



LifeKeeper for Windows

LifeKeeperVMware VirtualCenter Recovery Kit

Administration Guide

March 2007

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LifeKeeper VMware VirtualCenter Management Server Recovery Kit Administration Guide

The LifeKeeper® VMware VirtualCenter Management Server Recovery Kit provides fault resilience for VMware VirtualCenter Server 2.0.1 in a LifeKeeper environment.

The LifeKeeper VMware VirtualCenter Recovery Kit is compatible with VirtualCenter Server using Microsoft SQL Server and Oracle. **Note:** When used with Microsoft SQL Server or Oracle, fully licensed versions of LifeKeeper for Windows Core, SteelEye Data Replication, and LifeKeeper Microsoft SQL Server Recovery Kit or LifeKeeper Oracle Recovery Kit are required.

Document Contents

This guide provides the following information topics:

- [VMware VirtualCenter Recovery Kit Overview](#). This section provides a general overview of the product and the LifeKeeper environment required for protecting VMware VirtualCenter Server.
- [VMware VirtualCenter Server Configuration Considerations](#). This section describes basic configuration concepts that are important to a successful installation of VMware VirtualCenter Server with LifeKeeper.
- [Installing and Configuring VMware VirtualCenter Server with LifeKeeper](#). Follow the pre-installation checklist and special procedures to set up your servers for a highly available instance of VMware VirtualCenter Server.
- [VMware VirtualCenter Server Resource Configuration Tasks](#). After you have completed the necessary setup tasks, use the steps in this section to create, extend and manage the LifeKeeper generated VMware VirtualCenter Server hierarchy.
- [Hierarchy Administration](#). This section describes how set up and administer a single VMware VirtualCenter Server instance, add resource dependencies, and understand switchover capabilities.

LifeKeeper Documentation

The following documentation is associated with the LifeKeeper core product:

- *Release Notes*
- *Online Product Manual*
- *Planning and Installation Guide*

This documentation, along with documentation associated with other LifeKeeper recovery kits and SteelEye Data Replication for Windows, is available online at:

www.steeleye.com/support/documentation

In this document the terms VMware VirtualCenter and VMware VirtualCenter Server are used interchangeably. References to VMware VirtualCenter imply a more specific reference to VMware VirtualCenter Server.

Consult your LifeKeeper sales representative for release and ordering information.

Recovery Kit Requirements

Before installing and configuring the LifeKeeper VMware VirtualCenter Recovery Kit, be sure that your configuration meets the following requirements:

- **Operating System software.** LifeKeeper supports the following versions of Windows operating systems:
 - Windows 2000 Server Standard, Advanced, Data Center Editions
 - Windows Server 2003 Standard, Enterprise, Data Center, Web Editions
 - Windows Server 2003 R2 Editions
- **LifeKeeper software.** You must install the same version of LifeKeeper for Windows on *all* servers in the cluster.
- **VMware VirtualCenter Server software.** This recovery kit is compatible with VMware VirtualCenter Server version 2.0.1 and later. The same version of VMware VirtualCenter Server must be installed on all systems in the cluster. VMware VirtualCenter Server supports being protected in an Active/Passive configuration. Although VMware VirtualCenter Server can be installed on the system volume, the system volume is not eligible for volume protection. If VMware VirtualCenter Server is installed on a shared volume, the protected volume will be accessible under LifeKeeper control from primary and backup servers in the cluster.
- **SteelEye Data Replication for Windows (optional).** If you plan to install VMware VirtualCenter Server on a replicated volume rather than shared volume, you must also install SteelEye Data Replication software on each server in the cluster where VMware VirtualCenter Server will run.
- **VMware VirtualCenter Server Name and IP Address Configuration.** VMware VirtualCenter supports the use of a virtual IP address for the VMware Virtual Infrastructure Client application. To configure an IP address with VMware VirtualCenter the server name and associated IP address must be:
 - defined in a DNS “A” host record that is bound to this IP address,
 - the IP address must be configured by LifeKeeper as an IP protected resource, and
 - the IP address must be configured by LifeKeeper as a dependent resource of the VMware VirtualCenter Server resource.
- **VMware VirtualCenter Server Database Selection.** This recovery kit is compatible with VMware VirtualCenter Server when used with the following databases:
 - Microsoft SQL Server 2000 or Microsoft SQL 2005 database. The SQL database may also be protected by LifeKeeper with the optional LifeKeeper Microsoft SQL Server Recovery Kit (recommended).
 - Oracle 9i and 10g databases. The Oracle database may also be protected by LifeKeeper with the optional LifeKeeper Oracle Recovery Kit (recommended).

Recovery Kit Installation

For complete LifeKeeper installation instructions, refer to the *Planning and Installation Guide*.

Before installing the LifeKeeper VMware VirtualCenter Recovery Kit software, be sure you are familiar with the product prerequisites listed above, as well as the installation procedure outlined in the [Setup Checklist](#).

Kit Removal/Uninstall

To remove the LifeKeeper VMware VirtualCenter Recovery Kit, choose the **LifeKeeper VMware VirtualCenter Recovery Kit v6** in the Add/Remove programs applet in the control panel.

CAUTION: Be sure that all VMware VirtualCenter Server resource instances are out of service and the resources are deleted before this recovery kit software is removed from the system. Once this kit is uninstalled, these resources will all be unusable.

VMware VirtualCenter Recovery Kit Overview

The LifeKeeper VMware VirtualCenter Recovery Kit software makes VMware VirtualCenter Server services highly available through the clustering technology provided by LifeKeeper for Windows. LifeKeeper monitors the VMware VirtualCenter Server service and the associated IP communication resource.

Making VMware VirtualCenter Server highly available is accomplished by configuring the VMware VirtualCenter Server service and its clients to use a **virtual server name** and a **protected IP address** rather than the name of any specific server it is installed on. Using this approach VMware VirtualCenter Server can be run on either a primary or backup server while using the same backend inventory database. Virtual Infrastructure Client connections are completed by referencing the virtual server name or the associated IP address.

The LifeKeeper GUI allows you to create a VMware VirtualCenter Server resource hierarchy. LifeKeeper will configure the VMware VirtualCenter resource hierarchy by adding any required disk resources, IP resources, or database resources as a dependent of the VMware VirtualCenter parent resource.

The LifeKeeper VMware VirtualCenter Recovery Kit will monitor and protect the following service:

- vpxd (VMware VirtualCenter Service)

The LifeKeeper VMware VirtualCenter Recovery Kit provides optional monitoring of the following service:

- webAccess (VMware VirtualCenter Browser UI Service)

Should these services stop unexpectedly or if the system experiences a catastrophic failure, they will be restarted locally or restarted on another server in the cluster in the order and priority selected by the administrator. The recovery kit also runs a health check periodically to check whether VMware VirtualCenter Server services are running or not. Another periodic check will monitor connectivity on the VMware VirtualCenter default service ports. If either of these checks fails, LifeKeeper will restart all VMware VirtualCenter services locally or failover the complete resource hierarchy to another server in the cluster. Local recovery is an optional setting for each resource instance.

When the VMware VirtualCenter server resource is created, LifeKeeper will change all of the following services to Manual startup mode. A LifeKeeper *In-Service* action will start all of the following services and an *Out-of-Service* action will stop them all.

- vpxd (VMware VirtualCenter Service)
- webAccess (VMware VirtualCenter Browser UI Service)

VMware VirtualCenter Server Configuration Considerations

VMware VirtualCenter Server is managed by LifeKeeper in an Active/Standby configuration. Before you install and configure your cluster servers, including VMware VirtualCenter Server, it is important to understand the concepts of Active/Passive configurations; also called Active/Standby.

VMware VirtualCenter Active/Standby Configuration

A configuration is **Active/Standby** when there is only one instance of VMware VirtualCenter Server running, and it is located on a single LifeKeeper shared, replicated, or local volume. VMware VirtualCenter Server services are active and running on only one system at a time. The systems are assigned priorities within the LifeKeeper cluster which determine the order of failover for the complete resource hierarchy.

The figure below depicts a single VMware VirtualCenter Server instance installed on a pair of servers and resident on a single LifeKeeper protected shared or mirrored volume (G:\). The VMware VirtualCenter Server and its information database (Microsoft SQL Server or Oracle) must be resident on a LifeKeeper protected volume.

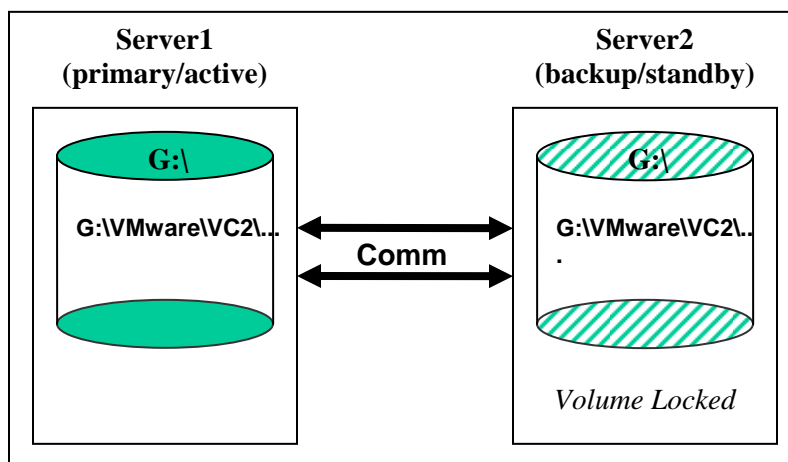


Figure 1

VMware VirtualCenter Server may be configured to use an external local, or an external remote database. An external database may be resident on the same server or it may be installed somewhere else on the network. If you choose to LifeKeeper-protect the database and install it on the local server, then you may use the same protected volume for database storage.

When you create the LifeKeeper VMware VirtualCenter Server resource, the LifeKeeper *Create Resource Wizard* will identify the LifeKeeper protected IP resources that are available to be used by VMware VirtualCenter Server for client connections. LifeKeeper will also determine if VMware VirtualCenter has been installed on a protected volume. LifeKeeper will also determine if the VMware VirtualCenter database, if external local, should be included in the resource hierarchy. The selected IP resource, associated database, and the associated volume for the VMware VirtualCenter Server will become dependent resources in the VMware VirtualCenter hierarchy.

Once the hierarchy is created, it will appear as follows in the LifeKeeper GUI:

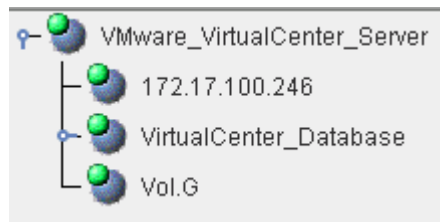


Figure 2

Notes:

- The hierarchy tag name, *VMware_VirtualCenter_Server*, is the name used by LifeKeeper to uniquely identify the VMware VirtualCenter Server resource. The default tag name generated by LifeKeeper is *VMwareVC.0*, but this name can be changed if desired during the creation of the hierarchy, as has been done in this example.
- The IP tagname, *172.17.100.246*, represents an IP address protected by LifeKeeper before the VMware VirtualCenter resource is created. LifeKeeper will automatically create a dependency relationship to the protected IP resource when the VMware VirtualCenter resource is created.
- The Volume tagname, *Vol.G*, represents a volume protected by LifeKeeper before the VMware VirtualCenter resource was created. LifeKeeper will automatically create a dependency relationship to the protected volume resource when the VMware VirtualCenter resource is created.
- The database tagname, *VirtualCenter_Database*, represents the database protected by LifeKeeper before the VMware VirtualCenter resource was created. LifeKeeper will automatically create a dependency relationship to the protected database resource when the VMware VirtualCenter resource is created.

Active/Standby Failover

In the event of failure, LifeKeeper brings the VMware VirtualCenter hierarchy in-service on the backup server. As soon as it is started and initialized, it will begin serving clients such as the VMware Virtual Infrastructure Client.

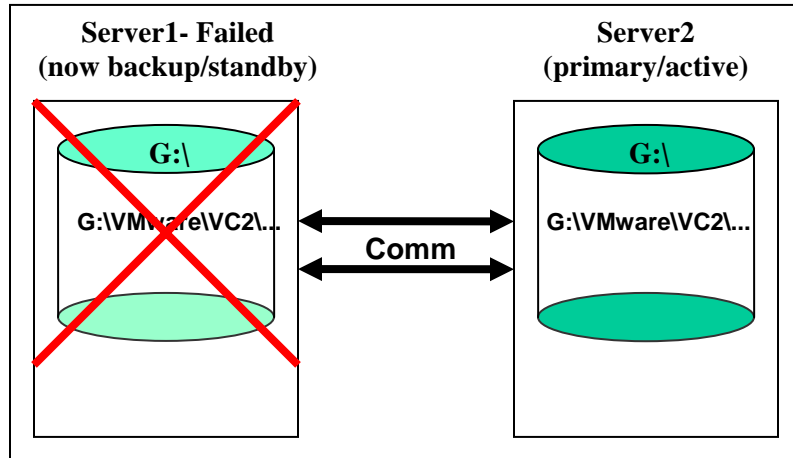


Figure 3

Installing and Configuring VMware VirtualCenter Server with LifeKeeper

Proper operation of the LifeKeeper VMware VirtualCenter Recovery Kit depends upon correct installation and configuration of the hardware and software from VMware and SteelEye Technology.

Before continuing, please preview the [Hierarchy Administration](#) section of this guide. This section provides general guidelines, configuration details, and troubleshooting hints to help you administer VMware VirtualCenter Server in a LifeKeeper environment.

VMware VirtualCenter ODBC Considerations

The VMware VirtualCenter requires the configuration of an ODBC connection for the external local or external remote database. Important considerations for configuring the ODBC connections for the High Availability configuration include:

1. VMware VirtualCenter requires an ODBC connection. The Data Source Name used on the primary must match the Data Source Name configured on each target server where the VMware VirtualCenter resource will be protected.
2. If the database is Oracle, the TNS Service Name entered for the ODBC DSN must be the same on each server. Additionally, the TNS configuration must also point to the same database for the primary and each additional target server where the VMware VirtualCenter resource will be protected.
3. If the database will be Microsoft SQL Server, the Server specified for the ODBC DSN must be the same on each server. Additionally, the Server must be configured to point to the same database for the primary and each additional target server where the VMware VirtualCenter resource will be protected.
4. When the database used for VMware VirtualCenter is external local, all ODBC connections should be configured to use the virtual IP address that will failover with the database resource.
5. Test all ODBC connections from all servers in the cluster that will be protecting the VMware VirtualCenter resource hierarchy.

Note: When using Microsoft SQL Server 2005 with VirtualCenter, the SQL Browser service should be protected as an optional service with the LifeKeeper resource. If the database is not protected with LifeKeeper, then the SQL Browser service should be started and the service startup type set to Automatic. If the VirtualCenter database will be an Oracle database, the listener should be configured and protected with the LifeKeeper resource. If the database is not protected with LifeKeeper, then the listener for the database instance should be started and the service startup type set to Automatic.

Additional Considerations for using Virtual IP Addresses

In addition to using the virtual IP address for VMware Virtual Infrastructure client connections, the virtual IP is also used in connections to the ESX Servers. The managed ESX Servers must be configured to use the virtual IP address while being managed by the VMware VirtualCenter Server. To configure VMware VirtualCenter Server to communicate to the ESX Servers over the virtual IP address the following steps must be followed.

1. Configure and protect a virtual IP address in LifeKeeper to be used in managing the VMware VirtualCenter Server in a clustered environment.
2. Edit the VMware registry on each cluster system to add the managedip string value to contain the virtual IP address. The VMware registry entries are located under: HKEY_LOCAL_MACHINE\Software\VMware, Inc\VMware VirtualCenter
3. Using the service management utility, restart the VMware VirtualCenter Server service.
4. In pre-existing environments, clustering the VMware VirtualCenter Server may also require a disconnect and reconnect of the ESX Servers to use the new managedip address configured in steps 1-2.

When properly configured, all connections to and communications between the VMware VirtualCenter and VMware ESX Servers will occur using the virtual IP address.

Additional Considerations for Installing Backup Servers

When installing VirtualCenter Server on any server, always refer to the VirtualCenter Infrastructure Installation Guide. There are some specific considerations that should be considered when installing in a high availability environment with LifeKeeper.

1. Configure the License server on the primary server only. The backup or target server should be configured to look for licenses from the primary server. Refer to the VirtualCenter Infrastructure Installation Guide.
2. During the ODBC configuration section of the VirtualCenter installation, the installation will prompt to override the existing inventory. On all target servers you **must** choose 'No' so that you do not override the existing database structure and inventory.

Setup Checklist

The installation and setup sequence should be performed in the following sequence. See the *Planning and Installation Guide* for additional details.

1. Set up your shared or replicated storage to reserve a protected volume for use by VMware VirtualCenter Server.
2. If a replicated (mirrored) volume will be used, also install SteelEye Data Replication for Windows.
3. Set up and test your network. LifeKeeper will transmit configuration information, status information and heartbeats across the network between primary and backup systems. It is essential that the network be operating properly.

4. Install and configure the LifeKeeper Core that includes the IP Recovery Kit and Volume Recovery Kit. Also install the VMware VirtualCenter Recovery Kit, and the correct database recovery kit for the database deployed in the VMware VirtualCenter Server configuration.
5. Create a DNS Host “A” record for the virtual server name and IP address
6. Create LifeKeeper IP and Volume resource hierarchies. **Note:** Refer to the [Additional Considerations for using Virtual IP Addresses](#) for information on ensuring proper operation of VMware VirtualCenter Server with virtual IP addresses.
7. Create the LifeKeeper database resource for the external local database.
8. Create the VMware VirtualCenter resource hierarchy.

Create Hierarchy Overview

After completing the VMware VirtualCenter Server installation and setup tasks, you are ready to use LifeKeeper to **create** and **extend** a VMware VirtualCenter hierarchy. See the next section for details on creating the VMware VirtualCenter Server resource hierarchy.

Resource Configuration Tasks

Once you have completed the setup tasks as described in the previous section, you are ready to create and extend your VMware VirtualCenter resource hierarchy.

The following four tasks are described in this guide, as they are unique to a VMware VirtualCenter resource instance and different for each recovery kit.

- [**Create a Resource Hierarchy**](#). Creates an application resource hierarchy in your LifeKeeper cluster.
- [**Extend a Resource Hierarchy**](#). Extends a resource hierarchy from the primary server to a backup server.
- [**Unextend a Resource Hierarchy**](#). Unextend (removes) a resource hierarchy from a single server in the LifeKeeper cluster.
- [**Delete a Resource Hierarchy**](#). Deletes a resource hierarchy from all servers in your LifeKeeper cluster.
- [**Manage VMware VirtualCenter Server Resource Configuration**](#). Allows administrative actions to be performed on your VMware VirtualCenter Server resource hierarchy.

The following tasks are described in the GUI Administrative Tasks section within the *LifeKeeper Online Product Manual*, because they are common tasks with steps that are identical across all recovery kits.

- **Create a Resource Dependency**. Creates a parent/child dependency between an existing resource and another resource instance and propagates the dependency changes to all applicable servers in the cluster.
- **Delete a Resource Dependency**. Deletes a resource dependency and propagates the dependency changes to all applicable servers in the cluster.
- **In Service**. Brings a resource hierarchy into service on a specific server.
- **Out of Service**. Takes a resource hierarchy out of service on a specific server.
- **View/Edit Properties**. View or edit the properties of a resource hierarchy on a specific server.

Note: Throughout the rest of this section, configuration tasks are performed using the **Edit** menu. You can also perform most of these tasks:

- from the toolbar
- by right clicking on a global resource in the left pane of the status display
- by right clicking on a resource instance in the right pane of the status display

Using the right-click method allows you to avoid entering information that is required when using the **Edit** menu.

Creating the VMware VirtualCenter Hierarchy

After completing the necessary setup tasks, use the following steps to create the VMware VirtualCenter Server resource.

Verify that all VMware VirtualCenter Server services are running.

1. From the LifeKeeper GUI menu, select **Edit**, then **Server**. From the menu, select **Create Resource Hierarchy**.

The *Create Resource Wizard* dialog box will appear with a drop down list box displaying all recognized recovery kits installed within the cluster.

2. Select *VMware VirtualCenter* and click **NEXT**.
3. You will be prompted to enter the following information. When the **Back** button is active in any of the dialog boxes, you can go back to the previous dialog box. This is helpful should you encounter an error requiring you to correct previously entered information. You may click **Cancel** at any time to cancel the entire creation process.

Field	Tips
Switchback Type	Choose either intelligent or automatic. This dictates how the VMware VirtualCenter resource instance will be switched back to this server when the server comes back up after a failover. The switchback type can be changed later from the General tab of the Resource Properties dialog box. Note: <u>The switchback strategy must match that of the IP and Volume resource to be used by the VMware VirtualCenter resource, or else the create will fail.</u>
Server	Select the Server on which you want to create the hierarchy.

VirtualCenter Configuration Path (<i>Display only</i>)	Display the root directory path where VMware VirtualCenter is installed on the server.
Select Optional Services for Protection	Display a choice list of optional services that can be protected with the VMware VirtualCenter resource hierarchy. A choice of <i>none</i> indicates that only the VMware VirtualCenter Server service should be protected.
Protected IP Address	The associated LifeKeeper protected IP addresses that VMware VirtualCenter Server can use will be displayed. You may also enter "NONE" and not include a protected IP address in the hierarchy at this time. However, a successful switchover or failover may require an IP resource dependency for this resource. It is recommended that you protect an IP address for VMware VirtualCenter Server prior to creating the VMware VirtualCenter resource.
Select Optional Database for Protection	Display a choice list of available databases that can be protected with the VMware VirtualCenter resource hierarchy. A choice of <i>none</i> indicates that no database should be included in the VMware VirtualCenter resource hierarchy.
Enable Remote Database Check (Optionally Displayed)	Displays the option to enable a simple database check when the VMware VirtualCenter database is an external remote database. This option is not available, and not necessary, when the database is external local. Note: See Troubleshooting for additional requirements for enabling this option.
Enter Remote Database User Name	Enter the database user name with administrator privileges and remote connectivity access to the external remote database.
Enter Password	Enter the password for the service account.
VMware VirtualCenter Tag	Enter a unique tag name, or you can accept the default tag name generated by LifeKeeper.
Quick Check Interval	Enter the interval (in minutes) between basic checks of the resource's availability. Different values can be specified for each system. The default is 3 minutes. Value can be between 0 to 10080. Setting interval value to 0 will disable the quick check monitoring.
Deep Check Interval	Enter the interval (in minutes) between extensive checks of the resource's availability. Different values can be specified for each system. The default value is 5 minutes. Value can be between 0 to 10080. An

	entry of 0 will disable the deep check monitoring.
Local Recovery	Select Yes to enable Local Recovery for this resource. Local recovery for a VMware VirtualCenter resource means that if any of the protected services fail, LifeKeeper will attempt to restart the affected service. If the restart is unsuccessful, then LifeKeeper will failover the service to the backup server.

4. Click **Create** and the *Create Resource Wizard* will create the VMware VirtualCenter Server resource. LifeKeeper will validate the data entered. If LifeKeeper detects a problem, an error message will appear in the information box.
5. Another information box will appear indicating that you have successfully created a VMware VirtualCenter resource hierarchy. You must **Extend** that hierarchy to another server in your cluster in order to achieve failover protection. Click **Next**.
6. Click **Continue** and LifeKeeper will launch the *Pre-Extend Wizard*. Refer to Step 2 under **Extending a VMware VirtualCenter Resource Hierarchy** (below) for details on how to extend your resource hierarchy to another server.

Extending a VMware VirtualCenter Hierarchy

This operation can be started from the **Edit** menu, or initiated automatically upon completing the **Create Resource Hierarchy** option, in which case you should refer to Step 2 below.

1. On the **Edit** menu, select **Resource**, then Extend Resource Hierarchy. The Pre-Extend Wizard appears. If you are unfamiliar with the Extend operation, click **Next**. If you are familiar with the LifeKeeper **Extend Resource Hierarchy** defaults and want to bypass the prompts for input/confirmation, click **Accept Defaults**.
2. The *Pre-Extend Wizard* will prompt you to enter the following information.
Note: The first two fields appear only if you initiated the Extend from the **Edit** menu.

Field	Tips
Template Server	Enter the server where your VMware VirtualCenter resource is currently in service.
Tag to Extend	Select the VMware VirtualCenter resource you wish to extend.
Target Server	Enter or select the server you are extending <i>to</i> .
Switchback Type	This dictates how the VMware VirtualCenter instance will be switched back to this server when it comes back into service after a failover to the backup server. You can choose either intelligent or automatic. The switchback type can be changed later, if desired, from the General tab of the Resource Properties dialog box. Note: <u>Remember that the switchback strategy must match that of the dependent resources to be used by the VMware VirtualCenter resource.</u>

Template Priority	(This field appears only if you did NOT extend directly from the Create function.) Enter a number between 1 and 999 to specify the template server's priority in the cascading failover sequence for this resource. A lower number means a higher priority. LifeKeeper assigns the number "1" to the server on which the hierarchy was created. No two servers can have the same priority for a given resource.
Target Priority	Enter a number between 1 and 999 to specify the target server's priority in the cascading failover sequence for this resource. A lower number means a higher priority. LifeKeeper offers a default of 10 for the first server to which a hierarchy is extended.
VMware VirtualCenter Resource Tag (<i>Display Only</i>)	The resource extend process will display the LifeKeeper tag name to be used for the extended resource on the target server. This is for information purposes. It cannot be modified.

3. After receiving the message that the pre-extend checks were successful, click **Next**.
4. After receiving the message "Hierarchy Verification Finished", click **Done**.
5. Bring the VMware VirtualCenter Server Hierarchy In-Service on the backup system.

Unextending a VMware VirtualCenter Hierarchy

To remove a resource hierarchy from a single server in the LifeKeeper cluster, do the following:

1. On the **Edit** menu, select **Resource**, then **Unextend Resource Hierarchy**.
2. Select the **Target Server** where you want to unextend the VMware VirtualCenter resource. It cannot be the server where the VMware VirtualCenter resource is currently in service. (This dialog box will not appear if you selected the Unextend task by right clicking on a resource instance in the right pane.) Click **Next**.
3. Select the VMware VirtualCenter hierarchy to unextend and click **Next**. (This dialog will not appear if you selected the Unextend task by right clicking on a resource instance in either pane).
4. An information box appears confirming the target server and the VMware VirtualCenter resource hierarchy you have chosen to unextend. Click **Unextend**.
5. Another information box appears confirming that the VMware VirtualCenter resource was unextended successfully. Click **Done** to exit the Unextend Resource Hierarchy menu selection.

Deleting a VMware VirtualCenter Hierarchy

Before deleting a VMware VirtualCenter hierarchy or instance, make sure that the hierarchy is active (green) on its primary server. You may also wish to remove the dependencies before deleting the hierarchy; otherwise, the dependencies will be deleted also.

To delete a resource hierarchy from all the servers in your LifeKeeper environment, complete the following steps:

1. On the **Edit** menu, select **Resource**, then **Delete Resource Hierarchy**.
2. Select the **Target Server** where you will be deleting your VMware VirtualCenter resource hierarchy and click **Next**. (This dialog will not appear if you selected the Delete Resource task by right clicking on a resource instance in either pane.)
3. Select the **Hierarchy to Delete**. (This dialog will not appear if you selected the Delete Resource task by right clicking on a resource instance in the left or right pane.) Click **Next**.
4. An information box appears confirming your selection of the target server and the hierarchy you have selected to delete. Click **Next**.
5. Another information box appears confirming that the VMware VirtualCenter resource was deleted successfully.
6. Click **Done** to exit.

Manage VMware VirtualCenter Server Resource Configuration

To view and manage a protected VMware VirtualCenter Server resource from the LifeKeeper GUI, right-click on the resource instance (on the right hand side of the LifeKeeper GUI) and select **Properties**, then select the **VMware VirtualCenter Server Configuration** tab. Use the resource properties page to view or change information about the VMware VirtualCenter Server resource.

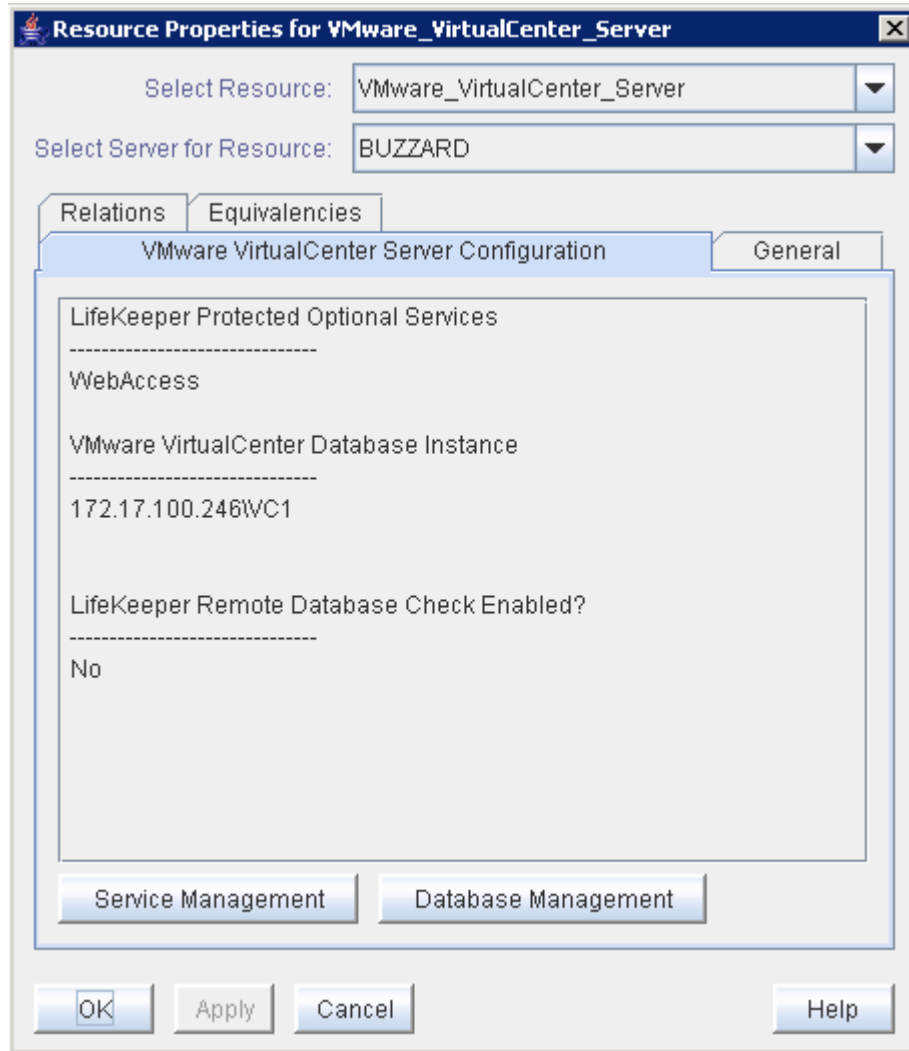


Figure 4

Figure 4 shows a typical VMware VirtualCenter Server resource property page that identifies the VMware VirtualCenter Server resource optional services, the associated database instance, and whether or not the remote database check is enabled or disabled.

The **Service Management** button may be used to update the list of optional services that are protected with a given VMware VirtualCenter Server resource hierarchy.

The **Database Management** button can be used to enable or disable the VMware VirtualCenter Server remote database check feature.

Database Management

This menu allows administrators to enable the remote database check, and set the database administrator ID and password that LifeKeeper uses to perform the simple database health check. This check can only be enabled when the database is an external remote database.

Database Management Action:

Field	Tips
Select Action	Choose a database management action. Available actions are: Disable Check, Enable Check, and Show User.
Enter Remote Database User Name	Enter the database user name with administrator privileges and remote connectivity access to the external remote database.
Enter Password	Enter the password for the service account.
Update All Systems	Select the scope for this database management change. The choices are 'Yes' (Update entire cluster), and 'No' (Update local system only).

Service Management

This menu allows administrators to add or remove monitoring of optional services from the LifeKeeper VMware VirtualCenter resource hierarchy.

Service Management Action:

Field	Tips
Select Action	Select Add Service to add an optional service to the VMware VirtualCenter resource hierarchy configuration. Select Delete Service to remove an optional service from the VMware VirtualCenter resource hierarchy configuration.
Service Name	Enter the service name from the available choice list to 'Add' or 'Remove' from the VMware VirtualCenter resource hierarchy configuration
Update All Systems	Select the scope for this service management change. The choices are 'Yes' (Update entire cluster), and 'No' (Update the local system only).

Testing the Resource Hierarchy

Test the VMware VirtualCenter resource hierarchy by initiating a manual switchover. This will simulate a failover of a resource instance from the primary server to the backup server.

Select **Edit**, then **Resource**, then **In Service**. For example, an *In Service* request executed on a backup server causes the application hierarchy to be taken out of service on the primary server and placed in service on the backup server. At this point, the original backup server is now the primary server and original primary server has now become the backup server.

If you execute the *Out of Service* request, the application is taken out of service without bringing it in service on the other server.

Hierarchy Administration

Follow these guidelines when administering your VMware VirtualCenter Server:

Access via protected TCP/IP address

All remote access of the VMware VirtualCenter Server service should be done through the hierarchy's protected IP address. Through a DNS host "A" record this IP address is associated with a virtual host name. The protected IP address managed by LifeKeeper will ensure that administrators and clients can access the VMware VirtualCenter Server service regardless of which server it is currently running on.

Reserve volumes for VMware VirtualCenter use

The volume containing the protected VMware VirtualCenter installation files should be reserved for use by VMware VirtualCenter exclusively. However, the same protected volume may also be used for Microsoft SQL Server or Oracle databases that are used by VMware VirtualCenter Server.

A LifeKeeper protected volume may fail to switchover if it is accessed by another non-protected application, process, or remote user outside of LifeKeeper control.

Start and stop VMware VirtualCenter *ONLY* through LifeKeeper

Although most administration of VMware VirtualCenter Server is done through the VMware VirtualCenter Console, there are two distinct benefits from bringing the VMware VirtualCenter Server in-service and out-of-service using the LifeKeeper administration options:

- **Resource monitoring failure.** If any of the VMware VirtualCenter services are stopped manually outside LifeKeeper management and control, the resource monitoring scripts will report the failure and LifeKeeper will initiate recovery of the VMware VirtualCenter Server service. Please refer to the **VMware VirtualCenter Recovery Kit Overview** section earlier in this guide for resource monitoring feature of the kit.
- **Consistent view.** When LifeKeeper stops and starts VMware VirtualCenter Server, it maintains a consistent and complete view of the VMware VirtualCenter Server service on all nodes in the cluster.
- **Protected VMware VirtualCenter Server** services are set to **Manual** startup mode when the resource hierarchy is created. The startup type setting of the VMware VirtualCenter Server service should not be changed while it is protected by LifeKeeper.
- **License Server and Other Processes** should be set to Automatic if they will not be included in the LifeKeeper VMware VirtualCenter resource hierarchy. Special attention should be given to ensure that such services are not installed on a protected volume.

Understanding manual switchover limitations

Local processes that have read-only access to volumes do not prevent removal of a resource from service but may cause a restore to fail when you try to switch back. Examples might be the Performance Monitor, which periodically polls each volume, or any running process which is installed on the shared or replicated volume.

Running VMware Virtual Infrastructure Client

When using the Virtual Infrastructure Client, the connection should be made to the virtual IP address. Connecting to the virtual IP address allows the client to connect to VMware VirtualCenter Server without knowing which underlying server it is running on.

During a switchover of the VMware VirtualCenter resource hierarchy, the VMware Virtual Infrastructure client application will be disconnected. This is a known issue with the VMware VirtualCenter and the connection checks with the client application.

Monitoring and Recovering Your VMware VirtualCenter Hierarchy

As mentioned in the [LifeKeeper VMware VirtualCenter Recovery Kit Overview](#) section, the kit monitors the VMware VirtualCenter Server service and an optional service, if selected. The check is done by the quick check script, which is executed by LifeKeeper at the interval specified by the administrator when the VMware VirtualCenter resource is created. The default interval is 3 minutes. The kit also comes with a deep check script, which runs a port check of the VMware VirtualCenter ports configured for VMware VirtualCenter Server.

If either quick check or deep check fails, LifeKeeper will restart all VMware VirtualCenter services locally if local recovery is enabled for the VMware VirtualCenter resource. If you choose not to enable the local recovery feature during create of the resource hierarchy, then LifeKeeper will initiate an immediate failover to another server in the cluster.

Troubleshooting

VMware VirtualCenter Remote Database Check

When attempting to configure the remote database check, a couple of steps are required to ensure successful configuration.

1. Install the appropriate client utility for the external remote database. The Oracle or SQL Server client utilities must be located on each of the servers in the VMware VirtualCenter resource hierarchy.
2. Test access to the remote database using the associated database client utility.
3. If problems persist, set the variable LKVMDB in the LifeKeeper default file located under \$LKROOT/etc/default. The format of the variable is LKVMDB=<path to utility>;utility name. For example LKVMDB=C:\oraclient9;sqlplus

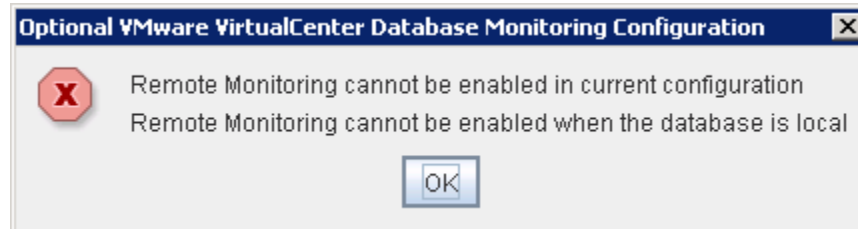
VMware VirtualCenter Fails to Start

1. Verify access to the external remote database is available. If the database is external local, verify the database resource is in-service and protected.
2. Verify correct ODBC settings for the Server/Server Name as well as proper authentication credentials have been specified.
3. From the LifeKeeper Graphical User Interface, take the protected VMware VirtualCenter resource out of service (Edit->Resource->Out of Service).
4. Using the Service Management utility, verify that the VMware VirtualCenter Server service is stopped on all servers in the cluster.
5. From the LifeKeeper Graphical User Interface, place the protected VMware VirtualCenter resource in service (Edit->Resource->In-Service).

What are LKSAV_VMwareVC and LifeKeeperSetup Files?

During the LifeKeeper extend operation for VMware VirtualCenter resources, several configuration files will be replicated to each target server. Before attempting to copy the configuration files from the template server to the target server, a copy of the file is made on the target server. The file is copied with an extension of .LKSAV_VMwareVC.

Unable to configure the Remote Database Check



The Remote Monitoring cannot be enabled in configurations where the VMware VirtualCenter database is configured as external local and is a protected resource configured as a dependent of the VMware VirtualCenter hierarchy.