

Backing Up and Recovering Data

You can configure vCenter Operations Manager to handle backup and recovery options, including high-availability clustering and remote failover. The appropriate amount of component redundancy varies from organization to organization.

At a minimum, include vCenter Operations Manager data components in the standard backup procedures of your organization. Perform a complete backup of vCenter Operations Manager data before you upgrade the vCenter Operations Manager software.

NOTE The vCenter Operations Manager vApp does not support replication, remote collectors, or distributed analytics.

This chapter includes the following topics:

- [“Backing Up and Recovering Data Components,”](#) on page 111
- [“Backing Up and Recovering Processing Components,”](#) on page 117

Backing Up and Recovering Data Components

vCenter Operations Manager stores data in the file system database (FSDB), its relational database (RDB), and its system files. Follow certain guidelines when you back up and recover these data components.

- [Backing Up the FSDB](#) on page 112
All metric values that vCenter Operations Manager collects are stored in its file system database (FSDB). This implementation enables the vCenter Operations Manager analytics software high access rates to the large amounts of data that vCenter Operations Manager stores.
- [Backing Up the RDB](#) on page 114
The vCenter Operations Manager RDB contains configuration and state information, such as dynamic threshold results, anomalies, alerts, and data correlation results that vCenter Operations Manager analytics and the vCenter Operations Manager user interface use.
- [Backing Up System Files](#) on page 114
vCenter Operations Manager uses system files for configuration, integration, and logging. These files are located in the vCenter Operations Manager software directory tree.
- [Recovering Data Components](#) on page 116
No data components depend on other components, and they do not need to be absolutely in sync relative to backup and recovery times. Keep the RDB and the vCenter Operations Manager system files as up-to-date as possible because they contain the configuration of the vCenter Operations Manager system, integration adapters, and monitored environment.

Backing Up the FSDB

All metric values that vCenter Operations Manager collects are stored in its file system database (FSDB). This implementation enables the vCenter Operations Manager analytics software high access rates to the large amounts of data that vCenter Operations Manager stores.

The FSDB is located on the vCenter Operations Manager server in either internal hard drives or a high-speed storage area network (SAN) device. vCenter Operations Manager does not support NAS or NFS file systems.

The default location for the FSDB is `vcenter-ops\data`, which is suitable for smaller environments. In larger environments, place the FSDB in a different file system than the vCenter Operations Manager software. You can store the FSDB in one path location, or split it into multiple locations.

Each resource has its own folder within the FSDB. The resource ID is the folder name. Each resource folder contains one data file for each month's data. Each file contains all metric values for all metrics for that resource for that month. While vCenter Operations Manager is collecting data, the current month's files in the FSDB are continually being updated.

FSDB Backup Guidelines

Back up all files in the vCenter Operations Manager FSDB folder regularly. You define these folders during installation, and you can find them by looking at the `FSDB_HOME` folder specification in the Configure VMware vCenter Operations Enterprise utility.

You can copy the FSDB at any time without stopping any vCenter Operations Manager services. The timing of the backup does not depend on other file backups. Performing incremental backups can reduce backup time and storage requirements, because only the most recent month's files are updated at any given time.

Over time, the FSDB can grow to be over 100GB. An efficient way to make incremental backups is to take advantage of the FSDB Replication Sync capability, which is provided to enable disaster recovery failover. The FSDB Replication Sync capability requires a separate vCenter Operations Manager server and FSDB data store, which runs in a warm or passive mode.

Set Up FSDB Replication

You can use the FSDB Replication Sync capability to make incremental backups of the FSDB. The FSDB Replication Sync capability requires a separate vCenter Operations Manager server and FSDB data store, which runs in a warm or passive mode.

NOTE The vCenter Operations Manager vApp does not support replication, remote collectors, or distributed analytics.

Prerequisites

- Become familiar with how to start and stop the Analytics service. See [“Start or Stop vCenter Operations Manager Services,”](#) on page 91.
- Contact VMware technical support before you change any replication settings.

Procedure

- 1 Create two vCenter Operations Manager servers, one primary and one backup.
- 2 Install the same version and build number of vCenter Operations Manager on both servers.
- 3 Open the `replication.properties` file in the `vcenter-ops\user\conf\analytics` directory on the vCenter Operations Manager server.
- 4 Set `enabled=true` to enable replication of FSDB content.
- 5 Save your changes and close the `replication.properties` file.

- 6 Restart the Analytics service on the primary vCenter Operations Manager server.

If a resource file is deleted on the primary vCenter Operations Manager server, it is also deleted on the replication server.

Switch the Primary and Backup Replication Servers

You can use the Configure VMware vCenter Operations utility to switch the replication server configuration from primary to backup, and the reverse.

NOTE The vCenter Operations Manager vApp does not support replication, remote collectors, or distributed analytics.

Prerequisites

- Set up FSDB replication. See [“Set Up FSDB Replication,”](#) on page 112.
- In a clustered environment, verify that the cluster resources are offline.

Procedure

- 1 From the **Start** menu, select **All Programs > VMware > vCenter Operations Enterprise > Configure VMware vCenter Operations** to start the Configure VMware vCenter Operations utility on each server.
 - On the primary vCenter Operations Manager server, on the Analytics page, select the **Enable Replication** check box and set the host to the backup vCenter Operations Manager server.
 - On the backup vCenter Operations Manager server, on the Replication Server page, set the host to be the local server.
- 2 Click **Finish** to save the configuration.

NOTE Because the vCenter Operations Manager services are reinstalled and restarted when you click **Finish**, click **Exit**, not **Finish**, to close the utility if you do not make any changes.

Enable FSDB Synchronization

Enable synchronization of FSDB content between the primary and backup vCenter Operations Manager servers only if missing or different data must be updated on the backup vCenter Operations Manager server. For example, if you configure and start the backup server after vCenter Operations Manager was already collecting data.

When synchronization is enabled, the task is sent to the replication server on the backup vCenter Operations Manager server. If the replication server is running, it returns a response to the primary Analytics service, which sends all missing and different data to the replication server.

After synchronization is finished, the Analytics service disables synchronization. Analytics continues to send real-time incoming data to the backup server, but not data from the FSDB.

NOTE The vCenter Operations Manager vApp does not support replication, remote collectors, or distributed analytics.

Prerequisites

- Set up FSDB replication. See [“Set Up FSDB Replication,”](#) on page 112.
- Become familiar with how to start and stop the Analytics service. See [“Start or Stop vCenter Operations Manager Services,”](#) on page 91.
- Contact VMware technical support before you change any FSDB synchronization settings.

Procedure

- 1 Open the `replication.properties` file in the `vcenter-ops\user\conf\analytics` directory on the vCenter Operations Manager server.
- 2 Set `synchronize=true`.
- 3 Specify the resource ID from which to start synchronization.
- 4 Save your changes and close the `replication.properties` file.
- 5 Restart the Analytics service on the primary vCenter Operations Manager server.

Backing Up the RDB

The vCenter Operations Manager RDB contains configuration and state information, such as dynamic threshold results, anomalies, alerts, and data correlation results that vCenter Operations Manager analytics and the vCenter Operations Manager user interface use.

In most cases, you put the RDB on a dedicated database server that is separate from the vCenter Operations Manager server but that is in close network proximity, such as in the same data center within the same firewall. In smaller environments, it might be suitable to host the RDB on the vCenter Operations Manager server.

Backing up the vCenter Operations Manager database has no special requirements. Your organization's database administrator can use standard corporate RDB procedures to back up the vCenter Operations Manager RDB on a regular basis.

Backing Up System Files

vCenter Operations Manager uses system files for configuration, integration, and logging. These files are located in the vCenter Operations Manager software directory tree.

Table 10-1. System File Backup Guidelines

System File Directory	Description	Backup Guidelines
<code>vcenter-ops\user\conf\analytics</code>	Analytics configuration directory. It includes files that contain parameters for the analytics algorithms, including which algorithms are enabled.	Back up the analytics configuration directory after vCenter Operations Manager is installed and configured and again if you make any configuration changes. This directory and its files are copied from the <code>vcenter-ops\save</code> directory during vCenter Operations Manager software upgrades.
<code>vcenter-ops\user\conf\plugins</code>	Analytics plug-ins directory. It contains algorithms that vCenter Operations Manager analytics uses, including files delivered with the software and any future algorithms that might become available. It contains a subdirectory for each installed Dynamic Threshold algorithm. Each plug-in directory includes a plug-in properties file, <code>vcenter-ops\user\conf\plugins\plugin_name\conf\plugin_name.properties</code> , that contains parameters for the algorithms.	The files in the analytics plug-ins directory are rarely updated after vCenter Operations Manager is in production. Back up the directory after vCenter Operations Manager is installed and configured and again if you change the configuration.

Table 10-1. System File Backup Guidelines (Continued)

System File Directory	Description	Backup Guidelines
<i>vcenter-ops</i> \user\plugins\outbound	Outbound alert plug-ins directory. It contains alert notification formats that vCenter Operations Manager uses.	The files in the outbound alert plug-ins directory are rarely updated after vCenter Operations Manager is in production. Back up the directory after vCenter Operations Manager is installed and configured and again if you make any changes to notification configuration.
<i>vcenter-ops</i> \collector	vCenter Operations Manager collector adapters directory. It contains all of the currently installed and configured collector adapters and their configurations.	The files and directories in the vCenter Operations Manager collector adapters directory are updated whenever adapters are added and removed from the system. Back up this directory, on the vCenter Operations Manager server and any remote server, after installation and after installing any new adapters. These file and directories are not overwritten during vCenter Operations Manager software upgrades unless a code change occurs to a adapter.
<i>vcenter-ops</i> \user\config\collector	vCenter Operations Manager collector configuration directory. It contains files that include parameters for the CollectorService and the trap listener.	The files in the vCenter Operations Manager collector configuration directory are rarely updated after vCenter Operations Manager is in production. Back up this directory, on the vCenter Operations Manager server and any remote server, after installation and after installing any new adapters. This directory and its files are copied to the <i>vcenter-ops</i> \save directory vCenter Operations Manager software upgrades.
<i>vcenter-ops</i> \uninstall_vcops\installvariables.properties	Install variables file. It contains key data from the initial install, which is reused for upgrades and the vCenter Operations adapter.	The install variables file is rarely updated after vCenter Operations Manager is in production. Back it up after installation. This file is overwritten during vCenter Operations Manager software upgrades.

Table 10-1. System File Backup Guidelines (Continued)

System File Directory	Description	Backup Guidelines
<i>vcenter-ops</i> \activemq\conf\log4j.properties	ActiveMQ logging properties file. It contains log4j parameters for ActiveMQ logging.	The ActiveMQ logging properties file is rarely updated after vCenter Operations Manager is in production. Back up this file after installation. This file is overwritten during vCenter Operations Manager software upgrades.
<i>vcenter-ops</i> \user\logs	vCenter Operations Manager log files, which include the optional vCenter Operations Manager Logs and the vCenter Operations Manager Collector Logs.	The files in the log files directory are rolled over on a daily basis. By default, vCenter Operations Manager is configured to keep up to seven daily log files of each type, but you can adjust this limit. To retain a copy of these files, you can back up this directory regularly on the vCenter Operations Manager server and remote servers. You can copy log files at any time without stopping vCenter Operations Manager services. To restore these log files, you must stop vCenter Operations Manager services.

Recovering Data Components

No data components depend on other components, and they do not need to be absolutely in sync relative to backup and recovery times. Keep the RDB and the vCenter Operations Manager system files as up-to-date as possible because they contain the configuration of the vCenter Operations Manager system, integration adapters, and monitored environment.

If you need to restore the RDB, follow the guidelines provided by your database administrator.

For information about how to recover the FSDB or vCenter Operations Manager system files, see [“Recover the FSDB or System Files,”](#) on page 116.

Recover the FSDB or System Files

You can recover the FSDB or vCenter Operations Manager system files.

Procedure

- 1 Stop the vCenter Operations Manager processes.

vCenter Operations Manager processes lock some files, particularly log files. You cannot restore them until the associated process stops. The vCenter Operations Manager processes include `vcopsWebService`, `AnalyticsServer`, `ActiveMQ`, and `CollectorService`.
- 2 Copy and paste the backup files back to their live locations.
- 3 After restoring all files, restart the vCenter Operations Manager processes.

Backing Up and Recovering Processing Components

You must follow certain guidelines when you back up and recover the vCenter Operations Manager processing components. The processing components include the vCenter Operations Manager server, the vCenter Operations Manager Remote Collector server, the DT processor server, and the database server.

- [Selecting a Backup and Recovery Strategy for the Server](#) on page 117
The vCenter Operations Manager server runs the services that make up the vCenter Operations Manager application. These services include the vCenter Operations Manager Web service, Collector service, ActiveMQ service, and Analytics service. Because it is a high-performance and resource-intensive application, vCenter Operations Manager usually requires a dedicated server.
- [Backing Up and Recovering the RDB Server](#) on page 119
vCenter Operations Manager uses commercially available relational databases. If the vCenter Operations Manager RDB is unavailable, vCenter Operations Manager becomes unavailable. If you require a high availability or remote failover capability, configure the RDB server to use clustering or a remote warm backup.
- [Backing Up and Recovering a Remote Collector Server](#) on page 119
The vCenter Operations Manager remote collector is a remote host that has only the vCenter Operations Manager collector installed. A remote collector does not store data. You might want to install one or more remote collectors to navigate firewalls, reduce bandwidth across data centers, and reduce the load on the vCenter Operations Manager server.
- [Backing Up and Recovering a Remote DT Processor Server](#) on page 119
A remote DT processor is a vCenter Operations Manager Server process that performs analytics calculations. It does not store data. You can distribute the load by starting a separate analytics process on one or more remote hosts to perform just the dynamic threshold (DT) portion of analytics processing.

Selecting a Backup and Recovery Strategy for the Server

The vCenter Operations Manager server runs the services that make up the vCenter Operations Manager application. These services include the vCenter Operations Manager Web service, Collector service, ActiveMQ service, and Analytics service. Because it is a high-performance and resource-intensive application, vCenter Operations Manager usually requires a dedicated server.

Many organizations use the vCenter Operations Manager server, and by extension the FSDB, as a mission-critical application. You can implement vCenter Operations Manager as a set of clustered servers for high availability, or as a set of remote servers for disaster recovery or failover purposes, or both.

Implementing High Availability for the Server

You can implement high availability for the vCenter Operations Manager server by using shared disks and clustering software. When a server that hosts vCenter Operations Manager becomes unavailable, the clustering software maps the shared disk and vCenter Operations Manager services to the backup server and brings them online.

High availability capability has the following hardware and software requirements.

- A shared disk (SAN) to install the vCenter Operations Manager software and vCenter Operations Manager FSDB.
- Two separate servers on which to deploy vCenter Operations Manager services and environment variables.
- Cluster software on both servers to manage vCenter Operations Manager services.
- A virtual IP address representing the cluster, for end users and remote collectors that point to the vCenter Operations Manager server to use.

When a server that hosts vCenter Operations Manager becomes unavailable and is remapped by the clustering software, any users that are logged in to vCenter Operations Manager are logged out and the vCenter Operations Manager system becomes unavailable for about 15 seconds. Because it is installed on the shared disk, the FSDB is not affected. The RDB remains accessible from both servers because it is installed on a different server than the vCenter Operations Manager software.

For more information about how to install and configure of a clustered environment, see your specific clustering documentation.

Implementing Disaster Recovery for the Server

vCenter Operations Manager has built-in abilities to enable a quick transition to a completely separate backup vCenter Operations Manager server or cluster if the primary server or cluster is unavailable. You must manually switch the vCenter Operations Manager software to use the backup server or cluster as the primary server or cluster.

The separate backup server typically resides in a different location than the primary system for disaster recovery purposes. The remote backup server or cluster contains a vCenter Operations Manager instance that serves as a backup replication server. This instance keeps a warm, updated copy of the FSDB.

Disaster recovery has the following hardware and software requirements.

- A separate remote vCenter Operations Manager instance that is configured as a backup server.
- A vCenter Operations Manager FSDB replication server that is running the replication service. After the remote FSDB is synchronized with the local FSDB, the data should be identical.
- A vCenter Operations Manager database that is synchronized with the appropriate vendor software.
- A scheduled batch file that copies key vCenter Operations Manager files to the backup server. For information about the vCenter Operations Manager files that are required on the backup server, see [“Backing Up System Files,”](#) on page 114.

When the primary server or cluster that hosts vCenter Operations Manager becomes unavailable, the vCenter Operations Manager database should failover to the backup database by using the appropriate vendor software. Users who were logged in to vCenter Operations Manager are logged out. The vCenter Operations Manager system is unavailable until you configure the backup server to be the primary server and all services are turned back on. See [“Switch the Primary and Backup Servers,”](#) on page 118.

The typical critical path timing item is the restoration of the RDB. All alerts in the new vCenter Operations Manager system at the time of the most recent RDB backup are active, but vCenter Operations Manager analytics should reset all alerts to the appropriate state after 15 minutes.

Switch the Primary and Backup Servers

If the primary server or cluster is unavailable, you must manually switch the vCenter Operations Manager software to use the backup server or cluster as the primary server or cluster.

Prerequisites

Implement disaster recovery. See [“Implementing Disaster Recovery for the Server,”](#) on page 118.

Procedure

- 1 From the **Start** menu, select **All Programs > VMware > vCenter Operations Enterprise > Configure VMware vCenter Operations** to start the Configure VMware vCenter Operations utility on the backup server.
- 2 On the Full Configuration page, change the **Server Configuration** setting from **Backup** to **Primary**.
This setting converts the vCenter Operations Manager system on the backup server to serve as the new primary server.

- 3 Update the server IP address, or the virtual IP address that represents the cluster, to the correct IP address for the new primary server or cluster.

End users and remote collectors that point to the vCenter Operations Manager server must use the new IP address.

- 4 Click **Finish** to save the configuration.

NOTE Because the vCenter Operations Manager services are reinstalled and restarted when you click **Finish**, click **Exit**, not **Finish**, to close the utility if you do not make any changes.

What to do next

If you need to switch a vCenter Operations Manager replication server to the primary server, you might need to make additional changes. See [“Switch the Primary and Backup Replication Servers,”](#) on page 113.

Backing Up and Recovering the RDB Server

vCenter Operations Manager uses commercially available relational databases. If the vCenter Operations Manager RDB is unavailable, vCenter Operations Manager becomes unavailable. If you require a high availability or remote failover capability, configure the RDB server to use clustering or a remote warm backup.

Instances that are configured against a single database are unavailable if that database becomes unavailable. If this situation occurs, a high availability strategy that includes a clustered database environment enables the cluster to immediately switch the shared disks and the vCenter Operations Manager instance to the backup server if one database becomes unavailable.

Backing Up and Recovering a Remote Collector Server

The vCenter Operations Manager remote collector is a remote host that has only the vCenter Operations Manager collector installed. A remote collector does not store data. You might want to install one or more remote collectors to navigate firewalls, reduce bandwidth across data centers, and reduce the load on the vCenter Operations Manager server.

If a remote collector server becomes unavailable, the primary vCenter Operations Manager server does not receive data from the portion of the monitored environment that is configured for that particular remote collector.

Although you can install a remote collector on a cluster, typical implementations install a separate collector on another server. This backup remote collector should have the same vCenter Operations Manager collector adapters folder and the same vCenter Operations Manager collector configuration folder as the primary remote collector. If the primary remote collector becomes unavailable, you can bring the backup remote collector online.

Backing Up and Recovering a Remote DT Processor Server

A remote DT processor is a vCenter Operations Manager Server process that performs analytics calculations. It does not store data. You can distribute the load by starting a separate analytics process on one or more remote hosts to perform just the dynamic threshold (DT) portion of analytics processing.

If a remote processor server goes down, vCenter Operations Manager continues to collect and store data, but dynamic thresholds are not recalculated based on the new data.

You do not need to have a backup of a remote DT processor. If the remote DT processor becomes unavailable, you can configure the analytics process on the vCenter Operations Manager server to perform the dynamic threshold calculations. See [“Configure the Analytics Process to Perform DT Calculations,”](#) on page 120.

You can also install the remote DT analytics process on a different host. See the *VMware vCenter Operations Installation Guide*.

Configure the Analytics Process to Perform DT Calculations

If the remote DT processor becomes unavailable, you can configure the analytics process on the vCenter Operations Manager server to perform dynamic threshold calculations.

IMPORTANT Always make a backup copy of the `advanced.properties` file. Changes that you make might cause errors in the file that can adversely affect vCenter Operations Manager operations.

Prerequisites

Become familiar with how to start and stop the Analytics service. See [“Start or Stop vCenter Operations Manager Services,”](#) on page 91.

Procedure

- 1 Make a backup copy of the `advanced.properties` file in the `vcenter-ops\user\conf\analytics` directory on the vCenter Operations Manager server.
- 2 Open the original `advanced.properties` file and find the `distributedDTCalculationsEnabled` property.
- 3 Change `distributedDTCalculationsEnabled` to `false`.
- 4 Save your changes and close the `advanced.properties` file.
- 5 Restart the Analytics service.