

# vCenter Chargeback Manager User's Guide

vCenter Chargeback Manager 2.0.0

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# About the User's Guide

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The *vCenter Chargeback Manager User's Guide* provides information about configuring and using the chargeback solution for virtual environments that use VMware Infrastructure or VMware vSphere.

## Intended Audience

This book is intended for anyone who wants to use vCenter Chargeback Manager. The information in this book is written for experienced Windows system administrators who are familiar with virtual machine technology and datacenter operations.



# Introduction to vCenter Chargeback Manager

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# 1

vCenter Chargeback Manager is an end-to-end cost reporting solution for virtual environments using vSphere. vCenter Chargeback Manager can also be used with VMware vCloud Director. Before you install and start using vCenter Chargeback Manager, an understanding of what is chargeback and about chargeback solutions for a virtual environment would be helpful.

This chapter includes the following topics:

- [“What Is Chargeback,”](#) on page 7
- [“Chargeback Solution for Virtual Environments,”](#) on page 7
- [“Overview of vCenter Chargeback Manager,”](#) on page 8

## What Is Chargeback

Chargeback is a mechanism to account for the operational costs involved in providing and maintaining an IT infrastructure, including the costs for IT services and applications. Measuring resource utilization and calculating the corresponding IT operational cost enables you to account for the IT resources utilized and bill for the services provided.

In a non-virtual environment, a physical server and the associated resources like the applications running on it can be easily mapped to the department using them, making the billing for such resource utilizations relatively easy. Also, costs incurred due to maintenance and licensing can be directly associated to a department, thereby enabling you to calculate the complete IT operational costs.

In a virtual environment, however, the task of calculating the IT operational cost for each department becomes very difficult. Multiple virtual machines run on a physical server, which might be shared across different departments or cost centers in an organization. As a result, resource utilization for this server and, therefore, the cost incurred cannot be directly associated to any single department or cost center. The difficulty in accounting gets further compounded when applications and services get shifted over time to different servers, based on the load and available infrastructure resources.

## Chargeback Solution for Virtual Environments

In a virtual environment, a chargeback solution requires a flexible metering system that can account for the utilization of resources shared across the organization.

These measurements can be based on allocation or actual usage of individual servers and resources. In the case of VMotion, DRS, or HA being enabled, the measurements could be based on the allocation or actual usage of resource pools.

To support chargeback, the virtual environment and the chargeback solution must provide ways to measure resource usage and associate the usage with a specific costing model. The chargeback solution must also support the use of different costing models so as to charge the various departments or cost centers differently.

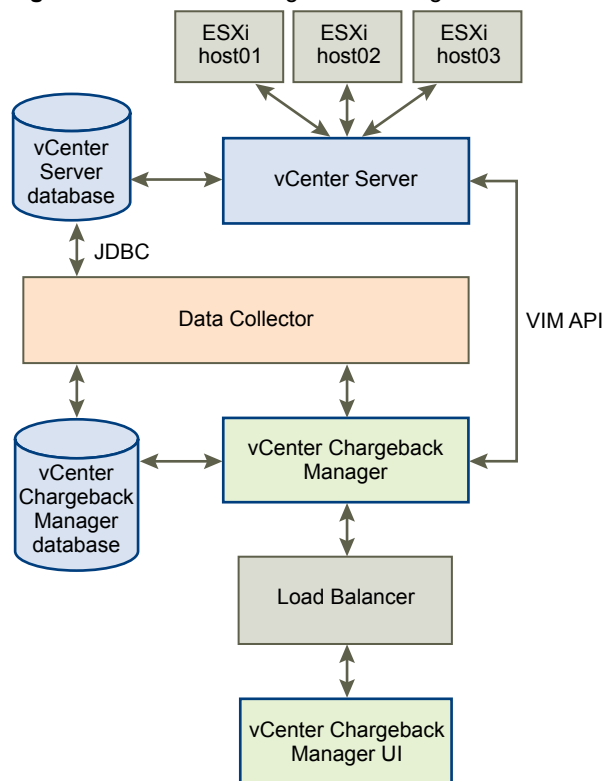
A chargeback solution for a virtual environment defines a hierarchy with different types of entities such as departments, divisions, business units, cost centers, physical servers, virtual machines, and so on. For each entity type, a cost model is defined that determines the rate for each unit of a resource utilized. The chargeback solution determines the resource usage by using either utilization-based metering or allocation-based metering of virtual machines. The metered parameters are then associated with the designated entities, and the cost model defined for that entity along with specific chargeback formulas are used as part of the overall chargeback solution.

## Overview of vCenter Chargeback Manager

Determining the resource utilization and calculating the corresponding cost for a virtual environment that uses VMware vSphere typically involves VMware professional services' work or use of partner solutions. These solutions are built using custom methods for VMware vSphere resource data collection and chargeback cost calculation for organizations.

vCenter Chargeback Manager is an end-to-end cost reporting solution for virtual environments that use VMware vSphere. This Web-based application interacts with the vCenter Server Database to retrieve usage information, calculates the cost by using the defined chargeback formulas, and generates cost and usage reports. [Figure 1-1](#) shows how vCenter Chargeback Manager interacts with various components of a virtual environment using VMware vSphere.

**Figure 1-1.** vCenter Chargeback Manager in a Virtual Environment



vCenter Chargeback Manager runs on an Apache Tomcat server instance. Users interact with vCenter Chargeback Manager through a load balancer (Apache HTTP Server). vCenter Chargeback Manager connects to the vCenter Chargeback Manager database that stores application-specific information, such as the defined chargeback hierarchies, cost models, users, roles, and so on. The application interacts with the vCenter Server using VIM APIs and with the vCenter Server Database through a data collector. The data collector communicates with the vCenter Server Database using JDBC.



When you install vCenter Chargeback Manager, a load balancer and a data collector is also installed and run on the same machine. Although the vCenter Chargeback Manager database can also be installed on the same machine, in a real-world scenario you would install the application and the database on separate machines.

vCenter Chargeback Manager retrieves the virtual infrastructure inventory and the resource usage information for each virtual machine from the vCenter Server database through the data collector. The data collector replicates this information in the vCenter Chargeback Manager database. vCenter Chargeback Manager uses this information from the vCenter Chargeback Manager database along with the cost model and chargeback cost calculation formulas to generate the cost reports. A single data collector instance can communicate with multiple vCenter Server instances and vCenter Server databases and replicate the relevant information in a vCenter Chargeback Manager database.

vCenter Chargeback Manager also lets you create a cluster of vCenter Chargeback Manager instances that share a single load balancer. Each user request is routed through the load balancer. The load balancer forwards the request to a vCenter Chargeback Manager instance in the cluster, while ensuring session affinity for an instance, based on the number of requests currently being serviced by each instance in the cluster. All the vCenter Chargeback Manager instances in a cluster are connected to the same vCenter Chargeback Manager database.

If you have a VMWare vCloud Director setup, you can install the vCloud Director Data Collector and configure it appropriately so that the vCloud Director setup can be integrated with vCenter Chargeback Manager. You can then generate various reports of the organizations classified under the different categories, such as Pay-As-You-Go, Reservation, and Allocation Pool.



# Configuring Administration Settings

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As an administrative user, you can perform various administrative tasks, such as configuring the LDAP and SMTP servers in the application and adding as well as updating vCenter Server information.

To perform these administrative tasks, you must have the Super User or Administrator role. The user account details provided during the installation has the Super User role defined on it. Log in to the application by using this administrative user account.

This chapter includes the following topics:

- [“Activate the Application,”](#) on page 11
- [“Configuring Generic Settings,”](#) on page 12
- [“Managing LDAP Servers,”](#) on page 15
- [“Managing vCenter Servers,”](#) on page 17
- [“Managing Data Collectors,”](#) on page 22
- [“Managing the Application License,”](#) on page 29
- [“Manage Report View,”](#) on page 30
- [“Managing Attributes,”](#) on page 31
- [“Manage System Health Thresholds,”](#) on page 33
- [“Manage Computing Resources,”](#) on page 33

## Activate the Application

When you log in to vCenter Chargeback Manager for the first time after installation, you are prompted to enter the license key.

### Procedure

- 1 On the Add License screen, enter the license key.
- 2 Provide the username and password of the Super User.
- 3 Click **Add**.

The details about this license is stored in the application and can be accessed from the **License** page of the **Settings** tab.

## Configuring Generic Settings

Before you start using the various features of vCenter Chargeback Manager, you must configure few settings in the application.

Some of the generic settings can be configured from the **Settings** tab. You can configure the SMTP server settings and the log level from the **General** page of the **Settings** tab.

The **General** page of the **Settings** tab lists all the vCenter Chargeback Manager instances added to the cluster. In the case of a stand-alone installation, a single URL for the vCenter Chargeback Manager is displayed. You can remove the vCenter Chargeback Manager instances that are not required or not responding from this page.

### Configure the SMTP Server Setting

You must configure the SMTP server setting in vCenter Chargeback Manager to send the generated and archived reports through email.

You must have the Super User role to perform this task.

#### Procedure

- 1 In the **Settings** tab, click **General**.
- 2 Click **Add** in the Email Setting section.  
The Manage Email Server screen is displayed.
- 3 Provide information about the SMTP server that the application uses to send emails.

Option	Description
<b>Server HostName</b>	Static IP address of the SMTP server. If the sever does not have a static IP address, ensure that you provide the FQDN.
<b>Server Port</b>	Port number on which the SMTP server is listening for requests.
<b>Email Address</b>	Email address that the application must use to send emails.
<b>Authentication Type</b>	Type of authentication to be used to access the SMTP server. The default is Anonymous.
<b>User Name</b>	User name to be used for authentication, if authentication type is Require Login.
<b>Password</b>	Password for the user name provided above.
<b>Maximum Attachment Size(KB)</b>	The maximum permissible file size for email attachments. The size specified is in KB.

- 4 Click **Add**.

The email address provided is displayed in the Email Setting section.

### Edit the SMTP Server Setting

After configuring the SMTP server setting, you can change it any time, provided you have the required privileges. For instance, if the SMTP user account password is changed on the SMTP server, you must also reflect this change in vCenter Chargeback Manager.

You must have the Super User role to perform this task.

#### Procedure

- 1 In the **Settings** tab, click **General**.

- 2 Click **Edit** in the Email Setting section.  
The Manage Email Server screen is displayed.
- 3 Modify the required SMTP server settings.

Option	Description
<b>Server HostName</b>	Static IP address of the SMTP server. If the sever does not have a static IP address, ensure that you provide the FQDN.
<b>Server Port</b>	Port number on which the SMTP server is listening for requests.
<b>Email Address</b>	Email address that the application must use to send emails.
<b>Authentication Type</b>	Type of authentication to be used to access the SMTP server. The default is Anonymous.
<b>User Name</b>	User name to be used for authentication, if authentication type is Require Login.
<b>Password</b>	Password for the user name provided above.
<b>Maximum Attachment Size(KB)</b>	The maximum permissible file size for email attachments. The size specified is in KB.

- 4 Click **Edit**.

The email address is displayed in the Email Setting section.

## Delete the SMTP Server Setting

You can remove an existing SMTP server and add a new one.

You must have the Super User role to perform this task.

### Procedure

- 1 In the **Settings** tab, click **General**.
- 2 Click **Remove** in the Email Setting section.  
A dialog confirming the action is displayed.
- 3 Click **OK**.

## Set Log Level

By default, the log level for the application is set at the info level. You can change the log level at any time in the application as per your requirements.

You must have the Super User role to perform this task.

---

**NOTE** In the case of a cluster installation, the changing of log level in one application instance will not be reflected in the other instances in the cluster immediately. The change will get reflected:

- If the vCenter Chargeback Manager service is restarted.
  - When the database is polled for changes, which automatically occurs every hour.
- 

### Procedure

- 1 In the **Settings** tab, click **General**.

- In the Log Setting section, select the required log level from the **Select Log level** list.

Option	Description
<b>trace</b>	The trace level is the most informative level providing fine-grained information about the events.
<b>debug</b>	The debug level provides event information that are most useful to debug an application.
<b>info</b>	(default): The info level provides coarse-grained informational messages that highlight the progress of the application.
<b>warn</b>	The warn level provides information about potentially harmful situations.
<b>error</b>	The error level designates error events that might still allow the application to continue running.
<b>fatal</b>	The fatal level designates very severe error events that will presumably lead the application to abort.

- Click **Apply**.

## Remove a vCenter Chargeback Manager

You must ensure that vCenter Chargeback Manager instances that are unavailable or not required are removed from the cluster.

In a cluster configuration, the load balancer forwards the requests to a vCenter Chargeback Manager instance that has a lighter load. However, even if a vCenter Chargeback Manager instance is unavailable and not responding, the load balancer tries to forward the requests to such an instance. You must, therefore, monitor the health of the vCenter Chargeback Manager instances and remove those instances from the cluster that are not responding.

When you remove a vCenter Chargeback Manager from the UI, the corresponding entries for the instance is removed from the System Health. However, the instance is still in the cluster and the load balancer sends requests to it. You must manually remove the instance from the load balancer by running the `ModifyLBWorkers.bat` file. You must have the Super User role to perform this task.

**NOTE** Removing a vCenter Chargeback Manager instance does not correspond to uninstalling the instance. Only the details of the instance is removed from a database table and from the application UI. The instance exists on the system that it is installed. You can log in to this instance and use it, if the instance functions correctly.

### Procedure

- In the **Settings** tab, click **General**.  
A list of vCenter Chargeback Manager instances is displayed under the Chargeback Servers section.
- Select the vCenter Chargeback Manager that you want to remove.
- Click **Remove**.
- Click **OK** to confirm the remove operation.

The vCenter Chargeback Manager details are removed from the database and the System Health page.

### What to do next

You must run the `ModifyLBWorkers.bat` file to remove the corresponding vCenter Chargeback Manager entry from the load balancer. Run the following commands from the command-line prompt:

```
> cd Installation_Folder\vCenter-CB-Tools\load-balancer\bin\  
> ModifyLBWorkers delete Server_Instance_Name
```

<Installation\_Folder> is the complete folder path provided during the vCenter Chargeback Manager installation. The default installation folder is C:\Program Files\VMware\VMware vCenter Chargeback. *Server\_Instance\_Name* is the name that you have provided during the installation.

You must restart the Load Balancer service after running the `ModifyLBWorkers.bat` file.

## Managing LDAP Servers

You can configure one or more LDAP servers in vCenter Chargeback Manager. vCenter Chargeback Manager supports only Microsoft Windows Server 2003 Active Directory and Microsoft Windows Server 2008 Active Directory.

You can view and manage the LDAP servers from the LDAP Servers page of the **Settings** tab. You can also configure the LDAP server for secure communication using SSL certificates.

### Configure the LDAP Server Setting

Configuring the LDAP server setting in the application enables Windows Active Directory users to access the application using their Windows Active Directory login credentials.

You must have the Super User role or the Administrator role to perform this task.

#### Procedure

- 1 In the **Settings** tab, click **LDAP Servers**.
- 2 Click **Add**.

The Manage LDAP Server screen is displayed.

- 3 Enter the information related to the LDAP server that you want to configure in the application.

Option	Description
<b>Server Name</b>	A user-defined name to uniquely identify the LDAP server. You can provide a full name or a short code to identify the LDAP server.
<b>Server Address</b>	Static IP address of the LDAP server. If the sever does not have a static IP address, ensure that you provide the fully-qualified domain name (FQDN).
<b>User Name</b>	The LDAP account to authenticate in to the LDAP server. The user name can be of the formats <code>user_name@domain_name</code> or <code>domain_name\user_name</code> . Preferably, use the User Principal Name (UPN).
<b>Password</b>	Password for the user name provided.
<b>BaseDN</b>	The distinguished name (DN) of the entity in the LDAP hierarchy from which groups and users can be added to the application. If not sepcified, vCenter Chargeback Manager automatically fetches the root base dn and uses this value.
<b>Port</b>	Port on which the LDAP service is listening. The default port is 389. If you select the <b>Enable LDAPS</b> option, ensure that you change this to a secure port, say 636.
<b>LDAP Limit</b>	The maximum number of Windows Active Directory users or groups to be fetched and displayed in the Add User Account screen of the application.
<b>Enable LDAPS</b>	Select this option to enable LDAP over SSL.

- 4 Click **Add**.

If you have selected **Enable LDAPS**, then a dialog requesting you to accept the SSL certificate is displayed.

- 5 Accept the SSL certificate.

If you click **Cancel**, the LDAP Server setting configuration fails.

On successfully configuring the LDAP server setting, the details of the LDAP server, except the authentication information, are displayed in the table on the LDAP Servers page.

### What to do next

You can now add the Windows Active Directory users and groups to vCenter Chargeback Manager so that they can access the application using their Windows Active Directory login credentials. To know more about adding LDAP users and groups to the application, see [“Creating Users,”](#) on page 45.

## Edit the LDAP Server Setting

After you have configured an LDAP server in the application, you can modify its details any time, provided you have the required privileges. For instance, if the LDAP user account password is changed on the LDAP server, you must also reflect this change in vCenter Chargeback Manager.

If the SSL certificate on the LDAP server is changed, you must modify the LDAP server setting in vCenter Chargeback Manager to obtain the modified SSL certificate. Else, communication with the LDAP server fails.

To perform this task, you must have the Super User role or the Administrator role. If you have the Administrator role, you can only edit those LDAP server settings that you have configured.



**CAUTION** Changes to the LDAP server settings might impact the corresponding LDAP users and groups that are already added to the application. If you change the BaseDN to the DN of an entity that is lower in the LDAP hierarchy compared to the currently set DN, then LDAP users that exist above the new DN will not be able to log in to vCenter Chargeback Manager, and the resources created by them in the application, such as hierarchies, cost model, and reports, might get orphaned and become unusable.

### Procedure

- 1 In the **Settings** tab, click **LDAP Servers**.
- 2 Select the required LDAP server from the table displayed on the page.
- 3 Click **Edit**.

The Manage LDAP Server screen is displayed.

- 4 Modify the required LDAP server setting.

Option	Description
<b>Server Name</b>	A user-defined name to uniquely identify the LDAP server. You can provide a full name or a short code to identify the LDAP server.
<b>Server Address</b>	Static IP address of the LDAP server. If the sever does not have a static IP address, ensure that you provide the fully-qualified domain name (FQDN).
<b>User Name</b>	The LDAP account to authenticate in to the LDAP server. The user name can be of the formats <code>user_name@domain_name</code> or <code>domain_name\user_name</code> . Preferably, use the User Principal Name (UPN).
<b>Password</b>	Password for the user name provided.
<b>BaseDN</b>	The distinguished name (DN) of the entity in the LDAP hierarchy from which groups and users can be added to the application. If not sepcified, vCenter Chargeback Manager automatically fetches the root base dn and uses this value.
<b>Port</b>	Port on which the LDAP service is listening. The default port is 389. If you select the <b>Enable LDAPS</b> option, ensure that you change this to a secure port, say 636.
<b>LDAP Limit</b>	The maximum number of Windows Active Directory users or groups to be fetched and displayed in the Add User Account screen of the application.
<b>Enable LDAPS</b>	Select this option to enable LDAP over SSL.



- 5 Click **Save**.

If you have selected **Enable LDAPS** during the modify LDAP Server setting operation or the SSL certificate on the LDAP server has changed, then a dialog requesting you to accept the SSL certificate is displayed.

- 6 Accept the SSL certificate.

If you click **Cancel**, the LDAP Server setting configuration fails.

The table on the LDAP Servers page lists the modified information for the selected LDAP server.

## Delete the LDAP Server Setting

Any LDAP server that is no longer in use and configured in the application can be deleted from the application.

To perform this task, you must have the Super User role or the Administrator role. If you have the Administrator role, you can only delete those LDAP server settings that you have configured.

---

**IMPORTANT** If you remove an LDAP server, the corresponding LDAP users and groups will also be deleted from the application.

---

### Procedure

- 1 In the **Settings** tab, click **LDAP Servers**.
- 2 Select the required LDAP server from the table displayed on the page.
- 3 Click **Delete**.  
A dialog confirming the action is displayed.
- 4 Click **OK**.

Information about the LDAP server is deleted from the table displayed on the LDAP Servers page.

## Managing vCenter Servers

To determine the utilization of computing resources by the virtual machines and calculate the total costs, you must first add the vCenter Server instances in your virtual environment to vCenter Chargeback Manager.

You can add more than one vCenter Server to the application. The application also lets you modify the information about the vCenter Server instances and delete a vCenter Server from the application when it is no longer required.

Communication with the vCenter Server is secured using a SSL certificate. After you add or modify the vCenter Server settings in vCenter Chargeback Manager, you can view and install the SSL certificate presented by the vCenter Server. If you chose not to install the SSL certificate, the vCenter Server is not added to and cannot be accessed from vCenter Chargeback Manager.

If you change the SSL certificate on the vCenter Server or upgrade the vCenter Server, then you must modify the vCenter Server information in vCenter Chargeback Manager to import the new SSL certificate.

### Add vCenter Server Information

vCenter Chargeback Manager can calculate overall resource utilization and corresponding cost only for vCenter Servers that are added to the application. You can add one or more vCenter Server instances to vCenter Chargeback Manager.

You must have the Super User role or the Administrator role to perform this task.

## Prerequisites

- Before you add a vCenter Server, you must ensure that the vCenter Server is accessible over the network. Also, ensure that vCenter Server and the vCenter Server database have static IP addresses. If not, you must provide the FQDN for such servers and databases when adding them to vCenter Chargeback Manager.
- You must ensure that the system time on the vCenter Server, vCenter Chargeback Manager, vCenter Server database, vCenter Chargeback Manager database, and data collectors are in sync.
- When adding a vCenter Server to vCenter Chargeback Manager, you must provide a vCenter Server user name and vCenter Server database user name. Create a clone of the **Read-only** role in vCenter Server and include the following permissions in this cloned role:
  - **Storage views.View**
  - **Global.Licenses**
  - **Extension.Register extension**
  - **Extension.Unregister extension**
  - **Extension.Update extension**
  - **Profile-driven storage.Profile-driven storage view**; if you are using vCenter Server 5.0.
  - **Global.vCenter Operations User**; if you have integrated the vCenter Server with VMware vCenter Operations.

Create a user in vCenter Server for vCenter Chargeback Manager and assign this cloned role to the user. Also, create a user in the vCenter Server database for vCenter Chargeback Manager and ensure that the user has read access on the VPXV\_HIST\_STAT\_DAILY, VPXV\_HIST\_STAT\_WEEKLY, VPXV\_HIST\_STAT\_MONTHLY, and VPXV\_HIST\_STAT\_YEARLY views.

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**NOTE** Do not provide the user details that vCenter Server uses to connect to the vCenter Server database.

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## Procedure

- 1 In the **Settings** tab, click **vCenter Servers**.

A table listing information about the vCenter Server instances added to the application is displayed.

- 2 Click **Add**.

The vCenter Server Information screen is displayed.

- 3 Enter information about the vCenter Server and its corresponding database that has to be added to the application.

Option	Description
<b>vCenter Server Hostname/IP</b>	FQDN or IP address of the vCenter Server. The IP address or host name cannot be edited after the vCenter Server is added to the application.
<b>vCenter Server Display Name</b>	A display name for the vCenter Server.
<b>vCenter Server Description</b>	A description of the vCenter Server. This is optional.
<b>vCenter Server Username</b>	User name to access the vCenter Server.
<b>vCenter Server Password</b>	Password for the user name entered.

Option	Description
<b>Database URL</b>	<p>URL to access the vCenter Server database.</p> <p>For Oracle Database, this URL must have the format:  <i>IP address/host name:TNS listener port</i></p> <p>For example:  123.123.123.123:1521</p> <p>For Microsoft SQL Server, this URL can be in the following formats:  <i>IP address/host name\database instance name</i>  or  <i>IP address/host name</i></p> <p>For example:  123.123.123.123\chargeback_db</p> <p>You can also specify a well formed JDBC URL that starts with 'jdbc' and contains the database name. If the vCenter Server database is on an Oracle RAC environment, then you must provide a JDBC URL for the database.</p>
<b>Database Name</b>	<p>Name of the vCenter Server database. For example, <i>vim_vcdb</i>, which is the default name given by vCenter Server. If you are using Oracle Database, then the database name can be either the service name or SID. If you are providing the service name, ensure that you prefix the service name with a forward slash (/). For example:  <i>/service_name</i></p>
<b>Database Type</b>	<p>The database type can be either <b>SQL Server</b> (default) or <b>Oracle</b>.</p>
<b>Authentication Type</b>	<p>This option is available only if you have set the <b>Database Type</b> to <b>SQL Server</b>. You can set the <b>Authentication Type</b> to <b>Credential Based Authentication</b> or <b>Windows Authentication</b>. <b>Credential Based Authentication</b> lets you access the database using SQL Server authentication. If you select <b>Credential Based Authentication</b>, you must provide the database user name and password to access the database. <b>Windows Authentication</b> lets you access the database using a Windows user account that can authenticate in to the SQL Server database. If you select <b>Windows Authentication</b>, you can provide a domain user name and password to access the vCenter Server database.</p>
<b>Database Username</b>	<p>A database user name to access the vCenter Server database. Ensure that this is not the same user that vCenter Server uses to connect to the vCenter Server database.</p> <p>If you have selected <b>Windows Authentication</b>, then provide a domain user name to access the vCenter Server Database. The domain user name must be of the form <b>user@domain.com</b> or <b>domain\user</b>. If you do not specify a domain user name, then vCenter Chargeback Manager uses the details of the domain user who started the current session of the vCenter Chargeback Manager service to access the vCenter Server Database.</p>
<b>Database Password</b>	<p>Password for the database user name or domain user name entered.</p>
<b>Register As vSphere Client Plug-in</b>	<p>Select this option if you would like to register vCenter Chargeback Manager as a plug-in to vSphere Client. If this option is selected, each time you log in to this vCenter Server using the vSphere Client, the vCenter Chargeback Manager plug-in is displayed on the vSphere Client. You can access the vCenter Chargeback Manager from the vSphere Client as a vCenter Server user. Ensure that you do not register more than one vCenter Chargeback Manager instance as a plug-in for a single vCenter Server.</p>
<b>Enable Stats Replication</b>	<p>Select this option if you want the resource usage statistics from the vCenter Server Database to be replicated in the vCenter Chargeback Manager Database. Statistics starting from three months prior to adding the vCenter Server are collected. vCenter Chargeback Manager considers the existing vCenter Server inventory to have existed for the three month period prior to adding the vCenter Server.</p>

4 Click **Add**.

A dialog requesting you to add an SSL certificate for secure communication with the vCenter Server is displayed.

5 Accept the SSL certificate request.

If you click **Cancel**, the add vCenter Server operation is cancelled.

The vCenter Server is added to the application and included in the table listing the vCenter Server instances.

### What to do next

You can log in to the vCenter Server by using a vSphere Client and access the vCenter Chargeback Manager plug-in if you have selected the **Register As vSphere Client Plug-in** option. You must, however, provide the IP address or the DNS name of the vCenter Server during login. If you use `localhost` during login, the plug-in might be unavailable.

## Edit vCenter Server Information

Changes to the vCenter Server configuration must be manually reflected in the vCenter Chargeback Manager. For example, if the vCenter Server user account password or the password for the vCenter Server database user is changed, you must also reflect this change in vCenter Chargeback Manager.

If you change the SSL certificate on the vCenter Server or upgrade the vCenter Server, then you must modify the vCenter Server information in vCenter Chargeback Manager to import the new SSL certificate. If the new SSL certificate is not imported on to the vCenter Chargeback Manager machine, then communication with the vCenter Server fails.

To modify the vCenter Server information in vCenter Chargeback Manager, you must have the Super User role or the Administrator role. If you have the Administrator role, you can edit only those vCenter Server settings that you have configured.

---

**NOTE** You cannot modify the vCenter Server ID, host name or IP address of the vCenter Server, and the vCenter Server version number.

---

### Procedure

1 In the **Settings** tab, click **vCenter Servers**.

A table listing information about the vCenter Server instances added to the application is displayed.

2 Select the vCenter Server for which you want to modify the details, and click **Edit**.

The vCenter Server Information screen is displayed.

3 Modify the required vCenter Server details.

Option	Description
<b>vCenter Server Hostname/IP</b>	FQDN or IP address of the vCenter Server. The IP address or host name cannot be edited after the vCenter Server is added to the application.
<b>vCenter Server Display Name</b>	A display name for the vCenter Server.
<b>vCenter Server Description</b>	A description of the vCenter Server. This is optional.
<b>vCenter Server Username</b>	User name to access the vCenter Server.
<b>vCenter Server Password</b>	Password for the user name entered.

Option	Description
<b>Database URL</b>	<p>URL to access the vCenter Server database.</p> <p>For Oracle Database, this URL must have the format:  <i>IP address/host name:TNS listener port</i></p> <p>For example:  123.123.123.123:1521</p> <p>For Microsoft SQL Server, this URL can be in the following formats:  <i>IP address/host name\database instance name</i>  or  <i>IP address/host name</i></p> <p>For example:  123.123.123.123\chargeback_db</p> <p>You can also specify a well formed JDBC URL that starts with 'jdbc' and contains the database name. If the vCenter Server database is on an Oracle RAC environment, then you must provide a JDBC URL for the database.</p>
<b>Database Name</b>	<p>Name of the vCenter Server database. For example, <i>vim_vcdb</i>, which is the default name given by vCenter Server. If you are using Oracle Database, then the database name can be either the service name or SID. If you are providing the service name, ensure that you prefix the service name with a forward slash (/). For example:  <i>/service_name</i></p>
<b>Database Type</b>	<p>The database type can be either <b>SQL Server</b> (default) or <b>Oracle</b>.</p>
<b>Authentication Type</b>	<p>This option is available only if you have set the <b>Database Type</b> to <b>SQL Server</b>. You can set the <b>Authentication Type</b> to <b>Credential Based Authentication</b> or <b>Windows Authentication</b>. <b>Credential Based Authentication</b> lets you access the database using SQL Server authentication. If you select <b>Credential Based Authentication</b>, you must provide the database user name and password to access the database. <b>Windows Authentication</b> lets you access the database using a Windows user account that can authenticate in to the SQL Server database. If you select <b>Windows Authentication</b>, you can provide a domain user name and password to access the vCenter Server database.</p>
<b>Database Username</b>	<p>A database user name to access the vCenter Server database. Ensure that this is not the same user that vCenter Server uses to connect to the vCenter Server database.</p> <p>If you have selected <b>Windows Authentication</b>, then provide a domain user name to access the vCenter Server Database. The domain user name must be of the form <b>user@domain.com</b> or <b>domain\user</b>. If you do not specify a domain user name, then vCenter Chargeback Manager uses the details of the domain user who started the current session of the vCenter Chargeback Manager service to access the vCenter Server Database.</p>
<b>Database Password</b>	<p>Password for the database user name or domain user name entered.</p>
<b>Register As vSphere Client Plug-in</b>	<p>Select this option if you would like to register vCenter Chargeback Manager as a plug-in to vSphere Client. If this option is selected, each time you log in to this vCenter Server using the vSphere Client, the vCenter Chargeback Manager plug-in is displayed on the vSphere Client. You can access the vCenter Chargeback Manager from the vSphere Client as a vCenter Server user. Ensure that you do not register more than one vCenter Chargeback Manager instance as a plug-in for a single vCenter Server.</p>
<b>Enable Stats Replication</b>	<p>Select this option if you want the resource usage statistics from the vCenter Server Database to be replicated in the vCenter Chargeback Manager Database. Statistics starting from three months prior to adding the vCenter Server are collected. vCenter Chargeback Manager considers the existing vCenter Server inventory to have existed for the three month period prior to adding the vCenter Server.</p>

- 4 Click **Save**.

If the SSL certificate on the vCenter Server has changed, a dialog requesting you to accept the new SSL certificate is displayed.

- 5 Accept the SSL certificate request.

If you click **Cancel**, the modify vCenter Server operation is cancelled.

The modified information is reflected in the table displayed on the page.

## Delete vCenter Server Information

If you no longer want to calculate costs and generate reports for the virtual machines managed by a vCenter Server, you can remove the vCenter Server from the vCenter Chargeback Manager.

To perform this task, you must have the Super User role or the Administrator role. If you have the Administrator role, you can delete only those vCenter Server settings that you have configured.

### Procedure

- 1 In the **Settings** tab, click **vCenter Servers**.

A table listing all the vCenter Servers is displayed.

- 2 Select the vCenter Server that you want to remove and click **Delete**.

If any of the entities of the vCenter Server are part of a chargeback hierarchy, the Manage linked entities screen is displayed.

- 3 (Optional) Click **Delete all these entries** to remove the entities from the hierarchy permanently.

You can retain the entities by clicking **Keep all these entries**. If you choose to retain the entities, they will be temporarily removed from the hierarchy and will appear automatically when you re-add the vCenter Server at a later stage.

- 4 If none of the vCenter Server entities are part of any of the chargeback hierarchies, the a dialog box confirming the delete operation request is displayed. Click **OK**.

## Managing Data Collectors

When you install vCenter Chargeback Manager, you can optionally install a data collector. You can register more than one data collector with a vCenter Chargeback Manager instance. You can also install the Cloud Director Data Collector and the vShield Manager Data Collector.

All the data collectors registered with the application can be managed from the **Settings** tab. You must have the Super User role to view and manage the data collectors.

- [View Data Collectors](#) on page 23

vCenter Chargeback Manager stores and displays information about each data collector registered with the application. The data collectors registered with the application and their corresponding details can be viewed from the **Settings** tab.

- [Enable Data Collector](#) on page 25

If a data collector registered with the application is disabled, you can enable it from the application.

- [Disable Data Collector](#) on page 25

When a data collector is installed, it is registered with the application and is enabled by default. If you do not want to use a data collector, you can disable it from the application.

- [Delete Data Collector](#) on page 26

A data collector registered with the application can be removed or deleted.

- [Configure VMware Cloud Director Data Collector](#) on page 26  
If you have installed the Cloud Director Data Collector, you must configure its properties from the Data Collectors page of the **Settings** tab.
- [Configure vShield Manager Data Collector](#) on page 27  
If you have installed the vShield Manager Data Collector, you must specify the user name and password to access the vShield Manager instances. You can set this access information from the Data Collectors page of the **Settings** tab.
- [Modify Super User Password for Cloud Data Collectors](#) on page 28  
If you change the password of the super user that was used when installing the VMware Cloud Director Data Collector and vShield Manager Data Collector, you must change the same from the Data Collectors page to ensure that these data collectors function correctly.

## View Data Collectors

vCenter Chargeback Manager stores and displays information about each data collector registered with the application. The data collectors registered with the application and their corresponding details can be viewed from the **Settings** tab.

### Procedure

- 1 Click the **Settings** tab.
- 2 Click **Data Collectors**.

A table listing all the data collectors registered with the application and their corresponding details is displayed.

## Registered Data Collectors

The Data Collectors page displays a table listing all the synchronization jobs that each registered data collector is running for each vCenter Server added to the application. If multiple data collectors are running, synchronization jobs are equally distributed among them.

The data collector runs two types of synchronization jobs: polling jobs and listening jobs. Polling jobs are jobs that run periodically at fixed interval of time and poll the vCenter Server database to fetch the changes in the database. Each time the job run completes, the last synchronization time for the job is updated. Stats Synchronization and Storage Synchronization are polling jobs.

Listening jobs start once and perform the initial synchronization. These jobs then register a listener with the vCenter Server database and listen continuously for any update. These jobs run continuously and are not periodic. They are always in the Running state and never set to Done. These jobs update their status and the last synchronization time only when an update in the vCenter Server database, for which the job is listening, is processed successfully.

[Table 2-1](#) lists the information displayed on the Data Collectors page.

**Table 2-1.** Information About Data Collectors Registered in the Application

Information Type	Description
<b>Data Collector ID</b>	The ID of the data collector defined in vCenter Chargeback Manager.
<b>Data Collector Heart Beat</b>	The time stamp when the data collector was last known to be running. The data collector updates this information with vCenter Chargeback Manager every 30 seconds. If vCenter Chargeback Manager does not receive any update from the data collector for more than 150 seconds, then vCenter Chargeback Manager considers the data collector to be down and reassigns the all jobs to another running data collector, if any.
<b>Data Collector Host Name</b>	The name of the machine on which the data collector is running.
<b>Registered</b>	Indicates if the data collector is enabled or disabled.

**Table 2-1.** Information About Data Collectors Registered in the Application (Continued)

Information Type	Description
Data Collector Name	The name of the data collector provided during the installation.
vCenter Server Name	The display name of the vCenter Server added to the application.
Job Type	<p>The type of the synchronization job.</p> <ul style="list-style-type: none"> <li>■ <b>Storage Synchronization:</b> The data collector obtains the storage information for all the virtual machines managed by the vCenter Server. For vSphere 4.0 and later, the data collector fetches all the files of a virtual machine and the datastore information of each file. For vCenter Server 2.5, the data collector fetches all the disks of a virtual machine and the datastore details of each disk. For vSphere 5.0, the data collector fetches the storage profiles and groups the datastores under the profiles that they match.</li> </ul> <p>When calculating the storage utilization, vCenter Chargeback Manager accounts for thin provisioning and linked clones. The first run of this job might fail if the first run of the Hosts &amp; Clusters and VMs &amp; Templates Synchronization job takes more than 5 minutes to complete. The VMware VirtualCenter Management Webservices service must be running on the vCenter Server machine for the storage synchronization to complete successfully. For vCenter Server 5.0, the VMware vSphere Profile-Driven Storage service must also be running on the vCenter Server machine for the storage synchronization to complete successfully.</p> <ul style="list-style-type: none"> <li>■ <b>Hosts &amp; Clusters and VMs &amp; Templates Synchronization:</b> The data collector copies the vCenter Server inventory in to the vCenter Chargeback Manager database. This synchronization job ensures that the Hosts &amp; Clusters view and VMs &amp; Templates view of the vCenter Server inventory are synchronized in the vCenter Chargeback Manager database.</li> <li>■ <b>Datastore Synchronization:</b> This synchronization job ensures that all information about the datastore view of the vCenter Server are synchronized in the vCenter Chargeback Manager database.</li> <li>■ <b>Network Synchronization:</b> This synchronization job ensures that all information about the network view of the vCenter Server are synchronized in the vCenter Chargeback Manager database.</li> <li>■ <b>Stats Synchronization:</b> If the <b>Enable Stats Replication</b> option is selected for a vCenter Server added to the application, all the vital performance statistics required for cost calculation is replicated in the vCenter Chargeback Manager database. This synchronization job ensures that the statistics information is periodically replicated in the vCenter Chargeback Manager database with the corresponding information in the vCenter Server database.</li> </ul> <p><b>IMPORTANT</b> For vCenter Server 2.5 Update 3, ensure that the stats collection level is set to 2 or above for the average memory usage counter to be available. If the stats collection level is set to 1, the cost for actual memory usage cannot be calculated.</p> <ul style="list-style-type: none"> <li>■ <b>Global Configuration Synchronization:</b> The data collector fetches global configuration data of the vCenter Server and stores it in the vCenter Chargeback Manager database. Currently, this synchronization job fetches the custom attributes from the vCenter Server.</li> </ul>
Job Interval	<p>The interval between consecutive job runs. The values can be:</p> <ul style="list-style-type: none"> <li>■ Not periodic: Indicates that the job runs eternally.</li> <li>■ Positive number: Indicates the repetition interval in minutes. The consecutive job starts n minutes from the completion of the earlier run of the job, where n denotes the value you enter in this field.</li> </ul>
Last Synchronize Time	The time stamp when the synchronization job was last completed.
Job State	<p>The status of the synchronization job. The displayed values are:</p> <ul style="list-style-type: none"> <li>■ Running: The job is in progress.</li> <li>■ Waiting: The job is yet to start. It is either waiting to be assigned to a data collector or waiting for the assigned data collector to start it.</li> <li>■ Failed: The job has failed. If the job has failed, the job is reassigned to a data collector after 10 minutes.</li> <li>■ Done: Refers to jobs that are run at specific intervals and the previous run is complete.</li> </ul>



## Modify Job Interval

You can control the time interval between two consecutive job runs for jobs that do not run eternally.

Ensure that the job interval time specified is sufficient enough to run the job completely. The data collector starts a job run only after the earlier job run is completed. If the specified interval is too small, then the job might not start exactly after the specified minutes post the last synchronization time. The job will start only after the earlier job run is completed.

### Procedure

- 1 Click **Edit** in the Job Interval column.  
The Change Job Interval screen is displayed.
- 2 Enter the new job interval.  
The specified job interval must be in minutes.
- 3 Click **Save**.

The new job interval is displayed in the table.

## Enable Data Collector

If a data collector registered with the application is disabled, you can enable it from the application.

### Procedure

- 1 In the **Settings** tab, click **Data Collectors**.  
A table listing all the data collectors registered with the application is displayed.
- 2 Select the data collector that you want to enable.
- 3 Click **Enable**.

## Disable Data Collector

When a data collector is installed, it is registered with the application and is enabled by default. If you do not want to use a data collector, you can disable it from the application.

---

**IMPORTANT** If only a single data collector is running, do not disable it. If disabled, the synchronization jobs will not run and the data in the vCenter Chargeback Manager database will not be in sync with the data in the vCenter Server databases.

---

### Procedure

- 1 In the **Settings** tab, click **Data Collectors**.  
A table listing all the data collectors registered with the application is displayed.
- 2 Select the data collector that you want to disable.
- 3 Click **Disable**.

The jobs assigned to the selected data collector are unassigned from it and the data collector is disabled.

## Delete Data Collector

A data collector registered with the application can be removed or deleted.

---

**IMPORTANT** If only a single data collector is running, do not delete it. If deleted, the synchronization jobs will not run and the data in the vCenter Chargeback Manager database will not be in sync with the data in the vCenter Server.

---

### Procedure

- 1 In the **Settings** tab, click **Data Collectors**.

A table listing all the data collectors registered with the application is displayed.

- 2 Select the data collector that you want to delete, and click **Delete**.

A dialog box confirming you action is displayed.

- 3 Click **OK** to confirm deletion.

The data collector is deleted and the synchronization jobs associated with the data collector are assigned to other registered data collectors, if any.

## Configure VMware Cloud Director Data Collector

If you have installed the Cloud Director Data Collector, you must configure its properties from the Data Collectors page of the **Settings** tab.

Only users with the Super User role assigned to them can perform this task.

Configuring the Cloud Director Data Collector ensures that vCenter Chargeback Manager related events in the vCloud Director are processed.

---

**NOTE** Only the vCenter Chargeback Manager related events are processed by the Cloud Director Data Collector. To update the vCloud Director Org hierarchies in vCenter Chargeback Manager, the corresponding vCenter Server must be added to vCenter Chargeback Manager and the vCenter Chargeback Manager data collector must be running to synchronize the vCenter Chargeback Manager database with the vCenter Server database. If the vCenter Chargeback Manager data collector is not installed or is not running, then the changes will not be processed and the changes in the vCenter Server and the vCloud Director Org hierarchy is not accounted for in vCenter Chargeback Manager.

---

### Procedure

- 1 In the **Settings** tab, click **Data Collectors**.
- 2 Select the **VMware Cloud Director** tab.
- 3 Select a property and click **Edit**.

You can edit several properties for VMware Cloud Director Data Collector.

Property	Description
<b>VMware Cloud Director database host</b>	IP address of the VMware vCloud Director database.
<b>VMware Cloud Director database type</b>	The type of database used to create the VMware vCloud Director database. The permissible values are <b>SQL_Server</b> and <b>Oracle</b> .
<b>VMware Cloud Director database name</b>	Name of the VMware vCloud Director database.

Property	Description
<b>VMware Cloud Director database port</b>	Port on which the VMware vCloud Director database is listening for request. If no port details are specified, vCenter Chargeback Manager considers the default database port.
<b>VMware Cloud Director database username</b>	VMware vCloud Director database user name.
<b>VMware Cloud Director database password</b>	Password for the VMware vCloud Director database user.
<b>Event processor job interval (in seconds)</b>	VMware Cloud Director Data Collector runs a job that reads and processes the chargeback events in VMware vCloud Director. This property defines the time in seconds between two such job runs. If the time between two job runs is too large, then virtual machines that are created and removed within this time frame might not be accounted for by vCenter Chargeback Manager during cost calculation.
<b>Failed events processor job interval (in seconds)</b>	VMware Cloud Director Data Collector runs a job to clear failed chargeback events in VMware vCloud Director. This property defines the time in seconds between two such job runs.
<b>Unprocessed VMware Cloud Director chargeback event lifetime (in seconds)</b>	This property defines the time for which an unprocessed event is retained in the database. The default value is 10 days. After this lifetime period, events are removed from the database because they are in an inconsistent state and cannot be processed. Inconsistency can occur due to the following reasons: <ul style="list-style-type: none"> <li>■ Event was generated when it was not necessary.</li> <li>■ Event fails to get persisted in the VMware vCloud Director database.</li> </ul>
<b>VM Instance job interval (in seconds)</b>	VMware Cloud Director Data Collector runs a job to apply the fixed costs defined in the virtual machine instance price matrix on the virtual machines in the vDCs (virtual data centers). This property defines the time in seconds between two such job runs.
<b>VMware Cloud Director apply overage charge on Allocation Pool vDC</b>	Set this flag to <b>true</b> to consider the percentage guarantee value along with the allocation value for the computing resources. This is global flag and is applicable for all Org vDCs in the Allocation Pool model. The default value is <b>false</b> .

The Change Data Collector property screen is displayed.

- 4 Modify the property value and click **Save**.

### What to do next

After you modify a property value, you must restart the data collector for the change to take effect.

You can test the connection to the vCloud Director database by clicking the **Test VMware Cloud Director database connection** link.

## Configure vShield Manager Data Collector

If you have installed the vShield Manager Data Collector, you must specify the user name and password to access the vShield Manager instances. You can set this access information from the Data Collectors page of the **Settings** tab.

The vShield Manager Data Collector cannot function if the user name and password for the vShield Manager instances are not set. After installing the vShield Manager Data Collector, the vShield Manager instances do not appear immediately in vCenter Chargeback Manager. You can see these instances in the application only after the VMware Cloud Director Data Collector processes the vShield Manager-related events.

Only users with the Super User role assigned to them can perform this task.

### Procedure

- 1 In the **Settings** tab, click **Data Collectors**.
- 2 Select the **vShield Manager** tab.

- 3 Select the property from the **vShield Manager common properties** section and click **Edit**.

You can modify the job interval for the external traffic statistics collector job run by the vShield Manager Data Collector. vShield Manager Data Collector runs a job that collects broadband statistics from vShield Manager for all the registered networks. The broadband statistics collector job interval defines the time in seconds between two such job runs.

The Change Data Collector Property screen is displayed.

- 4 Modify the property value and click **Save**.
- 5 Select the required instance from the **vShield Manager instances** section and click **Edit**.

The Edit vShield Manager Setting screen is displayed.

- 6 Modify the property values and click **Save**.

You can modify the following settings for the selected vShield Manager instance.

Property	Description
<b>Host</b>	Host name or IP address of the vShield Manager instance.
<b>User name</b>	User name used to connect to the vShield Manager instance.
<b>Password</b>	Password for the user.
<b>Confirm password</b>	Password for the user.

### What to do next

If you modify the **External traffic statistics collector job interval** property value, you must restart the data collector for the change to take effect. You need not restart the data collector if you have made modifications only to the vShield Manager instances.

## Modify Super User Password for Cloud Data Collectors

If you change the password of the super user that was used when installing the VMware Cloud Director Data Collector and vShield Manager Data Collector, you must change the same from the Data Collectors page to ensure that these data collectors function correctly.

You must have the Super User role to perform this task.

### Procedure

- 1 On the **Settings** tab, click **Data Collectors**.
- 2 Select the **VMware Cloud Director** tab.
- 3 Click **Change password for 'superuser' for cloud data collectors** link.

Here, *superuser* is the user name used when installing vCenter Chargeback Manager.

The Change Password screen is displayed.

- 4 Enter the new password for *superuser*.
- 5 Confirm the new password.
- 6 Click **Change Password**.

### What to do next

You must restart the VMware Cloud Director Data Collector after changing the password.

## Managing the Application License

If you have the Super User role, you can view the details of the current vCenter Chargeback Manager license by clicking **License** on the **Settings** tab.

The following table lists the license information displayed on the **License** page.

**Table 2-2.** License Information

License Information	Description
<b>License Key</b>	The current license key used to access the application.
<b>License Type</b>	The type of license used to access the application.
<b>Activated On</b>	The date and time when the application was activated using the current license key.
<b>Expiry Date</b>	The date on which the existing license will expire.
<b>Count Type</b>	vCenter Chargeback Manager provides a CPU-based or VM-based licensing. This entry defines whether the license is based on the number of CPUs or the number of virtual machines in your virtual environment that is accounted for using this vCenter Chargeback Manager setup.
<b>Current Count Used</b>	This entry indicates the current number of ESXi host CPUs or the virtual machines running on the ESXi hosts that are accounted for by using your vCenter Chargeback Manager setup.
<b>Maximum Count Allowed</b>	This entry indicates the maximum number of ESXi host CPUs or the virtual machines running on the ESXi hosts that can be accounted for by using your vCenter Chargeback Manager setup. This maximum limit is defined in the license.
<b>Is Valid</b>	Whether the current license is valid or not.

## Replace the Application License

You must replace an expired license with a valid license. You can also replace an existing valid license with another valid license.

You must have the Super User role to perform this task.

### Procedure

- 1 In the **Settings** tab, click **License**.

A table listing the details of the license added to the application is displayed.

- 2 Click **Replace**.

The Replace License screen is displayed.

- 3 Enter a valid license key and click **Replace**.

The new license replaces the existing license. The details of the new license is displayed in the table.

## Delete the Application License

An existing license can be removed from the application.

You must have the Super User role to perform this task.

---

**IMPORTANT** Removing a license will render the application unusable till another valid license is added.

---

### Procedure

- 1 In the **Settings** tab, click **License**.

A table listing the details of the license added to the application is displayed.

- 2 Select the license and click **Delete**.  
A dialog confirming the action is displayed.
- 3 Click **OK** to confirm the deletion.

## Manage Report View

vCenter Chargeback Manager provides a report view that is used by all the generated reports. You can configure the report view to display a specific set of information in each of the generated reports.

Like most reports, the chargeback report has multiple sections, such as Header, Title, Body, and Footer. The Title section appears only on the first page of the report. The contents in these sections can be modified as per your requirements. The information to be displayed in the Body section is defined when creating the report. The Header section is the report header that appears on all pages except the first. The Footer section is the report footer that appears on all the pages.

Changes made to the report view is reflected only in the reports generated after the report view is changed. Existing archived reports are not affected by the changes made to the report view.

You must have the Super User role to perform this task.

### Procedure

- 1 In the **Settings** tab, click **Report View**.
- 2 Select **Header**.  
The Header section of the report view displays four sub-sections.
- 3 Select a sub-section from the Header section of the report view.
- 4 Select an option from the Header Settings section to display the required information in the selected sub-section.

Option	Description
<b>Text</b>	The text that you want the report header to contain. For example, the name of the organization.
<b>Image</b>	An image that you want the header section to display. For instance, the company logo. Ensure that the image size does not exceed 1MB.
<b>Report Name</b>	The name of the report entered when generating the report.
<b>Report Description</b>	A description of the report provided when generating the report.
<b>None</b>	(default) No information is displayed in this sub-section in the report.

Repeat this step to set the information for each sub-section as required.

- 5 Click **Title**.  
The Title section of the report template displays nine sub-sections.
- 6 Select a sub-section from the Title section of the report template.
- 7 Select an option from the Title Settings section to display the required information in the selected sub-section.

Option	Description
<b>Text</b>	The text that you want the report header to contain. For example, the name of the organization.
<b>Image</b>	An image that you want the header section to display. For instance, the company logo. Ensure that the image size does not exceed 1MB.
<b>Report Name</b>	The name of the report entered when generating the report.

Option	Description
<b>Report Description</b>	A description of the report provided when generating the report.
<b>None</b>	(default) No information is displayed in this sub-section in the report.

Repeat this step to set the information for each sub-section as required.

- 8 Click **Footer**.

The Footer section of the report template displays three sub-sections.

- 9 Select a sub-section from the Footer section of the report template.
- 10 Select an option from the Footer Settings section to display the required information in the selected sub-section.

Option	Description
<b>Copyright</b>	The copyright information that you want to include in the report.
<b>Page Number</b>	Selecting this option ensures that each page of the report is numbered.
<b>Report Creation Time</b>	Date and time of report generation based on the system date and time on the machine where vCenter Chargeback Manager is installed.
<b>None</b>	(default) No information is displayed in this section in the report. This is the default selection.

Repeat this step to set the information for each sub-section as required.

- 11 (Optional) Click **Preview** to preview a sample report on the right pane of the page.
- 12 Click **Save**.

The report view is saved and will be used when the next report is generated.

In each section, the configured sub-sections will use the space available in the adjacent empty sub-sections. A configured sub-section will first try to expand and use the unused space in the sub-section to its right, then to its left, then to its bottom, and lastly in the sub-section above it. The content of a sub-section is center-aligned. Also, the images are stretched to fit into the available space.

## Managing Attributes

An attribute provides additional information about an entity in an hierarchy. You can define an attribute in the application and then assign it to an entity.

For example, you can create an attribute called `Geo_location`, and then assign it to various entities and set values indicating their geographic locations. To learn more about assigning attributes to entities, see [“Assign Attributes,”](#) on page 62. The attributes set on the hierarchy and entities can be used to filter the hierarchies and entities on which a report needs to be generated or scheduled.

If you integrate a vCloud Director setup with vCenter Chargeback Manager by installing the Cloud Director Data Collector, then a default attribute is created in vCenter Chargeback Manager. This attribute is called `EntityLevelOverageFlag`. You can use this attribute to override the global data collector property, `VMware Cloud Director apply overage charge on Allocation Pool vDC`, at the entity level. This attribute can be set to **true** or **false**.

You can manage the attributes in the application from the **Manage Attributes** page of the **Settings** tab. The page display a table listing the attributes created in vCenter Chargeback Manager and those imported from the vCenter Servers that are added to vCenter Chargeback Manager. The Source column of the table lists the vCenter Server name from which the attribute is imported. For attributes created in vCenter Chargeback Manager, this column is empty.

## Add an Attribute

You can define one or more attributes in vCenter Chargeback Manager.

You must have the Super User or Administrator role to perform this task.

### Procedure

- 1 In the **Settings** tab, click **Manage Attributes**.
- 2 Click **Create**.  
The Create Attribute screen is displayed.
- 3 Enter the name and description for the attribute.

A attribute can be attached to an entity to provide additional information about the entity. The attributes associated with an entity can be included in the chargeback reports.

- 4 Click **Create**.

The attribute is added to the table listing the attributes added to the application.

## Modify an Attribute

You can modify the attributes defined in vCenter Chargeback Manager

You must be the owner of the attribute or should have the Super User role to modify the attribute. Also, you can only modify attributes that are created in vCenter Chargeback Manager. Attributes imported from vCenter Server cannot be modified.

### Procedure

- 1 In the **Settings** tab, click **Manage Attributes**.  
The page displays a table with all the attributes available in your vCenter Chargeback Manager installation.
- 2 Select the attribute that you want to modify and click **Edit**.
- 3 Modify the required information.
- 4 Click **Save**.

The modified attribute details are listed in the table.

## Delete an Attribute

The attributes that are not required can be deleted from the application.

You cannot delete attributes that are imported from the vCenter Server. If an attribute is deleted from the vCenter Server, it is also deleted from vCenter Chargeback Manager during the next run of the data collector synchronization job.

You must have the Super User or Administrator role to perform this task.

### Procedure

- 1 In the **Settings** tab, click **Manage Attributes**.  
A table listing all the attributes added to the application is displayed.
- 2 Select the attribute that you want to remove.
- 3 Click **Delete**.



The attribute is deleted from the application and is removed from the table.

## Manage System Health Thresholds

The **System Health** tab provides information about the status of the entire system based on the response time of the various servers and databases in the system. The response time limits can be set in the application.

You must have the Super User role to perform this task.

You can set the response time limits in milliseconds for vCenter Chargeback Manager, vCenter Chargeback Manager database, vCenter Server, and vCenter Server database. The response time limits define the Normal, Warning, and Alert latency ranges.

### Procedure

- 1 In the **Settings** tab, click **System Health Thresholds**.
- 2 In the vCenter Chargeback Manager Server section, set the **Normal** and **Alert** response time limits.

The Normal, Warning, and Alert latency ranges are defined as follows:

Option	Description
<b>Normal</b>	The Normal latency range is (0, <i>normal response time limit</i> ). The default range is (0, 30000). If the response time is in the Normal latency range, the server is responding fine.
<b>Warning</b>	The Warning latency range is ( <i>normal response time limit</i> + 1, <i>alert response time limit</i> ). The default range is (30001, 120000). If the response time is in the Warning latency range, the server is responding slowly and might need some attention. The slow response could also be attributed to network congestion.
<b>Alert</b>	The Alert latency range is ( <i>alert response time limit</i> + 1, ...). The default range is (120001, ...). If the response time is in the Alert latency range, the user must take immediate action to rectify the issue.

- 3 In the vCenter Chargeback Manager Database section, set the **Normal** and **Alert** response time limits.  
The Normal, Warning, and Alert latency ranges for the vCenter Chargeback Manager database are defined using these limits.
- 4 In the vCenter Server section, set the **Normal** and **Alert** response time limits.  
The Normal, Warning, and Alert latency ranges for the vCenter Server are defined using these limits.
- 5 In the vCenter Server Database section, set the **Normal** and **Alert** response time limits.  
The Normal, Warning, and Alert latency ranges for the vCenter Server database are defined using these limits.
- 6 Click **Apply**.

The response time limits and the corresponding ranges set on this page are used on the System Health tab to show the health of the different servers and databases.

## Manage Computing Resources

You can specify the computing resources that will be available to the users in vCenter Chargeback Manager.

On the **Computing Resources** page of the **Settings** tab, you can specify the computing resources that will be available to the users in vCenter Chargeback Manager. To know more about the chargeable computing resources defined in vCenter Chargeback Manager, see [“Chargeable Computing Resource,”](#) on page 68.

Users can perform computing resource-related operations, such as defining base rates and rate factors, and generating reports, only for the selected computing resources. Specifying which computing resources are available to the users does not effect the data collector jobs. The data collector fetches the relevant information for all the computing resources.

You must have the Super User role to perform this task.

**Procedure**

- 1 In the **Settings** tab, click **Computing Resources**.
- 2 Select the computing resources that the users can use in vCenter Chargeback Manager.
- 3 Click **Apply**.

# Authenticating and Managing Users, Roles, and Permissions

# 3

vCenter Chargeback Manager provides user management features that enable you to manage the various users, roles, and permissions defined in the application.

vCenter Chargeback Manager provides resource-based authorization. The application defines different permissions for each resource. The application also provides few predefined roles. In addition, you can create new roles and users as per your requirements.

This chapter includes the following topics:

- [“Resource Based Authorization in vCenter Chargeback Manager,”](#) on page 35
- [“Permissions Defined in vCenter Chargeback Manager,”](#) on page 36
- [“Managing Roles,”](#) on page 37
- [“Managing Users,”](#) on page 44
- [“vCenter Chargeback Manager User Authentication,”](#) on page 52

## Resource Based Authorization in vCenter Chargeback Manager

vCenter Chargeback Manager defines various resource types and authorizes access to a resource on the basis of the role assigned to a user.

[Table 3-1](#) lists the various resource types defined in vCenter Chargeback Manager.

**Table 3-1.** Resource Types Defined in vCenter Chargeback Manager

Resource Type	Description
VMware vCenter Server	This resource type refers to the vCenter Server instances added to vCenter Chargeback Manager. A user must have read permission on a vCenter Server to read its entities and add them to a chargeback hierarchy.
vCenter Server Entity	This resource type refers to the entities in the vCenter Server hierarchy.
Data Collector	This resource type refers to data collectors registered with vCenter Chargeback Manager. Only a super user has all permissions on this resource type. A user with the Administrator role has only read permission on this resource type.
LDAP Server	This resource type refers to the LDAP servers configured in vCenter Chargeback Manager. An LDAP user, by default, has read permission on the corresponding LDAP server.
SMTP Server	This resource type refers to the SMTP server configured in vCenter Chargeback Manager. Only a super user has all permissions on this resource type.
Chargeback Hierarchy	This resource type refers to the hierarchies created in vCenter Chargeback Manager. A user must have read permission on a chargeback hierarchy to access the hierarchy.

**Table 3-1.** Resource Types Defined in vCenter Chargeback Manager (Continued)

Resource Type	Description
Chargeback Hierarchical Entity	This resource type refers to any entity created or added to a hierarchy in vCenter Chargeback Manager. A user must have read permission on the entity and the corresponding hierarchy to access it.
Attribute	This resource type refers to any attribute created or imported in vCenter Chargeback Manager. Only users with the Administrator role and Super User role have create permission for this resource type.
Tier	This resource type refers to the storage tiers created in vCenter Chargeback Manager. A user must have read permission on the vCenter Server to access storage tiers.
Cost Model	This resource type refers to the cost models defined or created in vCenter Chargeback Manager. A user must have read permission on a cost model to use it for cost configuration and report generation.
Cost Template	This resource type refers to the cost templates created in vCenter Chargeback Manager. A user must have read permission on a cost template to use it for cost configuration.
Fixed Cost	This resource type refers to the fixed costs created in vCenter Chargeback Manager. A user must have read permission on a fixed cost to use it for cost configuration.
Report	This resource type refers to the reports created in vCenter Chargeback Manager. A user must have read permission on a report to access the report.
Schedule	This resource type refers to the reporting schedules created in vCenter Chargeback Manager. A user must have read permission on a schedule to access the reporting schedule.
Role	This resource type refers to the roles defined or created in vCenter Chargeback Manager. Only users with the Administrator role or Super User role have create permission for this resource type.
Billing Policy	This resource type refers to the billing policies defined or created in vCenter Chargeback Manager. A user must have read permission on a billing policy to use it for cost configuration and report generation.
Automatic Report Scheduler	This resource type refers to the automatic report schedulers defined or created in vCenter Chargeback Manager. A user must have read permission on an automatic report scheduler to access it and the corresponding schedules.

## Permissions Defined in vCenter Chargeback Manager

vCenter Chargeback Manager provides five different permissions, create, read, update, delete, and entity cost modify, which can be set on a role for the different resource types.

[Table 3-2](#) shows the permissions that can be set for the resource types defined in vCenter Chargeback Manager.

**Table 3-2.** Permissions Applicable for Each Resource Type

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	Yes	Yes	Yes	Yes	No
Data Collector	Yes	Yes	Yes	Yes	No
LDAP Server	Yes	Yes	Yes	Yes	No
SMTP Server	Yes	Yes	Yes	Yes	No
Chargeback Hierarchy	Yes	Yes	Yes	Yes	No
Chargeback Hierarchical Entity	Yes	Yes	Yes	Yes	Yes
Attribute	Yes	Yes	Yes	Yes	No

**Table 3-2.** Permissions Applicable for Each Resource Type (Continued)

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
Tier	Yes	Yes	Yes	Yes	Yes
Cost Model	Yes	Yes	Yes	Yes	No
Cost Template	Yes	Yes	Yes	Yes	No
Fixed Cost	Yes	Yes	Yes	Yes	No
Report	Yes	Yes	Yes	Yes	No
Schedule	Yes	Yes	Yes	Yes	No
Role	Yes	Yes	Yes	Yes	No
Billing Policy	Yes	Yes	Yes	Yes	No
Automatic Report Scheduler	Yes	Yes	Yes	Yes	No

You can assign permissions on a resource type to a user only through a role. However, you cannot assign permissions for the following resource types:

- Data Collector
- LDAP Server
- SMTP Server
- vCenter Server Entity
- Attribute
- Role

The application automatically handles permissions for these resource types. Also, you cannot assign the create, update, and delete permissions for the VMware vCenter Server resource type during custom role creation.

## Managing Roles

A role is a set of permissions assigned to a user. vCenter Chargeback Manager provides some predefined roles that can be assigned to the users and groups created or added to the application. You can also create any new roles.

- [Predefined Roles in vCenter Chargeback Manager](#) on page 38  
vCenter Chargeback Manager provides various predefined roles that can be assigned to the application users. The predefined roles are Super User, Administrator, Hierarchy Manager, Report Generator, vCenter Guest User, No Access, Dependent Resource Update, and Dependent Resource Read. These roles have a set of permissions on the various resource types defined in them.
- [Create a Role](#) on page 42  
Apart from the system-defined roles, you can define your own custom roles in vCenter Chargeback Manager. These roles can then be assigned to the users created in the application.
- [Modify a Role](#) on page 43  
You can modify an existing role, other than the system-defined roles.
- [Delete a Role](#) on page 43  
You can delete any of the existing custom roles in the application. The system-defined roles cannot be deleted.

## Predefined Roles in vCenter Chargeback Manager

vCenter Chargeback Manager provides various predefined roles that can be assigned to the application users. The predefined roles are Super User, Administrator, Hierarchy Manager, Report Generator, vCenter Guest User, No Access, Dependent Resource Update, and Dependent Resource Read. These roles have a set of permissions on the various resource types defined in them.

### Super User Role

[Table 3-3](#) lists the permissions defined in the Super User role for each of the resource type.

**Table 3-3.** Permissions Defined on the Super User Role

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	Yes	Yes	Yes	Yes	No
Data Collector	Yes	Yes	Yes	Yes	No
LDAP Server	Yes	Yes	Yes	Yes	No
SMTP Server	Yes	Yes	Yes	Yes	No
Chargeback Hierarchy	Yes	Yes	Yes	Yes	No
Chargeback Hierarchical Entity	Yes	Yes	Yes	Yes	Yes
Attribute	Yes	Yes	Yes	Yes	No
Tier	Yes	Yes	Yes	Yes	Yes
Cost Model	Yes	Yes	Yes	Yes	No
Cost Template	Yes	Yes	Yes	Yes	No
Fixed Cost	Yes	Yes	Yes	Yes	No
Report	Yes	Yes	Yes	Yes	No
Schedule	Yes	Yes	Yes	Yes	No
Role	Yes	Yes	Yes	Yes	No
Billing Policy	Yes	Yes	Yes	Yes	No
Automatic Report Scheduler	Yes	Yes	Yes	Yes	No

### Administrator Role

[Table 3-4](#) lists the permissions defined in the Administrator role for each of the resource type.

**Table 3-4.** Permissions Defined on the Administrator Role

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	Yes	Yes	Yes	Yes	No
Data Collector	No	Yes	No	No	No
LDAP Server	Yes	Yes	Yes	Yes	No
SMTP Server	No	No	No	No	No

**Table 3-4.** Permissions Defined on the Administrator Role (Continued)

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
Chargeback Hierarchy	Yes	Yes	Yes	Yes	No
Chargeback Hierarchical Entity	Yes	Yes	Yes	Yes	Yes
Attribute	Yes	Yes	Yes	Yes	No
Tier	Yes	Yes	Yes	Yes	Yes
Cost Model	Yes	Yes	Yes	Yes	No
Cost Template	Yes	Yes	Yes	Yes	No
Fixed Cost	Yes	Yes	Yes	Yes	No
Report	Yes	Yes	Yes	Yes	No
Schedule	Yes	Yes	Yes	Yes	No
Role	Yes	Yes	Yes	Yes	No
Billing Policy	Yes	Yes	Yes	Yes	No
Automatic Report Scheduler	Yes	Yes	Yes	Yes	No

## Hierarchy Manager Role

[Table 3-5](#) lists the permissions defined in the Hierarchy Manager role for each of the resource type.

**Table 3-5.** Permissions Defined on the Hierarchy Manager Role

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	No	Yes	No	No	No
Data Collector	No	No	No	No	No
LDAP Server	No	No	No	No	No
SMTP Server	No	No	No	No	No
Chargeback Hierarchy	Yes	Yes	Yes	Yes	No
Chargeback Hierarchical Entity	Yes	Yes	Yes	Yes	Yes
Attribute	No	No	No	No	No
Tier	No	No	No	No	No
Cost Model	Yes	Yes	Yes	Yes	No
Cost Template	Yes	Yes	Yes	Yes	No
Fixed Cost	Yes	Yes	Yes	Yes	No
Report	Yes	Yes	Yes	Yes	No
Schedule	Yes	Yes	Yes	Yes	No
Role	No	No	No	No	No

**Table 3-5.** Permissions Defined on the Hierarchy Manager Role (Continued)

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
Billing Policy	Yes	Yes	Yes	Yes	No
Automatic Report Scheduler	Yes	Yes	Yes	Yes	No

## Report Generator Role

[Table 3-6](#) lists the permissions defined in the Report Generator role for each of the resource type.

**Table 3-6.** Permissions Defined on the Report Generator Role

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	No	No	No	No	No
Data Collector	No	No	No	No	No
LDAP Server	No	No	No	No	No
SMTP Server	No	No	No	No	No
Chargeback Hierarchy	No	Yes	No	No	No
Chargeback Hierarchical Entity	No	Yes	No	No	Yes
Attribute	No	No	No	No	No
Tier	No	No	No	No	No
Cost Model	Yes	Yes	Yes	Yes	No
Cost Template	Yes	Yes	Yes	Yes	No
Fixed Cost	Yes	Yes	Yes	Yes	No
Report	Yes	Yes	Yes	Yes	No
Schedule	Yes	Yes	Yes	Yes	No
Role	No	No	No	No	No
Billing Policy	Yes	Yes	Yes	Yes	No
Automatic Report Scheduler	Yes	Yes	Yes	Yes	No

## vCenter Guest User Role

[Table 3-7](#) lists the permissions defined in the vCenter Guest User role for each of the resource type.

**Table 3-7.** Permissions Defined on the vCenter Guest User Role

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	No	Yes	No	No	No
Data Collector	No	No	No	No	No
LDAP Server	No	No	No	No	No
SMTP Server	No	No	No	No	No



**Table 3-7.** Permissions Defined on the vCenter Guest User Role (Continued)

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
Chargeback Hierarchy	No	Yes	No	No	No
Chargeback Hierarchical Entity	No	Yes	No	No	No
Attribute	No	No	No	No	No
Tier	No	No	No	No	No
Cost Model	No	No	No	No	No
Cost Template	No	No	No	No	No
Fixed Cost	No	No	No	No	No
Report	No	No	No	No	No
Schedule	No	No	No	No	No
Role	No	No	No	No	No
Billing Policy	No	No	No	No	No
Automatic Report Scheduler	No	No	No	No	No

### No Access Role

The No Access role has no permissions defined on it. This role can be assigned only on the Chargeback Hierarchical Entity resource type.

### Dependent Resource Update Role

Table 3-8 lists the permissions defined in the Dependent Resource Update role for each of the resource type. vCenter Chargeback Manager assigns this role to the user on the dependent resources. For more information, “Assign a Role to a User for a Resource,” on page 50.

**Table 3-8.** Permissions Defined on the Dependent Resource Update Role

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	No	No	No	No	No
Data Collector	No	No	No	No	No
LDAP Server	No	No	No	No	No
SMTP Server	No	No	No	No	No
Chargeback Hierarchy	No	No	No	No	No
Chargeback Hierarchical Entity	No	No	No	No	No
Attribute	No	No	No	No	No
Tier	No	No	No	No	No
Cost Model	No	No	No	No	No
Cost Template	No	No	No	No	No
Fixed Cost	Yes	Yes	Yes	No	No

**Table 3-8.** Permissions Defined on the Dependent Resource Update Role (Continued)

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
Report	No	Yes	Yes	No	No
Schedule	No	Yes	Yes	No	No
Role	No	No	No	No	No
Billing Policy	No	Yes	Yes	No	No
Automatic Report Scheduler	No	No	No	No	No

## Dependent Resource Read Role

[Table 3-9](#) lists the permissions defined in the Dependent Resource Read role for each of the resource type. vCenter Chargeback Manager assigns this role to the user on the dependent resources. For more information, "[Assign a Role to a User for a Resource](#)," on page 50.

**Table 3-9.** Permissions Defined on the Dependent Resource Read Role

Resource Type	Create	Read	Update	Delete	Entity Cost Modify
VMware vCenter Server	No	No	No	No	No
Data Collector	No	No	No	No	No
LDAP Server	No	No	No	No	No
SMTP Server	No	No	No	No	No
Chargeback Hierarchy	No	No	No	No	No
Chargeback Hierarchical Entity	No	No	No	No	No
Attribute	No	No	No	No	No
Tier	No	No	No	No	No
Cost Model	No	No	No	No	No
Cost Template	No	No	No	No	No
Fixed Cost	No	Yes	No	No	No
Report	No	Yes	No	No	No
Schedule	No	Yes	No	No	No
Role	No	No	No	No	No
Billing Policy	No	Yes	No	No	No
Automatic Report Scheduler	No	No	No	No	No

## Create a Role

Apart from the system-defined roles, you can define your own custom roles in vCenter Chargeback Manager. These roles can then be assigned to the users created in the application.

Only users having the Super User role or the Administrator role assigned to them can perform this task.

**Procedure**

- 1 In the **Users & Roles** tab, click **Roles**.

A table listing all the roles defined in the application is displayed.

- 2 Click **Create**.

The Create Role screen is displayed.

- 3 Enter a name and description for the role.

Option	Description
<b>Role Name</b>	A name to uniquely identify the role. Provide a meaningful name to the role so that it is easy to identify the use of the role and the permissions assigned on the role. The character limit is 255 characters.
<b>Role Description</b>	A brief description of the role that you are creating. You can define the purpose of the role in this field. The character limit is 512 characters.

- 4 Select the required permissions for the available resource types.

- 5 Click **Create**.

The newly created role is added to the table displaying the roles defined in the application.

**Modify a Role**

You can modify an existing role, other than the system-defined roles.

You must have the Administrator role or the Super User role to perform this task. If you have the Administrator role, you can edit only the roles that you have created. A user with the Super User role can edit any roles other than the system-defined roles.

**Procedure**

- 1 In the **Users & Roles** tab, click **Roles**.

A table listing all the roles defined in the application is displayed.

- 2 Select the role that you want to modify, and click **Edit**.

The Edit Role screen is displayed.

- 3 Modify the required information.

You can modify the name and description of the role and also the set of permissions assigned to the role.

- 4 Click **Save**.

The modified role details are displayed in the table on the page.

**Delete a Role**

You can delete any of the existing custom roles in the application. The system-defined roles cannot be deleted.

You must have the Administrator role or the Super User role to perform this task. If you have the Administrator role, you can delete only the roles that you have created. A user with the Super User role can delete any roles other than the system-defined roles.

**Procedure**

- 1 In the **Users & Roles** tab, click **Roles**.

A table listing all the roles defined in the application is displayed.

- 2 Select the role that you want to delete, and click **Delete**.  
A dialog box confirming the action is displayed.
- 3 Click **OK**.

## Managing Users

When the application is installed, a user with the Super User role is created. The user name and password for this user are provided during the installation.

This is the only user that exists in a freshly installed vCenter Chargeback Manager instance. You can create more users in the application. To create and manage users in vCenter Chargeback Manager, you must have either the Super User role or the Administrator role. Before you start creating users and assigning them roles on various resources, you must understand the relationship between users, roles, and resources.

In vCenter Chargeback Manager, a super user, that is a user with the Super User role, has access to all the users and resources created in the application. This user has complete access in the application.

An administrator, that is a user with the Administrator role, has access only to the users that he has created. An administrator cannot access the users created by a super user or by another administrator. Also, an administrator can access only the following resources:

- Resources on which he is given access privileges by a super user.
- Resources created by him.
- Resources created by the users that he has created.

All other users can only see the super user and the users that have been created by the administrator or super user who created them. For example, consider the following scenario. We have a super user S1, two administrators A1 and A2, and six users U1, U2, U3, U4, U5, and U6. The super user S1 has created the two administrators and the user U1. The administrator A1 has created the users U2 and U3. The administrator A2 has created the user U4, U5, and U6.

Now, S1 can access all the users. A1 can see S1 and has complete access on U2 and U3. A1 cannot see or access any other user. Similarly, A2 can see S1 and has complete access on U4, U5, and U6. A2 cannot see or access any other user.

The user U1 can see only S1. This user cannot see the administrators and the users created by the administrators. The users U2 and U3 can see S1, A1, and each other. They cannot see the users U1, U4, U5, and U6, and the administrator A2.

Similarly, the users U4, U5, and U6 can see S1, A2, and each other. They cannot see the users U1, U2, and U3, and the administrator A1.

Also, a user, other than an administrator or super user, can access only the resources on which he has been given access and the resources created by him. If the user is an LDAP user and has no roles assigned to him, then the role assigned to the LDAP group to which he belongs is considered.

## Creating Users

You can create multiple users and groups in vCenter Chargeback Manager as per your requirements. You must have the Super User role or the Administrator role to create users.

The application lets you create the following types of users and groups:

<b>Local User</b>	This is a vCenter Chargeback Manager user whose details are defined in vCenter Chargeback Manager.
<b>LDAP User</b>	This is a Windows Active Directory user. The LDAP server must be configured in vCenter Chargeback Manager to add such a user. The details of the user are defined in the Windows Active Directory.
<b>LDAP Group</b>	This is a Windows Active Directory group. The LDAP server must be configured in vCenter Chargeback Manager to add such a group. The group details are defined in the Windows Active Directory.

vCenter Chargeback Manager also defines another type of user called VC User. This is a vCenter Server user. This user can access vCenter Chargeback Manager from the vSphere Client when he logs in to a vCenter Server that has been added to vCenter Chargeback Manager with the **Register As vSphere Client Plug-in** option selected. This user is added automatically to the list of users when the user logs in to vCenter Server.

### Create a Local User

A local user is a user whose account details are defined in the vCenter Chargeback Manager. You can create more than one local user in the application.

You must have the Super User role or the Administrator role to perform this task.

---

**NOTE** Only a user with the Super User role can assign a role when creating a user.

---

#### Procedure

- 1 In the **Users & Roles** tab, click **Users**.

A table listing all the users created in the application is displayed.

- 2 Click **Create**.

The Add User Account screen is displayed.

- 3 Enter the type, name, and authentication details of the user.

Option	Description
<b>User Type</b>	The user type must be <b>Local</b> .
<b>User Name</b>	A unique name to identify the user. The user name cannot exceed 255 characters in length.
<b>Password</b>	A password to authenticate the user. The password must contain at least 8 characters and should not exceed 24 characters in length. The password cannot be same as the user name. Also, the password must include a combination of upper-case and lower-case characters.
<b>Confirm Password</b>	Re-enter the password.

- 4 Select the required option from the Role section.

The default is not to assign any role to the user. You can alternately assign the Super User role or the Administrator role to the user on vCenter Chargeback Manager.

- 5 Click **Add**.

The newly created user is added to the table displaying the users and groups created in the application.

### What to do next

The role assigned to the user defines the permission that the user has in the application. You must, however, assign roles to the user on the individual resources for him to access those resources.

## Create an LDAP User

You can add Windows Active Directory users to vCenter Chargeback Manager. The account details of such users are originally defined in the Windows Active Directory. An LDAP user added to vCenter Chargeback Manager can log in to the application using the Windows login details.

You must have the Super User role or the Administrator role to perform this task.

---

**NOTE** Only a user with the Super User role can assign a role when creating a user.

---

### Prerequisites

Before you add an LDAP user, ensure that the LDAP server is configured in the application. If no LDAP Server is configured in vCenter Chargeback Manager, an error message stating the same is displayed when adding an LDAP user.

### Procedure

- 1 In the **Users & Roles** tab, click **Users**.

A table listing all the users created in the application is displayed.

- 2 Click **Create**.

The Add User Account screen is displayed.

- 3 Select **LDAP User** from the **User Type** list.

- 4 Select the required **LDAP Server**.

The LDAP Users section of the screen displays a table listing the Active Directory users defined in the selected LDAP server. The number of users listed in this table is limited by the LDAP Limit set in the LDAP Server configuration.

- 5 Select the required users from the LDAP Users section.

You can add multiple users at the same time by selecting each of the required users from the LDAP Users section. You can select more than one user by pressing the Ctrl button and clicking the required user names.

You can also search for a user by specifying the user name or a search string in the LDAP Users section and clicking **Search**. The application searches all the Unique Name (samAccountName in Windows Active Directory) and Common Name values in the Windows Active Directory and return all the users that match the search string.

- 6 Select the required option from the Role section.

The default is not to assign any role. You can alternately assign the Administrator role to the user on vCenter Chargeback Manager. An LDAP user cannot be assigned the Super User role.

- 7 Click **Add**.

The newly added LDAP users are added to the table displaying the users and groups added to the application on the Users page.

## What to do next

The role assigned to the user defines the permission that the user has in the application. You must, however, assign roles to the user on the individual resources for him to access those resources.

## Create an LDAP Group

Like LDAP users you can also add LDAP groups to vCenter Chargeback Manager.

You must have the Super User role or the Administrator role to perform this task.

---

**NOTE** Only a user with the Super User role can assign a role when creating a user.

---

### Prerequisites

Before you add an LDAP group, ensure that the LDAP server is configured in the application. If no LDAP Server is configured in vCenter Chargeback Manager, an error message stating the same is displayed when adding an LDAP group.

### Procedure

- 1 In the **Users & Roles** tab, click **Users**.

A table listing all the users created in the application is displayed.

- 2 Click **Create**.

The Add User Account screen is displayed.

- 3 Select **LDAP Group** from the **User Type** list.

- 4 Select the required **LDAP Server**.

The LDAP Groups section of the screen displays a table listing the Active Directory groups defined in the selected LDAP server. The number of groups listed in this table is limited by the LDAP Limit set in the LDAP Server configuration.

- 5 Select the required group from the LDAP Groups section.

You can add multiple groups at the same time by selecting each of the required groups from the LDAP Groups section. You can select more than one group by pressing the Ctrl button and clicking the required group names.

You can also search for a group by specifying the group name or a search string in the LDAP Groups section and clicking **Search**. The application searches all the Unique Name (samAccountName in Windows Active Directory) and Common Name values in the Windows Active Directory and return all the groups that match the search string.

- 6 Select the required option from the Role section.

The default is not to assign any role. You can alternately assign the Administrator role to the group on vCenter Chargeback Manager. An LDAP group cannot be assigned the Super User role.

- 7 Click **Add**.

The newly added LDAP groups are added to the table displaying the users and groups added to the application on the Users page.

After an LDAP group is added, a user belonging to that group can log in to the application. This LDAP user need not be explicitly added to the application. The LDAP user will have the same role as that set on the LDAP group.

### What to do next

The role assigned to the group defines the permission that the group has in the application. You must, however, assign roles to the group on the individual resources for granting access on those resources.

## Modify a User

After a user is created, you can change the password for the user by using the Modify User feature of the application. You can modify the password of only a Local user.

You must have the Super User role or the Administrator role to perform this task. If you have the Administrator role, then you can reset the password for only the users that you have created.

The password for an LDAP user, LDAP group, or vCenter Server user cannot be reset from vCenter Chargeback Manager.

### Procedure

- 1 In the **Users & Roles** tab, click **Users**.

A table listing all the users created in the application is displayed.

- 2 Select the required user name and click **Edit**.

The Edit User Account screen is displayed.

- 3 Modify the password and click **Save**.

The password must contain at least 8 characters and should not exceed 24 characters in length. The password cannot be the same as the user name. Also, the password must include a combination of upper-case and lower-case characters.

## Delete User

You can remove invalid or unused users from the application. However, you cannot delete the user that is created during installation.

You must have the Super User role or the Administrator role to perform this task. If you have the Administrator role, then you can delete only the users that you have created.

### Procedure

- 1 In the **Users & Roles** tab, click **Users**.

A table listing all the users created in the application is displayed.

- 2 Select the user that you want to delete, and click **Delete**.

- If the selected user has the Administrator or Super User role and has created other users in the application, the Delete User screen is displayed. You can reassign the users created by the selected user to another administrator or super user. Select the administrator or super user to whom the users have to be reassigned.

- If the user does not have the Administrator or Super User role or has not created any users in the application, then a dialog confirming the deletion is displayed.

- 3 Click **OK**.

The user is deleted from the application. The resources created by this user are assigned to the administrator or super user who created the user.



## Assign a Role to a User on vCenter Chargeback Manager

The role assigned to the user on vCenter Chargeback Manager defines the actions that the user can perform in the application. A user must have a role assigned to him on vCenter Chargeback Manager or on the resource defined in the application to enable him to perform some actions in the application.

When you create a user, no roles or permissions are assigned to it by default. You can assign the Super User role or the Administrator role when creating the user. Alternately, you can assign a role to the user after creating the user.

You can assign only a single role to a user on vCenter Chargeback Manager. If the user already has a role assigned to it, the same is removed and the new role is set on the user. Only a user with the Super User role can assign the Super User role or the Administrator role to a user on vCenter Chargeback Manager.

You must have the Super User role or the Administrator role to perform this task.

---

**NOTE** If you assign a role to an LDAP group for a resource, then the LDAP users belonging to the LDAP group will be assigned the same role on the resources. However, the LDAP user cannot perform any action on the resources, if the LDAP group does not have at least read privileges on the various resource types at the vCenter Chargeback Manager level.

---

### Procedure

- 1 In the **Users & Roles** tab, click **Permissions**.

A page listing the users, their type, whether the user has the Super User role or the Administrator role, and if the user is a vCenter Server user then the vCenter Server name or if the user is an LDAP user or group then the IP address of the LDAP server is displayed. The page also provides an option to select a resource type.

- 2 Select the user from the table listing the users.

If any role has already been assigned to the user on vCenter Chargeback Manager, the same is displayed under **Currently Assigned Role**.

- 3 Select the required role from the menu under **Set/Reset Role**.

Ensure that you do not select any resource on the left-side pane.

---

**NOTE** You cannot assign the Super User role on an LDAP user or group.

---

- 4 Click **Apply**.

The selected role is assigned to the user on vCenter Chargeback Manager.

### What to do next

Assigning a role on vCenter Chargeback Manager, other than the Super User role, only defines the actions that the user can perform in the application. This does not implicitly give access to the resources created in the application. To access a resource, the user must have either created it or should be explicitly assigned a role for the resource. If the user is assigned the Administrator role, then he implicitly gets access to all the resources created by the users that he has created.

Assigning the Super User role to a user automatically provides him with complete access to all the resources. You need not explicitly assign a role to the user for each of the resources created in the application.

## Assign a Role to a User for a Resource

A user can access a resource created in the application only if he has created it or has privileges to access it. A user can be given privileges to access a resource by assigning a role to him for the required resource.

If a user is assigned the Super User role, then he can access any resource created in the application. If a user is assigned the Administrator role, then he can also access the resources created by the users that he has created.

You can assign only a single role to a user for a given resource. If a user already has a role assigned to him for a given resource, the same is removed and the new role is set on the user for the selected resource.

A user with the Super User role can assign any role on any resource to a user. A user with the Administrator role can assign any of the system-defined roles, other than Super User and Administrator roles, and the custom roles created by him. This user can assign the roles only to users created by him and on the resources he has access to.

The role that users can assign to other users on a resource depends on:

- The permissions that the user has on the resource.
- The roles that the user has access to.

When you assign a role to a user for a resource, vCenter Chargeback Manager automatically assigns either the Dependent Resource Update role or the Dependent Resource Read role to the user for the dependent resources. [Table 3-10](#) lists the resources in vCenter Chargeback Manager that have a dependent resource.

**Table 3-10.** Dependent resources in vCenter Chargeback Manager

Parent Resource	Dependent Resources
Cost Model	Billing Policy and Fixed Cost
Cost Template	Fixed Cost
Schedule	Report
Automatic Report Scheduler	Schedule

If you assign a role with update permission on the parent resource, then vCenter Chargeback Manager assigns the Dependent Resource Update role to the user for the dependent resources. If you assign a role with only read permission on the parent resource, then vCenter Chargeback Manager assigns the Dependent Resource Read role to the user for the dependent resources.

For example, if you assign a role with only read permission to a user on a cost model that you have created, then the user automatically get read permission on the fixed costs defined in the cost model.

**NOTE** If you assign a role to an LDAP group for a resource, then the LDAP users belonging to the LDAP group will be assigned the same role on the resources. However, the LDAP user cannot perform any action on the resources, if the LDAP group does not have at least read privileges on the various resource types at the vCenter Chargeback Manager level.

### Procedure

- 1 In the **Users & Roles** tab, click **Permissions**.

A page listing the users, their type, whether the user has the Super User role or the Administrator role, and if the user is a vCenter Server user then the vCenter Server name or if the user is an LDAP user or group then the IP address of the LDAP server is displayed. The page also provides an option to select a resource type.

- 2 Select the required resource type from the list.

- 3 Expand the resource type folder and select the resources for which you want to set the role on the user.  
You can select more than one resource by pressing the Ctrl key and selecting each of the required resources. However, the roles that you can assign on these resources would depend on the intersection of the permissions you have on each of the selected resources.
- 4 Select the user from the table listing the users.  
If any role has already been assigned to the user on the selected resources, the same is displayed under Currently Assigned Role.
- 5 Select the required role from the menu under **Set/Reset Role**.
- 6 Click **Apply**.

The selected role is set on the user for the selected resources.

The role set on the user is applicable only for the selected resources. You must individually assign roles to the user on the all required resources in the application. A user can have different roles on different resources.

## Revoke the Role Assigned to a User for a Resource

Roles set on a user for a resource can be revoked as and when required.

### Procedure

- 1 In the **Users & Roles** tab, click **Permissions**.  
A page listing the users, their type, whether the user has the Super User role or the Administrator role, and if the user is a vCenter Server user then the vCenter Server name or if the user is an LDAP user or group then the IP address of the LDAP server is displayed. The page also provides an option to select a resource type.
- 2 Select the required resource type from the list.
- 3 Expand the resource type folder and select the resources for which you want to revoke the role on the user.
- 4 Select the user from the table listing the users.  
If any role has already been assigned to the user on the selected resources, the same is displayed under Currently Assigned Role.
- 5 Click **Unassign this role** under Current Assigned Role.

The role is revoked from the user for the selected resources. The user can no longer access the selected resources.

## Revoke the Role Assigned to a User on vCenter Chargeback Manager

The role assigned to user on vCenter Chargeback Manager can be revoked as and when required.

### Procedure

- 1 In the **Users & Roles** tab, click **Permissions**.  
A page listing the users, their type, whether the user has the Super User role or the Administrator role, and if the user is a vCenter Server user then the vCenter Server name or if the user is an LDAP user or group then the IP address of the LDAP server is displayed. The page also provides an option to select a resource type.
- 2 Select the user from the table listing the users.  
If any role has already been assigned to the user, the same is displayed under Currently Assigned Role.
- 3 Click **Unassign this role** under Current Assigned Role.

The role is revoked from the user. Revoking the role assigned to the user on vCenter Chargeback Manager does not automatically remove the roles explicitly assigned to the user for the various resources. The user can continue to access the resources that he has created and the resources for which he has been assigned a role.

## vCenter Chargeback Manager User Authentication

After a user is created, you can log in to the application using the credentials of this user.

You can log in as either a Local user or an LDAP user. If you are logging in as an LDAP user, you must provide the login credentials defined in the Windows Active Directory. The LDAP user login name can be the samAccountName or the FQDN. If the LDAP user contains special characters in the user name, then to log in to vCenter Chargeback Manager as such a user, replace each special character with an underscore (\_) in the user name.

Although you can create a user of the type LDAP group, you cannot log in to the application as an LDAP group. If an LDAP group is added to the application, you can log in as an LDAP user belonging to that group. This user will have the same roles and privileges as set on the LDAP group. If this LDAP user is not already added to the application, the same would be done when the user logs in.

---

**NOTE** The LDAP user name and password must contain only ASCII characters. If you log in to vCenter Chargeback Manager as a user that contains extended ASCII or non-ASCII characters in the user name or password, then the login operation might fail.

---

### Procedure

- 1 Open a Web browser and enter the application URL.

The application URL should be of the following type:

`https://IP address:port number/cbmui/`

- 2 Enter the user authentication details on the login screen.

Option	Description
<b>User name</b>	The user name of a user.
<b>Password</b>	Password for the user.
<b>Login in to</b>	The user type.
<b>LDAP Code</b>	If you select LDAP for <b>Login in to</b> , you must specify the LDAP Code for the LDAP server.

- 3 Click **OK**.

For a Local user, after three successive failed login attempts, the account gets locked and the application displays a Captcha image during login. You must authenticate with the correct user account details and enter the text in the Captcha image to unlock the account and log in to the application. If you do not unlock a locked user account, vCenter Chargeback Manager automatically unlocks it after 30 minutes.

On successful log in, the **Getting Started** tab of the application is displayed.

### What to do next

You can also access the application from the vSphere Client as a vCenter Server user, provided the application is registered with vCenter Server. To know about registering an application with vCenter Server, see [“Add vCenter Server Information,”](#) on page 17.

The vCenter Guest User role is the default role assigned to the vCenter Server user. If the user is same as the user whose details are used to register the vCenter Server with the application, then this user is assigned the Hierarchy Manager role on vCenter Chargeback Manager and the vCenter Server resource.

After registering the application as a plug-in, when you log in to the vCenter Server through the vSphere Client, the application might display a security warning message for installing or ignoring the SSL certificate from the vCenter Chargeback Manager instance. You must install this certificate.

When you access vCenter Chargeback Manager from the vSphere Client plug-in, you can see only the entities of the vCenter Server on which your user account is created. You cannot access any other vCenter Server added to vCenter Chargeback Manager, including vCenter Servers that are linked to the vCenter Server on which your user account is created.

## Modifying the Password of a User Account

After you log in to the application, you can modify the password any time.

Only Local users can change their password. LDAP users and groups must change the password in the Windows Active Directory.

### Procedure

1 Click **Tools** on the top right corner of the screen.

2 Select **Change Password**.

The Change Password screen is displayed.

3 Enter the existing and new passwords.

Option	Description
<b>Old Password</b>	The existing password.
<b>New Password</b>	The desired new password. The password must contain at least 8 characters and should not exceed 24 characters in length. The password cannot be the same as the user name. Also, the password must include a combination of upper-case and lower-case characters.
<b>Confirm New Password</b>	Re-enter the new password.

4 Click **Change**.



# Managing Chargeback Hierarchies

---

vCenter Chargeback Manager interacts with the vCenter Server to determine the utilization of the computing resources by various virtual machines that are created in the vCenter Server hierarchy. vCenter Chargeback Manager enables you to create multiple chargeback hierarchies, which can be different from the vCenter Server hierarchies.

A chargeback hierarchy is an organization of vCenter Server entities and vCenter Chargeback Manager entities. The vCenter Server entities include virtual machines, ESX Server hosts, data centers, resource pools, host folders, and virtual machine folders. A chargeback hierarchy can contain entities from more than one vCenter Server. The vCenter Chargeback Manager entities are custom entities that could represent a logical parent for the vCenter Server entities. For example, the vCenter Chargeback Manager entities could represent the departments, cost centers, or business units in an organization. A vCenter Chargeback Manager entity can contain one or more vCenter Server entities and vCenter Chargeback Manager entities.

This chapter includes the following topics:

- [“Creating a Chargeback Hierarchy,”](#) on page 55
- [“Managing a Chargeback Hierarchy,”](#) on page 58

## Creating a Chargeback Hierarchy

To identify the resource utilization and generate a usage or cost report, you must first create a chargeback hierarchy and add the required entities to it.

You can create one or more chargeback hierarchies in the application as per your requirements. Creating multiple chargeback hierarchies lets you organize a set of vCenter Server entities in multiple ways and also identify and compare the costs for each of these hierarchies. You can also create one hierarchy for each vCenter Server.

### Create a Custom Chargeback Hierarchy

You can create a custom chargeback hierarchy and add vCenter Server entities and vCenter Chargeback Manager entities to it.

To perform this task, you must have a role with the create privilege for the hierarchy resource type assigned to you on vCenter Chargeback Manager.

#### Procedure

- 1 In the **Manage Hierarchy** tab, click **Create Hierarchy**.

The Create Hierarchy screen is displayed.

- 2 Enter a name and description for the hierarchy.

The name must not exceed 255 characters and the description must not exceed 512 characters in length.

- 3 Select **Custom Hierarchy** (default).
- 4 Click **Create**.

An empty chargeback hierarchy with the given name is created.

#### **What to do next**

To add entities to this hierarchy and manage the hierarchy, see [“Managing a Chargeback Hierarchy,”](#) on page 58.

## **Synchronize a Chargeback Hierarchy with a vCenter Server**

You can create a chargeback hierarchy and synchronize it with a vCenter Server. This chargeback hierarchy will be same as the vCenter Server hierarchy.

To perform this task, you must have a role with the create privilege for the hierarchy resource type assigned to you on vCenter Chargeback Manager. You must also have a read privilege on the vCenter Server.

#### **Prerequisites**

Ensure that the vCenter Server is added to vCenter Chargeback Manager. To know more about how to add a vCenter Server to the application, refer to [“Add vCenter Server Information,”](#) on page 17.

The vCenter Server should be running to complete the hierarchy creation.

#### **Procedure**

- 1 In the **Manage Hierarchy** tab, click **Create Hierarchy**.

The Create Hierarchy screen is displayed.

- 2 Enter a name and description for the hierarchy.

The name must not exceed 255 characters and the description must not exceed 512 characters in length.

- 3 Select **Synchronize with vCenter Server**.

- 4 Select the required vCenter Server and the vCenter Server hierarchy view to be used for creating the chargeback hierarchy.

The application lists only those vCenter Server machines that are added to the application and on which you have the read privilege. You can add the entities from the vCenter Server hierarchy in the Hosts and Cluster view or the VMs and Templates view.

- 5 Click **Create**.

A chargeback hierarchy similar to the vCenter Server hierarchy with the selected view is created.

The custom attributes defined on the various entities in vCenter Server are imported into the chargeback hierarchy. These attributes provide additional information about the vCenter Server entities and can be displayed in the chargeback report.

#### **What to do next**

You can modify a chargeback hierarchy as per your requirements. To know more about editing a chargeback hierarchy, refer to [“Managing a Chargeback Hierarchy,”](#) on page 58.

## **Import a Chargeback Hierarchy from a CSV File**

You can create a chargeback hierarchy by importing a hierarchy defined in a .csv file.

To perform this operation, you must have a create privilege for the hierarchy resource type and a read privilege on all the vCenter Server instances whose entities are specified in the CSV file.



## Prerequisites

Before you begin, you must ensure that the .csv file entries are in the correct format. To know more about the format of the .csv file entries, refer to “[Format of the CSV File](#),” on page 57.

## Procedure

- 1 In the **Manage Hierarchy** tab, click **Create Hierarchy**.  
The Create Hierarchy screen is displayed.
- 2 Enter a name and description for the hierarchy.  
The name must not exceed 255 characters and the description must not exceed 512 characters in length.
- 3 Select **Import hierarchy from .csv file**.
- 4 Enter the path of the .csv file or alternately you can browse the system or the network to locate the file.
- 5 Click **Create**.

A chargeback hierarchy is created using the entries from the .csv file.

## What to do next

You can use the created hierarchy as is or modify it as per your requirements.

## Format of the CSV File

The entries in the CSV file used to create a chargeback hierarchy must adhere to the format defined by vCenter Chargeback Manager.

Starting with vCenter Chargeback 1.5, a new format for the entries in the CSV file is defined. This new format is as follows:

```
Uniqueid, ChildName, ParentId, ChildEntityType [[, description] [, vcIP/DNS, vcEntityMoId, vCenterViewId]]
```

[Table 4-1](#) describes each of the parameters in the CSV file entry.

**Table 4-1.** Parameters in the CSV File Entry

Parameters	Description
Uniqueid	A unique number to identify the entity. The Uniqueid of the first entry in the file must be 1.
ChildName	Name of the entity.
ParentId	The Uniqueid of the parent of this entity. If this entity is the root entity, the ParentId must be -1.
ChildEntityType	The type of the entity. If the entity is a vCenter Chargeback Manager entity, the ChildEntityType must be 101. If the entity is a vCenter Server entity, the ChildEntityType must be 0.
description	(optional) Description of the entity. For a vCenter Server entity, this is not applicable.
vcIP/DNS	The IP address or the DNS name of the vCenter Server as configured in the vCenter Chargeback Manager.
vcEntityMoId	The moId (managed object ID) of a virtual machine as defined in the vCenter Server. You can obtain the entity MoID by using vSphere SDK or through the vCenter server MOB ( <a href="http://{vcserverIP}/mob">http://{vcserverIP}/mob</a> )
vCenterViewId	The vCenter Server hierarchy view to be used for creating the chargeback hierarchy. If you want to use the Host & Clusters view, then set vCenterViewId to 1. For the VMs & Templates view, set vCenterViewId to 2.

The following sample is an example of the contents of such a file:

```
#version 1.5.0
1,CB-folder,-1,101
2,CB-folder-1,1,101,vCenter Chargeback Manager entity
3,cbm-vc,1,0,12.123.123.123,vm-203,1
4,CBM_1.5_B2,2,0,23.123.123.123,vm-218,2
```

The first line of the CSV file specifies the version of the chargeback hierarchy population CSV file. The latest version is 1.5.0. If this line is not present, the format of the CSV file entries defaults to that for vCenter Chargeback 1.0. Starting with the vCenter Chargeback 1.0.1 release, blank lines in the CSV file are ignored and lines starting with the hash sign (#) are considered as comments.

## Managing a Chargeback Hierarchy

After creating a chargeback hierarchy, you can perform various tasks on the hierarchy, such as view the hierarchy, modify the hierarchy by adding and deleting entities, manage attributes for individual entities in the hierarchy, and set the allocation units for individual computing resources.

### View a Chargeback Hierarchy

You can view the hierarchies created in the application from the **Manage Hierarchy** tab.

You must have a role with the read privilege on the hierarchy to view the hierarchy and its entities.

#### Procedure

1 Click the **Manage Hierarchy** tab.

2 Select the chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed. The right pane provides name, description, and various other details about the selected hierarchy. You can modify the description by providing the new description and clicking **Update**.

3 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.

The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.

The left pane of the page displays the expanded chargeback hierarchy.

---

**NOTE** vCenter Chargeback Manager does not display the status of the virtual machines and ESXi hosts added to the hierarchy.

---

#### What to do next

You can also search for entities in the hierarchy by using the **Search** field below the hierarchy on the left pane of the page. When you search for an entity, vCenter Chargeback Manager highlights the first entity in the hierarchy whose name contains the search string. You can click the next or previous icon next to the **Search** field to find the other entities in the hierarchy whose names contain the search string.

vCenter Chargeback Manager does not load the entire hierarchy when the hierarchy is selected. Only when the hierarchy or an entity is expanded, the entities in the next level are fetched and displayed in the application. The search operation only searches for entities that have been fetched and displayed in the application.

## Add a vCenter Chargeback Manager Entity

You can add vCenter Chargeback Manager entities to a chargeback hierarchy to logically group vCenter Server entities in the hierarchy. A vCenter Chargeback Manager entity can represent the departments, cost centers, and business units in an organization.

To add a vCenter Chargeback Manager entity to a chargeback hierarchy, you must have update privilege on the chargeback hierarchy and the parent entity.

### Procedure

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.

The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the hierarchy or the entity in the hierarchy to which you want to add a vCenter Chargeback Manager entity and select **New Chargeback Folder** from the pop-up menu.

You can add vCenter Chargeback Manager entities to the hierarchy or to another vCenter Chargeback Manager entity in the hierarchy. You cannot add a vCenter Chargeback Manager entity to a vCenter Server entity.

- 4 Provide a name for the added entity and click outside the entity-name text box.

The character limit for the entity name is 255 characters. The entity names are not case-sensitive.

The entity with the provided name is added to the chargeback hierarchy.

### What to do next

You can undo an add operation by right-clicking the newly added entity and selecting the **Revert this add operation** option. However, this option is not available on the entity if any further changes are made to the entity or to the chargeback hierarchy.

## Add a vCenter Server Entity

If you are creating a custom chargeback hierarchy, you must add vCenter Server entities, such as ESXi Server hosts and virtual machines, to it. You can also add a cluster or an entire data center to the hierarchy.

To add a vCenter Server entity to a chargeback hierarchy, you must have the read privilege on the vCenter Server and update privilege on the chargeback hierarchy and the parent entity.

### Prerequisites

Ensure that the vCenter Server is added to vCenter Chargeback and the Hosts & Clusters and VMs & Templates Synchronization job successfully synchronized the vCenter Server inventory in the vCenter Chargeback Manager database.

### Procedure

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.  
The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.
- 3 Right-click the entity to which you want to add a vCenter Server entity and select **New vCenter Server Entity** from the pop-up menu.  
You can add a vCenter Server entity to the hierarchy or to a vCenter Chargeback Manager entity in the hierarchy. You cannot add a vCenter Server entity to another vCenter Server entity in the chargeback hierarchy.
- 4 Select the required vCenter Server from the drop-down menu on the right pane.  
Only the vCenter Server instances on which you have a read privilege is included in the menu.  
The selected vCenter Server is displayed on the right pane.
- 5 (Optional) Click the arrow icon next to **Filters & Views** at the bottom of the right pane of the page.  
The filtering and hierarchy view options are displayed.
- 6 (Optional) Select the required filtering and hierarchy view options.  
The default is **No highlighting** and the **Hosts & Clusters** view. The view type selected must be same as the view type used to add the existing vCenter Server entities in the chargeback hierarchy. The entities in the selected vCenter Server hierarchy will be highlighted only if the view type for the hierarchy of the selected vCenter Server and the vCenter Chargeback Manager hierarchy are same and one of the highlighting options is selected.
- 7 Expand the vCenter Server hierarchy and select the entity that you want to add to the chargeback hierarchy.  
The number of vCenter Server entities selected is displayed next to the cursor indicating that the entity is selected and available for adding to the chargeback hierarchy. You can also select multiple entities and add them at the same time. To select multiple entities, press the Ctrl key and click the required vCenter Server entities.  
If you add a vCenter Server entity to a chargeback hierarchy, you cannot separately add its parent entity or any of its child entities to the same chargeback hierarchy.
- 8 Select the vCenter Chargeback Manager entity to which you want to add this vCenter Server entity.  
The selected vCenter Server entities are added to the chargeback hierarchy.  
After a vCenter Server entity is added to a chargeback hierarchy, you cannot delete any of its child entities from the chargeback hierarchy without deleting this added entity.

### What to do next

You can undo an add operation by right-clicking the newly added entity and selecting the **Revert this add operation** option. However, this option is not available on the entity if any further changes are made to the entity or to the chargeback hierarchy. If you add multiple entities at the same time, you can revert the add operation for only one of the entities. To revert the add operation for an entity, right-click the required entity and select **Revert this add operation**.

## Rename a Chargeback Hierarchy or a Chargeback Entity

You can edit the names of chargeback hierarchies and the vCenter Chargeback Manager entities in them.

To perform this task, you must have update privilege on the hierarchy and the chargeback hierarchical entity.

### Procedure

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.

The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the entity and select **Edit label** from the pop-up menu.

- 4 Provide a new name for the entity and click outside the entity-name text box.

The character limit for the hierarchy and entity names is 255 characters. The hierarchy and entity names are not case-sensitive.

## Delete an Entity from the Hierarchy

You can delete the vCenter Server entities and vCenter Chargeback entities from a chargeback hierarchy. If you have added a vCenter Server entity to the chargeback hierarchy, you cannot remove any of its child entities without deleting the directly added vCenter Server entity from the chargeback hierarchy.

Even if an entity is deleted from the hierarchy, the generated reports include these deleted entities for the time period they were available in the hierarchy. vCenter Chargeback maintains the history of the entities created in the chargeback hierarchies. Therefore, the cost information of the deleted entities can be retrieved for the period they existed in the chargeback hierarchy.

To delete an entity, you must have delete privilege on the chargeback hierarchical entity and update privilege on the hierarchy.



**CAUTION** You cannot undo a delete entity operation.

---

### Procedure

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.

The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the entity that you want to remove and select **Delete** from the pop-up menu.

A dialog confirming the action is displayed.

- 4 Click **OK**.

The entity and its child entities, if any, are removed from the hierarchy.

## Delete a Chargeback Hierarchy

You can remove invalid or unwanted chargeback hierarchies from the application.

You must have delete privilege on the hierarchy to delete it.



**CAUTION** You cannot undo a delete hierarchy operation. If a hierarchy is deleted, all the information associated with the hierarchy is lost.

---

**Procedure**

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Right-click the hierarchy and select **Delete this hierarchy** from the pop-up menu.

A dialog box confirming the action is displayed.

- 3 Click **OK**.

The chargeback hierarchy is deleted permanently from the application.

**Assign Attributes**

You can assign one or more attributes to the entities in a chargeback hierarchy. For example, you can create an attribute called `Geo_location` and then assign it to the required entities and give it a value that indicates their geographical location.

You must have read privilege on the hierarchy and update privilege on the chargeback hierarchical entity to perform this task.

**Procedure**

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.

The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the entity to which you want to assign attributes and select **Manage Attributes** from the pop-up menu.

The Assign Attributes screen is displayed. The screen lists the attributes in the application, including the ones imported from the vCenter Servers, and the corresponding values assigned to them on the entity, if any. You cannot modify the values assigned on a vCenter Server entity.

- 4 Enter or update the values for the attributes that you want to assign to the entity.

You can overwrite the values of only the attributes created in vCenter Chargeback Manager.

- 5 Click **Apply**.

The attributes with their values are assigned to the entity and can be included in the chargeback report.

The attribute value assigned to an entity does not get propagated to the child entities. You must individually set the value for the attributes on each of the entities.

**Move Entities Within a Hierarchy**

You can move the entities within a chargeback hierarchy. This is particularly useful if you want to rearrange the entities within a chargeback hierarchy. You cannot, however, rearrange the entities that are under a vCenter Server entity.

You must have the update privilege on the hierarchy, the chargeback hierarchical entity, and the current and new parent chargeback hierarchical entity to move entities within a hierarchy.

**Procedure**

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.

The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the entity that you want to move, and select **Cut Entity** from the pop-up menu.

---

**NOTE** This menu option is available only for the vCenter Chargeback Manager entities created in the hierarchy and the vCenter Server entities that are directly added to the hierarchy.

---

- 4 Right-click the destination entity and select **Paste Entity** from the pop-up menu.

The selected entity and all its child entities are moved under the destination entity. You cannot paste the entities under a vCenter Server entity.

**What to do next**

You can undo a paste operation by right-clicking the pasted entity and selecting the **Revert this paste operation** option. However, this option is not available on the entity if any further changes are made to the entity or to the chargeback hierarchy.

**Allocate Computing Resource Units for a Chargeback Entity**

You can allocate some computing resource units for a chargeback entity. This allocation can be used to calculate the cost when using an allocation-based billing policy.

Allocation of computing resource units is different from reservation of computing resource units. The reservation of computing resources for a virtual machine is performed in vCenter Server. The allocation of computing resource units is performed in vCenter Chargeback Manager. An allocation of computing resource does not imply that the chargeback entity will get to use the set amount of computing resource units at all times. This allocation is used purely for calculating the cost when using an allocation-based billing policy.

You can set the allocation units, when you want to charge an entity for a fixed amount of computing resource units, immaterial of the actual resource usage. For example, you want to charge a virtual machine for a minimum of 2GHz of CPU and 4GB of RAM immaterial of the actual CPU and memory usage by the virtual machine. In this case, you can set the allocation units for CPU and memory on the virtual machine, define an allocation-based billing policy, and create a cost model with appropriate base rates for the computing resources and set the allocation-based billing policy.

You must have read privilege on the hierarchy and update privilege on the chargeback hierarchical entity to perform this task.

**Procedure**

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed.

- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.

The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the chargeback entity for which you want to allocate computing resource units and select **Set allocation units** from the pop-up menu.  
The Define allocation units for the selected entity screen is displayed.
- 4 Define the time period for which the allocation is applicable.  
The default selection is **Update from now onwards** indicating the allocation is applicable from the time of setting the values till it is changed at a future date. Alternately, you can set a definite time period by selecting the **Update for the effective period** option and defining the start and end dates of the required time period.
- 5 (Optional) Click **Get** and then click the **Show** link next to Historical values to see the historical allocation values set for all the computing resources.
- 6 Set the allocation units for the required computing resources.
- 7 Click **Set**.
- 8 Click **OK** in the information dialog box.
- 9 Close the Define allocation units for the selected entity screen to return to the **Manage Hierarchy** tab.

The defined allocation units for the specified time period is set on the chargeback entity. You can set multiple allocation units for different time periods.

#### What to do next

The allocation units defined for a chargeback entity does not propagate to its child entities. You must individually set the allocation units for each chargeback entity in the hierarchy as per your requirements.

## Share Virtual Machine Cost

If you have a virtual machine that is shared by multiple departments and want to charge these departments proportionately, you must configure the share percentage in the hierarchy. The share percentage can be set only on virtual machines that are individually added to the chargeback hierarchy.

You must have the update privilege on the hierarchy, on the virtual machine that is being shared, and the parent chargeback hierarchical entities to perform this task.

#### Procedure

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.  
The collapsed view of the chargeback hierarchy is displayed.
- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.  
The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.
- 3 Right-click the virtual machine whose cost has to be shared and select **Manage cost sharing** from the pop-up menu.

---

**NOTE** This menu option is available only for the virtual machines that are individually added to the hierarchy.

---

- 4 Click **OK** on the information dialog box.
- 5 Right-click the vCenter Chargeback Manager entity that shares this virtual machine and select **Share Cost in this folder** from the pop-up menu.  
The Set cost sharing screen is displayed.



- 6 Set the share percentages and click **Apply**.

The share percentages must total up to 100.

The shared virtual machine is displayed in the hierarchy. You can change the share percentage or share the virtual machine again with more entities, by performing the same steps.

## Backdate a Chargeback Hierarchy

You can backdate a chargeback hierarchy so that the resource utilization details for the last three months from the current date are considered.

You must have update privilege on the hierarchy to perform this task.

---

**NOTE** If you have upgraded to vCenter Chargeback 1.5 and the chargeback hierarchy contains entities from vCenter Server instances added before the upgrade, then do not backdate the hierarchy.

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You cannot backdate hierarchies imported from a VMware Cloud Director setup in to vCenter Chargeback Manager. vCenter Chargeback Manager identifies the hierarchies imported from VMware Cloud Director by using the attribute `Vc1oudOrgEnti ty` set on them. Therefore, if the `Vc1oudOrgEnti ty` attribute is set on any user-defined hierarchy in vCenter Chargeback Manager, you cannot backdate that hierarchy.

### Procedure

- 1 In the **Manage Hierarchy** tab, select the chargeback hierarchy from the drop-down menu on the left pane of the page.  
The collapsed view of the chargeback hierarchy is displayed. The right pane provides various details about the selected hierarchy.
- 2 Click the arrow icon next to **Tools** below the hierarchy.  
The Hierarchy tools options are displayed.
- 3 Click **Backdate**.
- 4 Click **OK** in the information dialog box.

## View Properties of a vCenter Server Entity

A chargeback hierarchy can contain entities from more than one vCenter Server. In a chargeback hierarchy, you can identify the vCenter Server to which an entity belongs by viewing its properties.

You must have a read privilege on the hierarchy and the chargeback hierarchical entity to perform this task.

### Procedure

- 1 In the **Manage Hierarchy** tab, select the required chargeback hierarchy from the drop-down menu on the left pane of the page.  
The collapsed view of the chargeback hierarchy is displayed.
- 2 Expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name.  
The first-level entities in the hierarchy are displayed. You can view all the entities in the hierarchy by clicking the plus sign to the left of the entities that have sub-entities.
- 3 Right-click the vCenter Server entity and select **Properties** from the pop-up menu.

The vCenter Server Entity Properties screen displays the vCenter Server to which the entity belongs and the complete inventory path of the vCenter Server entity.



# Managing and Configuring vCenter Chargeback Manager Cost Elements

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# 5

vCenter Chargeback Manager provides various cost-related elements. These elements enable you to define the cost to be charged for each computing resource, fixed costs, and the cost calculation formula.

You must set the various cost-related elements in vCenter Chargeback Manager to successfully generate the required cost reports.

This chapter includes the following topics:

- [“vCenter Chargeback Manager Cost-Related Elements,”](#) on page 67
- [“Managing Cost Models,”](#) on page 73
- [“Managing Fixed Costs,”](#) on page 77
- [“Managing Cost Templates,”](#) on page 80
- [“Managing Billing Policies,”](#) on page 82
- [“Configuring Cost at the Entity Level,”](#) on page 85
- [“Physical Infrastructure Costing,”](#) on page 87
- [“Configuring a Pricing Matrix for Virtual Machines,”](#) on page 91

## vCenter Chargeback Manager Cost-Related Elements

You must know about the vCenter Chargeback Manager cost-related elements to effectively create and configure a cost model.

vCenter Chargeback Manager includes the following cost related elements.

- Chargeable computing resource
- Base rate
- Rate factor
- Fixed cost
- Billing policy
- Cost model
- Cost template

## Chargeable Computing Resource

A chargeable computing resource is any computing resource that must be accounted for when calculating the IT operational costs. The usage of the computing resources is measured and the corresponding charge is calculated.

vCenter Chargeback Manager accounts for the following computing resources:

<b>CPU</b>	The CPU usage is measured in GHz.
<b>Memory</b>	The memory usage is measured in GB.
<b>Network bandwidth</b>	The network usage (both upload and download) is measured in GB/hour.
<b>Storage</b>	The usage is measured in GB.
<b>Disk Read and Write</b>	The usage is measured in GB/hour.
<b>vCPU</b>	The number of virtual CPUs in the virtual machine.

If the VMware Cloud Director Data Collector and vShield Manager Data Collector is installed, vCenter Chargeback Manager also accounts for the following resources:

<b>Count of Networks</b>	The number of networks that belong to an organization or a vApp in VMware Cloud Director.
<b>NAT Service</b>	Whether the NAT service for VMware Cloud Director network is enabled or not.
<b>DHCP Service</b>	Whether the DHCP service for VMware Cloud Director network is enabled or not.
<b>Firewall Service</b>	Whether the firewall service for VMware Cloud Director network is enabled or not.
<b>IPSec VPN Tunnel Count</b>	The number of enabled IPSec VPN tunnels.
<b>External network transmit and receive</b>	The external network usage (both upload and download) is measured in MB.
<b>External network transmit and receive rate</b>	The external network usage (both upload and download) is measured in MB/hour.

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**NOTE** The cloud data collectors fetch the external network traffic data only for networks that have a vShield Edge instance in vShield Manager. An Edge instance is present only if the network is either PRIVATE\_ROUTED ORG NETWORK, ROUTED VAPP NETWORK or FENCED VAPP NETWORK. Therefore, the external network counters are not charged for other types of vCloud Director networks. Also, the chargeable external traffic networks are present at org level. Therefore, these counters are not accounted for in reports that are generated at the vDC level.

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## Base Rate

Base rate is a global rate that you want to charge for a unit of chargeable computing resource used, reserved, or allocated for a specific duration.

[Table 5-1](#) lists a set of sample base rates for a unit of each chargeable computing resource.

**Table 5-1.** Sample Base Rate Values

Chargeable Resource	Unit	Duration	Base Rate (\$)
CPU	GHz	Hourly	0.0399
Memory	GB	Hourly	0.0048
Network Received and Transmitted	GB/hour	Hourly	0.0008
Storage	GB	Hourly	0.0013
Disk Read and Write	GB/hour	Hourly	0.0008
vCPU	Count	Hourly	0.04

The base rate duration is configurable. vCenter Chargeback Manager lets you define the base rate for an hour, day, week, month, quarter, half-year, or year for each computing resource. The precision for a base rate value is four digits.

## Rate Factor

Rate factor is the multiplication factor to be used along with the base rate to calculate the charge for a unit of chargeable computing resource used or allocated for a specified duration. Rate factors are useful when you want to charge the entities in a hierarchy differently.

The rate factors enable you to apply a cost that is a multiple or a fraction of the base rate. The rate factor value can be between 0 and 999.99. The precision is up to two decimal places.

[Table 5-2](#) lists sample base rates, rate factors, and the total cost for a unit of the chargeable computing resource consumed, reserved, or allocated.

**Table 5-2.** Sample Base Rates and Rate Factors

Chargeable Resource	Base Rate (\$)	Rate Factor	Total Charge (\$)
CPU	0.0399	1.1	0.0439
Memory	0.0048	1.1	0.0053
Network Received and Transmitted	0.0008	1	0.0008
Storage	0.0013	1	0.0013
Disk Read and Write	0.0008	0.75	0.0006
vCPU	0.04	1	0.04

## Fixed Cost

A fixed cost is a definite cost that can be charged on an entity. Fixed costs can be recurring costs or one-time costs.

Recurring costs that are charged periodically for specific resources or services can be defined as fixed costs in the application. For example, the annual maintenance cost for the network or for each server. Costs that are applicable to almost all the entities and hierarchies can be defined as fixed costs. This lets you update such costs periodically and manage them centrally. It also ensures that all the entities and hierarchies are uniformly charged for common services and resources.

In addition, you can also define fixed costs that are specific to an entity, a group of entities, or an entire hierarchy. For example, the real estate cost for physical storage of the servers. This cost differs based on the actual geographic location.

A one-time fixed cost is a charge that you want to levy once on an entity for a service provided. For example, virtual machine provisioning fees. This is a one-time cost that you want to charge for every virtual machine provisioned. If the time when the fixed cost is applied on an entity falls within the reporting duration, then the report generated on the entity or its parent includes this cost.

## Billing Policy

A billing policy determines the cost types and the amount of chargeable computing resources units to be considered for calculating the chargeback cost.

vCenter Chargeback Manager provides the various billing policies. Each billing policy only accounts for the amount of resource consumed, reserved, or allocated during the reporting duration.

<b>Fixed Cost</b>	Only the fixed costs associated with each entity in the chargeback hierarchy is considered for billing. The actual usage of the chargeable computing resources is ignored.
<b>Actual Usage</b>	In this policy, the actual utilization of the chargeable computing resources of the virtual machines is determined. The total cost is then calculated by using the base rates set in the cost model and the actual used units of the chargeable computing resources.
<b>Reservation Based</b>	This policy takes into account the capacity of a chargeable resource reserved for a virtual machine. vCenter Server allows only CPU and memory reservation. This reserved capacity of CPU and memory along with the actual utilization of other chargeable computing resources is used for calculating the total cost.
<b>Allocation Based</b>	This policy takes into account the user-defined allocation units of chargeable computing resources for the chargeback entities. The allocated units along with the base rates defined in the cost model is used for calculating the total cost.
<b>CPU Reservation</b>	This policy takes into account the CPU capacity reserved for a virtual machine. This reserved CPU capacity along with the actual utilization of other chargeable computing resources is used for calculating the total cost.
<b>Memory Reservation</b>	This policy takes into account the memory capacity reserved for a virtual machine. This reserved memory capacity along with the actual utilization of other chargeable computing resources is used for calculating the total cost.
<b>Maximum of Usage and Reservation</b>	<p>In this policy, the maximum of the used and reserved units of CPU, the maximum of the used and reserved units of memory, and the actual utilization of other chargeable computing resources is used for calculating the total cost.</p> <p>The maximum of usage and reservation is not calculated by comparing the total used units for the entire reporting duration against the total reserved units for the entire reporting duration. vCenter Chargeback Manager compares the used and reserved units for each sample available for the specified reporting duration to calculate the total units to be charged. The samples are fetched from the vCenter Server database. vCenter Server provides samples for the following time slices: 5 minutes, 30 minutes, 2 hours, and 1 day.</p> <p>vCenter Chargeback Manager uses the largest time slice sample available to calculate the maximum of used and reserved units. For example, if a report is generated for a week using this billing policy, then for calculating the total CPU and memory units to be charged, vCenter Chargeback uses the daily sample for each day of the week and compares the used units for each day with the</p>

reserved units of that day and accounts for the maximum of the two. If for any days of the week the daily samples are unavailable, then vCenter Chargeback Manager uses the 2 hour samples only for those days to calculate the total CPU and memory units to be charged.

**Maximum of CPU Usage and CPU Reservation**

In this policy, the maximum of used and reserved units of CPU along with the actual utilization of other chargeable computing resources is considered for calculating the total cost. The total CPU units to be charged is calculated in the same way as specified for the Maximum of Usage and Reservation billing policy.

**Maximum of Memory Usage and Memory Reservation**

In this policy, the maximum of used and reserved units of memory along with the actual utilization of other chargeable computing resources is considered for calculating the total cost. The total memory units to be charged is calculated in the same way as specified for the Maximum of Usage and Reservation billing policy.

**Fixed Cost and Actual Usage**

This policy takes into account the fixed costs associated with the entity and the actual utilization of the chargeable computing resources for calculating the total cost.

**Fixed Cost and Allocation**

This policy takes into account the fixed costs associated with the entity and the user-defined allocations units of the chargeable computing resources for calculating the total cost.

**Fixed Cost and Reservation**

This policy takes into account the fixed costs associated with the entity, the reserved capacity of CPU and memory, and the actual utilization of other chargeable computing resources for calculating the total cost.

**Fixed Cost and CPU Reservation**

This policy takes into account the fixed costs associated with the entity, the reserved capacity of CPU, and the actual utilization of other chargeable computing resources for calculating the total cost.

**Fixed Cost and Memory Reservation**

This policy takes into account the fixed costs associated with the entity, the reserved capacity of memory, and the actual utilization of other chargeable computing resources for calculating the total cost.

**Fixed Cost and Maximum of Usage and Reservation**

This policy takes into account the fixed costs associated with the entity, the maximum of used and reserved units of CPU, the maximum of used and reserved units of memory, and the actual utilization of other chargeable computing resources for calculating the total cost. The total CPU and memory units to be charged is calculated in the same way as specified for the Maximum of Usage and Reservation billing policy.

**Fixed Cost and Maximum of CPU Usage and CPU Reservation**

This policy takes into account the fixed costs associated with the entity, the maximum of used and reserved units of CPU, and the actual utilization of other chargeable computing resources for calculating the total cost. The total CPU units to be charged is calculated in the same way as specified for the Maximum of Usage and Reservation billing policy.

**Fixed Cost and Maximum of Memory Usage and Memory Reservation**

This policy takes into account the fixed costs associated with the entity, the maximum of used and reserved units of memory, and the actual utilization of other chargeable computing resources for calculating the total cost. The total memory units to be charged is calculated in the same way as specified for the Maximum of Usage and Reservation billing policy.

**vCPU Count and Memory Size**

This policy takes into account the number of virtual CPUs, the total amount of memory allocated to the virtual machines, and the actual utilization of other chargeable computing resources for calculating the total cost.

**Fixed Cost and vCPU Count and Memory Size**

This policy takes into account the fixed costs associated with the entity, the number of virtual CPUs and the total amount of memory allocated to the virtual machines, and the actual utilization of other chargeable computing resources for calculating the total cost.

If you install the VMware Cloud Director Data Collector, then the following billing policies are also available:

**VMware Cloud Director Billing Policy - Actual Usage**

This policy takes in to account the user-defined allocation units for count of networks, enabled IPsec VPN tunnel count, and NAT, DHCP, and firewall services. For all other computing resources, the actual usage is considered for cost calculation. This billing policy is set in the VMware Cloud Director Actual Usage Cost Model.

**VMware Cloud Director Billing Policy - Allocation Pool**

This policy takes in to account the actual usage for external network transmit and external network receive computing resources. For all other resources, the user-defined allocation units are considered for cost calculation. This billing policy is set in the VMware Cloud Director Allocation Pool Cost Model.

**VMware Cloud Director Billing Policy - Overage Allocation Pool**

This policy calculates the overage cost for CPU based on the actual usage and that for memory based on the allocation. For the external network transmit and external network receive computing resources, the actual usage is considered. For all other resources, the user-defined allocation units are considered for cost calculation. This billing policy is set in the VMware Cloud Director Overage Allocation Pool Cost Model.

**VMware Cloud Director Billing Policy - Reservation Pool**

This policy takes in to account the actual usage for external network transmit and external network receive computing resources. For all other resources, the user-defined allocation units are considered for cost calculation. This billing policy is set in the VMware Cloud Director Reservation Pool Cost Model.

**VMware Cloud Director Billing Policy - Pay As You Go Fixed Charging**

This policy takes in to account the actual usage for external network transmit and external network receive computing resources. For all other resources, the user-defined allocation units are considered for cost calculation. The policy also takes in to account the fixed costs set on the entities. This billing policy is set in the VMware Cloud Director Pay As You Go - Fixed Charging Cost Model.

**VMware Cloud Director Billing Policy - Pay As You Go Resource Based Charging**

This policy takes in to account the user-defined allocation units for virtual CPUs and memory only if the virtual machine is powered on. It also takes in to account the actual usage for external network transmit and external network receive computing resources. For all other resources, the user-defined allocation units is considered for cost calculation. This billing policy is set in the VMware Cloud Director Pay As You Go - Resource Based Charging Cost Model.

**VMware Cloud Director Billing Policy - Networks**

This policy takes in to account the actual usage for external network transmit and external network receive computing resources. For all other resources, the user-defined allocation units are considered for cost calculation. This billing policy is set in the VMware Cloud Director Networks Cost Model.

vCenter Chargeback Manager also lets you define your own billing policies. To know more about creating custom billing policies, see [“Create a Billing Policy,”](#) on page 82.



## Cost Model

A cost model defines base rates for the chargeable computing resources, the currency, the billing policy to be used for calculating the total cost, and other costs.

The other costs include cost for the guest operating system installed on the virtual machine and cost for vServices such as, High Availability, Fault Tolerance, and virtual machine creation and deletion cost. A cost model also enables you to define different billing policies for different time periods. After you define a cost model in the application, you can define rate factors and fixed costs on entities or hierarchies for the selected cost model. You can also use the cost model to generate various reports.

## Cost Template

A cost template consists of entity-specific cost configuration details. These are rate factors for the chargeable computing resources and the fixed costs.

You can set these values in a cost template and use the template to configure the costs on one or more entities in the hierarchies.

## Managing Cost Models

vCenter Chargeback Manager provides a default cost model called Default Chargeback Cost Model. The cost models defined in the application can be viewed and managed from the Cost Models page of the **Manage Cost** tab.

You can start using the application by creating a chargeback hierarchy and generating basic reports using the default cost model. You can modify this cost model as per your requirements. You can also create and manage multiple other cost models.

Starting with vCenter Chargeback Manager 2.0, the application includes the Default Allocation Based Chargeback Cost Model. You must only modify the base rates in this cost model.

If you have installed the VMware Cloud Director Data Collector, vCenter Chargeback Manager provides few more cost models:

- VMware Cloud Director Actual Usage Cost Model
- VMware Cloud Director Allocation Pool Cost Model
- VMware Cloud Director Overage Allocation Pool Cost Model
- VMware Cloud Director Reservation Pool
- VMware Cloud Director Pay As You Go - Fixed Charging Cost Model
- VMware Cloud Director Pay As You Go - Resource Based Charging Cost Model
- VMware Cloud Director Networks Cost Model

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**NOTE** These cost models do not define any base rates or fixed costs. You must modify the cost models and set the required base rates and fixed costs before using them for generating reports. If you define and include fixed costs in these cost models, ensure that you modify the corresponding billing policies and select the **Add/Include Fixed Cost** option.

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- [Create a Cost Model](#) on page 74

You can create multiple cost models in vCenter Chargeback Manager. Defining multiple cost models enables you to charge different sets of entities or hierarchies differently. It also enables you to compare the costs calculated using different cost models for a hierarchy or a set of entities.

- [Modify a Cost Model](#) on page 76

After a cost model is created, you can modify it as and when required.

- [Delete a Cost Model](#) on page 77

You can remove invalid or unwanted cost models from the application. However, you cannot delete the Default Chargeback Cost Model and Default Allocation Based Chargeback Cost Model.

## Create a Cost Model

You can create multiple cost models in vCenter Chargeback Manager. Defining multiple cost models enables you to charge different sets of entities or hierarchies differently. It also enables you to compare the costs calculated using different cost models for a hierarchy or a set of entities.

You must have create privilege for the cost model resource type on vCenter Chargeback Manager to perform this task.

### Procedure

- 1 In the **Manage Cost** tab, click **Cost Models**.

A table listing all the cost models created in the application is displayed.

- 2 Click **Create**.

The Cost Model screen is displayed.

- 3 Provide a name description for the cost model and set the currency type in the **General** tab.

Option	Description
<b>Name</b>	Name for the cost model. This is mandatory information. The character limit for the cost model name is 255 characters.
<b>Description</b>	An optional description of the cost model. The character limit for the description is 512 characters.
<b>Currency</b>	The currency type used for defining the base rates and special costs in the cost model.

- 4 In the **Billing Policy** tab, set the period for which the billing policy will be effective.

The default selection is **Update from now onwards**, indicating the billing policy will be effective from the time of creation of the cost model till it is changed at a future date.

The other option is **Update for the effective period**. If you select this option, you must specify the start and end date of the period for which the billing policy will be effective. You must enter the dates in the mm/dd/yyyy format. If the end date is not specified, the billing policy will be effective from the specified start date till infinity.

- 5 Select the required policy from the **Billing Policy** list.

- 6 In the **Base Rates** tab, set the period for which the base rates will be effective.

The default selection is **Update from now onwards**, indicating the base rates will be effective from the time of creation of the cost model till it is changed at a future date.

The other option is **Update for the effective period**. If you select this option, you must specify the start and end date of the period for which the base rates will be effective. You must enter the dates in the mm/dd/yyyy format. If the end date is not specified, the base rates will be effective from the specified start date till infinity.

- 7 Set the base rate and the corresponding duration for the computing resources.

The duration specifies how often the specified rate is charged for the corresponding computing resource. The duration can be Hourly, Daily, Weekly, Monthly, Quarterly, Half-yearly, or Yearly. In vCenter Chargeback Manager, a duration value of Monthly is equal to 30 days, Quarterly is equal to 91 days, Half-yearly is equal to 182 days, and Yearly is equal to 365 days.

---

**NOTE** If the base rate for a chargeable computing resource is not entered, the base rate for that resource is considered to be zero.

---

- 8 (Optional) Select **Overage** to define an overage rate for the corresponding computing resource.

An overage rate lets you charge different rates for the allocated units and the units used beyond the allocation.

- 9 (Optional) If you have selected the **Overage** option, specify the rate to be charged for the allocated units of the computing resource and that for the units used beyond the allocation.

- 10 Set the cost for vServices in the **Other Costs** tab.

vServices include high availability, fault tolerance, and creation and deletion of virtual machines. You can specify whether these vServices costs are prorated and also whether the virtual machine power state needs to be considered.

---

**NOTE** If you set the fault tolerance cost, this cost will be charged on virtual machines that have fault tolerance turned on or disabled. The cost is not charged for virtual machines that have fault tolerance turned off.

---

- 11 Specify the fixed cost for various guest operating systems and the duration for charging the same.

You can specify whether the cost is prorated and also whether the virtual machine state is considered. If a virtual machine has the specified operating system installed on it, then the set rate would be charged.

- 12 Click **Create**.

The newly created cost model is added to the table listing the cost models.

## Calculate Base Rate Using Base Rate Calculator

vCenter Chargeback Manager provides a base rate calculator that helps you calculate the base rate for CPU, memory, and storage. The computed base rates when charged enable you to recover your hardware cost over a defined period.

The base rate calculator also helps you identify and calculate the fixed costs to be charged per virtual machine.

### Procedure

- 1 Click **Tools** on the top-right corner of the page.
- 2 Select **Base Rate Calculator** from the **Tools** menu.  
The Base Rate Calculator screen is displayed.
- 3 Click **Set Investment**.
- 4 Set **Recovery Tenure** and **Currency**.
- 5 In the **Hardware Cost** section, specify the cost per server, the number of servers, the CPU and memory capacity, the storage cost, and the storage capacity.

- 6 In the **Other Cost** section, specify the other costs incurred.

These costs can include license costs, maintenance cost, overheads, and so on. If the specified cost is applicable for each of the servers individually, then select the checkbox next to the cost. If the cost is a recurring cost, then select the checkbox under the Recurring Cost column corresponding to the specified cost. You can add and delete additional costs using the **Add** and **Delete** buttons.

- 7 Click **Calculate Metrics**.

The calculated costs are displayed in the Suggested Metrics page of the screen.

- 8 Specify the number of virtual machines in the **Number of VM** field.
- 9 Specify the total number of hours to be considered for a month.
- 10 Set the attribution percentages for the CPU and memory.

The attribution percentages must add up to 100 percent.

The annual, monthly, and hourly rates are displayed.

The various costs for different time periods are displayed on the Suggested Metrics page. You can note down these values and use them to create cost models and fixed costs in the application.

If you want to use only the base rates for CPU, memory, and storage, you can click the **Save these values in cost model** link on the top of the Suggested Metrics page. The Cost Model screen is displayed with the hourly base rates for CPU, memory, and storage populated in it. You must enter the remaining required values before completing the cost model creation task.

## Modify a Cost Model

After a cost model is created, you can modify it as and when required.

You must have update privilege on the cost model to perform this task.

### Procedure

- 1 In the **Manage Cost** tab, click **Cost Models**.

A table listing all the cost models created in the application is displayed.

- 2 Select the cost model that you want to modify, and click **Edit**.

The Cost Model screen is displayed.

- 3 In the **General** tab, modify the name and description as required.

You cannot modify the currency type for a cost model.

- 4 In the **Billing Policy** tab, modify the billing policy and the effective time period.

- a (Optional) To fetch the current billing policies set in the cost model, select the **Update for the effective period** option, specify the required time period, and click **Get**.

You can retain the currently set billing policies and add more policies for different time periods in the same cost model.

- b To add another billing policy, set the effective time period, select the billing policy, and then click **Set**.

Repeat this for each billing policy you want to add to the cost model.

- 5 In the **Base Rates** tab, modify the base rates for the chargeable computing resources, the duration, and the effective time period.
  - a (Optional) To fetch the historical base rate values, select the **Update for the effective period** option, specify the required time period, and click **Get**.
  - b Click the **Show** link next to **Historical values**.  
The historical base rate values for the specified period is displayed for each of the computing resources.
  - c To add another set of base rates, set the effective time period, set the base rates and corresponding duration, and then click **Set**.  
Repeat this for each set of base rates that you want to add to the cost model. You can also modify the existing base rates for different time periods.
- 6 (Optional) To create or modify the overage rate for a computing resource, select **Overage** and provide the rate to be charged for the allocated units of the computing resource and that for the units used beyond the allocation.
- 7 Modify the fixed cost for vServices and guest operating systems in the **Other Costs** tab.
- 8 Click **Save** to save all your changes.

---

**NOTE** The name of the cost model and the start dates are mandatory information and do not have any default values.

---

## Delete a Cost Model

You can remove invalid or unwanted cost models from the application. However, you cannot delete the Default Chargeback Cost Model and Default Allocation Based Chargeback Cost Model.

You must have delete privilege on the cost model to perform this task.



**CAUTION** If a cost model is deleted, any entity-specific cost configuration done for this cost model will also be deleted and the information cannot be retrieved.

---

### Procedure

- 1 In the **Manage Cost** tab, click **Cost Models**.  
A table listing all the cost models created in the application is displayed.
- 2 Select the cost model that you want to delete, and click **Delete**.  
A dialog box confirming the action is displayed.
- 3 Click **OK**.

The cost model is deleted from the application and, consequently, from the table listing the cost models.

## Managing Fixed Costs

vCenter Chargeback Manager provides functionality to create and manage fixed costs. These fixed costs provide a means to charge various resources identically.

The fixed costs defined in the application can be viewed and managed from the Fixed Cost page of the **Manage Cost** tab.

- [Create a Fixed Cost](#) on page 78  
You must create the fixed costs that you want to charge on the entities and hierarchies. These costs can include periodically charged costs and one time costs.
- [Modify a Fixed Cost](#) on page 79  
You can modify the fixed costs as and when required.
- [Delete a Fixed Cost](#) on page 80  
You can delete invalid or unwanted fixed costs from the application.

## Create a Fixed Cost

You must create the fixed costs that you want to charge on the entities and hierarchies. These costs can include periodically charged costs and one time costs.

When defining fixed costs, you can specify whether the cost must be prorated. Prorated fixed costs are considered only for the time for which they are applied on the entity.

For example, you define a fixed cost that must be charged on a monthly basis and assign this cost on an entity on the fifteenth day of the month. At the end of the month when you generate a report on this entity or any of its parent entity, the cost for only the second half of the month would be accounted for.

Also, if an entity is moved within the hierarchy after a prorated fixed cost is applied to it, then the rolled-up fixed cost on the new and old parent entities is accounted for only the duration for which the child entity was in the branch of the parent entities.

You must have create privilege for the fixed cost resource type on vCenter Chargeback Manager to perform this task.

### Procedure

- 1 In the **Manage Cost** tab, click **Fixed Cost**.

A table listing all the fixed costs created in the application is displayed. You can view the details of the fixed cost by clicking the plus sign (+) in the **Details** column of the table. The details include the value of the cost, the duration indicating how often the cost is charged, and the time period for which the set value and duration is valid or applicable.

- 2 Click **Create**.

The Fixed Cost screen is displayed.

- 3 Provide the fixed cost details on the **General** tab.

Option	Description
<b>Name</b>	A name for the fixed cost. The character limit for the fixed cost name is 255 characters.
<b>Description</b>	An optional description of the fixed cost. The character limit for the description is 512 characters.
<b>Currency</b>	The currency type used for defining the fixed cost.
<b>Prorate</b>	Select this option to specify that the fixed cost is prorated.
<b>Consider VM State</b>	If selected, the fixed cost is accounted only for the duration for which the virtual machine is in the powered on state.
<b>One Time</b>	If the defined cost has to be charged only once on the chargeback entity or hierarchy, then select this option. If you select this option, then you cannot set any duration value for the fixed cost. Also, one-time fixed costs cannot be prorated and do not consider the virtual machine power state.

- 4 In the **Cost Details** tab, set the period for which the cost will be effective.  
 The default selection is **Update from now onwards**, indicating the defined cost will be effective from the time of creation of the fixed cost till it is changed at a future date.  
 The other option is **Update for the effective period**. If you select this option, you must specify the start and end date of the period for which the cost will be effective. You must enter the dates in the mm/dd/yyyy format. If the end date is not specified, the cost will be effective from the specified start date till it is changed at a future date.
- 5 Enter the value of the cost and select the duration indicating how often the cost is incurred.  
 The duration can be Hourly, Daily, Weekly, Monthly, Quarterly, Half-yearly, or Yearly.
- 6 Click **Create**.

The newly created fixed cost is added to the table listing the fixed costs.

### What to do next

After a fixed cost is created, you can associate it with an entity, a set of entities, or hierarchies. This can be done while configuring costs at the entity level. Fixed costs can also be added to a template and then set on an entity or a hierarchy.

## Modify a Fixed Cost

You can modify the fixed costs as and when required.

You must have update privilege on the fixed cost to modify it.

vCenter Chargeback Manager does not maintain a history for the **Prorate** and **Consider VM State** options of a fixed cost. Therefore, if you change these options, vCenter Chargeback Manager uses the values set for these options on the fixed cost at the time of report generation immaterial of when these options were modified on the fixed cost.

### Procedure

- 1 In the **Manage Cost** tab, click **Fixed Cost**.  
 A table listing all the fixed costs created in the application is displayed. You can view the details of the fixed cost by clicking the plus sign (+) in the **Details** column of the table. The details include the value of the cost, the duration indicating how often the cost is charged, and the time period for which the set value and duration is valid or applicable.
  - 2 Select the fixed cost that you want to modify and click **Edit**.  
 The Fixed Cost screen is displayed.
  - 3 In the **General** tab, modify the fixed cost details as required.
- 
- NOTE** You cannot modify the currency type and the **One Time** option.
- 
- 4 In the **Cost Details** tab, set the period for which the modified cost value and duration will be effective.  
 The default selection is **Update from now onwards**, indicating that the defined cost detail will be effective from the time of updating the fixed cost till infinity.  
 The other option is **Update for the effective period**. If you select this option, you must specify the start and end date of the period for which the cost will be effective. You must enter the dates in the mm/dd/yyyy format. If the end date is not specified, the cost detail will be effective from the specified start date till infinity.
  - 5 (Optional) To fetch the cost values and duration set for a specific time period, select the **Update for the effective period** option, specify the start and end dates of the time period, and then click **Fetch**.

- 6 Enter the value of the cost and select the duration indicating how often the cost is incurred.  
The duration can be Hourly, Daily, Weekly, Monthly, Quarterly, Half-yearly, or Yearly.  
For one time costs, duration is not applicable.
- 7 If you are defining the cost for a specific time period, click **Set**.  
You can set more than one value and duration for different time periods by repeating [Step 4](#), [Step 6](#), and [Step 7](#).
- 8 Click **Save**.

The modified fixed cost is displayed in the table listing the fixed costs. You can view the modified cost details of the fixed cost by clicking the plus sign (+) in the **Details** column of the table.

## Delete a Fixed Cost

You can delete invalid or unwanted fixed costs from the application.

You must have delete privilege on the fixed cost to remove it from the application.



**CAUTION** Deleting a fixed cost removes it from the entities on which it is configured and does not reflect in a report. Only fixed costs that exist in the application at the time of report generation are included in the report.

### Procedure

- 1 In the **Manage Cost** tab, click **Fixed Cost**.  
A table listing all the fixed costs created in the application is displayed.
- 2 Select the fixed cost that you want to delete, and click **Delete**.  
A dialog box confirming the action is displayed.
- 3 Click **OK**.

The fixed cost is deleted from the application and, consequently, from the table listing the fixed costs.

## Managing Cost Templates

vCenter Chargeback Manager enables you to create cost templates that contain entity-specific cost configuration details.

The cost templates defined in the application can be viewed and managed from the Cost Template page of the **Manage Cost** tab.

- [Create a Cost Template](#) on page 81  
Entity-specific cost configuration, such as the rate factors and fixed costs, must be defined on the entity. If you want to apply a standard entity-specific cost setting on more than one entity, you can create a cost template that contains these settings, and apply the same to the required entities.
- [Modify a Cost Template](#) on page 81  
After a cost template is created, you can modify it as and when required.
- [Delete a Cost Template](#) on page 82  
Invalid or unwanted cost templates can be removed from the application. However, deleting a cost template does not remove the entity-specific cost settings applied on the entities using the cost template.



## Create a Cost Template

Entity-specific cost configuration, such as the rate factors and fixed costs, must be defined on the entity. If you want to apply a standard entity-specific cost setting on more than one entity, you can create a cost template that contains these settings, and apply the same to the required entities.

You must have create privilege for the cost template resource type on vCenter Chargeback Manager to perform this task.

### Procedure

- 1 In the **Manage Cost** tab, click **Cost Template**.

A table listing all the cost templates created in the application is displayed.

- 2 Click **Create**.

The Cost Template screen is displayed.

- 3 Provide the name, description, and currency type for the cost template in the **General** tab.

Option	Description
<b>Name</b>	A name for the cost template. The character limit for the cost template name is 255 characters.
<b>Description</b>	An optional description of the cost template not exceeding 512 characters in length.
<b>Currency</b>	The currency used to define the costs in the cost template.

- 4 In the **Rate Factors** tab, set the rate factors for the chargeable computing resources.

The rate factor value can be between 0 and 999.99. The application rounds off the precision to two decimal places.

- 5 Click the **Fixed Costs** tab.

- 6 Select the required fixed cost and click **Add to the list**.

The fixed cost is added to the list of fixed costs displayed in the **List Of fixed costs to be applied to the cost template** section. Repeat this step for each fixed cost that you want to include in the cost template.

**NOTE** Only the fixed costs having the currency type same as that set on the cost template are displayed and can be added to the cost template.

- 7 (Optional) Check the **Propagate** option corresponding to an added fixed cost if the cost has to be applied to the child entities of the entity on which the cost template is applied. You can also specify whether the cost must be applied to all descendants or only to the immediate child entities. You can also select a filter to ensure that the cost is applied to specific entity types, such as virtual machines, ESXi hosts, and vApps.

- 8 Click **Create**.

The cost template is added to the application and is displayed in the table listing the created cost templates. You can view the details of the cost template by clicking the plus sign (+) in the **Details** column of the table.

## Modify a Cost Template

After a cost template is created, you can modify it as and when required.

You must have the update privilege on the cost template to modify it.

**Procedure**

- 1 In the **Manage Cost** tab, click **Cost Template**.  
A table listing all the cost templates created in the application is displayed.
- 2 Select the cost template that you want to modify and click **Edit**.  
The **Cost Template** screen is displayed.
- 3 Modify the name and description as required in the **General** tab.

---

**NOTE** The name of the cost template is mandatory information and does not have any default values. Also, you cannot modify the currency type.

---

- 4 Click the **Rate Factors** tab and modify the rate factors for the computing resources.
- 5 Click the **Fixed Costs** tab and add new fixed costs or remove existing fixed costs as required.
- 6 Click **Save**.

Changes made to a cost template are not automatically reflected on the entities on which the template is applied. You must explicitly reapply the template on the entities for the changes to take effect.

**Delete a Cost Template**

Invalid or unwanted cost templates can be removed from the application. However, deleting a cost template does not remove the entity-specific cost settings applied on the entities using the cost template.

You must have delete privilege on the cost template to delete it.

**Procedure**

- 1 In the **Manage Cost** tab, click **Cost Template**.  
A table listing all the cost templates created in the application is displayed.
- 2 Select the cost template that you want to delete, and click **Delete**.  
A dialog box confirming the action is displayed.
- 3 Click **OK**.

The cost template is deleted from the application and, consequently, from the table listing the cost templates.

**Managing Billing Policies**

vCenter Chargeback Manager provides various system-defined billing policies. In addition, it lets you define your own billing policies.

You must have privileges on the billing policy resource type to create, update, and delete billing policies. You can view and manage the billing policies from the Billing Policy page of the **Manage Cost** tab.

**Create a Billing Policy**

vCenter Chargeback Manager lets you to define custom billing policies as per your requirements.

A billing policy defines an expression that is used for identifying the amount of computing resources units to be considered for calculating the costs. Therefore, a billing policy must account for all the computing resources. The billing policy contains an expression for each resource. The expression includes an attribute value that identifies the computing resource units to be considered for cost calculation. The attribute values can be allocation, reservation, size, and usage. The attribute value reservation is available only for CPU and memory. The attribute value size is available only for memory.

The expression can be set to obtain the maximum of available attributes. You can also define an expression that calculates the resource units only if the virtual machine is on. Also, for storage resources, you can specify whether the expression must account for thin provisioned disks as thick provisioned. A billing policy can also account for the fixed costs and the state of the virtual machine.

You must have create privilege for the billing policy resource type on vCenter Chargeback Manager to perform this task.

### Procedure

- 1 In the **Manage Cost** tab, click **Billing Policy**.

A table listing all the billing policies created in the application is displayed.

- 2 Click **Create**.

The Billing Policy screen is displayed.

- 3 Provide a name and description for the billing policy.

Option	Description
<b>Name</b>	Name for the billing policy. This is mandatory information. The character limit for the name is 255 characters.
<b>Description</b>	An optional description of the billing policy. The character limit for the description is 512 characters.

- 4 Select the **Expression** tab.

- 5 Select a resource and define an expression for it.

- a To include only an attribute, select the required attribute from the **Attribute** drop-down menu.

The following attributes are available in vCenter Chargeback Manager.

- Allocation: The user-defined allocation value for the resource is considered for cost calculation.
- Usage: The actual resource usage is considered for cost calculation.
- Reservation: The amount of resource reserved by the user is considered for cost calculation. This attribute is available only for CPU and memory.
- Burstable Utilization: This attribute lets you account for the 95th percentile of actual utilization. This attribute is available only for the external network transmit rate and external network receive rate computing resources.

- b To obtain a maximum of a set of attribute values, click **MAX** and then select the required attributes from the **Attribute** drop-down menu.

- c To calculate the resource units only for the powered-on virtual machine, first select the **VM Power On/Off** option and then define the required expression for the selected resource.

- d To account for the storage linked clones, select the **Distribute Linked Clones** option. This option is available only if you define an expression for the storage resource. Accounting for linked clones is only supported with vCenter Server 4.0 and later.

- e To charge thin provisioned disks as thick provisioned, select the **Charge as Thick Provisioning** option. This option is available only if you define an expression for the storage resource. Charging as thick provisioning is only supported with vCenter Server 4.0 and later.

- f Repeat this step for each computing resource. You can select **All other resources** from the **Resource** drop-down menu and define an expression for all the computing resources for which an expression has not been defined in the billing policy.

---

**NOTE** The billing policy must account for all the computing resources.

---

- 6 (Optional) Select **Add/Include Fixed Cost** to consider the fixed costs during cost calculation.
- 7 Click **Create**.

The created billing policy is displayed in the table on the Billing Policy page.

### Example: A Sample Billing Policy Expression

Let us try to define a billing policy that accounts for the maximum of reservation and usage for CPU and memory only for virtual machines that are powered on, maximum of allocation or usage for storage and also consider the linked clones, and allocation value for all other resources.

Table 5-3 lists the resources and the corresponding conditions, operators, and attributes for defining this billing policy expression.

**Table 5-3.** Sample Billing Policy Expression

Resource	VM Power On/Off	MAX Operator	Attribute(s)	Distributed Linked Clones
CPU	Yes	Yes	reservation, usage	N.A.
Memory	Yes	Yes	reservation, usage	N.A.
Storage	No	Yes	allocation, usage	Yes
All other resources	No	No	allocation	N.A.

In this billing policy, if you want to account for the fixed costs, then you must select the **Add/Include Fixed Cost** option.

## Edit a Billing Policy

You can modify the custom billing policies at any time.

You must have update privilege on the billing policy to perform this task. However, you cannot modify the system-defined billing policies that are listed in “Billing Policy,” on page 70.

### Procedure

- 1 In the **Manage Cost** tab, click **Billing Policy**.  
A table listing all the billing policies created in the application is displayed.
- 2 Select the required billing policy from the table and click **Edit**.  
The Billing Policy screen is displayed.
- 3 (Optional) Modify the name and description on the **General** tab.
- 4 Select the **Expression** tab and modify the required expressions.
  - a To modify only the expression for a resource, select the resource, click **Clear selected expression**, and define the new expression.
  - b If you want to delete a resource from the list of resources and corresponding expression, select the resource from the list and click **Delete row**. You can delete all the resources by clicking **Delete All**.
  - c You can include or exclude fixed costs by selecting or deselecting the **Add/Include Fixed Cost** option.
- 5 Click **Save**.

## Delete a Billing Policy

You can delete custom billing policies if they are no longer required.

You must have delete privilege on the billing policy to perform this task.

---

**NOTE** The system-defined billing policies cannot be deleted.

---

### Procedure

- 1 In the **Manage Cost** tab, click **Billing Policy**.  
A table listing all the billing policies created in the application is displayed.
- 2 Select the required billing policy from the table and click **Delete**.
- 3 Click **OK** to confirm the delete operation.

## Configuring Cost at the Entity Level

The base rates defined in a cost model are global values and can be applied uniformly to the entities and hierarchies for which you generate a report.

In a real-world scenario, however, you might want to charge each entity or a set of entities differently. That is, the resource usage costs for one virtual machine might differ from that for the other. This can be achieved only if the costs for each entity or a set of entities in the hierarchy are configured separately. You might also want charge specific fixed costs for some of the entities.

## View Cost Configuration of an Entity

You can view entity-specific cost configuration details in the **Configure Cost** tab.

You must have read privilege on the hierarchy, chargeback hierarchical entities, and the corresponding cost models to perform this task.

### Procedure

- 1 In the **Configure Cost** tab, click **View Entity Cost**.
- 2 Select a hierarchy from the hierarchies included in the drop-down menu.  
The menu includes only the hierarchies on which you have at least the read privilege.
- 3 Expand the hierarchy and select the required entity.
- 4 Enter the time period for which you want to view the entity-specific cost configuration details.
- 5 Select the required cost model from the **Cost Model** drop-down menu.  
Only the cost models on which you have the read privilege are displayed in the drop-down menu.
- 6 Click **Fetch**.

The entity-specific cost configuration details for the selected entity and cost model and the specified duration are displayed. If the entity is not configured for the specified duration or cost model, a message stating the same is displayed on the page.

## Edit Cost Configuration of an Entity

The entity-specific cost configuration details can be set from the **Configure Cost** tab.

The cost configuration is applied on an entity for the specified cost model and time period. These cost configuration details will be considered when a report is generated on the entity using the specified cost model.

---

**IMPORTANT** Ensure that you follow the sequence stated in this procedure. After you have entered some information, reverting to an earlier step in the task might reset the entries on the page.

---

You must have entity cost modify privilege on the chargeback hierarchical entities to perform this task. You must also have update privilege on the cost models and read privilege on the hierarchies.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit Entity Cost**.
- 2 Select the required hierarchy from the hierarchies included in the drop-down menu.  
Only the hierarchies on which you have at least the read privilege are included in the drop-down menu.
- 3 Expand the hierarchy and select the entity for which you want to configure the costs.
- 4 Select the cost model for which you want to specify entity-specific cost configuration details on the selected chargeback entity.
- 5 Specify the duration for which the cost configuration will be effective.  
The default selection is **Update from now onwards**, indicating that the cost configuration details will be effective from the time of setting these details on the entity till they are modified at a future date.  
If you want to set the cost configuration details for a specific duration, select **Update for the effective period** and specify the start and end date of the time period. The dates have to be entered in the mm/dd/yyyy format. If the end time is not specified, the cost configuration details will be effective till they are modified at a future date. You can view the existing cost configuration details for the specified time period by clicking **Get cost configuration**.
- 6 (Optional) Select a cost template from the **Apply a Cost Template** drop-down menu.  
Only the cost templates on which you have read privilege is displayed. The rate factors and fixed costs defined in the cost template are populated in the corresponding fields on the screen.
- 7 Enter the rate factors for the computing resources in the **Rate Factors** tab and click **Update Rate Factors**.  
The rate factor value can be between 0 and 999.99. The application considers a precision of up to two decimal places. If the rate factor is not specified for a computing resource, vCenter Chargeback Manager uses 1 as the rate factor of the computing resource.  
If you have selected a cost template, the rate factors defined in the cost template are populated in the **Rate Factors** fields corresponding to each computing resource. You can modify these rate factors, if required.  
You can view the rate factors already defined for various computing resources for different time periods by clicking **Show** next to **Historical values**.  
When you click **Update Rate Factors**, only the defined rate factors are set on the entity. No other cost configuration is set.
- 8 In the **Fixed Costs** tab, select the required fixed cost from the **Apply a Fixed Cost** drop-down menu and click **Add to the list**.  
The fixed cost is added to the list of fixed costs displayed in the table. For each fixed cost that you want to include, repeat this step.

If you have selected a cost template, the fixed costs included in the cost template and on which you have read privilege are added to the list of fixed costs to be applied on the selected entity. You can add more fixed costs to this list or remove existing fixed costs from the list.

- 9 (Optional) Check the **Propagate** option corresponding to an added fixed cost, if the cost has to be applied to the child entities of the entity on which the cost template is applied. You can also specify whether the cost must be applied to all descendants or only to the immediate child entities. You can also select a filter to ensure that the cost is applied to specific entity types. When a cost report is generated, the fixed costs on the child entities are rolled-up to the parent entity.
- 10 Click **Update Fixed Costs** to set the added fixed costs on the entity.

When you click **Update Fixed Costs**, only the fixed costs added are set on the entity. No other cost configuration is set.

- 11 Select the **Enable/Disable Billing** tab to configure the billing status.

Option	Description
<b>Enable (default)</b>	This option enables billing on the entity for the specified time period. You can use this option if billing was earlier disabled on the entity for the specified time period.
<b>Disable</b>	Select this option if you want to disable billing on the entity for the specified time period.

- 12 Click **Update Billing**.

When you click **Update Billing**, only the defined billing status is set on the entity. No other cost configuration is set.

The cost configuration details are set on the entity for the selected duration and cost model.

#### What to do next

You must repeat this procedure for each cost model that you want to configure on the entity.

## Physical Infrastructure Costing

In vCenter Chargeback Manager you can define rate factors also at the host and cluster level and the datastore level. You can do this from the Edit Infrastructure Cost page of the **Configure Cost** tab.

When you generate a report on a chargeback hierarchical entity or a chargeback hierarchy, vCenter Chargeback Manager checks whether any entity-specific cost configuration is set on the entity or the entities in the hierarchy for the selected cost model. If the entity-specific cost configuration details are specified, vCenter Chargeback Manager uses these details and generates the report.

If no entity-specific cost configuration details are available for the selected cost model, vCenter Chargeback Manager checks whether any rate factors are set at the host and cluster level and the datastore level for the virtual machines on which reports are being generated. If rate factors are set at these levels for the selected cost model, then vCenter Chargeback Manager uses the rate factors when calculating the costs and generating the report.

### Set Rate Factors at the Hosts and Clusters Level

vCenter Chargeback Manager lets you set rate factors at the hosts and clusters level. You can charge all the virtual machines in a cluster or on an ESXi host uniformly by setting rate factors at the hosts and clusters level.

---

**NOTE** You cannot set the rate factor for the storage resource at the hosts and clusters level.

---

## Prerequisites

You must have read privilege on the vCenter Server, entity cost modify privilege on the chargeback hierarchical entities, and update privilege on the cost models to perform this task.

## Procedure

- 1 In the **Configure Cost** tab, click **Edit Infrastructure Cost**.
- 2 Select **Hosts & Clusters** from the drop-down menu.
- 3 Expand the Hosts & Clusters folder by clicking the plus sign.
- 4 Click the plus sign next to **Clusters** to view the clusters defined in the vCenter Server instances added to vCenter Chargeback Manager.  
  
To view the ESXi hosts that are not included in any cluster, you can click the plus sign next to **Unclustered Hosts**.
- 5 Select the cluster or an individual ESXi host for which you want to define the rate factors.  
  
If you select a cluster, the right pane of the page displays the cluster properties and the ESXi hosts under the selected cluster along with the fields to set the rate factors for individual computing resources.
- 6 Select a cost model from the drop-down menu.
- 7 Specify the duration for which the rate factors will be effective.  
  
The default selection is **Update from now onwards**, indicating that the rate factors will be effective from the time of setting them on the entity till they are modified.  
  
If you want to set the rate factors for a specific duration, select **Update for the effective period** and specify the start and end date of the time period. The dates have to be entered in the mm/dd/yyyy format. If the end time is not specified, the rate factors will be effective till they are modified at a future date. You can view the existing rate factors for the specified time period by clicking **Get Rate Factors**.
- 8 (Optional) Click **Show** next to **Historical values** to view the historical base rate and rate factor values of all the computing resources for the specified time period.
- 9 Specify the rate factors for the required computing resources and click **Update Rate Factors**.
- 10 Click **OK** in the information dialog box.

## Managing Datastore Tiers

vCenter Chargeback Manager lets you define rate factors for individual datastores. You can also create tiers, add datastores to the tiers, and set rate factors at the tier level.

Setting rate factors at the tier level enables you to apply the same rate factor to multiple datastores. The rate factors set at the datastore level can be overridden by the rate factors set at the entity level in the chargeback hierarchy. You can also define rate factors for VM storage profiles defined in the vCenter Server. The rate factor configured on a storage profile is applied to all the datastores that match the storage profile.

When the storage cost is calculated, vCenter Chargeback Manager checks for the cost configuration on the datastore. If the datastore matches a profile and is listed under a profile, then the cost configuration on the profile is considered. If the datastore or the profile is grouped under a tier, then the cost configuration details of the tier is used for calculating the storage cost.

If a datastore matches more than one profile, then the datastore appears under each matching VM storage profile. In such a case, the highest user-defined rate factor set on the VM storage profiles is considered. Therefore, if a datastore matches two different profiles and if you have not defined any rate factor on either of the profiles, then default rate factor of 1 is considered. If you have defined rate factor on both the profiles, then the highest of the two rate factors is considered. However, if you have defined rate factor on only one of the profiles (say, 0.75), then the user-defined rate factor is considered even if it is less than the default value of 1.



## Create a Datastore Tier

You can create a datastore tier in vCenter Chargeback Manager and add various datastores and storage profiles to it. This enables you to define a standard rate factor for a set of datastores.

You must have create privilege for the tier resource type on vCenter Chargeback Manager to perform this task.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit Infrastructure Cost**.
- 2 Select **DataStores** from the drop-down menu.
- 3 Click **Create Tier** at the bottom of the left panel.
- 4 Provide a name for the newly created tier and click outside the editable tier name field.  
Datastore tier names are not case-sensitive.

A new datastore tier folder is created.

## Modify the Name of a Datastore Tier

You can modify the name of the tier folder at any time after it is created.

You must have update privilege on the tier to perform this task.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit Infrastructure Cost**.
- 2 Select **DataStores** from the drop-down menu.
- 3 Right-click the tier folder whose name you want to modify and select **Edit label**.
- 4 Enter the new name for the tier folder and click outside the editable tier name field.

## Add a Datastore to a Tier

After you have created a tier, you can add one or more datastores and storage profiles to it.

Adding datastores and storage profiles to a tier enables you to set rate factors for multiple datastores uniformly.

### Prerequisites

You must have update privilege on the tier and read privilege on the vCenter Server to perform this task.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit Infrastructure Cost**.
- 2 Select **DataStores** from the drop-down menu.
- 3 Expand the **ungrouped** folder by clicking the plus sign (+) next to it.  
Only the ungrouped datastores and storage profiles corresponding to the vCenter Server instances on which you have read privilege are displayed.
- 4 Right-click the datastore that you want to add to a tier and select **Move this Datastore to another tier**.
- 5 Right-click the tier folder to which you want to add this datastore and select **Put the Datastore/Storage Profile in this tier**.

The datastore is moved from the **ungrouped** folder to the selected tier folder.

## Set the Rate Factors on a Tier, Datastore, or Storage Profile

vCenter Chargeback Manager lets you define rate factors at the datastore level. You can set the rate factors on individual datastores, storage profiles, and tiers.

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**NOTE** You cannot set rate factors on individual datastores that are already grouped under a storage profile or tier. Also, you cannot set rate factors on storage profiles that are grouped under a tier.

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### Prerequisites

You must have the entity cost modify privilege on the tier and update privilege on the cost model to set rate factors on a tier. You must have read privilege on the vCenter Server and update privilege on the cost model to set rate factors on a datastore.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit Infrastructure Cost**.
- 2 Select **DataStores** from the drop-down menu.
- 3 Select the tier for which you want to configure the rate factor.

The right pane of the page displays the datastores included in the tier, their details, and the field to configure the rate factor for the tier.

If you want to set the rate factor on an ungrouped datastore or storage profile, select the required datastore or storage profile from the **ungrouped** folder.

- 4 Select the cost model from the drop-down menu.
- 5 Select the duration for which the rate factor will be effective.

The default selection is **Update from now onwards**, indicating that the rate factors will be effective from the time of setting them on the datastore till they are modified at a future date.

If you want to set the rate factors for a specific duration, select **Update for the effective period** and specify the start and end date of the time period. The dates have to be entered in the mm/dd/yyyy format. If the end time is not specified, the rate factors will be effective till they are modified at a future date. You can view the existing rate factors for the specified time period by clicking **Get Rate Factors**.

For a tier, the duration is always from the time of setting the rate factor till it is updated at a future time.

- 6 Specify the rate factor and click **Set**.
- 7 Click **OK** on the information dialog box.

The new rate factor is set on the datastore or tier for the selected cost model and specified time period.

## Move a Datastore or Storage Profile to Another Tier

You can move datastores and storage profiles across tiers.

After a datastore or storage profile is moved from one tier to another tier, the rate factor that it inherited from first tier is overridden by the rate factor configured on the second tier. However, this rate factor change history is maintained.

If a datastore or storage profile is ungrouped, then any rate factor set explicitly on the datastore or storage profile is applicable.

You must have update privilege on the tier and read privilege on the vCenter Server to perform this task.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit Infrastructure Cost**.

- 2 Select **DataStores** from the drop-down menu.
- 3 Expand the tier folder containing the datastore or storage profile that you want to move.
- 4 Right-click the datastore or storage profile that you want to move to another tier and select **Move this Datastore to another tier**.
- 5 Right-click the tier folder to which you want to move this datastore and select **Put the Datastore/Storage Profile in this tier**.

The datastore or storage profile is moved to the new tier folder.

## Configuring a Pricing Matrix for Virtual Machines

vCenter Chargeback Manager provides functionality to charge a fixed cost for virtual machines in a hierarchy based on the vCPU count and memory.

You can define one or more pricing matrices for the virtual machines in your hierarchies, such that the virtual machines are charged a fixed cost based on the vCPU count and memory bundle. This cost is applied only for the duration when a virtual machine is powered on and is not pro-rated.

A price matrix is associated with a cost model and can contain multiple cost entries for different vCPU count and memory bundles. You can also define a criterion to specify the hierarchies for which the price matrix is applicable. You can define multiple pricing matrices with different hierarchy selection criteria for each cost model defined in vCenter Chargeback Manager. Each hierarchy selection criteria for a selected cost model must be unique. Also, each entry in the pricing matrix must be unique.

vCenter Chargeback Manager applies the fixed cost defined in the pricing matrix on the virtual machines in a hierarchy by running a job that periodically checks for new and updated hierarchies, and hierarchy selection criteria and the corresponding pricing matrix. Based on the hierarchy and entity selection criteria, the application uses the corresponding pricing matrix to apply the fixed cost on the virtual machines in the hierarchies that match the specified criterion as follows:

- 1 vCenter Chargeback Manager checks for the hierarchy selection criteria and the corresponding pricing matrices defined in it.
- 2 vCenter Chargeback Manager uses the pricing matrix corresponding to the first matching criterion for each hierarchy.
- 3 vCenter Chargeback Manager first searches for a row in the pricing matrix that has the same vCPU count as in the virtual machine.
- 4 If such a row is not found, then vCenter Chargeback Manager selects the row with the next higher value of vCPU count than in the virtual machine.
- 5 For the selected vCPU count, vCenter Chargeback Manager checks for a memory value equal to or higher than the memory in the virtual machine.
- 6 If a row with the vCPU count or memory value equal to or higher than the vCPU count or memory in the virtual machine is not found, then vCenter Chargeback Manager uses the default cost configured in the matrix.

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**NOTE** For hierarchies imported from vCloud Director, the vCPU count and memory allocation values synchronized from the vCloud Director database is considered for applying the fixed cost. For hierarchies created in vCenter Chargeback Manager, the vCPU count and memory utilization values synchronized from the vCenter Server database is used for applying the fixed cost.

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If a virtual machine configuration is changed, then the corresponding change in the fixed cost is applicable from the time the configuration change is effected. If the fixed cost in the pricing matrix is changed, then the change is effected from the next run of the job.

If any row in the matrix is deleted, then the corresponding fixed cost is also deleted and is not considered during reporting. Similarly, if a cost matrix is deleted, then the costs defined in the matrix is lost and is not considered when a report is generated on the virtual machine, the parent entity, or hierarchy.

You must have a Super User role to create and manage virtual machine instance pricing matrix. Also, the defined fixed cost is reported only if the report is generated by a Super User.

## Create a Pricing Matrix for Virtual Machines

A pricing matrix defines multiple costs based on vCPU count and memory bundles and is associated with a cost model and a hierarchy selection criterion.

### Procedure

1 In the **Configure Cost** tab, click **Edit VM Instance Cost**.

2 Select a cost model from the drop-down menu.

A table listing the hierarchy selection criteria defined for the cost model is displayed on the page.

3 Click **Create**.

The Selection Criteria and VM Instance Matrix screen is displayed.

4 Select whether you want to apply the VM instance matrix to all hierarchies or only specific hierarchies.

5 Define the hierarchy and entity selection criteria, if you selected **Specify hierarchy selection criteria**.

a Define the hierarchy selection criteria based on the hierarchy name.

You must select a string comparison operator and specify a compare string. The available comparison operators are Equals, Starts with, Ends with, and Contains. You can also define the hierarchy selection criteria based on the hierarchy attribute by clicking **Enter Hierarchy Attribute**.

b (Optional) Click **Add Row** under **Entity selection criteria** and define the entity criteria.

The entity selection can be based on name or attribute. You must select a comparison operator and specify a compare string. The available comparison operators are Equals, Starts with, Ends with, and Contains. You can define multiple entity selection criteria. The criteria filters the entities in the selected hierarchies on which the pricing matrix is applied.

6 In the VM Instance Matrix section, click **Add**.

A new row is created in the table in the VM Instance Matrix section.

7 Enter the required vCPU count.

8 Click the Memory column of the row and enter the memory value in MB.

9 Click the Cost column of the row and enter the cost for the specified vCPU count and memory bundle.

10 Select the duration for which the cost is charged on the virtual machine.

11 Specify the default cost and duration.

If a virtual machine in the hierarchy has a vCPU count and memory bundle that does not match any entry in the defined virtual machine instance cost matrix, then this default cost is applied to the virtual machine.

12 Click **Create**.

A row corresponding to the specified hierarchy selection criterion is added to the table on the **Edit VM Instance Cost** page.

## Update Hierarchy Selection Criteria and Virtual Machine Instance Cost Matrix

You can update the hierarchy selection criterion and the corresponding virtual machine instance cost matrix.

You can modify the hierarchy selection criteria defined for a cost model as and when required. You can modify the entity filter criteria and edit the virtual machine instance cost matrix corresponding to the hierarchy selection criterion by adding new rows and delete existing rows. You can also modify the cost for a vCPU count and memory bundle or modify the bundle configuration.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit VM Instance Cost**.
- 2 Select a cost model from the drop-down menu.
 

A table listing the hierarchy selection criteria defined for the cost model is displayed on the page.
- 3 Select the hierarchy selection criterion from the table displayed on the page and click **Edit**.
- 4 (Optional) Modify the hierarchy selection criterion by selecting a different criterion option or by changing the criterion details.
- 5 (Optional) Modify the entity filter criterion by adding new criterion, deleting existing criterion, or by changing the existing criterion details.
- 6 (Optional) Modify the cost matrix by adding a new row.
  - a Click **Add** in the VM Instance Matrix section.
 

A new row is created in the table in the VM Instance Matrix section.
  - b Enter the vCPU count, memory, cost, and duration details.
- 7 (Optional) Modify the cost matrix by deleting a row.
  - a Select a row from the table in the VM Instance Matrix section.
  - b Click **Delete**.
 

You can delete all the rows by clicking **Delete All**.
- 8 (Optional) Modify the cost matrix by modifying a row.
  - a Select a row from the table in the VM Instance Matrix section.
  - b Modify the vCPU count, memory, cost, and duration details.
- 9 (Optional) Modify the default cost value and the corresponding duration.
- 10 Click **Save**.

The modified hierarchy selection criterion is listed in the table on the Edit VM Instance Cost page.

## Modify Priority Order of Selection Criteria

The default priority order for the hierarchy selection criteria is the order in which they are created. However, you can modify this order as per your requirements.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit VM Instance Cost**.
- 2 Select a cost model from the drop-down menu.
 

A table listing the hierarchy selection criteria defined for the cost model is displayed on the page.
- 3 Select a hierarchy selection criterion.

- 4 Move the selected criterion in the table by clicking **Move Up** or **Move Down**, as required.
- 5 (Optional) Repeat [Step 3](#) and [Step 4](#) to reorder other hierarchy selection criteria.
- 6 Click **Update Criteria Order**.

The modified criteria order is displayed on the page.

## Delete a Selection Criteria and Corresponding VM Instance Cost

You can delete a hierarchy selection criterion defined for a cost model and the corresponding virtual machine instance cost matrix, if it is no longer required.

### Procedure

- 1 In the **Configure Cost** tab, click **Edit VM Instance Cost**.
- 2 Select a cost model from the drop-down menu.  
A table listing the hierarchy selection criteria defined for the cost model is displayed on the page.
- 3 Select a hierarchy selection criterion.
- 4 Click **Delete**.

The hierarchy selection criterion and the corresponding virtual machine instance cost matrix is deleted from the table displayed on the page.

## Generating Reports

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After creating and configuring chargeback hierarchies and defining cost models, you can generate various cost reports, usage reports, cost comparison reports, and showback reports. The reports provide you with valuable information such as the usage of resources, the charge to levied on each entity, and the total cost.

This chapter includes the following topics:

- [“About Reports,”](#) on page 95
- [“Generate a Cost Report,”](#) on page 98
- [“Generate a Usage Report,”](#) on page 100
- [“Generate Cost Comparison Report,”](#) on page 101
- [“Generate Showback Report,”](#) on page 103
- [“Scheduling Report Generation,”](#) on page 105
- [“Managing Reports,”](#) on page 111
- [“Managing Archived Reports,”](#) on page 115
- [“Managing Automatic Report Scheduler,”](#) on page 118
- [“Report Dashboard,”](#) on page 120

### About Reports

vCenter Chargeback Manager enables you to generate cost reports, usage reports, cost comparison reports, and showback reports for a chargeback hierarchy and for entities in the hierarchy.

#### Cost Report

A cost report provides the cost and utilization information for each computing resource for the hierarchy or entity on which the report is generated based on the cost configured in the hierarchy and the cost model selected during report generation. An exported chargeback cost report includes various sections.

#### Report Summary

This section appear immediately below the report title on the first page of the report and includes the information provided in [Table 6-1](#).

**Table 6-1. Report Summary**

<b>Field</b>	<b>Description</b>
Name	Report name provided during report creation
Description	A short description about the report. This information is provided during report creation.
Bill Date	The date on which the report is generated.
Bill Period	The start and end date of the time period for which the report is generated. The resource usage details for this time period is considered when generating the report. The cost configuration details and applicable fixed costs for this time period are also considered when generating a cost report or cost comparison report.
Hierarchy	The name of hierarchy on which the report is generated. If the report is generated for an entity, then the name of the hierarchy in which the entity exists is included.
Chargeback Model	The vCenter Chargeback Manager cost models used to compute the costs when generating the report. Multiple cost models are displayed for cost comparison reports and for cost reports that were generated on multiple entities using different cost models. The cost model names are separated by a semi-colon (;). This field is not displayed in a usage report. In showback report, the distribution policy is displayed instead of the cost model.
Report Addressed To	To whom the report is addressed to. This value is entered when generating the report.
Total Charges	The total rolled-up cost for the entity or hierarchy on which the report is generated. This field is displayed only in cost reports and showback reports.

### **Chargeback Cost Summary**

This section specifies the total cost for the entity and all its child entities. The total cost for an entity is the rolled-up cost. That is, the costs of all the child entities are considered while calculating the cost of the parent entity. This section is not included in a usage report.

### **Chargeback Resource Summary**

This section provides cost for each chargeable computing resource, the fixed costs, and the total cost for the entity and its immediate child entities. These details are displayed for each entity levels starting from the entity on which the report is generated to the leaf entities, that is, entities without any child entity. The costs displayed in the report for each entity and for each resource are the rolled-up costs at that entity level. This section also displays the actual resource



utilization details at each entity level. In a cost report, this section also includes the following graphs for each entity level starting with the entity on which the report is generated:

- Cost per Resource
- Cost per Child Entity
- Usage per Child Entity

If the cost and usage data is not available for a specified period, then the graphs for this period are excluded from the exported report. Also, if a report is generated on a virtual machine or an entity without any child entities, then the report does not include any graphs.

### **Chargeback Cost Details**

This section lists all the costs charged on each entity, the rolled-up costs of its child entities, and the total fixed costs. It also provides information about the cost model, the attributes set on the entities, and informational messages for the entities. The report contains a separate cost details section for each entity. This section displays the base rates, rate factors, used units, attribution percentage, and total cost for each computing resource of each virtual machine.

### **Usage Report**

A usage report is similar to a cost report except that it provides only the computing resource utilization data. This report type is useful when you only want to analyze the resource utilization for various entities in a hierarchy. The report structure is similar to the cost report with the following exceptions:

- Report does not include the Cost Summary section.
- The Report Summary section does not include any cost information.
- The Resource Summary section does not include any cost information.
- The Resource Summary section includes only the Usage per Child Entity graph.
- The Cost details section is not applicable. Instead, the report includes the Usage details section. This section provides the usage details of each computing resource for each entity separately. This section does not include any cost-related information other than the cost model used for generating the report.

### **Cost Comparison Report**

A cost comparison report enables you to compare the costs for each resource and entity based on two different cost models. The report structure is similar to the cost report with the following exceptions:

- Report summary section does not display the total cost.

- No graphs are available in the resource summary.

### Showback Report

A showback report lets you analyse how the costs are distributed among the entities based on a specified distribution policy. This report type is useful when you know the total cost and want to analyze how this cost is distributed among the entities by selecting different distribution policies. The report structure is similar to the cost report with the following exceptions:

- Report summary section displays the distribution policy instead of the chargeback cost model.
- No graphs are available in the resource summary.
- Report does not include the Cost details section.

## Generate a Cost Report

You can generate cost reports for a hierarchy and for individual entities in a hierarchy.

You must have create privilege on the report resource type and at least the read privilege on the hierarchy, chargeback hierarchical entities, and cost models to perform this task.

### Procedure

- 1 In the **Reports** tab, click **Create Reports**.

- 2 Select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed. You can expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name. The first level entities of the hierarchy is displayed. To further expand, click the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the hierarchy or the entity on which you want to generate the report and select **Generate Cost Report** from the pop-up menu.

To generate a report for multiple entities, press the Ctrl key, select each of the required entities, and right-click and select **Generate Cost Report** from the pop-up menu. Do not release the Ctrl key till you right-click.

The Create Report screen is displayed.

- 4 Provide the requested report details and click **Next**.

Option	Description
<b>Name</b>	Enter a meaningful name for the report. The character limit for the report name is 255 characters.
<b>Description</b>	Provide an optional description of the report. The character limit for the report description is 512 characters.
<b>User Name</b>	(Optional) Enter the name of the user to whom the report is addressed to. The report is not automatically emailed to this user.
<b>Report Duration</b>	Select the <b>Generate this report now</b> option (default) and specify the effective time period for generating the report by providing the start date and end date for the reporting duration. This reporting duration is the time period for which the usage stats of computing resources will be retrieved and used for calculating the costs. The entity-specific cost configuration details, such as rate factors and fixed costs, that are applicable during this time period will also be used. Ensure that the dates are entered in the mm/dd/yyyy format.

Option	Description
<b>Select a cost model</b>	Select the cost model to be used for generating the report. If you are generating a report for multiple entities, you can choose to use different cost models for each entity by selecting the <b>Use different cost models for entities</b> option and then select the required cost models for each entity. Ensure that the selected cost models have the same currency type.
<b>Computation Resources</b>	Select the resources to be considered for calculating the costs and to be reported. You can either select <b>Disk Read</b> and <b>Disk Write</b> to be reported individually or to be reported in total as <b>Disk Read and Write</b> . Similarly, the data traffic over the network can be either reported separately as <b>Network Received</b> and <b>Network Transmitted</b> or in total as <b>Network Received and Transmitted</b> .
<b>Auto Archive</b>	Select this option to automatically save the generated report.

- 5 On the **Resource Summary** page, select **Include resource summary in report**.

Select this option to include the summary of costs for the selected resources in the report. You must also select the type of resource summary to be reported. The resource summary can either be **Complete** (default) or **Basic**. A basic summary includes the resource cost summary for the selected entity and its immediate child in the report. A complete summary provides the resource cost summary for the selected entity and all its child entities up to the leaf node.

- 6 Select the computing resources whose usage and cost details have to included in the report.

- 7 Select **Include cost summary in report** to include the summary of costs in the report.

The cost summary can be either **Complete** (default) or **Basic**.

- 8 Click **Next**.

- 9 On the **Details** page, select the fixed cost details, usage-related details, and other information to be displayed in the report, and click **Next**.

Option	Description
<b>Show these details in report</b>	Select this option if you want to include information about the selected cost model or the entity attributes, or information messages in the Cost Details section of the report. The selected information is displayed in the report for the selected entity and all the entities that are under it in the chargeback hierarchy.
<b>Show these columns in the usage details table</b>	Select this option to include the usage statistics in the report. You must also select the types of information that should be displayed in the usage table in the report.
<b>Show fixed cost in report</b>	Select this option to include the details of the fixed costs in the report. If you select this option, you must also select the fixed cost details to be included in the report.

- 10 (Optional) On the **Attributes** page, select **Filter the report based on attributes** to define attribute filters.

You must specify an attribute name value pair. Specifying attribute filters lets you generate report for only the entities on which the attribute name-value pair is set. Also, the report is generated on the entities only for the time period with in the reporting duration for which the attribute name-value pair is applicable.

- 11 Click **Submit**.

The generated report is displayed.

## Generate a Usage Report

You can generate resource usage reports for a hierarchy and for individual entities in a hierarchy.

You must have create privilege on the report resource type and at least the read privilege on the hierarchy, chargeback hierarchical entities, and cost models to perform this task.

### Procedure

- 1 In the **Reports** tab, click **Create Reports**.

- 2 Select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed. You can expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name. The first level entities of the hierarchy is displayed.

To further expand, click the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the hierarchy or entity on which you want to generate the report and select **Generate Usage Report** from the pop-up menu.

To generate a report for multiple entities, press the Ctrl key, select each of the required entities, and right-click and select **Generate Usage Report**. Do not release the Ctrl key till you right-click.

The Create Report screen is displayed.

- 4 Provide the requested report details and click **Next**.

Option	Description
<b>Name</b>	Enter a meaningful name for the report. The character limit for the report name is 255 characters.
<b>Description</b>	Provide an optional description of the report. The character limit for the report description is 512 characters.
<b>User Name</b>	(Optional) Enter the name of the user to whom the report is addressed to. The report is not automatically emailed to this user.
<b>Report Duration</b>	Select the <b>Generate this report now</b> option (default) and specify the effective time period for generating the report by providing the start date and end date for the reporting duration. This reporting duration is the time period for which the usage statistics of computing resources will be retrieved. Ensure that the dates are entered in the mm/dd/yyyy format.
<b>Select a cost model</b>	Select the cost model to be used for generating the report. If you are generating a report for multiple entities, you can choose to use different cost models for each entity by selecting the <b>Use different cost models for entities</b> option and then select the required cost models for each entity.
<b>Computation Resources</b>	Select the resources for which the usage statistics have to be reported. You can either select <b>Disk Read</b> and <b>Disk Write</b> to be reported individually or to be reported in total as <b>Disk Read and Write</b> . Similarly, the data traffic over the network can be either reported separately as <b>Network Received</b> and <b>Network Transmitted</b> or in total as <b>Network Received and Transmitted</b> .
<b>Auto Archive</b>	Select this option to automatically save the generated report.

- 5 On the **Resource Summary** tab, select **Include resource summary in report**.

Select this option to include the summary of usage statistics for the selected resources in the report. You must also select the type of resource summary to be reported. The resource summary can either be **Complete** (default) or **Basic**. A basic summary includes the resource summary for the selected entity and its immediate child in the report. A complete summary provides the resource summary for the selected entity and all its child entities up to the leaf node.

- 6 Select the computing resources whose usage details have to included in the report and click **Next**.

- On the **Details** page, select the usage-related details and other information to be displayed in the report, and click **Next**.

Option	Description
<b>Show these details in report</b>	Select this option if you want to include information about the selected cost model or the entity attributes, or some information messages in the Usage Details section of the report. The selected information is displayed in the report for the selected entity and all the entities that are under it in the chargeback hierarchy.
<b>Show these columns in the usage details table</b>	Select this option to include the usage statistics in the report. You must also select the types of information that should be displayed in the usage table in the report.

- (Optional) On the **Attributes** page, select **Filter the report based on attributes** to define attribute filters.  
You must specify an attribute name value pair. Specifying attribute filters lets you generate report for only the entities on which the attribute name-value pair is set. Also, the report is generated on the entities only for the time period with in the reporting duration for which the attribute name-value pair is applicable.
- Click **Submit**.

The generated report is displayed.

## Generate Cost Comparison Report

You can compare the costs calculated by two different cost models on the same entity or hierarchy by generating a cost comparison report.

You must have create privilege on the report resource type and at least the read privilege on the hierarchy, chargeback hierarchical entity, and cost models to perform this task.

### Procedure

- In the **Reports** tab, click **Create Reports**.
- Select the required chargeback hierarchy from the drop-down menu on the left pane of the page.  
The collapsed view of the chargeback hierarchy is displayed. You can expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name. The first level entities of the hierarchy is displayed. To further expand, click the plus sign to the left of the entities that have sub-entities.
- Right-click the hierarchy or entity on which you want to generate the report and select **Generate Comparison Report** from the pop-up menu.

The Create Report screen is displayed.

- Provide the requested report details and click **Next**.

Option	Description
<b>Name</b>	Enter a meaningful name for the report. The character limit for the report name is 255 characters.
<b>Description</b>	Provide an optional description of the report. The character limit for the report description is 512 characters.
<b>User Name</b>	(Optional) Enter the name of the user to whom the report is addressed to. The report is not automatically emailed to this user.

Option	Description
<b>Report Duration</b>	Select the <b>Generate this report now</b> option (default) and specify the effective time period for generating the report by providing the start date and end date for the reporting duration. This reporting duration is the time period for which the usage stats of computing resources will be retrieved and used for calculating the costs. The entity-specific cost configuration details, such as rate factors and fixed costs, that are applicable during this time period will also be used. Ensure that the dates are entered in the mm/dd/yyyy format.
<b>Compare Cost Models</b>	Select the cost models to be used for generating the comparison report. Ensure that the selected cost models have the same currency type.
<b>Computation Resources</b>	Select the resources to be considered for calculating the costs and to be reported. You can either select <b>Disk Read</b> and <b>Disk Write</b> to be reported individually or to be reported in total as <b>Disk Read and Write</b> . Similarly, the data traffic over the network can be either reported separately as <b>Network Received</b> and <b>Network Transmitted</b> or in total as <b>Network Received and Transmitted</b> .
<b>Auto Archive</b>	Select this option to automatically save the generated report.

- 5 On the **Resource Summary** tab, select **Include resource summary in report**.

Select this option to include the summary of costs for the selected resources in the report. You must also select the type of resource summary to be reported. The resource summary can either be **Complete** (default) or **Basic**. A basic summary includes the resource cost summary for the selected entity and its immediate child in the report. A complete summary provides the resource cost summary for the selected entity and all its child entities up to the leaf node.

- 6 Select the computing resources whose usage and cost details have to included in the report.

- 7 Select **Include cost summary in report** to include the summary of costs in the report.

The cost summary can be either **Complete** (default) or **Basic**.

- 8 Click **Next**.

- 9 On the **Details** page, select the fixed cost details, usage-related details, and other information to be displayed in the report, and click **Next**.

Option	Description
<b>Show these details in report</b>	Select this option if you want to include information about the selected cost model or the entity attributes, or information messages in the Cost Details section of the report. The selected information is displayed in the report for the selected entity and all the entities that are under it in the chargeback hierarchy.
<b>Show these columns in the usage details table</b>	Select this option to include the usage statistics in the report. You must also select the types of information that should be displayed in the usage table in the report.
<b>Show fixed cost in report</b>	Select this option to include the details of the fixed costs in the report. If you select this option, you must also select the fixed cost details to be included in the report.

- 10 (Optional) On the **Attributes** page, select **Filter the report based on attributes** to define attribute filters.

You must specify an attribute name value pair. Specifying attribute filters lets you generate report for only the entities on which the attribute name-value pair is set. Also, the report is generated on the entities only for the time period with in the reporting duration for which the attribute name-value pair is applicable.

- 11 Click **Submit**.

- 12 Select whether you want to open or save the report and click **OK** in the dialog box.

## Generate Showback Report

You can generate a showback report to analyse how the cost is distributed among the entities based on a specified distribution policy.

A showback report is a configurable report that does not include any costs when it is generated. You can specify the total cost, fixed cost, and resource weightage in the generated report to obtain the cost for each entity and for each resource per entity. The cost per entity is calculated based on the distribution policy that you select when generating the showback report. [Table 6-2](#) lists the available distribution policies.

**Table 6-2.** Showback report distribution policies

Distribution Policy	Description
Equally among Hosts	Total cost is distributed equally among the hosts.
Equally among VMs	Total cost is distributed equally among the virtual machines.
Equally among Children	Total cost is distributed equally among all child entities.
As per Allocation	Total cost is distributed based on the resource allocation values.
As per Usage	Total cost is distributed based on the actual resource usage values.

After you specify the total cost, this cost is distributed across the entities based on the distribution policy. You can obtain the cost for each resource per entity, by specifying weightage for each resource. The weightage is a percentage value that is used to identify the resource cost for each entity.

**NOTE** If you have defined allocation on both the parent and child entity and you generate a showback report using the As per allocation distribution policy, then the total cost is distributed only till the parent entity for the time period for which allocation is set on both the parent and the child entity. The cost is not distributed to the child entities of the parent entity for the overlapping time period.

You can also specify fixed cost per entity. The fixed cost is deleted from the entity cost and the cost for each resource is recalculated using the differential cost.

You must have create privilege on the report resource type and at least the read privilege on the hierarchy, chargeback hierarchical entity, and cost models to perform this task.

### Procedure

- 1 In the **Reports** tab, click **Create Reports**.
- 2 Select the required chargeback hierarchy from the drop-down menu on the left pane of the page.  
The collapsed view of the chargeback hierarchy is displayed. You can expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name. The first level entities of the hierarchy is displayed. To further expand, click the plus sign to the left of the entities that have sub-entities.
- 3 Right-click the hierarchy or entity on which you want to generate the report and select **Generate Showback Report** from the pop-up menu.  
The Create Report screen is displayed.
- 4 Provide the requested report details and click **Next**.

Option	Description
<b>Name</b>	Enter a meaningful name for the report. The character limit for the report name is 255 characters.
<b>Description</b>	Provide an optional description of the report. The character limit for the report description is 512 characters.

Option	Description
<b>User Name</b>	(Optional) Enter the name of the user to whom the report is addressed to. The report is not automatically emailed to this user.
<b>Report Duration</b>	Select the <b>Generate this report now</b> option (default) and specify the effective time period for generating the report by providing the start date and end date for the reporting duration. This reporting duration is the time period for which the usage stats of computing resources will be retrieved and used for calculating the costs. The entity-specific cost configuration details, such as rate factors and fixed costs, that are applicable during this time period will also be used. Ensure that the dates are entered in the mm/dd/yyyy format.
<b>Select a distribution policy</b>	Select the distribution policy to be used for generating the report.
<b>Computation Resources</b>	Select the resources to be considered for calculating the costs and to be reported. You can either select <b>Disk Read</b> and <b>Disk Write</b> to be reported individually or to be reported in total as <b>Disk Read and Write</b> . Similarly, the data traffic over the network can be either reported separately as <b>Network Received</b> and <b>Network Transmitted</b> or in total as <b>Network Received and Transmitted</b> .

- 5 On the **Resource Summary** page, select **Include resource summary in report**.

Select this option to include the summary of costs for the selected resources in the report. You must also select the type of resource summary to be reported. The resource summary can either be **Complete** (default) or **Basic**. A basic summary includes the resource cost summary for the selected entity and its immediate child in the report. A complete summary provides the resource cost summary for the selected entity and all its child entities up to the leaf node.

- 6 Select the computing resources whose usage and cost details have to included in the report.

- 7 Select **Include cost summary in report** to include the summary of costs in the report.

The cost summary can be either **Complete** (default) or **Basic**.

- 8 Click **Next**.

- 9 On the **Details** page, select the fixed cost details, usage-related details, and other information to be displayed in the report, and click **Next**.

Option	Description
<b>Show these details in report</b>	Select this option if you want to include information about the selected cost model or the entity attributes, or information messages in the Cost Details section of the report. The selected information is displayed in the report for the selected entity and all the entities that are under it in the chargeback hierarchy.
<b>Show these columns in the usage details table</b>	Select this option to include the usage statistics in the report. You must also select the types of information that should be displayed in the usage table in the report.
<b>Show fixed cost in report</b>	Select this option to include the details of the fixed costs in the report. If you select this option, you must also select the fixed cost details to be included in the report.

- 10 (Optional) On the **Attributes** page, select **Filter the report based on attributes** to define attribute filters.

You must specify an attribute name value pair. Specifying attribute filters lets you generate report for only the entities on which the attribute name-value pair is set. Also, the report is generated on the entities only for the time period with in the reporting duration for which the attribute name-value pair is applicable.

- 11 Click **Submit**.

The generated report is displayed



### What to do next

On the generated report, you can specify the total cost. The cost is distributed across the entities based on the selected distribution policy. You can also specify weightage (a percentage value) for each selected resource to identify the resource cost for each entity. You can also modify the distribution policy for the child entities. The report provides a menu of applicable distribution policies for each child entity on which you can modify the distribution policy.

## Scheduling Report Generation

When creating a report, you can choose to schedule the report to be generated periodically. vCenter Chargeback Manager provides various scheduling parameters for scheduling a report.

- [Scheduling Parameters](#) on page 105  
You can set various scheduling parameters while scheduling a report.
- [Schedule Report Generation](#) on page 106  
When creating a report, you can choose to schedule the report generation from the Create Report screen. You can schedule cost reports, cost comparison reports, and usage reports. Showback reports cannot be scheduled.
- [Reschedule Report Generation](#) on page 108  
A report generation schedule can be modified to define a new schedule.
- [Remove a Schedule](#) on page 109  
An existing and valid report generation schedule can be deleted from the application. However, deleting a schedule does not automatically delete the reports generated and archived as per the schedule.
- [Email a Scheduled Report](#) on page 109  
A scheduled report can be automatically sent through an email to the required recipients when the report gets generated.
- [Advanced Search for Scheduled Reports](#) on page 110  
You can search for specific scheduled reports by using the advanced search feature of vCenter Chargeback Manager.

## Scheduling Parameters

You can set various scheduling parameters while scheduling a report.

<b>Report Creation Time</b>	This is the time of the day when the report has to be generated. The time specified is the time on the server when the report is generated. vCenter Chargeback Manager does not account for the time on the client machine.
<b>Recurrence Pattern</b>	This defines how often the report has to be generated. vCenter Chargeback Manager provides various options to define the recurrence pattern. <ul style="list-style-type: none"> <li>■ <b>Daily:</b> A report is generated daily. The report is generated for the previous day. The resource utilization and cost details are computed as per the billing policy set in the cost model.</li> <li>■ <b>Weekly:</b> This option lets you select a seven-day reporting period as well as the day on which the report has to be generated. The reporting period considered is always the one that occurred before the reporting day. For example, if the reporting period is set to Sunday–Saturday and the report generation day as Thursday, the report generated every Thursday is for the period Sunday through Saturday of the earlier week.</li> </ul>

- **Monthly:** In this case, the reporting period is one month. You can select the date of the month starting from which the billing has to be done. You can also define a schedule policy that defines when the report has to be generated. For example, suppose you want to generate a report on the 5th of each month for the period from the 2nd of the previous month through the 1st of the current month. In this case, you can specify the start billing date for the month as 2 and the report generation day as 5, which is the scheduling policy.
- **Quarterly:** This option lets you specify a date of the first month of a quarter on which the report for the previous quarter has to be generated. The quarters defined are January–March, April–June, July–September, and October–December. For example, if the date is set to 5, then the report for the period April through June is generated on the 5th of July and the report for the period July through September will be generated on 5th of October.
- **Half Yearly:** This is similar to the Quarterly option. In this case, the report is generated for a six-month duration. The report for the duration January to June is generated on the set date in July. The report for the duration July to December is generated on the set date in January.
- **Yearly:** This option is similar to the Monthly option. You can select the month and day starting from which the billing has to be done. You can also define a schedule policy that defines when the report has to be generated. For example, suppose you want to generate a yearly report for the earlier year on the second Sunday of January. In this case, you can specify the billing day as 1, the month as January, and the report generation day as the second Sunday of January, which is the scheduling policy.
- **Custom:** You can set a custom billing period by specifying the start date of the billing period as the number of days prior to the report generation day and the duration for which the entities have to be billed. You must also specify how often the report has to be generated. This value is set as number of days. For example, suppose you want to schedule a bi-weekly report. Set the start date for billing as 14 days prior to the report generation day, duration as 14 days, and the report scheduling policy as 14 days.

#### Range of Recurrence

The recurrence range specifies the start and end date of the period for which the report schedule is available. The report schedule will be removed after the specified end date. You can also create a never-ending schedule.

## Schedule Report Generation

When creating a report, you can choose to schedule the report generation from the Create Report screen. You can schedule cost reports, cost comparison reports, and usage reports. Showback reports cannot be scheduled.

Other than the create privilege for report and schedule resource types, you must have read privilege on the hierarchy, chargeback hierarchical entities, and cost models to perform this task.

#### Prerequisites

Before you schedule a report, refer to [“Scheduling Parameters,”](#) on page 105 to know about the scheduling parameters in vCenter Chargeback Manager.

#### Procedure

- 1 In the **Reports** tab, click **Create Reports**.

- 2 Select the required chargeback hierarchy from the drop-down menu on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed. You can expand the hierarchy by clicking the plus sign (+) to the left of the hierarchy name. The first level entities of the hierarchy is displayed. To further expand, click the plus sign to the left of the entities that have sub-entities.

- 3 Right-click the hierarchy or the entity on which you want to generate the report and select **Generate Cost Report** from the pop-up menu.

To generate a report for multiple entities, press the Ctrl key, select each of the required entities, and right-click and select **Generate Cost Report** from the pop-up menu. Do not release the Ctrl key till you right-click.

The Create Report screen is displayed.

- 4 Provide the requested report details and click **Next**.

Option	Description
<b>Name</b>	Enter a meaningful name for the report. The character limit for the report name is 255 characters.
<b>Description</b>	Provide an optional description of the report. The character limit for the report description is 512 characters.
<b>User Name</b>	(Optional) Enter the name of the user to whom the report is addressed to.
<b>Report Duration</b>	Select <b>Schedule this report</b> .
<b>Select a cost model</b>	Select the cost model to be used for generating the report. If you are generating a report for multiple entities, you can choose to use different cost models for each entity by selecting the <b>Use different cost models for entities</b> option and then select the required cost models for each entity. Ensure that the selected cost models have the same currency type.
<b>Computation Resources</b>	Select the resources to be considered for calculating the costs and to be reported. You can either select <b>Disk Read</b> and <b>Disk Write</b> to be reported individually or to be reported in total as <b>Disk Read and Write</b> . Similarly, the data traffic over the network can be either reported separately as <b>Network Received</b> and <b>Network Transmitted</b> or in total as <b>Network Received and Transmitted</b> .

- 5 On the **Schedule** page and set the scheduling parameters.

Option	Description
<b>Report Creation Time</b>	When the report has to be generated.
<b>Recurrence Pattern</b>	How often the report has to be generated.
<b>Range of Recurrence</b>	Till when the report has to be generated periodically.

**IMPORTANT** You must provide the schedule information. The application does not define any default values for the schedule information.

- 6 On the **Resource Summary** page, select **Include resource summary in report**.

Select this option to include the summary of costs for the selected resources in the report. You must also select the type of resource summary to be reported. The resource summary can either be **Complete** (default) or **Basic**. A basic summary includes the resource cost summary for the entity and its immediate child in the report. A complete summary provides the resource cost summary for the selected entity and all its child entities.

- 7 Select the computing resources whose usage and cost details have to included in the report.

- 8 Select **Include cost summary in report** to include the summary of costs in the report.

The cost summary cab be either **Complete** (default) or **Basic**.

- 9 Click **Next**.
- 10 On the **Details** page, select the fixed cost details, usage-related details, and other information to be displayed in the report, and click **Next**.

Option	Description
<b>Show these details in report</b>	Select this option if you want to include information about the selected cost model or the entity attributes, or information messages in the Cost Details section of the report. The selected information is displayed in the report for the selected entity and all the entities that are under it in the chargeback hierarchy.
<b>Show these columns in the usage details table</b>	Select this option to include the usage statistics in the report. You must also select the types of information that should be displayed in the usage table in the report.
<b>Show fixed cost in report</b>	Select this option to include the details of the fixed costs in the report. If you select this option, you must also select the fixed cost details to be included in the report.

- 11 (Optional) On the **Attributes** page, select **Filter the report based on attributes** to define attribute filters.  
You must specify an attribute name value pair. Specifying attribute filters lets you generate report for only the entities on which the attribute name-value pair is set. Also, the report is generated on the entities only for the time period with in the reporting duration for which the attribute name-value pair is applicable.
- 12 Click **Submit**.

The report is generated periodically as per the schedule options set. The generated reports are automatically archived and can be viewed from the Archived Reports page of the **Reports** tab. You can similarly schedule usage reports and cost comparison reports.

### What to do next

All active report schedule can be accessed from the Schedule Reports page of the **Reports** tab. A report schedule would expire only if the range of recurrence is limited with an end date. Even if a report schedule has expired, the reports generated and archived as per the schedule are available and can be viewed from the Archived Reports page of the **Reports** tab.

## Reschedule Report Generation

A report generation schedule can be modified to define a new schedule.

You must have update privilege on the report schedule to perform this task.

### Prerequisites

Before you reschedule a report, refer to [“Scheduling Parameters,”](#) on page 105 to learn about the scheduling parameters in vCenter Chargeback Manager.

### Procedure

- 1 In the **Reports** tab, click **Scheduled Reports**.  
A table listing all the report generation schedules is displayed.
- 2 Select the required report schedule from the table.
- 3 Click the scheduler icon above the table.  
The Schedule Report screen is displayed.

- 4 Enter relevant values for the scheduling parameters.

Option	Description
<b>Report Creation Time</b>	When the report has to be generated.
<b>Recurrence Pattern</b>	How often the report has to be generated.
<b>Range of Recurrence</b>	Till when the report has to be generated periodically.

- 5 Click **Schedule**.

The revised report generation schedule is listed in the table.

## Remove a Schedule

An existing and valid report generation schedule can be deleted from the application. However, deleting a schedule does not automatically delete the reports generated and archived as per the schedule.

You must have delete privilege on the schedule to perform this task.

### Procedure

- 1 In the **Reports** tab, click **Scheduled Reports**.  
A table listing all the active report generation schedules is displayed.
- 2 Select the required report schedule from the table.
- 3 Click the delete icon (a red cross) above the table.  
The Delete Schedule dialog window is displayed.
- 4 Specify whether the reports generated and archived by this schedule should be deleted from the application.
- 5 Click **OK**.

The report generation schedule is removed permanently from the application.

## Email a Scheduled Report

A scheduled report can be automatically sent through an email to the required recipients when the report gets generated.

You must have at least update privilege on the report schedule to perform this task.

### Prerequisites

Before you perform this task, ensure that the SMTP server is configured on the application.

### Procedure

- 1 In the **Reports** tab, click **Scheduled Reports**.  
A table listing all the reporting schedules created in the application is displayed.
- 2 Select the required schedule.
- 3 Click the mail icon above the table.  
The screen with the emailing details is displayed.

- 4 Provide the email details.

Option	Description
<b>To</b>	The email address of the recipients. The email addresses should be separated by commas.
<b>Subject</b>	A subject for the email.
<b>Body</b>	The body text for the email.

- 5 Click **Save**.

The email details are saved. If the size of the report in the PDF format is less than the attachment size limit configured for the SMTP server in vCenter Chargeback Manager, then the report in the PDF format is attached to the email and sent to the marked recipients. Else, a link to the PDF report is included in the email. The PDF report in the attachment or at the link provided is password-protected. The password to access the report is emailed separately.

## Advanced Search for Scheduled Reports

You can search for specific scheduled reports by using the advanced search feature of vCenter Chargeback Manager.

You can only search for scheduled reports on which you have read permission.

### Procedure

- 1 Click **Advanced** on the Schedule Reports page of the **Reports** tab.

The Advanced Search screen is displayed.

- 2 Provide the required search parameters.

Parameter	Description
<b>Name of Report</b>	Name or part of the name of the report. You can either search for reports that have the specified name or the ones that do not have the specified name.
<b>Hierarchy name</b>	Name of a chargeback hierarchy. You can search for all the reports that are generated on a hierarchy or any of its entities by specifying the name of the hierarchy. You can also search for reports that are not generated on a specified hierarchy or any of its entities.
<b>Created by user</b>	You can search for reports scheduled by a specific user or the ones that are not scheduled by the specified user.
<b>Cost Model</b>	You can search for reports that are generated by using the specified cost model or the ones that are not generated by using the specified cost model.
<b>Entity Name</b>	You can search for reports that are generated on the specified entity or the ones that are not generated on the specified entity.
<b>Report scheduling policy</b>	This is reporting duration. The permissible values are daily, weekly, monthly, quarterly, half-yearly, yearly, and custom.
<b>Auto-email enable</b>	Whether or not automatic email of the scheduled report is configured.

- 3 Specify the filters to sort the search results.

You can specify two filter levels. The results can be sorted based on the report name, hierarchy name, entity name, or cost model name.

- 4 Click **Search**.

The scheduled reports that match the criteria specified by using the search parameters are displayed in the table on the **Schedule Reports** page of the **Reports** tab.

## Managing Reports

After you generate a report, the report is displayed in the application. You can remove rows and columns from the displayed report and also rearrange the columns in the report. You can also archive, schedule, email, and export the report.

- [Modifying the Report in the Interactive Report View](#) on page 111  
After a report is generated and displayed in the application, you can make few modifications to the report. vCenter Chargeback Manager lets you remove rows and columns from the generated report. You can also rearrange the columns in the report. You can chose the types of the graphs to be included in the report.
- [Configure vCenter Chargeback Manager to Correctly Display the Characters in the Exported Report](#) on page 112  
If you are using vCenter Chargeback Manager on a localized operating system or if the generated report contains extended ASCII or Unicode characters, these characters might not be displayed correctly when the report is exported or emailed.
- [Configure Precision Value for Numbers Displayed in the Report](#) on page 112  
The precision value for the numbers displayed in the exported PDF report can be configured in the vCenter Chargeback Manager database.
- [Archive Report](#) on page 113  
A generated report can be archived and stored in the application. After you generate a report, the application displays the generated report.
- [Schedule Report](#) on page 113  
You can schedule report generation after a report has been generated.
- [Email Report](#) on page 114  
After a report is generated, you can send it to one or more recipients through an email.
- [Export Report](#) on page 114  
After a report is generated, you can export it to .rtf, .pdf, and .csv formats.

### Modifying the Report in the Interactive Report View

After a report is generated and displayed in the application, you can make few modifications to the report. vCenter Chargeback Manager lets you remove rows and columns from the generated report. You can also rearrange the columns in the report. You can chose the types of the graphs to be included in the report.

You must have update privilege on the report to modify the report view.

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**NOTE** The changes made to the report view can be emailed or exported report only after the modified report is archived. However, not all changes made to the generated report are included in the emailed or exported report. Only show/hide of columns and the reordering of columns in the generated report are reflected in the emailed or exported report.

---

#### Procedure

- 1 Select an entity to view informational messages related to the entity.

All the informational messages related to the selected entity are displayed in the **Info** section below the report.

- 2 To remove row from the displayed report, select the row and click the **Delete Selection** icon (a cross sign) above the report.  
The selected entity and its child entities are removed from the report. You can add the entities back to the report by clicking the **Undo Delete** icon. However, the undo delete operation is available only for the last delete operation performed.
- 3 To choose the columns to be displayed in the report, click the **Display Columns** icon, select the required columns, and click **Done**.
- 4 To choose the graphs to be displayed in the report, click the **Display Graph** icon, select the required graphs, and click **Done**.
- 5 To rearrange the columns in the displayed report, select the column head and drag the mouse cursor to the left or right as required. Release the mouse button to move the column to the new location.

#### What to do next

To save the modified report, click the **Save Report** icon above the report. The modified report is archived and can be accessed from the Archived Reports page of the **Reports** tab.

## Configure vCenter Chargeback Manager to Correctly Display the Characters in the Exported Report

If you are using vCenter Chargeback Manager on a localized operating system or if the generated report contains extended ASCII or Unicode characters, these characters might not be displayed correctly when the report is exported or emailed.

To ensure that the extended ASCII characters and Unicode characters in the exported or emailed report are displayed correctly, you must use the appropriate font files and modify specific files in your vCenter Chargeback Manager setup to point to the correct font files. Also, these characters will be displayed correctly only if the desired font for the locale that you are using is a TrueType font.

#### Procedure

- 1 Traverse to the <Installation\_Directory>\Apache-Tomcat\webapps\vCenter-CB\WEB-INF\classes folder.
- 2 Rename the jasperreports\_extension.properties.tmp1 file to jasperreports\_extension.properties.
- 3 Copy the desired TrueType font file for your locale to the <Installation\_Directory>\Apache-Tomcat\webapps\vCenter-CB\WEB-INF\classes\fonts folder.
- 4 Traverse to the <Installation\_Directory>\Apache-Tomcat\webapps\vCenter-CB\WEB-INF\classes\fonts folder.
- 5 Open the fonts.xml file and replace YourFontFileName.TTF to the actual font file name.
- 6 Restart the vCenter Chargeback Manager service.

## Configure Precision Value for Numbers Displayed in the Report

The precision value for the numbers displayed in the exported PDF report can be configured in the vCenter Chargeback Manager database.

The precision value used for calculating costs and those used for displaying cost and other numeric data in the report are different. The PDF report displays rounded off numbers for costs, base rates, and usage. You can, however, configure the precision value for the numbers displayed in the PDF report by modifying certain server properties in the CB\_SERVER\_PROPERTY table.

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**NOTE** Configuring the reporting\_pdf\_report\_cost\_pattern property affects only the usage based costs and total cost displayed in the report. The fixed costs precision digits are not affected by this change.

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**Procedure**

- 1 Log in to the vCenter Chargeback Manager database.  
Ensure that you have modify privilege on the CB\_SERVER\_PROPERTY table.
- 2 Configure the server properties for precision data in the CB\_SERVER\_PROPERTY table.  
The table contains three properties that enable you to configure the precision value for numbers displayed in the PDF report.

Option	Description
<b>reporting_pdf_report_cost_pattern</b>	Pattern used to display all the cost values. The default value is #,##0.00.
<b>reporting_pdf_report_usage_pattern</b>	Pattern used to display all the usage values. The default value is #,##0.00.
<b>reporting_pdf_report_number_pattern</b>	Pattern used to display all other numbers, such as base rates and rate factors. The default value is #,##0.000.

**What to do next**

Restart the vCenter Chargeback Manager service.

**Archive Report**

A generated report can be archived and stored in the application. After you generate a report, the application displays the generated report.

**Procedure**

- 1 Click the **Archive Report** icon above the generated report.  
A dialog reporting whether the action was successful or not is displayed.
- 2 Click **OK**.

If the report is archived successfully, the report can be accessed from the Archived Reports page.

**What to do next**

To know more about viewing and managing archived reports, see [“Managing Archived Reports,”](#) on page 115.

**Schedule Report**

You can schedule report generation after a report has been generated.

Other than the privileges required to create a report, you must have create privilege on the schedule resource type to perform this task.

**Prerequisites**

Before you schedule a report, refer to [“Scheduling Parameters,”](#) on page 105 to learn about the scheduling parameters in vCenter Chargeback Manager.

**Procedure**

- 1 Click the **Schedule Report** icon above the generated report.  
The Schedule Report screen is displayed.

- 2 Enter relevant values for the scheduling parameters.

Option	Description
<b>Report Creation Time</b>	When the report has to be generated.
<b>Recurrence Pattern</b>	How often the report has to be generated.
<b>Range of Recurrence</b>	Till when the report has to be generated periodically.

- 3 Click **Schedule**.

The report is generated periodically as per the scheduling options set. The report schedule can be accessed from the Scheduled Reports page.

## Email Report

After a report is generated, you can send it to one or more recipients through an email.

### Prerequisites

Ensure that the SMTP server has been configured, before emailing the report.

### Procedure

- 1 Click the Email Report icon above the generated report.

The Email Report screen is displayed.

- 2 Provide the email details.

Option	Description
<b>To</b>	The email address of the recipients. The email addresses should be separated by commas.
<b>Subject</b>	A subject for the email.
<b>Body</b>	The body text for the email.

- 3 Click **Send**.

If the size of the report in the PDF format is less than the attachment size limit configured for the SMTP server in vCenter Chargeback Manager, then the report in the PDF format is attached to the email and sent to the marked recipients. Else, a link to the PDF report is included in the email. The PDF report in the attachment or at the link provided is password-protected. The password to access the report is emailed separately.

## Export Report

After a report is generated, you can export it to .rtf, .pdf, and .csv formats.

### Procedure

- 1 Select the output type.

- To export the report to the .rtf format, click the Microsoft Word document icon.
- To export the report to the .pdf format, click the Adobe PDF icon.
- To export the report to the .csv format, click the Microsoft Excel icon.

The Convert Report Format screen is displayed.

- 2 Click the **Click to download** link.

The application exports the report to the specified format. If the report name contains any special characters, then such characters are replaced with an underscore (\_) in the exported report file name.

If you have chosen to view the report in the .rtf format, an Opening *filename.rtf* dialog is displayed.

---

**NOTE** If the `temp` folder in the Tomcat installation folder is deleted, the export to .rtf might fail.

---

If you have chosen to view the report in the .pdf format, an Opening *filename.pdf* dialog is displayed.

If you have chosen to view the report in the .csv format, an Opening *filename.csv* dialog is displayed.

- 3 You can either chose to open the file with a supported application or save the file on the system.

## Managing Archived Reports

The Archived Reports page of the **Reports** tab displays a table listing all the reports archived in the application. This includes manually generated and saved reports as well as reports generated by report schedules.

All the reports generated by a single schedule have the same name but different **Created on** and **Billing Period** values. The reports are listed in the ascending order of their creation time. You can view an archived report by clicking it.

- [Export Archived Report](#) on page 115  
After a report is generated and archived, it can be exported to the required format at any time.
- [Email Archived Report](#) on page 116  
After a report is generated and archived, you can send it through email to one or more recipients.
- [Delete Archived Report](#) on page 116  
You can clear the archive by deleting unwanted reports.
- [Advanced Search for Archived Reports](#) on page 117  
You can search for specific archived reports by using the advanced search feature of vCenter Chargeback Manager.

## Export Archived Report

After a report is generated and archived, it can be exported to the required format at any time.

To export an archived report, you must have at least read privilege on the report.

### Procedure

- 1 In the **Reports** tab, click **Archived Reports**.  
A table listing all the archived reports is displayed.
- 2 Select the report that you want to view.
- 3 Select the output type.
  - To export the report to the .rtf format, click the Microsoft Word document icon.
  - To export the report to the .pdf format, click the Adobe PDF icon.
  - To export the report to the .csv format, click the Microsoft Excel icon.
 The Convert Report Format screen is displayed.

- 4 Select the **Click to download** link.

The application exports the report to the specified format. If the report name contains any special characters, then such characters are replaced with an underscore (\_) in the exported report file name.

If you have chosen to export the report to the .rtf format, an Opening *filename.rtf* dialog is displayed.

---

**NOTE** If the `temp` folder in the Tomcat installation folder is deleted, the export to .rtf might fail.

---

If you have chosen to export the report to the .pdf format, an Opening *filename.pdf* dialog is displayed.

If you have chosen to export the report to the .csv format, an Opening *filename.csv* dialog is displayed.

- 5 You can either chose to open the file with a supported application or save the file on the system.

## Email Archived Report

After a report is generated and archived, you can send it through email to one or more recipients.

### Prerequisites

Ensure that the SMTP server has been configured, before emailing the report.

### Procedure

- 1 In the **Reports** tab, click **Archived Reports**.

A table listing all the archived reports is displayed.

- 2 Select the report that you want to email.

- 3 Click the **Email this report** icon.

The Email Report screen is displayed.

- 4 Provide the email details.

Option	Description
<b>To</b>	The email address of the recipients. The email addresses should be separated by commas.
<b>Subject</b>	A subject for the email.
<b>Body</b>	The body text for the email.

- 5 Click **Send**.

If the size of the report in the PDF format is less than the attachment size limit configured for the SMTP server in vCenter Chargeback Manager, then the report in the PDF format is attached to the email and sent to the marked recipients. Else, a link to the PDF report is included in the email. The PDF report in the attachment or at the link provided is password-protected. The password to access the report is emailed separately.

---

**NOTE** Reports generated and archived prior to upgrading to vCenter Chargeback Manager 2.0 are not password-protected.

---

## Delete Archived Report

You can clear the archive by deleting unwanted reports.

### Prerequisites

You must have delete privilege on the report to perform this task.

**Procedure**

- 1 In the **Reports** tab, click **Archived Reports**.  
A table listing all the archived reports is displayed.
- 2 Select the archived report that you want to delete.
- 3 Click the delete icon (a red cross) above the table.  
A dialog box confirming the action is displayed.
- 4 Click **OK**.

The archived report is permanently deleted from the application.

**Advanced Search for Archived Reports**

You can search for specific archived reports by using the advanced search feature of vCenter Chargeback Manager.

You can only search for archived reports on which you have read permission.

**Procedure**

- 1 Click **Advanced** on the Archived Reports page of the **Reports** tab.  
The Advanced Search screen is displayed.
- 2 Provide the required search parameters.

Parameter	Description
<b>Name of Report</b>	Name or part of the name of the report. You can either search for reports that have the specified name or the ones that do not have the specified name.
<b>Hierarchy name</b>	Name of a chargeback hierarchy. You can search for all the reports that are generated on a hierarchy or any of its entities by specifying the name of the hierarchy. You can also search for reports that are not generated on a specified hierarchy or any of its entities.
<b>Created by user</b>	You can search for reports created and archived by a specific user or the ones that are not created by the specified user.
<b>Cost Model</b>	You can search for reports that are generated by using the specified cost model or the ones that are not generated by using the specified cost model.
<b>Entity Name</b>	You can search for reports that are generated on the specified entity or the ones that are not generated on the specified entity.
<b>Number of entities</b>	The number of entities for which the report is generated. This is a value range. The search result includes reports that have total number of entities in the specified range.
<b>Total cost in report</b>	The value of total cost in the archived reports. This is a value range. The search result includes reports that have total cost in the specified range.

- 3 Specify the filters to sort the search results.  
You can specify two filter levels. The results can be sorted based on the report name, hierarchy name, entity name, or page count.
- 4 Click **Search**.

The reports that match the criteria specified by using the search parameters are displayed in the table on the **Archived Reports** page of the **Reports** tab.

## Managing Automatic Report Scheduler

An automatic report scheduler creates report schedules for hierarchies and entities that match the criteria specified in the automatic report scheduler.

The automatic report scheduler scans all the vCenter Chargeback Manager hierarchies and creates report schedules for the hierarchies and entities that match the specified criteria. The scheduler runs every 30 minutes.

The scheduler creates report schedule only for the hierarchies and entities that match the criteria and on which the user, who created the automatic report scheduler, has at least read privileges.

### Create Automatic Report Scheduler

You can create automatic report schedulers to ensure that report schedules are created automatically for hierarchies and entities that match a specific criteria.

You must have a create privilege on Automatic Report Scheduler to perform this task.

#### Procedure

- 1 Click **Automatic Report Scheduler** on the **Reports** tab.

A list of automatic report schedulers created in the application is displayed.

- 2 Click **Create**.

The Create Automatic Report Scheduler window is displayed.

- 3 Provide the schedule and report details and click **Next**.

Option	Description
<b>Scheduler Name</b>	A name for the automatic report scheduler. The name should not exceed 255 characters.
<b>Schedule Name</b>	A name for the report schedule created by the automatic report scheduler. The name should not exceed 255 characters.
<b>Report Type</b>	The type of report. You can select <b>Cost Report</b> or <b>Usage Report</b> .
<b>Hierarchy Filter</b>	You can filter the hierarchies based on <b>Hierarchy Name</b> or <b>Hierarchy Attribute</b> . If you define a filter based on hierarchy attribute, the scheduler will filter hierarchies for which the attribute criteria matches at the root level. The scheduler considers only the hierarchies on which you have at least read privileges.
<b>Select a Cost Model</b>	Select the cost model to use for report generation.
<b>Multiple Entity Selection</b>	Select this option to generate report at the entity level. If you select this option, then you must perform the following steps: <ol style="list-style-type: none"> <li>a Click <b>Add Row</b>.</li> <li>b Specify the entity selection criteria.  The entity selection can be based on entity name or an attribute assigned to the entity.</li> <li>c Select the cost model for the entity.</li> </ol> You can add multiple criteria. The scheduler considers only the entities on which you have at least read privileges.
<b>Hierarchy Entity Level</b>	Specifies the number of levels for which the criteria is applied to select entities. To scan the entire hierarchy, set the value as zero.
<b>Computation Resources</b>	Select the computing resource to be accounted for during report generation.

- 4 On the **Schedule** page, specify the report schedule details and click **Next**.

Option	Description
<b>Report Creation Time</b>	When the report has to be generated.
<b>Recurrence Pattern</b>	How often the report has to be generated.
<b>Range of Recurrence</b>	Till when the report has to be generated periodically.

- 5 On the **Resource Summary** page, select **Include resource summary in report**.

Select this option to include the summary of costs for the selected resources in the report. You must also select the type of resource summary to be reported. The resource summary can either be **Complete** (default) or **Basic**. A basic summary includes the resource cost summary for the entity and its immediate child in the report. A complete summary provides the resource cost summary for the selected entity and all its child entities.

- 6 Select the computing resources whose usage and cost details have to included in the report.

- 7 Select **Include cost summary in report** to include the summary of costs in the report.

The cost summary cab be either **Complete** (default) or **Basic**.

- 8 Click **Next**.

- 9 On the **Details** page, select the fixed cost details, usage-related details, and other information to be displayed in the report, and click **Next**.

Option	Description
<b>Show these details in report</b>	Select this option if you want to include information about the selected cost model or the entity attributes, or information messages in the Cost Details section of the report. The selected information is displayed in the report for the selected entity and all the entities that are under it in the chargeback hierarchy.
<b>Show these columns in the usage details table</b>	Select this option to include the usage statistics in the report. You must also select the types of information that should be displayed in the usage table in the report.
<b>Show fixed cost in report</b>	Select this option to include the details of the fixed costs in the report. If you select this option, you must also select the fixed cost details to be included in the report.

- 10 Click **Submit**.

The created automatic report scheduler is listed in the Automatic Report Scheduler page.

## Modify Automatic Report Scheduler

You can modify the automatic report schedulers that you have created in the application.

You must have update privilege on the automatic report scheduler.

### Procedure

- 1 Click **Automatic Report Scheduler** on the **Reports** tab.

A list of automatic report schedulers created in the application is displayed.

- 2 Select the scheduler that you want to modify and click **Edit**.

The Edit Automatic Report Scheduler window is displayed.

- 3 Modify the necessary details and click **Next**.

- 4 Modify the scheduling parameters and click **Next**.

- 5 Modify the report summary details and click **Next**.
- 6 Specify the information to be included in the report and click **Submit**.

The modified automatic report scheduler is displayed on the page.

## Delete Automatic Report Scheduler

You can delete unwanted report schedulers from the application

When you delete an automatic report scheduler, the report schedules created by the scheduler are automatically deleted. You can also choose to delete the reports archived by the corresponding schedules. You must have delete privilege on the automatic report scheduler.

### Procedure

- 1 Click **Automatic Report Scheduler** on the **Reports** tab.  
A list of automatic report schedulers created in the application is displayed.
- 2 Select the scheduler that you want to remove and click **Delete**.  
The Delete Policy window is displayed.
- 3 (Optional) Select the option to delete the archived reports that were generated by the report schedules created by the automatic report scheduler.
- 4 Click **OK**.

The report scheduler and the corresponding schedules are removed from the applications

## Report Dashboard

vCenter Chargeback Manager provides a report dashboard that displays various graphs providing information about the resource cost and usage for a selected hierarchy or entity for the last 30 days excluding the current date.

The report dashboard displays three charts, Cost per Resource, Cost per child Entity, and Cost per Day, for the selected hierarchy or entity. The dashboard also provides an option to view the following Top N reports:

- Top N most expensive VMs
- Top N least expensive VMs
- Top N CPU consuming VMs
- Top N Memory consuming VMs

Here, N can take the values 10, 20, and 50.

To fetch a Top N report, you must select the value for N, select the report type, and click **Fetch**. For each virtual machine listed in the Top N report, you can view the Cost per Resource graph by clicking the virtual machine name in the report.

For a hierarchy that includes a vCenter Server that is integrated with VMware vCenter Operations, the dashboard provides the following details:

- The Cost per Resource bar chart in the **Cost projection** tab shows cost for each resource, which is color coded, for the past 30 days and projected data for next three months in sets of 30 days each.
- The Cost per Day graph in the **Cost projection** tab charts the variance in the total cost for the entity for the past 30 days and projected data for next three months.
- The Cost Optimization tab lists the following optimization opportunities: Oversized Virtual Machines, Undersized Virtual Machines, Idle Virtual Machines, and Powered Off Virtual Machines.



- For each optimization opportunity, the corresponding virtual machines along with the configured and recommended resource-cost details are listed.

---

**NOTE**

- The graphs and optimization reports are generated only if the vCenter Server user, which was used for adding the vCenter Server to vCenter Chargeback Manager, has either the **Global.vCenter Operations User** privilege or the **Global.vCenter Operations Admin** privilege assigned on the root folder.
  - Cost projection reports are enabled only with pure usage-based cost model, else graphs based on only past 30 days data are displayed. If the hierarchy is less than 30 days old and is not back-dated, then the graph based on the available data is displayed.
- 

## Configure Hierarchy for Display in Report Dashboard

You can configure a chargeback hierarchy so that its usage and cost statistics for the hierarchy and its entities are visible in the report dashboard.

Only users with the Super User role assigned to them can perform this task.

### Procedure

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down menu on the left pane of the page.  
The collapsed view of the chargeback hierarchy is displayed. The right pane provides various details about the selected hierarchy.
- 3 Click the arrow icon next to **Tools** below the hierarchy.  
The Hierarchy tools options are displayed.
- 4 Select **Show this hierarchy in the Report Dashboard against the Cost Model**.
- 5 Select a cost model.  
If the hierarchy contains entities from a vCenter Server that is integrated with vCenter Operations, then to obtain the cost projection and cost optimization details you must use a pure usage based cost model.
- 6 Set the time of the day when the report in the dashboard has to be updated.  
The time must be specified in the hh:mm:ss format.
- 7 Click **Update**.
- 8 Click **OK** in the information dialog box.

### What to do next

The report dashboard displays the usage and cost statistics for the hierarchy after the time specified during configuration. The report is updated each day at this specified time.

## View Hierarchy Details in the Report Dashboard

If a chargeback hierarchy is configured for display in the report dashboard, then you can view the resource usage and cost statistics for the hierarchy and its entities in the Dashboard page of the application.

### Prerequisites

To perform this task, you must have read privilege on the hierarchy and on the corresponding cost model used to configure the report dashboard.

## Procedure

- 1 In the **Reports** tab, click **Dashboard**.

- 2 Select the hierarchy from the drop-down menu.

The collapsed view of the hierarchy is displayed. If the hierarchy contains entities from a vCenter Server that is integrated with vCenter Operations, the right pane of the dashboard shows two tabs: **Cost Projection** and **Cost Optimization**.

- 3 Expand the hierarchy and select the entity for which you want to view the resource cost and usage statistics.

The dashboard displays the Cost per Resource, Cost per child Entity, and Cost per Day graphs. If the hierarchy contains entities from a vCenter Server that is integrated with vCenter Operations, then the **Cost Projection** tab shows the Cost per Resource and Cost per Day graphs. For all entities, the graphs show data for the last 30 days. For entities of vCenter Servers that are integrated with vCenter Operations, the graphs include data for the next 90 days only if the hierarchy is configured for displaying data on the report dashboard using a pure usage-based cost model.

- 4 You can obtain different Top N report data for the selected entity.

For an entity from a vCenter Server that is integrated with vCenter Operations, perform the followings steps to obtain the Top N reports.

- a Click **Top VMs**.

- b Select a value for N from the drop-down menu next to **Top**.

The values available are 10, 20, and 50.

- c Select the report type from the report type drop-down menu.

- d Select the duration form the duration drop-down menu.

- e Click **Fetch**.

The Top N report for the selected entity is displayed.

- f Select the virtual machine name from the report to view the Cost per Resource graph for the selected virtual machine.

- 5 To view the cost optimization opportunities for a vCenter Operations integrated vCenter Server entity, select the **Cost Optimization** tab.

The tab displays the various cost optimization opportunities.

## Monitoring System Health

The **System Health** tab acts as a dashboard, providing you with information about and status of the entire system. Only a user with Super User role has access to this tab.

The dashboard shows colored status indicators next to the URL for each server and service. The significance of the colors is as is described in the table [Table 7-1](#).

**Table 7-1.** Significance of Dashboard Status Indicator Colors

Color	Significance
Green	Normal The response time within the acceptable range.
Yellow	Warning The response time is beyond the acceptable range but not too high to be a cause of serious concern.
Red	Alert The response time is too high or the application is not functioning. You must take immediate action. A very high response time might cause the application to respond slowly or become unresponsive.

The response time ranges can be defined in the system. You can change these settings from the **Settings** tab. To know more about response time settings, refer to [“Manage System Health Thresholds,”](#) on page 33.

The information on the page is classified into six sections. The different sections and the corresponding information displayed is listed in the table [Table 7-2](#).

**Table 7-2.** Section in the System Health Tab

Section	Information
vCenter Chargeback Manager Servers	URL of all the vCenter Chargeback Manager instances included in the cluster is listed. If the installation is a stand-alone instance, only one URL is displayed. When you move the cursor over a URL, a tool tip displays the URL to access the vCenter Chargeback Manager instance, status of the instance, response time, and product build number.
LDAP Servers	URL of all the LDAP servers configured in vCenter Chargeback Manager is listed. When you move the cursor over an LDAP server URL, a tool tip displays the URL and status of the LDAP server.
vCenter Servers	Display names of all the vCenter Server instances added to the vCenter Chargeback Manager instances in the cluster is listed. In the case of a stand-alone vCenter Chargeback Manager instance, the display names of all the vCenter Server instances added to the application is listed. When you move the cursor over a vCenter Server name, a tool tip displays the name, status, response time, the vCenter Server version, and the URL of the corresponding vCenter Server database.

**Table 7-2.** Section in the System Health Tab (Continued)

Section	Information
Data Collectors	Names of all the data collector instances along with name of the machine on which they are installed is listed. When you move the cursor over the data collector name, a tool tip displays the name of the data collector, the name of the host on which it is installed, and the status of the data collector. If a data collector is not responding, then the data collector name becomes clickable and links to the <b>Data Collectors</b> page on the <b>Settings</b> tab.
General Info	This section provides information about the number of vCenter Servers added to the application and the number of chargeback hierarchies and entities created. It also displays the URL and port details for the SMTP server and the URL of the vCenter Chargeback Manager database. This section displays the date and time when the page was last updated. When you move the cursor over the SMTP server URL, a tool tip displays the URL and status of the server. When you move the cursor over the database URL, a tool tip displays the URL, status, and response time of the database.
vCenter Server Databases	The URL of the vCenter Server databases for each vCenter Server added to the application is listed. In the case of a cluster installation, the URL of the databases of all the vCenter Server instances added to any of the vCenter Chargeback Manager instance in the cluster is listed. When you move the cursor over the database URL, a tool tip displays the URL, name of the database, the display name of the corresponding vCenter Server, the status of the database, and the database response time.

If the **System Health** tab is the active tab, then the user session will not time out. The page automatically refreshes every 9 minutes and can be manually refreshed by clicking the refresh icon. On all other tabs, if there is no action, the user session times out after 30 minutes.

## vCenter Chargeback Manager Events

Most user actions generate an event in the application. These events are recorded in the **Events Details** panel of the application.

This panel can be viewed on all the pages. The panel is minimized by default. To view the entries in the panel, click the triangular icon in the bottom-right corner of the screen. The information displayed on the panel is listed in the table.

**Table 7-3.** Information Displayed in the Event Details Panel

Information Type	Description
Message	A short message giving information about the event.
User Name	The user login that caused the event.
Time	The date and time when the event occurred.
Type	The type of event.

A user can see only the events generated by his actions in vCenter Chargeback Manager. If the user has an Administrator role, he can also see the events generated due to the actions performed by the users that he has created. A user with the Super User role can see all the events.

The information displayed in the table is useful to track which users performed which actions on the application. The information in the **Event Details** panel is refreshed every 30 seconds. If this panel is open, the user session does not get timed out.

If the system time of the vCenter Chargeback Manager instances in a cluster are not in sync, the **Event Details** tab does not display any event messages.

# Administration Utilities

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vCenter Chargeback Manager interacts with various servers and databases. It also stores information about users and various components, such as hierarchies and entities. To ensure that the application and the corresponding components are working properly, one must monitor the health of the entire system periodically.

vCenter Chargeback Manager provides a few utilities and database management scripts that enable you to manage the application efficiently.

This chapter includes the following topics:

- [“Database Password Change Utility,”](#) on page 125
- [“vCenter Chargeback Manager IP Address Reset Utility,”](#) on page 126
- [“Statistics Collection Scripts,”](#) on page 127
- [“vCenter Chargeback Manager Database Management Scripts,”](#) on page 134

## Database Password Change Utility

vCenter Chargeback Manager also provides a utility to change the password of the vCenter Chargeback Manager database user.

This utility changes the password in the `hibernate.cfg.xml` file in the following directories:

- `Installation_Directory/apache-tomcat-6.0.18/webapps/vCenter-CB/WEB-INF/classes`
- `Installation_Directory/DataCollector-Embedded/classes`

If you have installed and configured more than one data collector instance for a single vCenter Chargeback Manager database, you must manually copy the updated `hibernate.cfg.xml` file to each of the corresponding data collector folders.

## Running the Database Password Change Utility

You can change the vCenter Chargeback Manager database password by running this utility.

You must belong to the Administrators group.

### Procedure

- 1 Run the database password change utility from the command prompt.  

```
cd Installation_Directory\vCenter-CB-Tools\database-update\bin
UpdateChargebackDatabaseCredentials.bat
```

You can also run this utility by selecting **Update Chargeback Database Credentials** from the **Start > Programs > VMware > VMware vCenter Chargeback > vCenter Chargeback Tools** menu.

- 2 Enter the existing and new passwords.
  - Existing password
  - New password
  - Confirmation of the new password
- 3 Restart the vCenter Chargeback Manager service and the data collector services.

### What to do next

If you have installed the VMware Cloud Director Data Collector and vShield Manager Data Collector with vCenter Chargeback Manager or individually installed any of the data collectors, then you must copy the `hibernate.cfg.xml` file from the `Installation_Directory/apache-tomcat-6.0.18/webapps/vCenter-CB/WEB-INF/classes` folder to the `Installation_Directory/Data_Collector_Name/classes` folder for each data collector. You must restart the data collectors after copying the `hibernate.cfg.xml` file.

## vCenter Chargeback Manager IP Address Reset Utility

If vCenter Chargeback Manager is installed on a machine that does not have a static IP address and the IP address changes dynamically, then the vCenter Chargeback Manager service might not function properly. vCenter Chargeback Manager, therefore, provides a utility to reset the IP address in the database and the relevant configuration files.

The IP reset utility is located in `Installation_Directory\vCenter-CB-Tools\reset-IP\bin` and the utility file is `UpdateCbmServer.bat`.

This utility updates the IP address references for the vCenter Chargeback Manager database and the embedded data collectors.

### Reset vCenter Chargeback Manager IP Address

If the IP address of the machine on which vCenter Chargeback Manager is installed is changed, you must reset the IP address for the vCenter Chargeback Manager in the database and other configuration files by running the IP address reset utility.

#### Prerequisites

You must have execute access permission on the machine on which vCenter Chargeback Manager is installed.

#### Procedure

- 1 From the command prompt run the `UpdateCbmServer.bat` file located at `Installation_Directory\vCenter-CB-Tools\reset-IP\bin`.
- 2 Provide the requested information and press Enter.

Information	Description
<b>New IP address</b>	The new IP address of the machine on which vCenter Chargeback Manager is installed.
<b>Existing IP address</b>	The old IP address of the machine on which vCenter Chargeback Manager is installed.
<b>Database type</b>	The type of database used to create the vCenter Chargeback Manager database. The database type can be either Oracle or SQL Server.
<b>Database URL</b>	The URL to connect to the vCenter Chargeback Manager database.
<b>Database user name</b>	User name to access the vCenter Chargeback Manager database.
<b>Database password</b>	Password for the user name provided.
<b>IP address for the data collector</b>	IP address of the machine on which the data collector is installed.

3 Press the Y key to confirm the information provided.

The IP address for vCenter Chargeback Manager is modified in the database and relevant configuration files.

## Statistics Collection Scripts

vCenter Chargeback Manager provides few SQL scripts that help you collect different resource usage and allocation statistics.

vCenter Chargeback Manager provides the following SQL scripts:

- Guest OS licensing script
- Storage allocation script
- Performance statistics script

These SQL scripts can be run from the SQL prompt by any database user having the required permissions. These scripts are packaged with the application and are located in the following folders:

- For SQL Server

*Installation\_Directory*\Database Scripts\main\version\mssql\gos-license-accounting

The script names are of the form *script\_name\_mssql.sql*.

- For Oracle

*Installation\_Directory*\Database Scripts\main\version\oracle\gos-license-accounting

The script names are of the form *script\_name\_oracle.sql*.

*Installation\_Directory* refers to the complete path of the folder in which vCenter Chargeback Manager is installed. *version* refers to a folder that has version number as the folder name. For example, v2.0.

## Guest OS Licensing Script

The guest OS licensing script helps you identify the operating system running on a virtual machine and the corresponding memory and vCPU details for that virtual machine. The script considers only the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager.

### Running the Guest OS Licensing Script in SQL Server

You must have the **SELECT** permission on the tables in the vCenter Chargeback Manager database to run the guest OS licensing script.

On running the script, two database objects are created.

- The **CB\_VIEW\_GOS\_LICENSE\_INVENTORY** database view.
- The **CB\_FN\_GOS\_LICENSE\_PAYG** function.

The **CB\_VIEW\_GOS\_LICENSE\_INVENTORY** view contains the guest OS details and the corresponding memory, vCPU, and power state details for all the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager. [Table 8-1](#) lists the details of the columns in the **CB\_VIEW\_GOS\_LICENSE\_INVENTORY** view.

**Table 8-1.** Column Details of the GOS Licensing Database View

Column Name	Data Type	Nullable	Description
VM_NAME	NVARCHAR2(255 CHAR)	No	Name of the virtual machine.
VM_MOID	NVARCHAR2(255 CHAR)	No	Managed Object ID of the virtual machine.

**Table 8-1.** Column Details of the GOS Licensing Database View (Continued)

Column Name	Data Type	Nullable	Description
VC_SERVER_UUID	NVARCHAR2(255 CHAR)	No	UUID of the vCenter Server on which the virtual machine exists.
HIERARCHY_NAME	NVARCHAR2(255 CHAR)	No	Name of the chargeback hierarchy in which the virtual machine exists.
RESOURCE_TYPE	NVARCHAR2(255 CHAR)	No	The type of resource. For each virtual machine, the view contains at least four rows, one each for the following resource types: <ul style="list-style-type: none"> <li>■ VM_STATE: The power state of the virtual machine.</li> <li>■ VM_MEM_SIZE: Amount of memory utilized in MB.</li> <li>■ VM_VCPU_COUNT: Number of vCPUs.</li> <li>■ VM_GUEST_FULL_NAME: Name of the guest operating system running on the virtual machine.</li> </ul>
RESOURCE_VALUE	NVARCHAR2(255 CHAR)	No	The value for the resource.
START_TIME	DATETIME	No	The start time for the resource type.
END_TIME	DATETIME	Yes	The end time for the resource type or the end time of the virtual machine in the hierarchy, whichever is earlier.

After the view is created, you can run SELECT queries on the view to obtain the necessary information.

[Table 8-2](#) shows the sample output for a SELECT query on the CB\_VIEW\_GOS\_LICENSE\_INVENTORY view.

**Table 8-2.** Sample Output for a SELECT Query on the CB\_VIEW\_GOS\_LICENSE\_INVENTORY View

VM_NAME	VM_M OID	VC_SERVER_UUID	HIERARCHY_NAME	RESOURCE_TYPE	RESOURCE_VALUE	START_TIME	END_TIME
vm01	vm-1044	7BF5FFD5-F56C-4205-808D-329BB92636F0	Dev-Hierarchy	VM_STATE	poweredOff	2011-06-01 12:12:21.463	
vm01	vm-1044	7BF5FFD5-F56C-4205-808D-329BB92636F0	Dev-Hierarchy	VM_MEM_SIZE	2668	2011-06-01 12:12:21.463	
vm01	vm-1044	7BF5FFD5-F56C-4205-808D-329BB92636F0	Dev-Hierarchy	VM_VCPU_COUNT	1	2011-06-01 12:12:21.463	
vm01	vm-1044	7BF5FFD5-F56C-4205-808D-329BB92636F0	Dev-Hierarchy	VM_GUEST_FULL_NAME	Red Hat Enterprise Linux 5 (64-bit)	2011-06-01 12:12:21.463	
vm02	vm-112	07F6FF05-9546-4D01-B9C0-0170AA219579	QA-Hierarchy	VM_STATE	poweredOn	2011-06-01 12:12:21.463	
vm02	vm-112	07F6FF05-9546-4D01-B9C0-0170AA219579	QA-Hierarchy	VM_MEM_SIZE	4096	2011-06-01 12:12:21.463	



**Table 8-2.** Sample Output for a SELECT Query on the CB\_VIEW\_GOS\_LICENSE\_INVENTORY View (Continued)

VM_NAME	VM_M_OID	VC_SERVER_UID	HIERARCHY_NAME	RESOURCE_TYPE	RESOURCE_VALUE	START_TIME	END_TIME
vm02	vm-112	07F6FF05-9546-4 D01- B9C0-0170AA21 9579	QA-Hierarchy	VM_VCPU_COU NT	2	2011-06-0 1 12:12:21.4 63	
vm02	vm-112	07F6FF05-9546-4 D01- B9C0-0170AA21 9579	QA-Hierarchy	VM_GUEST_FUL L_NAME	Microsoft Windows Server 2003 (32-bit)	2011-06-0 1 12:12:21.4 63	

The CB\_FN\_GOS\_LICENSE\_PAYG function returns the guest OS details and the corresponding memory, vCPU, and power state details for all the virtual machines in a given hierarchy in the Pay As You Go model. You must provide values for the following input parameters when running the function:

- *hierarchy name*: Name of the hierarchy for which the virtual machine details must be retrieved.
- *start time*: The start time in the format YYYY-MM-DD hh:mm:ss.mls.
- *end time*: The end time in the format YYYY-MM-DD hh:mm:ss.mls.

For example,

```
SELECT * from CB_FN_GOS_LICENSE_PAYG('Test Hierarchy', '2011-01-14 00:00:00.000', '2011-07-14 23:59:59.999');
```

The function returns values similar to the output of a SELECT query on the CB\_VIEW\_GOS\_LICENSE\_INVENTORY database view. However, in this case the data for only a given hierarchy and for a specific duration is returned.

**NOTE** The CB\_FN\_GOS\_LICENSE\_PAYG function assumes that all the virtual machines in vCenter Chargeback Manager under the Pay as You Go model for any hierarchy organization is present under Pay as You Go > *Any\_OrgVDC* > vApps Folder > vApps.

## Running the Guest OS Licensing Script in Oracle

You must have the SELECT permission on the tables in the vCenter Chargeback Manager database to run the guest OS licensing script.

On running the script, two database objects are created.

- The CB\_VIEW\_GOS\_LICENSE\_INVENTORY database view.
- The CB\_FN\_GOS\_LICENSE\_PAYG function.

The CB\_VIEW\_GOS\_LICENSE\_INVENTORY view contains the guest OS details and the corresponding memory, vCPU, and power state details for all the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager. The CB\_FN\_GOS\_LICENSE\_PAYG function returns the guest OS details and the corresponding memory, vCPU, and power state details for all the virtual machines in the Pay As You Go model for a given hierarchy (*\$hierarchy\_name*) and for the specified time period (*\$start\_time* : *\$end\_time*).

Table 8-1 lists the details of the columns in the CB\_VIEW\_GOS\_LICENSE\_INVENTORY database view. The CB\_FN\_GOS\_LICENSE\_PAYG function returns values similar to the output of a SELECT query on the CB\_VIEW\_GOS\_LICENSE\_INVENTORY database view. However, in this case the data for only a given hierarchy and for a specific duration is returned.

For example,

```
SELECT * from TABLE(CB_FN_GOS_LICENSE_PAYG('Test Hierarchy',to_timestamp('20110114 00:00:00',
'YYYYMMDD HH24:MI:SS'), to_timestamp('20110714 23:59:59', 'YYYYMMDD HH24:MI:SS')));
```

---

**NOTE** The CB\_FN\_GOS\_LICENSE\_PAYG function is created based on the assumption that all the virtual machines in vCenter Chargeback Manager under the Pay as You Go model for any hierarchy organization is present under Pay as You Go > *Any\_OrgVDC* > vApps Folder > vApps.

---

## Storage Allocation Script

The storage allocation script helps you identify the storage allocation details for the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager.

### Running the Guest OS Licensing Script in SQL Server

You must have the **SELECT** permission on the tables in the vCenter Chargeback Manager database to run the guest OS licensing script.

On running the script, two database objects are created.

- The CB\_VIEW\_STORAGEALLOC\_INVENTORY database view.
- The CB\_FN\_STORAGE\_ALLOC\_PAYG function.

The CB\_VIEW\_STORAGEALLOC\_INVENTORY view contains the storage allocation values for the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager. [Table 8-3](#) lists the details of the columns in the CB\_VIEW\_STORAGEALLOC\_INVENTORY view.

**Table 8-3.** Column Details of the Storage Allocation Database View

Column Name	Data Type	Nullable	Description
VM_NAME	NVARCHAR2(255 CHAR)	No	Name of the virtual machine.
VM_MOID	NVARCHAR2(255 CHAR)	No	Managed Object ID of the virtual machine.
VC_SERVER_UIID	NVARCHAR2(255 CHAR)	No	UUID of the vCenter Server on which the virtual machine exists.
RESOURCE_TYPE	NVARCHAR2(255 CHAR)	No	The type of resource. Applicable value is Storage.
RESOURCE_VALUE	NUMBER(19,4)	No	Storage allocation value in KB.
START_TIME	DATETIME	No	The start time for the resource type.
END_TIME	DATETIME	Yes	The end time for the resource type or the end time of the virtual machine in the hierarchy, whichever is earlier.

After the view is created, you can run SELECT queries on the view to obtain the necessary information. [Table 8-4](#) shows the sample output for a SELECT query on the CB\_VIEW\_STORAGEALLOC\_INVENTORY view.

**Table 8-4.** Sample Output for a SELECT Query on the CB\_VIEW\_STORAGEALLOC\_INVENTORY View

VM_NAME	VM_MOI_D	VC_SERVER_UID	RESOURCE_TYPE	RESOURCE_VALUE	START_TIME	END_TIME
vm01	vm-1044	7BF5FFD5-F56C-4205-808D-329BB92636F0	Storage	80	28-AUG-11 07.12.56 PM	30-NOV-99 11.59.59 PM
vm02	vm-4417	7BF5FFD5-F56C-4205-808D-329BB92636F0	Storage	80	30-AUG-11 10.53.57 AM	30-NOV-99 11.59.59 PM
vm03	vm-4418	7BF5FFD5-F56C-4205-808D-329BB92636F0	Storage	80	30-AUG-11 10.54.04 AM	30-NOV-99 11.59.59 PM
vm04	vm-1049	7BF5FFD5-F56C-4205-808D-329BB92636F0	Storage	80	30-AUG-11 10.54.38 AM	30-NOV-99 11.59.59 PM

The CB\_FN\_STORAGE\_ALLOC\_PAYG function returns the storage allocation details for all the virtual machines in a given hierarchy in the Pay As You Go model. You must provide values for the following input parameters when running the function:

- *hierarchy name*: Name of the hierarchy for which the virtual machine details must be retrieved.
- *start time*: The start time in the format YYYY-MM-DD hh:mm:ss.mls.
- *end time*: The end time in the format YYYY-MM-DD hh:mm:ss.mls.

For example,

```
SELECT * from CB_FN_STORAGE_ALLOC_PAYG('Test Hierarchy', '2011-01-14 00:00:00.000', '2011-07-14 23:59:59.999');
```

The function returns values similar to the output of a SELECT query on the CB\_VIEW\_STORAGEALLOC\_INVENTORY database view. However, in this case the data for only a given hierarchy and for a specific duration is returned.

---

**NOTE** The CB\_FN\_STORAGE\_ALLOC\_PAYG function assumes that all the virtual machines in vCenter Chargeback Manager under the Pay as You Go model for any hierarchy organization is present under Pay as You Go > *Any\_OrgVDC* > vApps Folder > vApps.

---

## Running the Guest OS Licensing Script in Oracle

You must have the **SELECT** permission on the tables in the vCenter Chargeback Manager database to run the guest OS licensing script.

On running the script, two database objects are created.

- The CB\_VIEW\_STORAGEALLOC\_INVENTORY database view.
- The CB\_FN\_STORAGE\_ALLOC\_PAYG function.

The CB\_VIEW\_STORAGEALLOC\_INVENTORY view contains the storage allocation details for all the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager. The CB\_FN\_STORAGE\_ALLOC\_PAYG function returns the storage allocation details for all the virtual machines in the Pay As You Go model for a given hierarchy (*\$hierarchy\_name*) and for the specified time period (*\$start\_time* : *\$end\_time*).

[Table 8-3](#) lists the details of the columns in the CB\_VIEW\_STORAGEALLOC\_INVENTORY database view. The CB\_FN\_STORAGE\_ALLOC\_PAYG function returns values similar to the output of a SELECT query on the CB\_VIEW\_STORAGEALLOC\_INVENTORY database view. However, in this case the data for only a given hierarchy and for a specific duration is returned

For example,

```
SELECT * from TABLE(CB_FN_STORAGE_ALLOC_PAYG('Test Hierarchy',to_timestamp('20110114 00:00:00',
'YYYYMMDD HH24:MI:SS'), to_timestamp('20110714 23:59:59', 'YYYYMMDD HH24:MI:SS')));
```

---

**NOTE** The CB\_FN\_STORAGE\_ALLOC\_PAYG function is created based on the assumption that all the virtual machines in vCenter Chargeback Manager under the Pay as You Go model for any hierarchy organization is present under Pay as You Go > *Any\_OrgVDC* > vApps Folder > vApps.

---

## Performance Statistics Script

The performance statistics script helps you obtain the average resource usage details for the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager.

### Running the Guest OS Licensing Script in SQL Server

You must have the **SELECT** permission on the tables in the vCenter Chargeback Manager database to run the guest OS licensing script.

On running the script, two database objects are created.

- The CB\_VIEW\_VC\_STAT\_INVENTORY database view.
- The CB\_FN\_VC\_STAT\_PAYG function.

The CB\_VIEW\_VC\_STAT\_INVENTORY view contains the average usage details of different resources for all the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager. [Table 8-5](#) lists the details of the columns in the CB\_VIEW\_GOS\_LICENSE\_INVENTORY view.

**Table 8-5.** Column Details of the Performance Statistics Database View

Column Name	Data Type	Nullable	Description
VM_NAME	NVARCHAR2(255 CHAR)	No	Name of the virtual machine.
VM_MOID	NVARCHAR2(255 CHAR)	No	Managed Object ID of the virtual machine.
VC_SERVER_UUID	NVARCHAR2(255 CHAR)	No	UUID of the vCenter Server on which the virtual machine exists.
HIERARCHY_NAME	NVARCHAR2(255 CHAR)	No	Name of the chargeback hierarchy in which the virtual machine exists.
RESOURCE_TYPE	NVARCHAR2(255 CHAR)	No	The type of resource. For each virtual machine, the view contains at least nine rows, one each for the following resource types: <ul style="list-style-type: none"> <li>■ Average CPU usage in MHz.</li> <li>■ Average memory consumed in KB.</li> <li>■ Average disk read and write in KB/s.</li> <li>■ Average disk read in KB/s.</li> <li>■ Average disk write in KB/s.</li> <li>■ Average network received and transmitted in KB/s.</li> <li>■ Average network received in KB/s.</li> <li>■ Average network transmitted in KB/s.</li> <li>■ Average storage usage in KB.</li> </ul>
RESOURCE_VALUE	NUMBER	No	The value for the resource.
START_TIME	DATETIME	Yes	The start time for the resource type.
END_TIME	DATETIME	Yes	The end time for the resource type or the end time of the virtual machine in the hierarchy, whichever is earlier.

After the view is created, you can run SELECT queries on the view to obtain the necessary information.

Table 8-6 shows the sample output for a SELECT query on the CB\_VIEW\_VC\_STAT\_INVENTORY view.

**Table 8-6.** Sample Output for a SELECT Query on the CB\_VIEW\_VC\_STAT\_INVENTORY View

VM_NAME	VM_M OID	VC_SERVER_U UID	HIERARCHY_ NAME	RESOURCE_TY PE	RESOURCE_ VALUE	START_ TIME	END_TIM E
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	CPU	606	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Memory	2472619	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Disk Read and Write	228	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Disk Read	5	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Disk Write	222	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Network Received and Transmitted	166	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Network Received	77	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Network Transmitted	87	8/29/11 2:00	8/29/11 4:00
VM01	vm-444 2	7BF5FFD5- F56C-4205-808D- 329BB92636F0	DB Hierarchy 1	Storage	4096	8/29/11 2:00	8/29/11 4:00

The CB\_FN\_VC\_STAT\_PAYG function returns the average usage details of different resources for all the virtual machines in a given hierarchy in the Pay As You Go model. You must provide values for the following input parameters when running the function:

- *hierarchy name*: Name of the hierarchy for which the virtual machine details must be retrieved.
- *start time*: The start time in the format YYYY-MM-DD hh:mm:ss.mls.
- *end time*: The end time in the format YYYY-MM-DD hh:mm:ss.mls.

For example,

```
SELECT * from CB_FN_VC_STAT_PAYG('Test Hierarchy', '2011-01-14 00:00:00.000', '2011-07-14
23:59:59.999');
```

The function returns values similar to the output of a SELECT query on the CB\_VIEW\_VC\_STAT\_INVENTORY database view. However, in this case the data for only a given hierarchy and for a specific duration is returned.

**NOTE** The CB\_FN\_VC\_STAT\_PAYG function assumes that all the virtual machines in vCenter Chargeback Manager under the Pay as You Go model for any hierarchy organization is present under Pay as You Go > *Any\_Org*VDC > vApps Folder > vApps.

## Running the Guest OS Licensing Script in Oracle

You must have the **SELECT** permission on the tables in the vCenter Chargeback Manager database to run the guest OS licensing script.

On running the script, two database objects are created.

- The CB\_VIEW\_VC\_STAT\_INVENTORY database view.
- The CB\_FN\_VC\_STAT\_PAYG function.

The CB\_VIEW\_VC\_STAT\_INVENTORY view contains the average usage details of different resources for all the virtual machines that are part of any hierarchy created in vCenter Chargeback Manager. The CB\_FN\_VC\_STAT\_PAYG function returns the average usage details of different resources for all the virtual machines in the Pay As You Go model for a given hierarchy (*\$hierarchy\_name*) and for the specified time period (*\$start\_time* : *\$end\_time*).

Table 8-5 lists the details of the columns in the CB\_VIEW\_VC\_STAT\_INVENTORY database view. The CB\_VIEW\_VC\_STAT\_PAYG function returns values similar to the output of a SELECT query on the CB\_VIEW\_VC\_STAT\_INVENTORY database view. However, in this case the data for only a given hierarchy and for a specific duration is returned.

For example,

```
SELECT * from TABLE(CB_FN_VC_STAT_PAYG('Test Hierarchy',to_timestamp('20110114 00:00:00',
'YYYYMMDD HH24:MI:SS'), to_timestamp('20110714 23:59:59', 'YYYYMMDD HH24:MI:SS')));
```

---

**NOTE** The CB\_FN\_VC\_STAT\_PAYG function is created based on the assumption that all the virtual machines in vCenter Chargeback Manager under the Pay as You Go model for any hierarchy organization is present under Pay as You Go > *Any\_OrgVDC* > vApps Folder > vApps.

---

## vCenter Chargeback Manager Database Management Scripts

vCenter Chargeback Manager provides SQL scripts that can help database administrators to manage the vCenter Chargeback Manager database.

These SQL scripts can be run from the SQL prompt by any database user having the required permissions. These scripts are packaged with the application and are located in the following folders:

- For SQL Server

*Installation\_Directory*\Database Scripts\main\version\mssql\db-management

The script names are of the form *script\_name\_mssql.sql*.

- For Oracle

*Installation\_Directory*\Database Scripts\main\version\oracle\db-management

The script names are of the form *script\_name\_oracle.sql*.

*Installation\_Directory* refers to the complete path of the folder in which vCenter Chargeback Manager is installed. *version* refers to a folder that has version number as the folder name. For example, v1.5.0 or v2.0.

## Generic Scripts

vCenter Chargeback Manager provides few generic SQL scripts that let you fetch certain statistical data about the vCenter Chargeback Manager database.

### Prerequisites for Running the Generic SQL Scripts

You must have the **SELECT** permission on the tables in the vCenter Chargeback Manager database to run these scripts. Before running the generic scripts on an SQL Server database, you must replace `$dbName` with the name of the vCenter Chargeback Manager database in the SQL scripts.

### About the Generic SQL Scripts

[Table 8-7](#) lists the generic SQL scripts provided with vCenter Chargeback Manager.

**Table 8-7.** Generic SQL Scripts

Script Name	Description
countActiveConns	This script returns the number of active connections to the database.
countRows	This script returns the number of rows in each of the tables in the database.
dbSize	This script return the space occupied by the tables in the database.

## Space Calculation Scripts

The space calculation scripts shipped with vCenter Chargeback Manager enable you to calculate the space that can be retrieved by purging the old data from the database tables.

### Prerequisites for Running the Space Calculation Scripts

You must have the **SELECT** permission on the tables in the vCenter Chargeback Manager database to run the space calculation scripts. The `v_months_in_history` parameter in the Oracle scripts and the `@MONTHS_IN_HISTORY` parameter in the SQL Server scripts is set to 6 months by default. You can change this in the scripts to the desired number of months.

### About the Space Calculation Scripts

[Table 8-8](#) lists the space calculation scripts provided with vCenter Chargeback Manager.

**Table 8-8.** Space Calculation Scripts

Script	Description
spaceCostData	This script returns the amount of space that can be retrieved by purging the cost data that is older than the specified number of months.
spaceHierarchyData	This script returns the amount of space that can be retrieved by purging the hierarchy data that is older than the specified number of months.
spaceReportData	This script returns the amount of space that can be retrieved by purging the report data that is older than the specified number of months.
spaceTablesData	This script returns the amount of space that can be retrieved by purging the cost, hierarchy, and report data that is older than the specified number of months.
spaceStatsData	This script returns the amount of space that can be retrieved by purging the performance statistics data (from the <code>CB_VC_PERFORMANCE_STAT</code> table) that is older than the specified number of months.

## Data Purging Scripts

The data purging scripts enable you to remove data older than the specified number of months from the vCenter Chargeback Manager database tables.

### Prerequisites for Running the Data Purging Scripts

You must have the **SELECT** and **DELETE** permissions on the vCenter Chargeback Manager database tables to run the data purging scripts. Before you run the scripts, take a backup of the vCenter Chargeback Manager database.

### About the Data Purging Scripts

[Table 8-9](#) lists the data purging scripts provided with vCenter Chargeback Manager.

**Table 8-9.** Data Purging Scripts

Script	Description
<code>purgeCostData</code>	This script removes the cost-related data that is older than the specified number of months. The number of months is specified using the <code>MONTHS_IN_HISTORY</code> parameter in the Oracle script and the <code>@MONTHS_IN_HISTORY</code> parameter in the SQL Server script. You can set this parameter appropriately before running the script. The script removes the data from the following tables: <ul style="list-style-type: none"> <li>■ <code>CB_BASE_RATE</code></li> <li>■ <code>CB_BILLING_POLICY</code></li> <li>■ <code>CB_ENTITY_METERING</code></li> <li>■ <code>CB_RATE_FACTOR</code></li> <li>■ <code>CB_FIXED_COST</code></li> </ul>
<code>purgeHierarchyData</code>	This script removes the hierarchy-related data that is older than the specified number of months. The number of months is specified using the <code>MONTHS_IN_HISTORY</code> parameter in the Oracle script and the <code>@MONTHS_IN_HISTORY</code> parameter in the SQL Server script. You can set this parameter appropriately before running the script. The script removes the data from the following tables: <ul style="list-style-type: none"> <li>■ <code>CB_VC_ENTITY_RELATION</code></li> <li>■ <code>CB_VC_ENTITY_PROPERTY</code></li> <li>■ <code>CB_VC_ENTITY_MAPPING</code></li> <li>■ <code>CB_HIERARCHY_RELATION</code></li> </ul>
<code>purgeStatsData</code>	This script removes the vCenter Server performance statistics data that is older than the specified number of months from the <code>CB_VC_PERFORMANCE_STAT</code> table. The number of months is specified using the <code>MONTHS_IN_HISTORY</code> parameter in the Oracle script and the <code>@MONTHS_IN_HISTORY</code> parameter in the SQL Server script. You can set this parameter appropriately before running the script.
<code>purgeTables</code>	This script is a superset of the <code>purgeCostData</code> , <code>purgeHierarchyData</code> , and <code>purgeStatsData</code> scripts. The script removes the cost, hierarchy, and vCenter Server performance statistics related data that is older than the specified number of months. The number of months is specified using the <code>MONTHS_IN_HISTORY</code> parameter in the Oracle script and the <code>@MONTHS_IN_HISTORY</code> parameter in the SQL Server script. You can set this parameter appropriately before running the script.

### About the Statistics Data Purging Stored Procedure

vCenter Chargeback Manager schedules a daily roll up of vCenter Server performance statistics data in the vCenter Chargeback Manager database. The `CB_STATS_ROLLUP_PROC` stored procedure in the vCenter Chargeback Manager database purges the vCenter Server performance statistics data that is no longer required. The stored procedure purges data in the database in batches of 50,000 rows.

You can also manually run this stored procedure. This procedure must be called multiple times till it returns the value '1', indicating that the roll up is complete.



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