EN-000606-00	Initial release.

Troubleshooting Virtual Machines

The virtual machine troubleshooting topics provide solutions to potential problems that you might encounter when using your virtual machines.

This chapter includes the following topics:

- [“Troubleshooting Fault Tolerant Virtual Machines,”](#) on page 9
- [“Troubleshooting USB Passthrough Devices,”](#) on page 13
- [“Recover Orphaned Virtual Machines in the vSphere Client,”](#) on page 14
- [“Recover Orphaned Virtual Machines in the vSphere Web Client,”](#) on page 15
- [“Virtual Machine Does Not Power On After Cloning or Deploying from Template,”](#) on page 15

Troubleshooting Fault Tolerant Virtual Machines

To maintain a high level of performance and stability for your fault tolerant virtual machines and also to minimize failover rates, you should be aware of certain troubleshooting issues.

The troubleshooting topics discussed focus on problems that you might encounter when using the vSphere Fault Tolerance feature on your virtual machines. The topics also describe how to resolve problems.

You can also see the VMware knowledge base article at <http://kb.vmware.com/kb/1033634> to help you troubleshoot Fault Tolerance. This article contains a list of error messages that you might encounter when you attempt to use the feature and, where applicable, advice on how to resolve each error.

Hardware Virtualization Not Enabled

You must enable Hardware Virtualization (HV) before you use vSphere Fault Tolerance.

Problem

When you attempt to power on a virtual machine with Fault Tolerance enabled, an error message might appear if you did not enable HV.

Cause

This error is often the result of HV not being available on the ESXi server on which you are attempting to power on the virtual machine. HV might not be available either because it is not supported by the ESXi server hardware or because HV is not enabled in the BIOS.

Solution

If the ESXi server hardware supports HV, but HV is not currently enabled, enable HV in the BIOS on that server. The process for enabling HV varies among BIOSes. See the documentation for your hosts' BIOSes for details on how to enable HV.

If the ESXi server hardware does not support HV, switch to hardware that uses processors that support Fault Tolerance.

Compatible Hosts Not Available for Secondary VM

If you power on a virtual machine with Fault Tolerance enabled and no compatible hosts are available for its Secondary VM, you might receive an error message.

Problem

The following error message might appear in the Recent Task Pane:

Secondary VM could not be powered on as there are no compatible hosts that can accommodate it.

Cause

This can occur for a variety of reasons including that there are no other hosts in the cluster, there are no other hosts with HV enabled, data stores are inaccessible, there is no available capacity, or hosts are in maintenance mode.

Solution

If there are insufficient hosts, add more hosts to the cluster. If there are hosts in the cluster, ensure they support HV and that HV is enabled. The process for enabling HV varies among BIOSes. See the documentation for your hosts' BIOSes for details on how to enable HV. Check that hosts have sufficient capacity and that they are not in maintenance mode.

Secondary VM on Overcommitted Host Degrades Performance of Primary VM

If a Primary VM appears to be executing slowly, even though its host is lightly loaded and retains idle CPU time, check the host where the Secondary VM is running to see if it is heavily loaded.

Problem

When a Secondary VM resides on a host that is heavily loaded, this can effect the performance of the Primary VM.

Evidence of this problem could be if the vLockstep Interval on the Primary VM's Fault Tolerance panel is yellow or red. This means that the Secondary VM is running several seconds behind the Primary VM. In such cases, Fault Tolerance slows down the Primary VM. If the vLockstep Interval remains yellow or red for an extended period of time, this is a strong indication that the Secondary VM is not getting enough CPU resources to keep up with the Primary VM.

Cause

A Secondary VM running on a host that is overcommitted for CPU resources might not get the same amount of CPU resources as the Primary VM. When this occurs, the Primary VM must slow down to allow the Secondary VM to keep up, effectively reducing its execution speed to the slower speed of the Secondary VM.

Solution

To resolve this problem, set an explicit CPU reservation for the Primary VM at a MHz value sufficient to run its workload at the desired performance level. This reservation is applied to both the Primary and Secondary VMs ensuring that both are able to execute at a specified rate. For guidance setting this reservation, view the performance graphs of the virtual machine (prior to Fault Tolerance being enabled) to see how much CPU resources it used under normal conditions.

Virtual Machines with Large Memory Can Prevent Use of Fault Tolerance

You can only enable Fault Tolerance on a virtual machine with a maximum of 64GB of memory.

Problem

Enabling Fault Tolerance on a virtual machine with more than 64GB memory can fail. Migrating a running fault tolerant virtual machine using vMotion also can fail if its memory is greater than 15GB or if memory is changing at a rate faster than vMotion can copy over the network.

Cause

This occurs if, due to the virtual machine's memory size, there is not enough bandwidth to complete the vMotion switchover operation within the default timeout window (8 seconds).

Solution

To resolve this problem, before you enable Fault Tolerance, power off the virtual machine and increase its timeout window by adding the following line to the vmx file of the virtual machine:

```
ft.maxSwitchoverSeconds = "30"
```

where 30 is the timeout window in number in seconds. Enable Fault Tolerance and power the virtual machine back on. This solution should work except under conditions of very high network activity.

NOTE If you increase the timeout to 30 seconds, the fault tolerant virtual machine might become unresponsive for a longer period of time (up to 30 seconds) when enabling FT or when a new Secondary VM is created after a failover.

Secondary VM CPU Usage Appears Excessive

In some cases, you might notice that the CPU usage for a Secondary VM is higher than for its associated Primary VM.

Problem

When the Primary VM is idle, the relative difference between the CPU usage of the Primary and Secondary VMs might seem large.

Cause

Replaying events (such as timer interrupts) on the Secondary VM can be slightly more expensive than recording them on the Primary VM. This additional overhead is small.

Solution

None needed. Examining the actual CPU usage shows that very little CPU resource is being consumed by the Primary VM or the Secondary VM.

Primary VM Suffers Out of Space Error

If the storage system you are using has thin provisioning built in, a Primary VM can crash when it encounters an out of space error.

Problem

When used with a thin provisioned storage system, a Primary VM can crash. The Secondary VM replaces the Primary VM, but the error message "There is no more space for virtual disk <disk_name>" appears on the vSphere client.

Cause

If thin provisioning is built into the storage system, it is not possible for ESX/ESXi hosts to know if enough disk space has been allocated for a pair of fault tolerant virtual machines. If the Primary VM asks for extra disk space but there is no space left on the storage, the primary VM crashes.

Solution

The error message gives you the choice of continuing the session by clicking "Retry" or clicking "Cancel" to terminate the session. Ensure that there is sufficient disk space for the fault tolerant virtual machine pair and click "Retry".

Fault Tolerant Virtual Machine Failovers

A Primary or Secondary VM can fail over even though its ESXi host has not crashed. In such cases, virtual machine execution is not interrupted, but redundancy is temporarily lost. To avoid this type of failover, be aware of some of the situations when it can occur and take steps to avoid them.

Partial Hardware Failure Related to Storage

This problem can arise when access to storage is slow or down for one of the hosts. When this occurs there are many storage errors listed in the VMkernel log. To resolve this problem you must address your storage-related problems.

Partial Hardware Failure Related to Network

If the logging NIC is not functioning or connections to other hosts through that NIC are down, this can trigger a fault tolerant virtual machine to be failed over so that redundancy can be reestablished. To avoid this problem, dedicate a separate NIC each for vMotion and FT logging traffic and perform vMotion migrations only when the virtual machines are less active.

Insufficient Bandwidth on the Logging NIC Network

This can happen because of too many fault tolerant virtual machines being on a host. To resolve this problem, more broadly distribute pairs of fault tolerant virtual machines across different hosts.

vMotion Failures Due to Virtual Machine Activity Level

If the vMotion migration of a fault tolerant virtual machine fails, the virtual machine might need to be failed over. Usually, this occurs when the virtual machine is too active for the migration to be completed with only minimal disruption to the activity. To avoid this problem, perform vMotion migrations only when the virtual machines are less active.

Too Much Activity on VMFS Volume Can Lead to Virtual Machine Failovers

When a number of file system locking operations, virtual machine power ons, power offs, or vMotion migrations occur on a single VMFS volume, this can trigger fault tolerant virtual machines to be failed over. A symptom that this might be occurring is receiving many warnings about SCSI reservations in the VMkernel log. To resolve this problem, reduce the number of file system operations or ensure that the fault tolerant virtual machine is on a VMFS volume that does not have an abundance of other virtual machines that are regularly being powered on, powered off, or migrated using vMotion.

Lack of File System Space Prevents Secondary VM Startup

Check whether or not your `/(root)` or `/vmfs/datasource` file systems have available space. These file systems can become full for many reasons, and a lack of space might prevent you from being able to start a new Secondary VM.

Troubleshooting USB Passthrough Devices

Information about feature behavior can help you troubleshoot or avoid potential problems when USB devices are connected to a virtual machine.

Error Message When You Try to Migrate Virtual Machine with USB Devices Attached

Migration with vMotion cannot proceed and issues a confusing error message when you connect multiple USB devices from an ESXi host to a virtual machine and one or more devices are not enabled for vMotion.

Problem

The Migrate Virtual Machine wizard runs a compatibility check before a migration operation begins. If unsupported USB devices are detected, the compatibility check fails and an error message similar to the following appears: Currently connected device 'USB 1' uses backing 'path:1/7/1', which is not accessible.

Cause

When you connect USB devices from a host to a virtual machine, you must select all USB devices on the virtual machine for migration for vMotion to be successful. If one or more devices are not enabled for vMotion, migration will fail.

Solution

- 1 Make sure that the devices are not in the process of transferring data before removing them.
- 2 Re-add and enable vMotion for each affected USB device.

USB Passthrough Device Is Nonresponsive

USB devices can become nonresponsive for several reasons, including unsafely interrupting a data transfer or if a guest operating system driver sends an unsupported command to the device.

Problem

The USB device is nonresponsive.

Cause

A data transfer was interrupted or nonsupported devices are being used. For example, if a guest driver sends a SCSI REPORT LUNS command to some unsupported USB flash drives, the device stops responding to all commands.

Solution

- 1 Physically detach the USB device from the ESXi host and reattach it.
- 2 Fully shut down the host (not reset) and leave it powered off for at least 30 seconds to ensure that the host USB bus power is fully powered down.

Cannot Copy Data From an ESXi Host to a USB Device That Is Connected to the Host

You can connect a USB device to an ESXi host and copy data to the device from the host. For example, you might want to gather the vm-support bundle from the host after the host loses network connectivity. To perform this task, you must stop the USB arbitrator.

Problem

If the USB arbitrator is being used for USB passthrough from an ESXi host to a virtual machine, or if the USB device is formatted with a FAT16 partition and is the maximum size of 2GB, the USB device appears under `lsusb` but does not mount correctly.

Cause

This problem occurs because the `usbarbitrator` service has claimed the device to make it available for passthrough from the host to virtual machines.

Solution

- 1 Stop the `usbarbitrator` service: `/etc/init.d/usbarbitrator stop`
- 2 Disconnect and reconnect the USB device.

By default, the device location is `/vmfs/devices/disks/mpx.vmhbaXX:C0:T0:L0`.

After using the device, restart the `usbarbitrator` service: `/etc/init.d/usbarbitrator start`

Recover Orphaned Virtual Machines in the vSphere Client

Virtual machines appear in the vSphere Client inventory list with `(orphaned)` appended to their name.

Problem

Virtual machines that reside on an ESXi host managed by vCenter Server might become orphaned in rare cases. Such virtual machines exist in the vCenter Server database, but the ESXi host no longer recognizes them.

Cause

Virtual machines can become orphaned if a host failover is unsuccessful, or when the virtual machine is unregistered directly on the host. If this situation occurs, move the orphaned virtual machine to another host in the datacenter that has access to the datastore on which the virtual machine files are stored.

Solution

- 1 In the vSphere Client inventory list, right-click the virtual machine and select **Relocate**.
A list of available hosts appears.
- 2 Select the host on which to place the virtual machine.
If no hosts are available, add a host that can access the datastore on which the virtual machine's files are stored.
- 3 Click **OK** to save your changes.
The virtual machine is connected to the new host and appears in the inventory list.

Recover Orphaned Virtual Machines in the vSphere Web Client

Virtual machines appear in the vSphere Web Client inventory list with (orphaned) appended to their name.

Problem

Virtual machines that reside on an ESXi host managed by vCenter Server might become orphaned in rare cases. Such virtual machines exist in the vCenter Server database, but the ESXi host no longer recognizes them.

Cause

Virtual machines can become orphaned if a host failover is unsuccessful, or when the virtual machine is unregistered directly on the host. If this situation occurs, move the orphaned virtual machine to another host in the datacenter that has access to the datastore on which the virtual machine files are stored.

Solution

- 1 In the vSphere Web Client inventory list, right-click the virtual machine and select **Migrate**.
A list of available hosts appears.
- 2 Select the host on which to place the virtual machine.
If no hosts are available, add a host that can access the datastore on which the virtual machine's files are stored.
- 3 Click **OK** to save your changes.
The virtual machine is connected to the new host and appears in the inventory list.

Virtual Machine Does Not Power On After Cloning or Deploying from Template

Virtual machines do not power on after you complete the clone or deploy from template workflow.

Problem

When you clone a virtual machine or deploy a virtual machine from a template, you can select the **Power on this virtual machine after creation** check box on the Ready to Complete page. However, the virtual machine might not automatically power on upon creation.

Cause

The swap file size is not reserved when the virtual machine disks are created.

Solution

- Reduce the size of the swap file that is required for the virtual machine. You can do this by increasing the virtual machine memory reservation.
 - a In the vSphere Client inventory, right-click the virtual machine and select **Edit Settings**.
 - b Select the **Resources** tab and click **Memory**.
 - c Use the Reservation slider to increase the amount of memory allocated to the virtual machine.
 - d Click **OK**.
- Alternatively, you can increase the amount of space available for the swap file by moving other virtual machine disks off of the datastore that is being used for the swap file.
 - a In the vSphere Client inventory, select the datastore and click the **Virtual Machines** tab.
 - b For each virtual machine to move, right-click the virtual machine and select **Migrate**.

- c Select **Change datastore**.
- d Proceed through the Migrate Virtual Machine wizard.
- You can also increase the amount of space available for the swap file by changing the swap file location to a datastore with adequate space.
 - a In the vSphere Client inventory, select the host and click the **Configuration** tab.
 - b Under Software, select **Virtual Machine Swapfile Location**.
 - c Click **Edit**.

NOTE If the host is part of a cluster that specifies that the virtual machine swap files are stored in the same directory as the virtual machine, you cannot click **Edit**. You must use the Cluster Settings dialog box to change the swap file location policy for the cluster.

- d Select a datastore from the list and click **OK**.

Troubleshooting Hosts

The host troubleshooting topics provide solutions to potential problems that you might encounter when using your vCenter Servers and ESXi hosts.

This chapter includes the following topics:

- [“Troubleshooting vCenter Server and ESXi Host Certificates,”](#) on page 17
- [“Troubleshooting vSphere HA Host States,”](#) on page 19
- [“Troubleshooting Auto Deploy,”](#) on page 22
- [“Troubleshooting vCenter Server Plug-Ins,”](#) on page 28
- [“Linked Mode Troubleshooting,”](#) on page 28
- [“Configuring Logging for the VMware Inventory Service,”](#) on page 30
- [“Authentication Token Manipulation Error,”](#) on page 31
- [“Active Directory Rule Set Error Causes Host Profile Compliance Failure,”](#) on page 31

Troubleshooting vCenter Server and ESXi Host Certificates

Certificates are automatically generated when you install vCenter Server. These default certificates are not signed by a commercial certificate authority (CA) and might not provide strong security. You can replace default vCenter Server certificates with certificates signed by a commercial CA. When you replace vCenter Server and ESXi certificates, you might encounter errors.

vCenter Server Cannot Connect to the Database

After you replace default vCenter Server certificates, you might be unable to connect to the vCenter Server database.

Problem

vCenter Server is unable to connect to the vCenter Server database, and therefore cannot be restarted after you replace default vCenter Server certificates.

Cause

The database password must be reset.

Solution

Reset the database password by running the following command: `vpxd -P pwd`.

vCenter Server Cannot Connect to Managed Hosts

After you replace default vCenter Server certificates and restart the system, vCenter Server might not be able to connect to managed hosts.

Problem

vCenter Server cannot connect to managed hosts after server certificates are replaced and the system is restarted.

Solution

Log into the host as the root user and reconnect the host to vCenter Server.

New vCenter Server Certificate Does Not Appear to Load

After you replace default vCenter Server certificates, the new certificates might not appear to load.

Problem

When you install new vCenter Server certificates, you might not see the new certificate.

Cause

Existing open connections to vCenter Server are not forcibly closed and might still use the old certificate.

Solution

To force all connections to use the new certificate, use one of the following methods.

- Restart the network stack or network interfaces on the server.
- Restart the vCenter Server service.

Cannot Configure vSphere HA When Using Custom SSL Certificates

After you install custom SSL certificates, attempts to enable vSphere High Availability (HA) fail.

Problem

When you attempt to enable vSphere HA on a host with custom SSL certificates installed, the following error message appears: vSphere HA cannot be configured on this host because its SSL thumbprint has not been verified.

Cause

When you add a host to vCenter Server, and vCenter Server already trusts the host's SSL certificate, VPX_HOST.EXPECTED_SSL_THUMBPRINT is not populated in the vCenter Server database. vSphere HA obtains the host's SSL thumbprint from this field in the database. Without the thumbprint, you cannot enable vSphere HA.

Solution

- 1 In the vSphere Client, disconnect the host that has custom SSL certificates installed.
- 2 Reconnect the host to vCenter Server.
- 3 Accept the host's SSL certificate.
- 4 Enable vSphere HA on the host.

Troubleshooting vSphere HA Host States

vCenter Server reports vSphere HA host states that indicate an error condition on the host. Such errors can prevent vSphere HA from fully protecting the virtual machines on the host and can impede vSphere HA's ability to restart virtual machines after a failure. Errors can occur when vSphere HA is being configured or unconfigured on a host or, more rarely, during normal operation. When this happens, you should determine how to resolve the error, so that vSphere HA is fully operational.

vSphere HA Agent Is in the Agent Unreachable State

The vSphere HA agent on a host is in the Agent Unreachable state for a minute or more. User intervention might be required to resolve this situation.

Problem

vSphere HA reports that an agent is in the Agent Unreachable state when the agent for the host cannot be contacted by the master host or by vCenter Server. Consequently, vSphere HA is not able to monitor the virtual machines on the host and might not restart them after a failure.

Cause

A vSphere HA agent can be in the Agent Unreachable state for several reasons. This condition most often indicates that a networking problem is preventing vCenter Server from contacting the master host and the agent on the host, or that all hosts in the cluster have failed. This condition can also indicate the unlikely situation that the agent on the host has failed, and the watchdog process was unable to restart it.

Solution

Determine if vCenter Server is reporting the host as not responding. If so, there is a networking problem or a total cluster failure. After either condition is resolved, vSphere HA works correctly again. If, however, vCenter Server reports the hosts as responding, reconfigure vSphere HA on the host.

vSphere HA Agent is in the Uninitialized State

The vSphere HA agent on a host is in the Uninitialized state for a minute or more. User intervention might be required to resolve this situation.

Problem

vSphere HA reports that an agent is in the Uninitialized state when the agent for the host is unable to enter the run state and become the master host or to connect to the master host. Consequently, vSphere HA is not able to monitor the virtual machines on the host and might not restart them after a failure.

Cause

A vSphere HA agent can be in the Uninitialized state for one or more reasons. This condition most often indicates that the host does not have access to any datastores. Less frequently, this condition indicates that the host does not have access to its local datastore on which vSphere HA caches state information, the agent on the host is inaccessible, or the vSphere HA agent is unable to open required firewall ports.

Solution

Search the list of the host's events for recent occurrences of the event vSphere HA Agent for the host has an error. This event indicates the reason for the host being in the uninitialized state. If the condition exists because of a datastore problem, resolve whatever is preventing the host from accessing the affected datastores. After the problem has been resolved, if the agent does not return to an operational state, reconfigure vSphere HA on the host.

NOTE If the condition exists because of a firewall problem, check if there is another service on the host that is using port 8192. If so, shut down that service, and reconfigure vSphere HA.

vSphere HA Agent is in the Initialization Error State

The vSphere HA agent on a host is in the Initialization Error state for a minute or more. User intervention is required to resolve this situation.

Problem

vSphere HA reports that an agent is in the Initialization Error state when the last attempt to configure vSphere HA for the host failed. vSphere HA does not monitor the virtual machines on such a host and might not restart them after a failure.

Cause

This condition most often indicates that vCenter Server was unable to connect to the host while the vSphere HA agent was being installed or configured on the host. This condition might also indicate that the installation and configuration completed, but the agent did not become a master host or a slave host within a timeout period. Less frequently, the condition is an indication that there is insufficient disk space on the host's local datastore to install the agent, or that there are insufficient unreserved memory resources on the host for the agent resource pool. Finally, for ESXi 5.0 hosts, the configuration fails if a previous installation of another component required a host reboot, but the reboot has not yet occurred.

Solution

When a Configure HA task fails, a reason for the failure is reported.

Reason for Failure	Action
Host communication errors	Resolve any communication problems with the host and retry the configuration operation.
Timeout errors	Possible causes include that the host crashed during the configuration task, the agent failed to start after being installed, or the agent was unable to initialize itself after starting up. Verify that vCenter Server is able to communicate with the host. If so, see "vSphere HA Agent Is in the Agent Unreachable State," on page 19 or "vSphere HA Agent is in the Uninitialized State," on page 19 for possible solutions.
Lack of file space	Free up approximately 75MB of disk space. If the failure is due to insufficient unreserved memory, free up memory on the host by either relocating virtual machines to another host or reducing their reservations. In either case, retry the vSphere HA configuration task after resolving the problem.
Reboot pending	If an installation for a 5.0 or later host fails because a reboot is pending, reboot the host and retry the vSphere HA configuration task.

vSphere HA Agent is in the Uninitialization Error State

The vSphere HA agent on a host is in the Uninitialization Error state. User intervention is required to resolve this situation.

Problem

vSphere HA reports that an agent is in the Uninitialization Error state when vCenter Server is unable to unconfigure the agent on the host during the Unconfigure HA task. An agent left in this state can interfere with the operation of the cluster. For example, the agent on the host might elect itself as master host and lock a datastore. Locking a datastore prevents the valid cluster master host from managing the virtual machines with configuration files on that datastore.

Cause

This condition usually indicates that vCenter Server lost the connection to the host while the agent was being unconfigured.

Solution

Add the host back to vCenter Server (version 5.0 or later). The host can be added as a stand-alone host or added to any cluster.

vSphere HA Agent is in the Host Failed State

The vSphere HA agent on a host is in the Host Failed state. User intervention is required to resolve the situation.

Problem

Usually, such reports indicate that a host has actually failed, but failure reports can sometimes be incorrect. A failed host reduces the available capacity in the cluster and, in the case of an incorrect report, prevents vSphere HA from protecting the virtual machines running on the host.

Cause

This host state is reported when the vSphere HA master host to which vCenter Server is connected is unable to communicate with the host and with the heartbeat datastores that are in use for the host. Any storage failure that makes the datastores inaccessible to hosts can cause this condition if accompanied by a network failure.

Solution

Check for the noted failure conditions and resolve any that are found.

vSphere HA Agent is in the Network Partitioned State

The vSphere HA agent on a host is in the Network Partitioned state. User intervention might be required to resolve this situation.

Problem

While the virtual machines running on the host continue to be monitored by the master hosts that are responsible for them, vSphere HA's ability to restart the virtual machines after a failure is affected. First, each master host has access to a subset of the hosts, so less failover capacity is available to each host. Second, vSphere HA might be unable to restart a Secondary VM after a failure (see [“Primary VM Remains in the Need Secondary State,”](#) on page 38).

Cause

A host is reported as partitioned if both of the following conditions are met:

- The vSphere HA master host to which vCenter Server is connected is unable to communicate with the host by using the management network, but is able to communicate with that host by using the heartbeat datastores that have been selected for it.
- The host is not isolated.

A network partition can occur for a number of reasons including incorrect VLAN tagging, the failure of a physical NIC or switch, configuring a cluster with some hosts that use only IPv4 and others that use only IPv6, or the management networks for some hosts were moved to a different virtual switch without first putting the host into maintenance mode.

Solution

Resolve the networking problem that prevents the hosts from communicating by using the management networks.

vSphere HA Agent is in the Network Isolated State

The vSphere HA agent on a host is in the Network Isolated state. User intervention is required to resolve this situation.

Problem

When a host is in the Network Isolated state, vSphere HA applies the power-off or shutdown host isolation response to virtual machines running on the host. vSphere HA continues to monitor the virtual machines that are left powered on. While a host is in this state, vSphere HA's ability to restart virtual machines after a failure is affected. vSphere HA only powers off or shuts down a virtual machine if the agent on the host determines that a master host is responsible for the virtual machine.

Cause

A host is network isolated if both of the following conditions are met:

- Isolation addresses have been configured and the host is unable to ping them.
- The vSphere HA agent on the host is unable to access any of the agents running on the other cluster hosts.

Solution

Resolve the networking problem that is preventing the host from pinging its isolation addresses and communicating with other hosts.

Troubleshooting Auto Deploy

The Auto Deploy troubleshooting topics offer solutions for situations when provisioning hosts with Auto Deploy does not work as expected.

Auto Deploy TFTP Timeout Error at Boot Time

A TFTP Timeout error message appears when a host provisioned by Auto Deploy boots. The text of the message depends on the BIOS.

Problem

A TFTP Timeout error message appears when a host provisioned by Auto Deploy boots. The text of the message depends on the BIOS.

Cause

The TFTP server is down or unreachable.

Solution

- ◆ Ensure that your TFTP service is running and reachable by the host that you are trying to boot.

Auto Deploy Host Boots with Wrong Configuration

A host is booting with a different ESXi image, host profile, or folder location than the one specified in the rules.

Problem

A host is booting with a different ESXi image profile or configuration than the image profile or configuration that the rules specify. For example, you change the rules to assign a different image profile, but the host still uses the old image profile.

Cause

After the host has been added to a vCenter Server system, the boot configuration is determined by the vCenter Server system. The vCenter Server system associates an image profile, host profile, or folder location with the host.

Solution

- ◆ Use the `Test-DeployRuleSetCompliance` and `Repair-DeployRuleSetCompliance` PowerCLI cmdlets to reevaluate the rules and to associate the correct image profile, host profile, or folder location with the host.

Host Is Not Redirected to Auto Deploy Server

During boot, a host that you want to provision with Auto Deploy loads gPXE. The host is not redirected to the Auto Deploy server.

Problem

During boot, a host that you want to provision with Auto Deploy loads gPXE. The host is not redirected to the AutoDeploy server.

Cause

The `tramp` file that is included in the TFTP ZIP file has the wrong IP address for the Auto Deploy server.

Solution

- ◆ Correct the IP address of the Auto Deploy server in the `tramp` file, as explained in the *vSphere Installation and Setup* documentation.

Package Warning Message When You Assign an Image Profile to Auto Deploy Host

When you run a PowerCLI cmdlet that assigns an image profile that is not Auto Deploy ready, a warning message appears.

Problem

When you write or modify rules to assign an image profile to one or more hosts, the following error results:

```
Warning: Image Profile <name-here> contains one or more software packages that are not stateless-ready. You may experience problems when using this profile with Auto Deploy.
```

Cause

Each VIB in an image profile has a `stateless-ready` flag that indicates whether the VIB can be used with Auto Deploy. You get the error if you attempt to write an Auto Deploy rule that uses an image profile in which one or more VIBs have that flag set to `FALSE`.

Solution

- 1 Use Image Builder PowerCLI cmdlets to view the VIBs in the image profile.
- 2 Remove any VIBs that are not `stateless-ready`.
- 3 Rerun the Auto Deploy PowerCLI cmdlet.

Auto Deploy Host with a Built-In USB Flash Drive Does Not Send Coredumps to Local Disk

If your Auto Deploy host has a built-in USB flash drive, and an error results in a coredump, the coredump is lost. Set up your system to use ESXi Dump Collector to store coredumps on a networked host.

Problem

If your Auto Deploy host has a built-in USB Flash, and if it encounters an error that results in a coredump, the coredump is not sent to the local disk.

Solution

- 1 Install ESXi Dump collector on a system of your choice.
ESXi Dump Collector is included with the vCenter Server installer.
- 2 Use ESXCLI to configure the host to use ESXi Dump Collector.

```
esxcli conn_options system coredump network set IP-addr,port
esxcli system coredump network set -e true
```
- 3 Use ESXCLI to disable local coredump partitions.

```
esxcli conn_options system coredump partition set -e false
```

vmware-fdm Warning Message When You Assign an Image Profile to Auto Deploy Host

When users run PowerCLI cmdlets that assign an image profile to one or more hosts, an error results if the `vmware-fdm` package is not part of the image profile. This package is required if you use the Auto Deploy host with vSphere HA.

Problem

When users write or modify rules to assign an image profile to one or more Auto Deploy hosts, the following error appears:

```
WARNING: The supplied image profile does not contain the "vmware-fdm" software
package, which is required for the vSphere HA feature. If this image profile
is to be used with hosts in a vSphere HA cluster, you should add the vmware-fdm
package to the image profile. The vmware-fdm package can be retrieved from the
software depot published by this vCenter Server at the following URL:
```

```
http://<VC-Address>/vSphere-HA-depot
```

You can use the `Add-EsxSoftwarePackage` cmdlet to add the package to the image profile and then update any hosts or rules that were using the older version of the profile.

Cause

The image profile does not include the `vmware-fdm` software package, which is required by vSphere HA.

Solution

If you will not use the Auto Deploy hosts in an environment that uses vSphere HA, you can ignore the warning. If you will use the Auto Deploy hosts in an environment that uses vSphere HA, follow the instructions in the warning.

- 1 At the PowerCLI command prompt, add the software depot that includes the `vmware-fdm` package.
`Add-EsxSoftwareDepot http://VC-Address/vSphere-HA-depot`
- 2 (Optional) If the image profile that generated the warning is read-only, clone the image profile.
`New-EsxImageProfile -CloneProfile My_Profile -name "Test Profile Error Free"`
 This example clones the profile named `My_Profile` and assigns it the name `Test Profile Error Free`.
- 3 Run `Add-EsxSoftwarePackage` to add the package to the image profile.
`Add-EsxSoftwarePackage -ImageProfile "Test Profile Error Free" -SoftwarePackage vmware-fdm`

Auto Deploy Host Reboots After Five Minutes

An Auto Deploy host boots and displays gPXE information, but reboots after five minutes.

Problem

A host to be provisioned with Auto Deploy boots from gPXE and displays gPXE information on the console. However, after five minutes, the host displays the following message to the console and reboots.

```
This host is attempting to network-boot using VMware
AutoDeploy. However, there is no ESXi image associated with this host.
Details: No rules containing an Image Profile match this
host. You can create a rule with the New-DeployRule PowerCLI cmdlet
and add it to the rule set with Add-DeployRule or Set-DeployRuleSet.
The rule should have a pattern that matches one or more of the attributes
listed below.
```

The host might also display the following details:

```
Details: This host has been added to VC, but no Image Profile
is associated with it. You can use Apply-ESXImageProfile in the
PowerCLI to associate an Image Profile with this host.
Alternatively, you can reevaluate the rules for this host with the
Test-DeployRuleSetCompliance and Repair-DeployRuleSetCompliance cmdlets.
```

The console then displays the host's machine attributes including vendor, serial number, IP address, and so on.

Cause

No image profile is currently associated with this host.

Solution

You can temporarily assign an image profile to the host by running the `Apply-EsxImageProfile` cmdlet.

You can permanently assign an image profile to the host as follows.

- 1 Run the `New-DeployRule` cmdlet to create a rule that includes a pattern that matches the host with an image profile.
- 2 Run the `Add-DeployRule` cmdlet to add the rule to a ruleset.
- 3 Run the `Test-DeployRuleSetCompliance` cmdlet and use the output of that cmdlet as the input to the `Repair-DeployRuleSetCompliance` cmdlet.

See *vSphere Installation and Setup* documentation for details about vSphere Auto Deploy.

Auto Deploy Host Cannot Contact TFTP Server

The host you provision with Auto Deploy cannot contact the TFTP server.

Problem

When you attempt to boot a host provisioned with Auto Deploy, the host performs a network boot and is assigned a DHCP address by the DHCP server, but the host cannot contact the TFTP server.

Cause

The TFTP server might have stopped running, or a firewall might block the TFTP port.

Solution

- If you installed the WinAgents TFTP server, open the WinAgents TFTP management console and verify that the service is running. If the service is running, check the Windows firewall's inbound rules to make sure the TFTP port is not blocked. Turn off the firewall temporarily to see whether the firewall is the problem.
- For all other TFTP servers, see the server documentation for debugging procedures.

Auto Deploy Host Cannot Retrieve ESXi Image from Auto Deploy Server

The host you provision with Auto Deploy stops at the gPXE boot screen.

Problem

When you attempt to boot a host provisioned with Auto Deploy, the boot process stops at the gPXE boot screen and the status message indicates that the host is attempting to get the ESXi image from the Auto Deploy server.

Cause

The Auto Deploy service might be stopped or the Auto Deploy server might be inaccessible.

Solution

- 1 Log in to the system on which you installed the Auto Deploy server.
- 2 Check that the Auto Deploy server is running.
 - a Click **Start > Settings > Control Panel > Administrative Tools**.
 - b Double-click **Services** to open the Services Management panel.
 - c In the Services field, look for the VMware vSphere Auto Deploy Waiter service and restart it if it is not running.

- 3 Open a Web browser and enter the following URL and check whether the Auto Deploy server is accessible.
https://Auto_Deploy_Server_IP_Address:Auto_Deploy_Server_Port/vmw/rdp

NOTE Use this address only to check whether the server is accessible.

- 4 If the server is not accessible, a firewall problem is likely.
 - a Try setting up permissive TCP Inbound rules for the Auto Deploy server port.
 The port is 6501 unless you specified a different port during installation.
 - b As a last resort, disable the firewall temporarily and enable it again after you verified whether it blocked the traffic. Do not disable the firewall on production environments.

 To disable the firewall, run `netsh firewall set opmode disable`. To enable the firewall, run `netsh firewall set opmode enable`.

Auto Deploy Host Does Not Get a DHCP Assigned Address

The host you provision with Auto Deploy fails to get a DHCP Address.

Problem

When you attempt to boot a host provisioned with Auto Deploy, the host performs a network boot but is not assigned a DHCP address. The Auto Deploy server cannot provision the host with the image profile.

Cause

You might have a problem with the DHCP service or with the firewall setup.

Solution

- 1 Check that the DHCP server service is running on the Windows system on which the DHCP server is set up to provision hosts.
 - a Click **Start > Settings > Control Panel > Administrative Tools**.
 - b Double-click **Services** to open the Services Management panel.
 - c In the Services field, look for the DHCP server service and restart the service if it is not running.
- 2 If the DHCP server is running, recheck the DHCP scope and the DHCP reservations you configured for your target hosts.

If the DHCP scope and reservations are configured correctly, the problem most likely involves the firewall.

- 3 As a temporary workaround, turn off the firewall to see whether that resolves the problem.
 - a Open the command prompt by clicking **Start > Program > Accessories > Command prompt**.
 - b Type the following command to temporarily turn off the firewall. Do not turn off the firewall in a production environment.

`netsh firewall set opmode disable`
 - c Attempt to provision the host with Auto Deploy.
 - d Type the following command to turn the firewall back on.

`netsh firewall set opmode enable`
- 4 Set up rules to allow DHCP network traffic to the target hosts.

 See the firewall documentation for DHCP and for the Windows system on which the DHCP server is running for details.

Auto Deploy Host Does Not Network Boot

The host you provision with Auto Deploy comes up but does not network boot.

Problem

When you attempt to boot a host provisioned with Auto Deploy, the host does not start the network boot process.

Cause

You did not enable your host for network boot.

Solution

- 1 Reboot the host and follow the on-screen instructions to access the BIOS configuration.
If you have an EFI host, you must switch the EFI system to BIOS compatibility mode.
- 2 In the BIOS configuration, enable Network Boot in the Boot Device configuration.

Troubleshooting vCenter Server Plug-Ins

In cases where vCenter Server plug-ins are not working, you have several options to correct the problem.

vCenter Server plug-ins that run on the Tomcat server have `extension.xml` files, which contain the URL where the corresponding Web application can be accessed. These files are located in `C:\Program Files\VMware\Infrastructure\VirtualCenter Server\extensions`. Extension installers populate these XML files using the DNS name for the machine.

Example from the `stats extension.xml` file: `<url>https://SPULOV-XP-VM12.vmware.com:8443/statsreport/vicr.do</url>`.

vCenter Server, plug-in servers, and the vSphere Clients that use them must be located on systems under the same domain. If they are not under the same domain, or if the DNS of the plug-in server is changed, the plug-in clients will not be able to access the URL, and the plug-in will not work.

You can edit the XML files manually by replacing the DNS name with an IP address. Reregister the plug-in after you edit its `extension.xml` file.

Linked Mode Troubleshooting

If you are having trouble with your Linked Mode group, consider the following points.

When you have multiple vCenter Server instances, each instance must have a working relationship with the domain controller and not conflict with another machine that is in the domain. Conflicts can occur, for example, when you clone a vCenter Server instance that is running in a virtual machine and you do not use `sysprep` or a similar utility to ensure that the cloned vCenter Server instance has a globally unique identifier (GUID).

If the domain controller is unreachable, vCenter Server might be unable to start. You might be unable to change the Linked Mode configuration of the affected vCenter Server system. If this occurs, resolve the problem with the domain controller and restart vCenter Server. If resolving the problem with the domain controller is impossible, you can restart vCenter Server by removing the vCenter Server system from the domain and isolating the system from its current Linked Mode group.

The DNS name of the machine must match with the actual machine name. Symptoms of machine names not matching the DNS name are data replication problems, ticket errors when trying to search, and missing search results from remote instances.

NOTE Make sure your Windows and network-based firewalls are configured to allow Linked Mode.

Joining a Linked Mode Group

There is correct order of operations for joining a Linked Mode group.

Procedure

- 1 Verify that the vCenter Server domain name matches the machine name. If they do not match, change one or both to make them match.
- 2 Update the URLs to make them compatible with the new domain name and machine name.

If you do not update the URLs, remote instances of vCenter Server cannot reach the vCenter Server system, because the default URL entries are no longer accurate.

- 3 Join the vCenter Server system to a Linked Mode group.

If a vCenter Server instance is no longer reachable by remote instances of vCenter Server, the following symptoms might occur:

- Clients logging in to other vCenter Server systems in the group cannot view the information that belongs to the vCenter Server system on which you changed the domain name because the users cannot log in to the system.
- Any users that are currently logged in to the vCenter Server system might be disconnected.
- Search queries do not return results from the vCenter Server system.

To resolve these problems, make sure that the `Virtualcenter.VimApiUrl` key points to the location where the vSphere Client and SDK clients can access the vCenter Server system, and the `Virtualcenter.VimWebServicesUrl` key points to the location where vCenter Server Webservices is installed. For the `Virtualcenter.InstanceName` key, change the value so that the modified name appears in the vCenter Server inventory view.

What to do next

If you cannot join a vCenter Server instance, you can resolve the problem with the following actions:

- Ensure that the machine is grouped into the correct organizational unit in the corresponding domain controller.
- When you install vCenter Server, ensure that the logged in user account has administrator privileges on the machine.
- To resolve trust problems between a machine and the domain controller, remove the machine from the domain and then add it to the domain again.
- To ensure that the Windows policy cache is updated, run the `gpupdate /force` command from the Windows command line. This command performs a group policy update.

If the local host cannot reach the remote host during a join operation, verify the following:

- Remote vCenter Server IP address or fully qualified domain name is correct.
- LDAP port on the remote vCenter Server is correct.
- VMwareVCMSDS service is running.

Configure a Windows Firewall to Allow a Specified Program Access

vCenter Server uses Microsoft ADAM/AD LDS to enable Linked Mode, which uses the Windows RPC port mapper to open RPC ports for replication. When you install vCenter Server in Linked Mode, you must modify the firewall configuration on the local machine .

Incorrect configuration of firewalls can cause licenses and roles to become inconsistent between instances.

Prerequisites

- The Windows version must be earlier than Windows Server 2008. For Windows Server 2008, Windows automatically configures the firewall to permit access.
- No network-based firewalls can exist between vCenter Server Linked Mode instances. For environments with network-based firewalls, see “[Configure Firewall Access by Opening Selected Ports](#),” on page 30.

Procedure

- 1 Select **Start > Run**.
- 2 Type `firewall.cpl` and click **OK**.
- 3 Make sure that the firewall is set to allow exceptions.
- 4 Click the **Exceptions** tab.
- 5 Click **Add Program**.
- 6 Add an exception for `C:\Windows\ADAM\dsamain.exe` and click **OK**.
- 7 Click **OK**.

Configure Firewall Access by Opening Selected Ports

vCenter Server uses Microsoft ADAM/AD LDS to enable Linked Mode, which uses the Windows RPC port mapper to open RPC ports for replication. When you install vCenter Server in Linked Mode, the firewall configuration on any network-based firewalls must be modified.

Incorrect configuration of firewalls can cause licenses and roles to become inconsistent between instances.

Procedure

- ◆ Configure Windows RPC ports to generically allow selective ports for machine-to-machine RPC communication.

Choose one of the following methods.

- Change the registry settings. See <http://support.microsoft.com/kb/154596/en-us>.
- Use Microsoft's `RPCCFG.exe` tool. See <http://support.microsoft.com/kb/908472/en-us>.

Configuring Logging for the VMware Inventory Service

Prior to generating a support bundle request, to facilitate better troubleshooting, you should reconfigure the logging level of the VMware Inventory Service to TRACE.

Problem

You might have to change your vCenter Server logging configuration if any of several problems occur when you use the vSphere Client or the vSphere Web Client.

Client	Problem
vSphere Client	<ul style="list-style-type: none"> ■ High latency occurs between issuing a search and obtaining responses from the server. ■ You have multiple vCenter Servers in Linked Mode, and results from some of the servers are not being returned.
vSphere Web Client	<ul style="list-style-type: none"> ■ Loading the inventory tree does not work. ■ Client is unable to log into vCenter Server. ■ Properties or objects in the client appear out of date or missing.

Solution

- 1 Open <Inventory Service install location>\lib\server\config\log4j.properties.
- 2 Change the keys `log4j.logger.com.vmware.vim` and `log4j.appender.LOGFILE.Threshold` to the new log level.

For example, `log4j.logger.com.vmware.vim = TRACE` (or `log4j.appender.LOGFILE.Threshold = TRACE`) sets the Inventory Service logging to trace.

Valid log levels are TRACE, DEBUG, INFO, WARN, ERROR, in increasing order of verbosity.

- 3 Restart the VMware Inventory Service to pick up the new log level.

Authentication Token Manipulation Error

Creating a password that does not meet the authentication requirements of the host causes an error.

Problem

When you create a password on the host, the following error message appears: `A general system error occurred: passwd: Authentication token manipulation error.`

Cause

The host checks for password compliance using the default authentication plug-in, `pam_passwdqc.so`. If the password is not compliant, the error appears.

Solution

When you create a password, include a mix of characters from four character classes: lowercase letters, uppercase letters, numbers, and special characters such as an underscore or dash.

Your user password must meet the following length requirements.

- Passwords containing characters from one or two character classes must be at least eight characters long.
- Passwords containing characters from three character classes must be at least seven characters long.
- Passwords containing characters from all four character classes must be at least six characters long.

NOTE An uppercase character that begins a password does not count toward the number of character classes used. A number that ends a password does not count toward the number of character classes used.

You can also use a passphrase, which is a phrase consisting of at least three words, each of which is 8 to 40 characters long.

For more information, see the *vSphere Security* documentation.

Active Directory Rule Set Error Causes Host Profile Compliance Failure

Applying a host profile that specifies an Active Directory domain to join causes a compliance failure.

Problem

When you apply a host profile that specifies an Active Directory domain to join, but you do not enable the **activeDirectoryAll** rule set in the firewall configuration, a compliance failure occurs. The vSphere Client displays the error message `Failures against the host profile: Ruleset activedirectoryAll does not match the specification.` The compliance failure also occurs when you apply a host profile to leave an Active Directory domain, but you do not disable the **activeDirectoryAll** rule set in the host profile.

Cause

Active Directory requires the **activeDirectoryAll** firewall rule set. You must enable the rule set in the firewall configuration. If you omit this setting, the system adds the necessary firewall rules when the host joins the domain, but the host will be non-compliant because of the mismatch in firewall rules. The host will also be non-compliant if you remove it from the domain without disabling the Active Directory rule set.

Solution

- 1 In the vSphere Client inventory, right-click the host profile and select **Edit Profile**.
- 2 Expand the host profile in the left pane and select **Firewall Configuration > Ruleset Configuration > activeDirectoryAll**.
- 3 In the right panel, click **Edit**.
- 4 Select the **Flag indicating whether ruleset should be enabled** check box.
Deselect the check box if the host is leaving the domain.
- 5 Click **OK**.

Troubleshooting Clusters

The cluster troubleshooting topics provide solutions to potential problems that you might encounter when using your hosts and datastores in vSphere DRS, vSphere HA, or vSphere Storage DRS clusters.

You might get an error message when you try to use vSphere HA or vSphere FT. For information about these error messages, see the VMware knowledge base article at <http://kb.vmware.com/kb/1033634>.

This chapter includes the following topics:

- [“Troubleshooting vSphere HA Admission Control,”](#) on page 33
- [“Troubleshooting Heartbeat Datastores,”](#) on page 35
- [“Troubleshooting vSphere HA Failovers,”](#) on page 36
- [“Troubleshooting vSphere Fault Tolerance in Network Partitions,”](#) on page 38
- [“Troubleshooting Storage I/O Control,”](#) on page 39
- [“Troubleshooting Storage DRS,”](#) on page 41
- [“Cannot Create Resource Pool When Connected Directly to Host,”](#) on page 46

Troubleshooting vSphere HA Admission Control

vCenter Server uses admission control to ensure that sufficient resources in a vSphere HA cluster are reserved for virtual machine recovery in the event of host failure. If vSphere HA admission control does not function properly, there is no assurance that all virtual machines in the cluster can be restarted after a host failure.

Red Cluster Due to Insufficient Failover Resources

When you use the Host Failures Cluster Tolerates admission control policy, vSphere HA clusters might become invalid (red) due to insufficient failover resources.

Problem

If you select the Host Failures Cluster Tolerates admission control policy and certain problems arise, the cluster turns red.

Cause

This problem can arise when hosts in the cluster are disconnected, in maintenance mode, not responding, or have a vSphere HA error. Disconnected and maintenance mode hosts are typically caused by user action. Unresponsive or error-possessing hosts usually result from a more serious problem, for example, hosts or agents have failed or a networking problem exists.

Another possible cause of this problem is if your cluster contains any virtual machines that have much larger memory or CPU reservations than the others. The Host Failures Cluster Tolerates admission control policy is based on the calculation on a slot size consisting of two components, the CPU and memory reservations of a virtual machine. If the calculation of this slot size is skewed by outlier virtual machines, the admission control policy can become too restrictive and result in a red cluster.

Solution

Check that all hosts in the cluster are healthy, that is, connected, not in maintenance mode and free of vSphere HA errors. vSphere HA admission control only considers resources from healthy hosts.

Unable to Power On Virtual Machine Due to Insufficient Failover Resources

You might get a not enough failover resources fault when trying to power on a virtual machine in a vSphere HA cluster.

Problem

If you select the Host Failures Cluster Tolerates admission control policy and certain problems arise, you might be prevented from powering on a virtual machine due to insufficient resources.

Cause

This problem can have several causes.

- Hosts in the cluster are disconnected, in maintenance mode, not responding, or have a vSphere HA error.
Disconnected and maintenance mode hosts are typically caused by user action. Unresponsive or error-possessing hosts usually result from a more serious problem, for example, hosts or agents have failed or a networking problem exists).
- Cluster contains virtual machines that have much larger memory or CPU reservations than the others.
The Host Failures Cluster Tolerates admission control policy is based on the calculation on a slot size comprised of two components, the CPU and memory reservations of a virtual machine. If the calculation of this slot size is skewed by outlier virtual machines, the admission control policy can become too restrictive and result in the inability to power on virtual machines.
- No free slots in the cluster.
Problems occur if there are no free slots in the cluster or if powering on a virtual machine causes the slot size to increase because it has a larger reservation than existing virtual machines. In either case, you should use the vSphere HA advanced options to reduce the slot size, use a different admission control policy, or modify the policy to tolerate fewer host failures.

Solution

Click on the **Advanced Runtime Info** link that appears in the vSphere HA section of the cluster's **Summary** tab in the vSphere Client. This information box shows the slot size and how many available slots there are in the cluster. If the slot size appears too high, click on the **Resource Allocation** tab of the cluster and sort the virtual machines by reservation to determine which have the largest CPU and memory reservations. If there are outlier virtual machines with much higher reservations than the others, consider using a different vSphere HA admission control policy (such as the Percentage of Cluster Resources Reserved admission control policy) or use the vSphere HA advanced options to place an absolute cap on the slot size. Both of these options, however, increase the risk of resource fragmentation.

Fewer Available Slots Shown Than Expected

The Advanced Runtime Info box might display a smaller number of available slots in the cluster than you expect.

Problem

When you select the Host Failures Cluster Tolerates admission control policy, the **Advanced Runtime Info** link appears in the vSphere HA section of the cluster's **Summary** tab in the vSphere Client. Clicking this link displays information about the cluster, including the number of slots available to power on additional virtual machines in the cluster. This number might be smaller than expected under certain conditions.

Cause

Slot size is calculated using the largest reservations plus the memory overhead of any powered on virtual machines in the cluster. However, vSphere HA admission control considers only the resources on a host that are available for virtual machines. This amount is less than the total amount of physical resources on the host, because there is some overhead.

Solution

Reduce the virtual machine reservations if possible, use vSphere HA advanced options to reduce the slot size, or use a different admission control policy.

Troubleshooting Heartbeat Datastores

When the master host in a vSphere HA cluster can no longer communicate with a slave host over the management network, the master host uses datastore heartbeating to determine if the slave host might have failed or is in a network partition. If the slave host has stopped datastore heartbeating, that host is considered to have failed and its virtual machines are restarted elsewhere.

vCenter Server automatically selects a preferred set of datastores for heartbeating. This selection is made with the goal of maximizing the number of hosts that have access to a given datastore and minimizing the likelihood that the selected datastores are backed by the same storage array or NFS server. In most cases, this selection should not be changed. However, if you must replace a selected datastore, you can go to the Cluster Settings dialog box of the vSphere Client and select the Datastore Heartbeating page to specify alternative datastores. Only datastores mounted by at least two hosts are available here. You can also see which datastores vSphere HA has selected for use by viewing the **Heartbeat Datastores** tab of the HA Cluster Status dialog box.

User-Preferred Datastore is Not Chosen

vCenter Server might not choose a datastore that you specify as a preference for vSphere HA storage heartbeating.

Problem

You can specify the datastores preferred for storage heartbeating, and based on this preference, vCenter Server determines the final set of datastores to use. However, vCenter Server might not choose the datastores that you specify.

Cause

This problem can occur in the following cases:

- The specified number of datastores is more than is required. vCenter Server chooses the optimal number of required datastores out of the stated user preference and ignores the rest.

- A specified datastore is not optimal for host accessibility and storage backing redundancy. More specifically, the datastore might not be chosen if it is accessible to only a small set of hosts in the cluster. A datastore also might not be chosen if it is on the same LUN or the same NFS server as datastores that vCenter Server has already chosen.
- A specified datastore is inaccessible because of storage failures, for example, storage array all paths down or permanent device loss.
- If the cluster contains a network partition, or if a host is unreachable or isolated, the host continues to use the existing heartbeat datastores even if the user preferences change.

Solution

Verify that all the hosts in the cluster are reachable and have the vSphere HA agent running. Also, ensure that the specified datastores are accessible to most, if not all, hosts in the cluster and that the datastores are on different LUNs or NFS servers.

Unmounting or Removing Datastore Fails

When you try to unmount or remove a datastore, the operation fails.

Problem

The operation to unmount or remove a datastore fails if the datastore has any opened files. For these user operations, the vSphere HA agent closes all of the files that it has opened, for example, heartbeat files. If the agent is not reachable by vCenter Server or the agent cannot flush out pending I/Os to close the files, a The HA agent on host '{hostName}' failed to quiesce file activity on datastore '{dsName}' fault is triggered.

Cause

If the datastore to be unmounted or removed is used for heartbeating, vCenter Server excludes it from heartbeating and chooses a new one. However, the agent does not receive the updated heartbeat datastores if it is not reachable, that is, if the host is isolated or in a network partition. In such cases, heartbeat files are not closed and the user operation fails. The operation can also fail if the datastore is not accessible because of storage failures such as all paths down.

NOTE When you remove a VMFS datastore, the datastore is removed from all the hosts in inventory. So if there are any hosts in a vSphere HA cluster that are unreachable or that cannot access the datastore, the operation fails.

Solution

Ensure that the datastore is accessible and the affected hosts are reachable.

Troubleshooting vSphere HA Failovers

vSphere HA provides high availability for virtual machines by pooling them and the hosts that they reside on into a cluster. Hosts in the cluster are monitored and in the event of a failure, the virtual machines on a failed host are restarted on alternate hosts.

Incorrect Virtual Machine Protection State

A virtual machine in a vSphere HA cluster is reported as vSphere HA unprotected although it has been powered on for several minutes.

Problem

When a virtual machine is powered on for several minutes, yet its vSphere HA protection state remains as unprotected, if a failure occurs, vSphere HA might not attempt to restart the virtual machine.

Cause

vCenter Server reports a virtual machine as protected after the vSphere HA master host that is responsible for the virtual machine has saved to disk the information that the virtual machine must be restarted after a failure. This process can fail for a number of reasons.

- vSphere HA master host has not been elected or vCenter Server is unable to communicate with it.

In this situation, vCenter Server reports the vSphere HA host state for the cluster hosts as Agent Unreachable or Agent Uninitialized and reports a cluster configuration problem that a master host has not been found.

- Multiple master hosts exist and the one with which vCenter Server is communicating is not responsible for the virtual machine.

Problems occur when vCenter Server is in contact with a master host, but due to a management network partition, there are multiple master hosts, and the agent with which vCenter Server is communicating is not responsible for the virtual machine. This situation is likely if vCenter Server is reporting the vSphere HA state of some hosts as network partitioned.

- Agent is unable to access the datastore on which the configuration file of the virtual machine is stored.

vCenter Server might be in contact with the vSphere HA master host that owns the virtual machine, but the agent is unable to access the datastore on which the configuration file of the virtual machine is stored. This situation can occur if an all paths down condition affects all hosts in the cluster.

Solution

- 1 Determine whether vCenter Server is in contact with a vSphere HA master host, and if not, address this problem.
- 2 If vCenter Server is in contact with a master host, determine whether there is a network partition, and if so, address that problem.
- 3 If the problem persists, determine if other virtual machines that use the same datastore for their configuration files are also unprotected.
- 4 If these virtual machines are unprotected, verify that the vSphere HA master host can access the datastore.
- 5 If none of the previous steps resolves the problem, restore protection by reconfiguring vSphere HA on the host on which the virtual machine is running.

Virtual Machine Restart Fails

After a host or virtual machine failure, a virtual machine might not be restarted.

Problem

When a host fails or a virtual machine fails while its host continues running, the virtual machine might not restart or restarts only after a long delay.

Cause

vSphere HA might not restart a virtual machine after a failure or might delay its restart for several reasons.

- Virtual machine is not protected by vSphere HA at the time the failure occurred
- Insufficient spare capacity on hosts with which the virtual machine is compatible
- vSphere HA attempted to restart the virtual machine but encountered a fatal error each time it tried.
- Restart actually succeeded.

Solution

To avoid virtual machine restart failures, check that virtual machines become protected by vSphere HA after they are powered on. Also, ensure that your admission control settings match your restart expectations if a failure occurs. Maximizing the compatibility between virtual machines and hosts in the cluster can also reduce the likelihood of restart failures.

Troubleshooting vSphere Fault Tolerance in Network Partitions

When a vSphere HA cluster experiences a failure of the network that vSphere uses for inter-agent communication (the management network), a subset of the cluster's hosts might be unable to communicate with other cluster hosts. In this case, the set of hosts that can communicate with each other are considered to be in a network partition.

A cluster partition impedes cluster management functions such as vMotion and can impact vSphere HA's ability to monitor and restart virtual machines after a failure. This condition must be corrected as soon as possible.

Network partitions also degrade the functionality of vSphere Fault Tolerance. For example, in a partitioned cluster, a Primary VM (or its Secondary VM) could end up in a partition managed by a master host that is not responsible for the virtual machine. When a Secondary VM must be restarted, vSphere HA does so only if the Primary VM is in a partition managed by the master host responsible for it. Ultimately, you must correct the network partition, but until that is possible, you must troubleshoot and correct any problems that arise with your fault-tolerant virtual machines to ensure that they are properly protected.

Primary VM Remains in the Need Secondary State

A fault tolerant Primary VM can remain in the need secondary state even though sufficient resources are available to start the Secondary VM.

Problem

vSphere HA might not restart the Secondary VM of a vSphere Fault Tolerance (FT) virtual machine pair even though there are sufficient resources available.

Cause

To restart a Secondary VM, vSphere HA requires that the Primary VM be running on a host that is in the same partition as the one containing the vSphere HA master host responsible for the FT pair. In addition, the vSphere HA agent on the Primary VM's host must be operating correctly. If these conditions are met, FT also requires that there be at least one other host in the same partition that is compatible with the FT pair and that has a functioning vSphere HA agent.

Solution

To fix this condition, check the vSphere HA host states reported by vCenter Server. If hosts are identified as partitioned, isolated, or unreachable, resolve the problem before proceeding. In some situations, you can resolve a restart problem by reconfiguring vSphere HA on the host that vCenter Server is reporting as the master host. However, in most situations, this step is insufficient, and you must resolve all host state problems.

After you have addressed any host state problems, check if there are any hosts in the cluster other than the Primary VM's that are compatible with the FT virtual machine pair. You can determine compatibility by trying to migrate the Primary VM to other hosts. Address any incompatibilities that are discovered.

Role Switch Behavior Problems

vCenter Server can report that the Primary VM of a vSphere Fault Tolerance virtual machine pair is powered off, but the Secondary VM is powered on.

Problem

After a failover occurs, vCenter Server might incorrectly report that the Primary VM is powered off and registered to its original host, and that the Secondary VM is powered on and registered to its original host.

Cause

This error occurs when vCenter Server is unable to communicate with the hosts on which the Primary VM and Secondary VM are actually running. vCenter Server reports these hosts as not responding and the problem persists until vCenter Server is able to communicate with the hosts.

Solution

To fix this problem, resolve the networking problem that is preventing vCenter Server from communicating with the hosts in the cluster.

Troubleshooting Storage I/O Control

The Storage I/O Control troubleshooting topics provide solutions to potential problems that you might encounter when using Storage I/O Control with datastores.

Unsupported Host Connected to Datastore

In the vSphere Client, an alarm is triggered when vCenter Server detects that a workload from a host might be affecting performance.

Problem

The alarm **Pre-4.1 host connected to SIOC-enabled datastore** is triggered.

Cause

The datastore is Storage I/O Control-enabled, but it cannot be fully controlled by Storage I/O Control because of the external workload.

This condition can occur if the Storage I/O Control-enabled datastore is connected to a host that does not support Storage I/O Control.

Solution

Ensure that all hosts that are connected to the datastore support Storage I/O Control.

Unmanaged Workload Detected on Datastore

In the vSphere Client, an alarm is triggered when vCenter Server detects that a workload from a host might be affecting performance.

Problem

The alarm **Unmanaged workload is detected on the datastore** is triggered.

Cause

The array is shared with non-vSphere workloads, or the array is performing system tasks such as replication.

Solution

There is no solution. vCenter Server does not reduce the total amount of I/O sent to the array, but continues to enforce shares.

Unable to View Performance Charts for Datastore

Performance charts for a datastore do not appear on the Performance tab.

Problem

You are unable to view performance charts for a datastore on the **Performance** tab in the vSphere Client.

Cause

Storage I/O Control is disabled for the datastore.

Solution

- 1 In the vSphere Client inventory, select a datastore and click the **Configuration** tab.
- 2 Click **Properties**.
- 3 Under Storage I/O Control, select the **Enabled** check box.
- 4 Click **Close**.

On the **Datastore** tab, the Storage I/O Control column shows that Storage I/O Control is enabled for the datastore.

Cannot Enable Storage I/O Control on Datastore

Storage I/O Control is disabled on a datastore and cannot be enabled.

Problem

You cannot enable Storage I/O Control on a datastore.

Cause

The following reasons might prevent you from enabling Storage I/O Control on a datastore.

- At least one host that is connected to the datastore is not running ESX/ESXi 4.1 or later.
- You do not have the appropriate license to enable Storage I/O Control.

Solution

- Verify that the hosts connected to the datastore are ESX/ESXi 4.1 or later.
- Verify that you have the appropriate license to enable Storage I/O Control.

Troubleshooting Storage DRS

The Storage DRS troubleshooting topics provide solutions to potential problems that you might encounter when using Storage DRS-enabled datastores in a datastore cluster.

Storage DRS is Disabled on a Virtual Disk

Even when Storage DRS is enabled for a datastore cluster, it might be disabled on some virtual disks in the datastore cluster.

Problem

You have enabled Storage DRS for a datastore cluster, but Storage DRS is disabled on one or more virtual machine disks in the datastore cluster.

Cause

The following scenarios can cause Storage DRS to be disabled on a virtual disk.

- A virtual machine's swap file is host-local (the swap file is stored in a specified datastore that is on the host). The swap file cannot be relocated and Storage DRS is disabled for the swap file disk.
- A certain location is specified for a virtual machine's .vmsx swap file. The swap file cannot be relocated and Storage DRS is disabled on the .vmsx swap file disk.
- The relocate or Storage vMotion operation is currently disabled for the virtual machine in vCenter Server (for example, because other vCenter Server operations are in progress on the virtual machine). Storage DRS is disabled until the relocate or Storage vMotion operation is re-enabled in vCenter Server.
- The home disk of a virtual machine is protected by vSphere HA and relocating it will cause loss of vSphere HA protection.
- The disk is a CD-ROM/ISO file.
- If the disk is an independent disk, Storage DRS is disabled, except in the case of relocation or clone placement.
- If the virtual machine has system files on a separate datastore from the home datastore (legacy), Storage DRS is disabled on the home disk. If you use Storage vMotion to manually migrate the home disk, the system files on different datastores will be all be located on the target datastore and Storage DRS will be enabled on the home disk.
- If the virtual machine has a disk whose base/redo files are spread across separate datastores (legacy), Storage DRS for the disk is disabled. If you use Storage vMotion to manually migrate the disk, the files on different datastores will be all be located on the target datastore and Storage DRS will be enabled on the disk.
- The virtual machine has hidden disks (such as disks in previous snapshots, not in the current snapshot). This situation causes Storage DRS to be disabled on the virtual machine.
- The virtual machine is a template.
- The virtual machine is vSphere Fault Tolerance-enabled.
- The virtual machine is sharing files between its disks.
- The virtual machine is being Storage DRS-placed with manually specified datastores.

Solution

Address the problem that is causing Storage DRS to be disabled on the disk.

Datstore Cannot Enter Maintenance Mode

You place a datastore in maintenance mode when you must take it out of usage to service it. A datastore enters or leaves maintenance mode only as a result of a user request.

Problem

A datastore in a datastore cluster cannot enter maintenance mode. The Entering Maintenance Mode status remains at 1%.

Cause

One or more disks on the datastore cannot be migrated with Storage vMotion. This condition can occur in the following instances.

- Storage DRS is disabled on the disk.
- Storage DRS rules prevent Storage DRS from making migration recommendations for the disk.

Solution

- If Storage DRS is disabled, enable it or determine why it is disabled. See [“Storage DRS is Disabled on a Virtual Disk,”](#) on page 41 for reasons why Storage DRS might be disabled.
- If Storage DRS rules are preventing Storage DRS from making migration recommendations, you can remove or disable particular rules.
 - a In the vSphere Client inventory, right-click the datastore cluster and select **Edit Settings**.
 - b Select **Rules** and click the rule.
 - c Click **Remove**.
 - d Click **OK**.
- Alternatively, if Storage DRS rules are preventing Storage DRS from making migration recommendations, you can set the Storage DRS advanced option IgnoreAffinityRulesForMaintenance to 1.
 - a In the vSphere Client inventory, right-click the datastore cluster and select **Edit Settings**.
 - b Select **SDRS Automation** and click **Advanced Options**.
 - c Enter **1** in the Value column for IgnoreAffinityRulesForMaintenance.
 - d Click **OK**.

Storage DRS Cannot Operate on a Datastore

Storage DRS generates an alarm to indicate that it cannot operate on the datastore.

Problem

Storage DRS generates an event and an alarm and Storage DRS cannot operate.

Cause

The following scenarios can cause vCenter Server to disable Storage DRS for a datastore.

- The datastore is shared across multiple datacenters.

Storage DRS is not supported on datastores that are shared across multiple datacenters. This configuration can occur when a host in one datacenter mounts a datastore in another datacenter, or when a host using the datastore is moved to a different datacenter. When a datastore is shared across multiple datacenters, Storage DRS I/O load balancing is disabled for the entire datastore cluster. However, Storage DRS space balancing remains active for all datastores in the datastore cluster that are not shared across datacenters.

- The datastore is connected to an unsupported host.
Storage DRS is not supported on ESX/ESXi 4.1 and earlier hosts.
- The datastore is connected to a host that is not running Storage I/O Control.

Solution

- The datastore must be visible in only one datacenter. Move the hosts to the same datacenter or unmount the datastore from hosts that reside in other datacenters.
- Ensure that all hosts associated with the datastore cluster are ESXi 5.0 or later.
- Ensure that all hosts associated with the datastore cluster have Storage I/O Control enabled.

Moving Multiple Virtual Machines into a Datastore Cluster Fails

Migrating more than one datastore into a datastore cluster fails with an error message after the first virtual machine has successfully moved into the datastore cluster.

Problem

When you attempt to migrate multiple virtual machines into a datastore cluster, some virtual machines migrate successfully, but migration of subsequent virtual machines fails. vCenter Server displays the error message, *Insufficient Disk Space on Datastore*.

Cause

Until each placement recommendation is applied, the space resources appear to be available to Storage DRS. Therefore, Storage DRS might reallocate space resources to subsequent requests for space.

Solution

Retry the failed migration operations one at a time and ensure that each recommendation is applied before requesting the next migration

Storage DRS Generates Fault During Virtual Machine Creation

When you create or clone a virtual machine on a datastore cluster, Storage DRS might generate a fault.

Problem

When you attempt to create or clone a virtual machine on a datastore cluster, you might receive the error message, *Operation Not Allowed in the Current State*.

Cause

Storage DRS checks for rule violations when you create a virtual machine on a Storage DRS-enabled datastore. If Storage DRS cannot create the new virtual machine's disks in compliance with the rules, it generates a fault. The fault is generated because Storage DRS cannot reference the virtual machine, which is in the process of being created and does not yet exist.

Solution

Revise or remove the rules and retry the create or clone virtual machine operation.

Storage DRS is Enabled on a Virtual Machine Deployed from an OVF Template

Storage DRS is enabled on a virtual machine that was deployed from an OVF template that has Storage DRS disabled. This can occur when you deploy an OVF template on a datastore cluster.

Problem

When you deploy an OVF template with Storage DRS disabled on a datastore cluster, the resulting virtual machine has Storage DRS enabled.

Cause

The vSphere Client applies the default automation level of the datastore cluster to virtual machines deployed from an OVF template.

Solution

- 1 To manually change the automation level of the virtual machine, right-click the datastore cluster and select **Edit Settings**.
- 2 Select **Virtual Machine Settings**.
- 3 Deselect the **Keep VMDKs together** check box for the virtual machine.
- 4 Click **OK**.

Storage DRS Rule Violation Fault Is Displayed Multiple Times

When you attempt to put a datastore into maintenance mode, the same affinity or anti-affinity rule violation fault might appear to be listed more than once in the Faults dialog box.

Problem

The Faults dialog box appears to display multiple instances of identical faults, but in fact, each fault refers to a different datastore. The Faults dialog box does not list the names of the datastores, which causes the faults to appear to be redundant.

Solution

The Faults dialog box always displays a separate rule violation fault for each datastore that is considered for placement. If you want the datastore to enter maintenance mode, remove the rule that prevents the virtual machine from being migrated.

Storage DRS Rules Not Deleted from Datastore Cluster

Affinity or anti-affinity rules that apply to a virtual machine are not deleted when you remove the virtual machine from a datastore cluster.

Problem

When you remove a virtual machine from a datastore cluster, and that virtual machine is subject to an affinity or anti-affinity rule in a datastore cluster, the rule remains. This allows you to store virtual machine configurations in different datastore clusters. If the virtual machine is moved back into the datastore cluster, the rule is applied. You cannot delete the rule after you remove the virtual machine from the datastore cluster.

Cause

vCenter Server retains rules for a virtual machine that is removed from a datastore cluster if the virtual machine remains in the vCenter Server inventory.

Solution

To remove a rule from a datastore cluster configuration, you must delete the rule before you remove the virtual machine to which the rule applies from the datastore cluster.

- 1 In the vSphere Client, right-click the datastore cluster and select **Edit Settings**.
- 2 In the left pane, select **Rules**.
- 3 Select the rule to delete and click **Remove**.
- 4 Click **OK**.

Alternative Storage DRS Placement Recommendations Are Not Generated

When you create, clone, or relocate a virtual machine, Storage DRS generates only one placement recommendation.

Problem

Storage DRS generates a single placement recommendation when you create, clone, or relocate a virtual machine. No alternative recommendations are provided when multiple alternative recommendations are expected.

Cause

If the destination host explicitly specifies the virtual machine's swap file location as a datastore in the target datastore cluster, the disks to be placed in that cluster do not form a single affinity group. Storage DRS generates alternative placement recommendations only for a single item or a single affinity group.

Solution

Accept the single recommendation. To obtain multiple recommendations, choose a destination host that does not specify that the virtual machine swap file location is on a datastore that is in the target datastore cluster.

Applying Storage DRS Recommendations Fails

Storage DRS generates space or I/O load balancing recommendations, but attempts to apply the recommendations fail.

Problem

When you apply Storage DRS recommendations for space or I/O load balancing, the operation fails.

Cause

The following scenarios can prevent you from applying Storage DRS recommendations.

- A Thin Provisioning Threshold Crossed alarm might have been triggered for the target datastore, which indicates that the datastore is running out of space and no virtual machines will be migrated to it.
- The target datastore might be in maintenance mode or is entering maintenance mode.

Solution

- Address the issue that triggered the Thin Provisioning Threshold Crossed alarm.
- Verify that the target datastore is not in maintenance mode or entering maintenance mode.

Cannot Create Resource Pool When Connected Directly to Host

If vCenter Server is unavailable, and a host is being managed by vCenter Server, you might need to connect directly to the host with the vSphere Client to create a resource pool or make changes to the hierarchy.

Problem

You cannot create a resource pool or make changes to the hierarchy when you connect directly to a managed host with the vSphere Client.

Solution

- 1 Disassociate the host from vCenter Server.
 - a In the vSphere Client connected directly to the host, click the **Summary** tab.
 - b Under Host Management, click **Disassociate host from vCenter Server**.
 - c Click **OK**.
- 2 Make changes to the resource pool hierarchy and/or create a resource pool.

Your changes will be overwritten when you reconnect the host to vCenter Server. This is the desired behavior in most cases. Manual changes to resource pool configuration are usually required only when vCenter Server is unavailable.
- 3 If it is necessary to override the vCenter Server resource pool configuration with your changes, remove from and re-add the host to the vCenter Server inventory before you reconnect to vCenter Server.
 - a Using the vSphere Client, log into the vCenter Server system that manages the host.
 - b Right-click the host in the inventory and select **Remove**.
 - c Click **OK**.

The host is removed.
 - d Re-add the host to the vCenter Server inventory.

When you re-add the host to the vCenter Server inventory, your changes to the resource pool hierarchy and new resource pools will appear in the vSphere Client.
 - e In the vSphere Client connected to the vCenter Server system, select **File > New > Add Host**.
 - f Complete the Add Host wizard.
 - g Verify that any new resource pools or changes to the hierarchy appear in the vSphere Client inventory.

Troubleshooting Storage

The storage troubleshooting topics provide solutions to potential problems that you might encounter when using your hosts in the SAN environment. For information about setting up the SAN storage and working with datastores, see the *vSphere Storage* documentation.

This chapter includes the following topics:

- [“Resolving SAN Storage Display Problems,”](#) on page 47
- [“Resolving SAN Performance Problems,”](#) on page 49
- [“Virtual Machines with RDMS Need to Ignore SCSI INQUIRY Cache,”](#) on page 52
- [“Software iSCSI Adapter Is Enabled When Not Needed,”](#) on page 53
- [“Failure to Mount NFS Datastores,”](#) on page 53

Resolving SAN Storage Display Problems

When you use the vSphere Client to view storage devices available to your host, the output might differ from what you expect to see. A number of troubleshooting tasks exist that you can perform to resolve storage display problems.

Resolving Fibre Channel Storage Display Problems

If Fibre Channel storage devices do not display correctly in the vSphere Client, perform troubleshooting tasks.

Table 4-1. Troubleshooting Fibre Channel LUN Display

Troubleshooting Task	Description
Check cable connectivity.	If you do not see a port, the problem could be cable connectivity. Check the cables first. Ensure that cables are connected to the ports and a link light indicates that the connection is good. If each end of the cable does not show a good link light, replace the cable.
Check zoning.	Zoning limits access to specific storage devices, increases security, and decreases traffic over the network. Some storage vendors allow only single-initiator zones. In that case, an HBA can be in multiple zones to only one target. Other vendors allow multiple-initiator zones. See your storage vendor’s documentation for zoning requirements. Use the SAN switch software to configure and manage zoning.

Table 4-1. Troubleshooting Fibre Channel LUN Display (Continued)

Troubleshooting Task	Description
Check access control configuration.	<ul style="list-style-type: none"> ■ The MASK_PATH plug-in allows you to prevent your host from accessing a specific storage array or specific LUNs on a storage array. If your host is detecting devices and paths that you do not want the host to access, path masking could have been set up incorrectly. ■ For booting from a SAN, ensure that each host sees only required LUNs. Do not allow any host to see any boot LUN other than its own. Use storage system software to make sure that the host can see only the LUNs that it is supposed to see. ■ Ensure that the Disk.MaxLUN parameter allows you to view the LUN you expect to see. For information on the parameter, see the <i>vSphere Storage</i> documentation.
Check storage processor setup.	If a disk array has more than one storage processor (SP), make sure that the SAN switch has a connection to the SP that owns the LUNs you want to access. On some disk arrays, only one SP is active and the other SP is passive until there is a failure. If you are connected to the wrong SP (the one with the passive path), you might see the LUNs but get errors when trying to access them.
Rescan your HBA.	<p>Perform a rescan each time you complete the following tasks:</p> <ul style="list-style-type: none"> ■ Create new LUNs on a SAN. ■ Change the path masking configuration on the host. ■ Reconnect a cable. ■ Make a change to a host in a cluster. <p>For information, see the <i>vSphere Storage</i> documentation.</p>

Resolving iSCSI Storage Display Problems

Perform troubleshooting tasks if iSCSI storage devices do not display correctly in the vSphere Client.

Table 4-2. Troubleshooting iSCSI LUN Display

Troubleshooting Task	Description
Check cable connectivity.	If you do not see a port, the problem could be cable connectivity or routing. Check the cables first. Ensure that cables are connected to the ports and a link light indicates that the connection is good. If each end of the cable does not show a good link light, replace the cable.
Check routing settings.	Controls connectivity between different subnets on your Ethernet configuration. If your ESXi system and iSCSI storage are not on the same subnet, ensure that appropriate routing exists between the subnets. Also, ensure that the subnet mask and gateway address are set correctly on the iSCSI storage and the iSCSI initiator in the ESXi host.
Check access control configuration.	<p>If the expected LUNs do not appear after rescan, access control might not be configured correctly on the storage system side:</p> <ul style="list-style-type: none"> ■ If CHAP is configured, ensure that it is enabled on the ESXi host and matches the storage system setup. ■ If IP-based filtering is used, ensure that the iSCSI HBA or the VMkernel port group IP address is allowed. ■ If you are using initiator name-based filtering, ensure that the name is a qualified iSCSI name and matches the storage system setup. ■ For booting from a SAN, ensure that each host sees only required LUNs. Do not allow any host to see any boot LUN other than its own. Use storage system software to make sure that the host can see only the LUNs that it is supposed to see. ■ Ensure that the Disk.MaxLUN setting allows you to view the LUN you expect to see. For information, see the <i>vSphere Storage</i> documentation.
Check storage processor setup.	If a storage system has more than one storage processor, make sure that the SAN switch has a connection to the SP that owns the LUNs you want to access. On some storage systems, only one SP is active and the other SP is passive until a failure occurs. If you are connected to the wrong SP (the one with the passive path) you might not see the expected LUNs, or you might see the LUNs but get errors when trying to access them.

Table 4-2. Troubleshooting iSCSI LUN Display (Continued)

Troubleshooting Task	Description
For software and dependent hardware iSCSI, check network configuration.	The software iSCSI and dependent hardware adapters in ESXi require that VMkernel network port have access to the iSCSI storage. The adapters use the VMkernel for data transfer between the ESXi system and the iSCSI storage.
Rescan your iSCSI initiator.	Perform a rescan each time you complete the following tasks: <ul style="list-style-type: none"> ■ Create new LUNs on a SAN. ■ Change the LUN masking. ■ Reconnect a cable. ■ Make a change to a host in a cluster. ■ Change CHAP settings or add new discovery addresses. For information, see the <i>vSphere Storage</i> documentation.

Resolving SAN Performance Problems

A number of factors can negatively affect storage performance in the ESXi SAN environment. Among these factors are excessive SCSI reservations, path thrashing, and inadequate LUN queue depth.

Excessive SCSI Reservations Cause Slow Host Performance

Operations that require getting a file lock or a metadata lock in VMFS result in short-lived SCSI reservations. SCSI reservations lock an entire LUN. Excessive SCSI reservations by a host can cause performance degradation on other servers accessing the same VMFS.

Problem

Excessive SCSI reservations cause performance degradation and SCSI reservation conflicts.

Cause

Several operations require VMFS to use SCSI reservations.

- Creating, resignaturing, or expanding a VMFS datastore
- Powering on a virtual machine
- Creating or deleting a file
- Creating a template
- Deploying a virtual machine from a template
- Creating a new virtual machine
- Migrating a virtual machine with VMotion
- Growing a file, such as a thin provisioned virtual disk

NOTE ESXi hosts use the SCSI reservations mechanism only when storage devices do not support the hardware acceleration. For storage devices that support the hardware acceleration, the hosts use the atomic test and set (ATS) algorithm to lock the LUN. For more information on hardware acceleration, see the *vSphere Storage* documentation.

Solution

To eliminate potential sources of SCSI reservation conflicts, follow these guidelines:

- Serialize the operations of the shared LUNs, if possible, limit the number of operations on different hosts that require SCSI reservation at the same time.
- Increase the number of LUNs and limit the number of hosts accessing the same LUN.

- Reduce the number snapshots. Snapshots cause numerous SCSI reservations.
- Reduce the number of virtual machines per LUN. Follow recommendations in *Configuration Maximums*.
- Make sure that you have the latest HBA firmware across all hosts.
- Make sure that the host has the latest BIOS.
- Ensure a correct Host Mode setting on the SAN array.

Path Thrashing Causes Slow LUN Access

If your ESXi host is unable to access a LUN, or access is very slow, you might have a problem with path thrashing, also called LUN thrashing.

Problem

Your host is unable to access a LUN, or access is very slow. The host's log files might indicate frequent path state changes.

Cause

The problem might be caused by path thrashing. Path thrashing might occur when two hosts access the same LUN through different storage processors (SPs) and, as a result, the LUN is never available.

Path thrashing typically occurs on active-passive arrays. Path thrashing can also occur on a directly connected array with HBA failover on one or more nodes. Active-active arrays or arrays that provide transparent failover do not cause path thrashing.

Solution

- 1 Ensure that all hosts that share the same set of LUNs on the active-passive arrays use the same storage processor.
- 2 Correct any cabling or masking inconsistencies between different hosts and SAN targets so that all HBAs see the same targets.
- 3 Ensure that the claim rules defined on all hosts that share the LUNs are exactly the same.
- 4 Configure the path to use the Most Recently Used PSP, which is the default.

Increased Latency for I/O Requests Causes Slow Virtual Machine Performance

If the ESXi host generates more commands to a LUN than the LUN queue depth permits, the excess commands are queued in VMkernel. This increases the latency, or the time taken to complete I/O requests.

Problem

The host takes longer to complete I/O requests and virtual machines display unsatisfactory performance.

Cause

The problem might be caused by an inadequate LUN queue depth. SCSI device drivers have a configurable parameter called the LUN queue depth that determines how many commands to a given LUN can be active at one time. If the host generates more commands to a LUN, the excess commands are queued in the VMkernel.

Solution

- 1 If the sum of active commands from all virtual machines consistently exceeds the LUN depth, increase the queue depth.

The procedure that you use to increase the queue depth depends on the type of storage adapter the host uses.

- 2 Adjust the `Disk.SchedNumReqOutstanding` parameter, so that it matches the queue depth value.

Adjust Queue Depth for QLogic and Emulex HBAs

If you are not satisfied with your host's performance, change the maximum queue depth for the QLogic or Emulex HBA.

To adjust the maximum queue depth parameter, use the vCLI commands.

In the procedure, `--server=server_name` specifies the target server. The specified target server prompts you for a user name and password. Other connection options, such as a configuration file or session file, are supported. For a list of connection options, see *Getting Started with vSphere Command-Line Interfaces*.

Prerequisites

Install vCLI or deploy the vSphere Management Assistant (vMA) virtual machine. See *Getting Started with vSphere Command-Line Interfaces*. For troubleshooting, run `esxcli` commands in the ESXi Shell.

Procedure

- 1 Verify which HBA module is currently loaded by entering one of the following commands:
 - For QLogic: `esxcli --server=server_name system module list |grep qla`
 - For Emulex: `esxcli --server=server_name system module list |grep lpfc`
- 2 Adjust the queue depth for the appropriate module.

NOTE The examples show the QLogic `qla2xxx` and Emulex `lpfc820` modules. Use the appropriate module based on the outcome of the previous step.

- For QLogic:
`esxcli --server=server_name system module parameters set -m qla2xxx -p ql2xmaxqdepth=value`
 - For Emulex:
`esxcli --server=server_name system module parameters set -m lpfc820 -p lpfc0_lun_queue_depth=value`
- 3 Reboot your host.
 - 4 Verify your changes by running the following command:
`esxcli --server=server_name system module parameters list -m=module.`
module is your QLogic or Emulex module, such as `lpfc820` or `qla2xxx`.

Adjust Maximum Queue Depth for Software iSCSI

If you notice unsatisfactory performance for your software iSCSI LUNs, change their maximum queue depth by running the `esxcli` commands.

Prerequisites

- Install vCLI or deploy the vSphere Management Assistant (vMA) virtual machine. See *Getting Started with vSphere Command-Line Interfaces*. For troubleshooting, you can run `esxcli` commands in the ESXi Shell.
- In the procedure, the `--server=server_name` connection option specifies the target server. Be prepared to enter a user name and password when the target server prompts you. For a list of other possible connection options, see *Getting Started with vSphere Command-Line Interfaces*.

Procedure

- 1 Run the following command:

```
esxcli --server=server_name system module parameters set -m iscsi_vmk -p
iscsvmk_LunQDepth=value
```

The `iscsvmk_LunQDepth` parameter sets the maximum number of outstanding commands, or queue depth, for each LUN accessed through the software iSCSI adapter. The default value is 128.

- 2 Reboot your system.
- 3 Verify your changes by running the `esxcli --server=server_name system module parameters list -m iscsi_vmk` command.



CAUTION Setting the queue depth to a value higher than the default can decrease the total number of LUNs supported.

Change Maximum Outstanding Disk Requests for Virtual Machines

If you adjusted the LUN queue depth, change the `Disk.SchedNumReqOutstanding` parameter, so that its value matches the queue depth. The parameter controls the maximum number of outstanding requests that each virtual machine can issue to the LUN.

Change this parameter only when you have multiple virtual machines active on a LUN. The parameter does not apply when only one virtual machine is active on a LUN. In that case, the bandwidth is limited by the queue depth of the storage adapter.

Procedure

- 1 In the vSphere Client, select the host in the inventory panel.
- 2 Click the **Configuration** tab and click **Advanced Settings** under Software.
- 3 Click **Disk** in the left panel and scroll down to **Disk.SchedNumReqOutstanding**.
- 4 Change the parameter value to the number of your choice and click **OK**.

This change can impact disk bandwidth scheduling, but experiments have shown improvements for disk-intensive workloads.

Virtual Machines with RDMS Need to Ignore SCSI INQUIRY Cache

Storage vendors might require that virtual machines with RDMS (hardware version 8) ignore SCSI INQUIRY data cached by ESXi.

Problem

Certain guest operating systems or applications run in virtual machines with RDMS display unpredictable behavior.

Cause

This behavior might be caused by cached SCSI INQUIRY data that interferes with specific guest operating systems and applications.

When the ESXi host first connects to a target storage device on a SAN, it issues the SCSI INQUIRY command to obtain basic identification data from the device. By default, ESXi caches the received SCSI INQUIRY data (Standard, page 80, and page 83) and the data remains unchanged afterwards.

Solution

- ◆ Configure the virtual machine with RDM to ignore the SCSI INQUIRY cache by adding the following parameter to the .vmx file.

```
scsi:x.ignoreDeviceInquiryCache = "true"
```

where x is the SCSI controller number and y is the SCSI target number of the RDM.

Because this parameter is configurable only on virtual machines with hardware version 8, upgrade the virtual machine prior to adding the parameter.

Enable this parameter only when your storage vendor recommends that you do so. This parameter is required for just a limited number of storage arrays and only for specific guest operating systems.

Software iSCSI Adapter Is Enabled When Not Needed

When your host uses a network adapter with iBFT, the software iSCSI adapter is always enabled by default.

Problem

After your ESXi host's first boot, the software iSCSI adapter is enabled and appears in the vSphere Client on the list of storage adapters.

Cause

The iBFT-enabled network adapter on your host causes the software iSCSI to be always present. This condition occurs even when you do not use iBFT for the iSCSI boot.

Solution

If you do not use the iBFT-enabled network adapter for the iSCSI boot and do not want the software iSCSI adapter to be enabled, remove the iBFT configuration from the network adapter. Because this process is vendor-specific, consult your vendor documentation for details.

Failure to Mount NFS Datastores

Attempts to mount NFS datastores with names in international languages result in failures.

Problem

The use of non-ASCII characters for directory and file names on NFS storage might cause unpredictable behavior. For example, you might fail to mount an NFS datastore or not be able to power on a virtual machine.

Cause

ESXi supports the use of non-ASCII characters for directory and file names on NFS storage, so you can create datastores and virtual machines using names in international languages. However, when the underlying NFS server does not offer internationalization support, unpredictable failures might occur.

Solution

Always make sure that the underlying NFS server offers internationalization support. If the server does not, use only ASCII characters.

Troubleshooting Licensing

The troubleshooting licensing topics provide solutions to problems that you might encounter as a result of an incorrect or incompatible license setup in vSphere. The information also provides solutions to problems that you might have accessing and using the licensing reporting function.

This chapter includes the following topics:

- [“Troubleshooting Host Licensing,”](#) on page 55
- [“Troubleshooting License Reporting,”](#) on page 57
- [“Unable to Power On a Virtual Machine,”](#) on page 60
- [“Unable to Hot Add Memory to a Virtual Machine,”](#) on page 61
- [“Unable to Assign a License Key to vCenter Server,”](#) on page 61
- [“Unable to Configure or Use a Feature,”](#) on page 62

Troubleshooting Host Licensing

You might encounter different problems that result from an incompatible or incorrect license configuration of ESXi hosts.

Unable to Assign a License Key to an ESXi Host

You cannot assign a license key to an ESXi host asset.

Problem

You try to assign a license key to an ESXi host, but you cannot perform the operation and you receive an error message.

Cause

You might be unable to assign a license key to an ESXi because of the following reasons:

- The calculated license usage for the host exceeds the license capacity. For example, you have a vSphere Essentials license key with capacity for two processors with up to six cores each. You try to assign the key to a host that has two processors with 12 cores each. You cannot assign the key, because the required license usage for the host is greater than two processors with six cores each.
- The features on the host do not match the license edition. For example, suppose that you configure vMotion and DRS on a cluster of hosts while you are using evaluation mode. Later, you try to assign Standard license keys to the hosts. This operation fails because the Standard edition does not include vMotion and DRS.
- You do not apply the correct license key.

Solution

- Assign a license key with larger capacity.
- Upgrade the license edition to match the resources and features on the host, or disable the features and resources that do not match the license edition.
- Assign a correct license key. To license ESXi hosts, you must assign a vSphere license key.

Cannot Add or Connect an ESXi Host to vCenter Server

You cannot add an ESXi host to vCenter Server.

Problem

You attempt to add or connect an ESXi host to vCenter Server but the operation is unsuccessful and you receive the following error message.

Unable to perform the operation. There is no available vRAM capacity.

Cause

The vCenter Server system to which you tried to add the host is licensed with a license key of vCenter Server Essentials that is part of the Essentials Kits. vCenter Server 5.0 Essentials licenses are hard-enforced. You cannot exceed the amount of pooled vRAM for vSphere 5.0 Essentials license keys that are assigned to the ESXi 5.0 hosts while vCenter Server manages the hosts. The memory that is configured to the powered-on virtual machines on the host that you try to add or reconnect exceeds the amount of pooled vRAM for vSphere Essentials. For details about vRAM and vRAM pooling, see *License Management and Reporting from vCenter Server and Host Management*.

Solution

Reduce the amount of memory that is configured for the powered-on virtual machines and retry to add or connect the ESXi host to vCenter Server.

The License Key of an ESXi Host is Replaced

The license key that you assigned to an ESXi host changes.

Problem

You use the vSphere Client to connect directly to an ESXi host. You use the **Configuration > Licensed Features > Edit** operation to assign a license key to the host. Later, a different license key replaces the license key you assigned to the host.

Cause

If a vCenter Server system manages an ESXi host, changes made to the host license through direct connection to the host do not persist, because the license key assigned through vCenter Server overwrites the changes.

If you use the **Configuration > Licensed Features > Edit** operation, any license assignment operation that you perform in vCenter Server overrides the host license configuration.

Solution

If you use vCenter Server to manage the host through vCenter Server, use either the **Home > Administration > Licensing** interface or the Add Host operation to configure host licensing.

ESXi Host Disconnects from vCenter Server

ESXi host disconnects from vCenter Server or all ESXi hosts disconnect from vCenter Server at the same time.

Problem

An ESXi host disconnects from vCenter Server or all ESXi hosts disconnect from vCenter Server and you receive a licensing-related error message. You cannot add hosts to the vCenter Server inventory. The hosts and the virtual machines on the hosts continue to run.

Cause

- The 60 day evaluation period of the host is expired or the host license is expired.
- The 60 day evaluation period of vCenter Server is expired or the vCenter Server license is expired.

Solution

- Obtain a vSphere license key and assign it to the ESXi host.
- Obtain a vCenter Server license key and assign it to vCenter Server. If the vCenter Server system is managing ESXi 3.5, it must have access to a license server. You can download the VMware License Server from the VMware Web site.

NOTE When you assign a license key to an ESXi host and vCenter Server, the license edition must be compatible with all of the resources and features you configured. If the license edition and resources are not compatible, you cannot assign the license key.

Troubleshooting License Reporting

The troubleshooting license reporting topics provide solutions to problems that you might have in accessing the license reporting function in the vSphere Client, viewing the license use for products, or exporting a licensing report.

License Reporting Interface Does Not Display

License reporting is not available on the **Reporting** tab of the Licensing page in the vSphere Client.

Problem

In the vSphere Client, when you go to **Home > Administration > Licensing** and select the **Reporting** tab, the license reporting interface does not load and an error message appears.

Cause

The license reporting interface might not load because of the following reasons.

- You do not have Flash Player for Internet Explorer installed.
- VMware VirtualCenter Management Webservices service is not running on the vCenter Server system that you are connected to.
- The vCenter Inventory Service is not running on the vCenter Server system that you are connected to.
- A license service is not running on the vCenter Server system that you are connected to.
- The vSphere Web Client is not installed or it is not running.
- The network connection between the vCenter Server that you are connected to and the vSphere Web Client is not available.

- The vCenter Server system that you are connected to is not registered with the vSphere Web Client or the specified host name or the IP address for the vCenter Server system is incorrect.
- The specified host name URL for the vSphere Web Client was incorrect when it was registered to vCenter Server.
- The vSphere Web Client is registered with the correct host name URL to vCenter Server, but the machine where the vSphere Client is running cannot resolve the vSphere Web Client host name.
- The machine where vSphere Web Client is running cannot resolve the host name of vCenter Server.

Solution

Table 5-1. Enabling the License Reporting

Cause	Solution
Flash Player for Internet Explorer is not installed.	Verify that you have Flash Player for Internet Explorer installed.
VMware VirtualCenter Management Webservices service is not running on vCenter Server.	Verify that the VMware VirtualCenter Management Webservices service is running on the vCenter Server system that you are connected to. Select Home > Administration > vCenter Server Status . The page displays the following message if the VMware VirtualCenter Management Webservices service is not started. Could not get vCenter Health status If you see this error message, start the VMware VirtualCenter Management Webservices service.
vCenter Inventory Service is not running on vCenter Server.	Verify that vCenter Inventory Service is running on the vCenter Server system that you are connected to. Start the vCenter Inventory Service if it is not running.
A license service is not running on vCenter Server.	Verify that all license services are running on the vCenter Server system that you are connected to. Select Home > Administration > vCenter Server Status . The license services are listed under the License Services node. If a license service is not available, perform the actions recommended in the error message that appears. Restarting the VMware VirtualCenter Management Webservices service might also help.
The vSphere Web Client is not installed or it is not running.	Verify that the vSphere Web Client is installed and running.
The network connection between vSphere Web Client and vCenter Server is down.	Repair the network connection between the machine where the vSphere Web Client is running and the machine where vCenter Server is running.
vCenter Server is not registered with the vSphere Web Client or the specified host name or the IP address for vCenter Server is incorrect.	Verify that the vCenter Server system that you are connected to is registered with the vSphere Web Client and that the server name or IP address for vCenter Server is correct. If the specified server name or IP address for vCenter Server is correct, the specified host name URL for the vSphere Web Client might be incorrect. In both cases, unregister vCenter Server from the vSphere Web Client and reregister. Specify correct values in the text boxes.
vSphere Web Client is registered with incorrect host name URL to vCenter Server.	<ul style="list-style-type: none"> ■ vCenter Server URL. Type the correct server name or IP address of the vCenter Server system that you are connected to. Do not include <code>http://</code> or <code>https://</code> ■ vSphere Web Client URL. Type the correct IP address or the host name of the machine where the vSphere Web Client is installed.

Table 5-1. Enabling the License Reporting (Continued)

Cause	Solution
The machine where the vSphere Client is running cannot resolve the vSphere Web Client host name.	The vSphere Client machine must be able to resolve the host name of the vCenter Server. If necessary, add the host name of vCenter Server in the hosts file of the vSphere Web Client machine. The hosts file is located at C:\WINDOWS\system32\drivers\etc\hosts.
The machine where vSphere Web Client is running cannot resolve the host name of vCenter Server.	The vSphere Web Client must be able to resolve the fully-qualified domain name (FQDN) of vCenter Server. If necessary, add the host name of the vCenter Server machine in the hosts file of the vSphere Web Client machine. The hosts file is located at C:\WINDOWS\system32\drivers\etc\hosts.

Unable to View the License Use for Products

You try to view the license use for products from the **Reporting** tab on the Licensing page, but license use data does not appear.

Problem

You select the **Reporting** tab of the Licensing page and one of the following situations occurs:

- You try to view the license use for products for a certain time period and vCenter Server. One of the following error messages appears:
The licensing service for vCenter Server is unavailable.
Licensing usage data for <vCenter Server instance> is missing for the selected time period.
- You try to view details for a license key over a certain time period and the following error message appears:
Licensing usage data for <license key> is missing for the selected time period.

Cause

- VMware VirtualCenter Management Webservices service is not running on the vCenter Server system that you are connected to.
- No license keys are assigned to assets for the vCenter Server instance and the time period you select.

Solution

- Verify that the VMware VirtualCenter Management Webservices service is running on the vCenter Server that you are connected to. Select **Home > Administration > vCenter Server Status**. The following message appears if the VMware VirtualCenter Management Webservices service is not running:
Could not get vCenter Health status.
If you see this error message, start the VMware VirtualCenter Management Webservices service.
- Select a time period and a vCenter Server instance for which licenses keys are assigned to assets.

Unable to Export a Licensing Report

You cannot export a licensing report from the **Reporting** tab on the Licensing page of the vSphere Client.

Problem

- You click **export** for a licensing report in the **Reporting** tab, and the following error message appears:
Cannot export licensing usage data.
An integrity problem with the license data detected in the database of vCenter Server.

- You try to export the license usage for all vCenter Server instances in the Linked Mode group. In the Export License Data dialog box, you select **All vCenter Server instances** and click **Export**. The following error message appears:

```
vCenter Server instances included in the generated export file:
<a list of vCenter Server instance>
Unable to export license usage data for:
<a list of vCenter Server instances>
```

Cause

- The license usage data stored in the vCenter Server database was modified. Modifying licensing records in vCenter Server database is discouraged.
- The vCenter Server instances for which you cannot export license usage are not running.
- The vCenter Server instances for which you cannot export license usage are isolated from the Linked Mode group.

Solution

- If the license usage data in the vCenter Server database was modified, no solution is available. You cannot export licensing reports for this vCenter Server or Linked Mode group within this time period.
- If the vCenter Server instances for which you cannot export a licensing report are not running, restart them if possible and try to export a licensing report again.
- If the vCenter Server instances for which you cannot export a licensing report are isolated, restart the vSphere Client and try to export the licensing report again.

Unable to Power On a Virtual Machine

You cannot power on a virtual machine on an ESXi host.

Problem

You try to power on a virtual machine but the operation is unsuccessful and you receive an error message.

Cause

You might be unable to power on a virtual machine because of the following reasons.

- The 60-day evaluation period of the host is expired.
- The license of the host is expired.
- The edition of the license key does not match the configured features and resources on the host.
- You try to power on a virtual machine through a direct connection to its ESXi 5.0 host. The host is managed by a vCenter Server 5.0 system that is licensed with a license key of vCenter Server Essentials that is part of the Essentials Kits. vCenter Server Essentials licenses restrict the power on operation on virtual machines through a direct connection to their ESXi 5.0 host.
- The host is connected to a vCenter Server 5.0 system that is licensed with a license key of vCenter Server Essentials that is part of the Essentials Kits. vCenter Server 5.0 Essentials licenses are hard-enforced. You cannot exceed the amount of pooled vRAM for vSphere 5.0 Essentials license keys that are assigned to the ESXi 5.0 hosts while vCenter Server manages the hosts. The memory that is configured to the virtual machine that you try to power on exceeds the vRAM that is pooled for vSphere Essentials. For details about vRAM and vRAM pooling, see *License Management and Reporting from vCenter Server and Host Management*.

Solution**Table 5-2.** Power on a Virtual Machine

Cause	Solution
The evaluation period of the host is expired.	Obtain a vSphere license key and assign the key to the ESXi host. Verify that the edition of the license key matches the configured features and resources on the host. If they do not match, you cannot assign the license key.
The license of the host is expired.	
The edition of the license key does not match the configured features and resources on the host.	
vCenter Server restricts the power on operation through a direct connection to an ESXi host.	Connect the host to vCenter Server and power on the virtual machine.
The memory that is configured for the virtual machine exceeds the amount of pooled vRAM for the host licenses.	To free a certain amount of vRAM, reconfigure the memory for the powered on virtual machines on the hosts that are connected to vCenter Server.
	Power off virtual machines to free a certain amount of vRAM.

Unable to Hot Add Memory to a Virtual Machine

You cannot hot add memory to a virtual machine through a direct connection to its ESXi host.

Problem

You try to hot add memory to a virtual machine through a direct connection to its ESXi host but the operation is unsuccessful and you receive the following error message.

```
You cannot hot plug memory to this virtual machine via direct connection to its ESXi host. The
host is managed by vCenter Server
licensed with vRAM license key. Connect to vCenter Server to hot plug memory to this virtual
machine.
```

Cause

The vCenter Server system that manages the host where the virtual machine runs is licensed with a license key of the vCenter Server Essentials edition that is part of the Essentials Kits. vCenter Server 5.0 Essentials licenses are hard-enforced. You cannot exceed the amount of pooled vRAM for vSphere 5.0 Essentials license keys that are assigned to the ESXi 5.0 hosts while vCenter Server manages the hosts. To prevent exceeding the pooled vRAM, vCenter Server Essential licenses restrict the hot addition of memory to virtual machines through a direct connection to their ESXi hosts. For details about vRAM and vRAM pooling, see *License Management and Reporting* from *vCenter Server and Host Management*.

Solution

Connect to vCenter Server and retry the operation.

Unable to Assign a License Key to vCenter Server

You cannot assign a license key to a vCenter Server system.

Problem

You try to assign a license key to a vCenter Server system, but the operation is unsuccessful and you receive an error message.

Cause

You might be unable to assign a license key to a vCenter Server system because of the following reasons.

- The license edition does not match the currently configured resources and features on vCenter Server. For example, while in evaluation mode, you add the vCenter Server system to a Linked Mode group. Then you try to assign a Foundation or an Essentials license key to the vCenter Server system. The operation is unsuccessful because the Foundation and Essentials license editions do not support the Linked Mode feature.
- You assign an incorrect license key.
- You try to assign a license key of vCenter Server Essentials and the total amount of memory that is configured to the powered on virtual machines exceeds the vRAM limit that vCenter Server Essentials imposes.

Solution

- Upgrade the license edition to match the currently configured features and resources on vCenter Server. For example, you need a Standard or an Enterprise license key to be able to license a vCenter Server system that is in Linked Mode.
- Assign a correct license key. To license vCenter Server, you need a vCenter Server license key.
- Reduce the memory that is configured to the powered on virtual machines.

Unable to Configure or Use a Feature

You cannot use a feature or change its configuration.

Problem

You cannot use or configure a feature and a licensing-related error message appears.

Cause

If you downgrade your license from evaluation mode to a license that does not support the features that you configured while you used evaluation mode, you receive a warning message about license downgrade.

Solution

Check the licensed features on the host and on the vCenter Server system. Upgrade the edition of the license assigned to the host or vCenter Server if they do not include the features that you try to configure or use.

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