

vCenter Chargeback User's Guide

vCenter Chargeback 1.0

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About This Book

The *vCenter Chargeback User's Guide* provides information about configuring and using the chargeback solution for a virtualized environment.

Intended Audience

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

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Introduction to vCenter Chargeback

Before you install and start using the vCenter Chargeback application, an understanding of what chargeback is and chargeback solution for a virtualized environment would be helpful. This chapter provides a quick overview of the vCenter Chargeback application.

This chapter includes the following topics:

- [“What Is Chargeback?”](#) on page 9
- [“Chargeback Solution for Virtualized Environments”](#) on page 9
- [“Overview of vCenter Chargeback”](#) on page 10

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-virtualized 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 virtualized 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 Virtualized Environments

In a virtualized 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 or 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 virtualized 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.

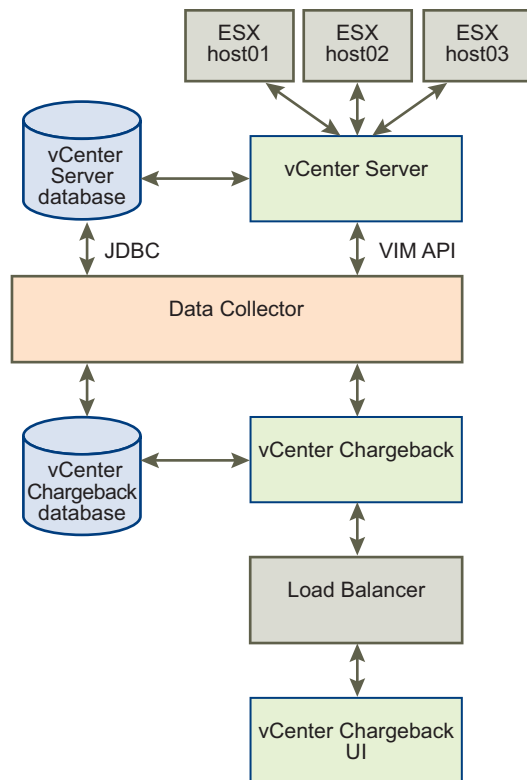
A chargeback solution for a virtualized environment defines a hierarchy with different types of entities such as departments, divisions, business units, cost centers, physical servers, virtual machines, and so on. For each entity type, a cost model is defined that determines the rate for each unit of a resource utilized. The chargeback solution determines the resource usage either using by 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 is used as part of the overall chargeback solution.

Overview of vCenter Chargeback

Determining the resource utilization and calculating the corresponding cost for environments virtualized using VMware vSphere typically involves VMware professional services' work or use of partner solutions, such as those provided by Evident, Comparex, and IBM/Tivoli. These solutions are built using custom methods for VMware vSphere resource data collection and chargeback cost calculation for organizations.

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

Figure 1-1. vCenter Chargeback in a Virtualized Environment



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

When you install vCenter Chargeback, the vCenter Chargeback application, the load balancer, and the data collector are installed and run on the same machine. Although the vCenter Chargeback 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 retrieves the resource usage and allocation information for each virtual machine from the vCenter Server database through the data collector. The data collector replicates this information in the vCenter Chargeback database. vCenter Chargeback uses this information from the vCenter Chargeback 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 database. A data collector instance can also communicate with more than one vCenter Chargeback database.

vCenter Chargeback also lets you create a cluster of vCenter Chargeback 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 instance in the cluster based on the number request currently being serviced by each instance in the cluster. All the vCenter Chargeback instances in a cluster are connected to the same vCenter Chargeback database.

Installing vCenter Chargeback

This chapter includes the following topics:

- [“System Requirements”](#) on page 13
- [“Prerequisites for vCenter Chargeback”](#) on page 14
- [“Install vCenter Chargeback”](#) on page 16
- [“Starting the vCenter Chargeback Application”](#) on page 21
- [“Downloading and Installing Data Collector”](#) on page 22
- [“Deploying vCenter Chargeback as a Virtual Appliance”](#) on page 23
- [“Uninstalling vCenter Chargeback”](#) on page 25

System Requirements

This section provides details of the minimum hardware configuration required for installing and running vCenter Chargeback. The section also provides information about the supported operating systems, database management systems, and the vCenter Server releases. It also lists the supported Web browsers to access the vCenter Chargeback application.

Hardware Requirements

vCenter Chargeback can be run on a computer or a virtual machine with the following hardware specifications:

- 2.0GHz or faster Intel or AMD x86 processor
- 3GB or more of RAM
- A minimum of 1.1GB disk storage (2GB recommended)
- 10/100 Ethernet adapter (Gigabit recommended)

If you are installing the vCenter Chargeback database on the same computer as vCenter Chargeback, additional storage, memory, and processor capacity is required.

Software Requirements

Other than an operating system, you must have a database management system and a Web browser installed to run and access vCenter Chargeback. This section lists the supported operating systems, database management systems, Web browsers, and vCenter Server releases.

Operating Systems

The vCenter Chargeback application can be installed and run on the following operating systems:

- Microsoft Windows 2003 Server with SP2
- Microsoft Windows 2003 Server R2
- Microsoft Windows 2008 Server

Database Management Systems

vCenter Chargeback supports the following database management systems (both 32 bit and 64 bit):

- Microsoft SQL Server 2005 (Standard and Enterprise)
- Microsoft SQL Server 2008 (Standard and Enterprise)
- Oracle Database 10g (Standard and Enterprise)
- Oracle Database 11g (Standard and Enterprise)

Web Browsers

vCenter Chargeback is a browser-based application that is tested and supported on the following:

- Microsoft Internet Explorer 6.x and 7.x
- Mozilla Firefox 2.x and 3.x

Although vCenter Chargeback can be accessed through a Microsoft Internet Explorer 6.x or Mozilla Firefox 2.x Web browser, VMware recommends that you use a Microsoft Internet Explorer 7.x or Mozilla Firefox 3.x Web browser.

VMware vCenter Server

vCenter Chargeback supports VirtualCenter Server 2.5 Update 3 and later releases and vCenter Server 4.0.

Prerequisites for vCenter Chargeback

You need to perform the following tasks before installing the vCenter Chargeback application:

- Create a vCenter Chargeback Database and Database User

vCenter Chargeback stores the application-specific data, such as cost models, chargeback hierarchies, and users and roles, in the vCenter Chargeback database. You must, therefore, first create a database for storing this data. The database management systems supported by vCenter Chargeback are listed in [“Database Management Systems”](#) on page 14. You can either create the database yourself by referring to the corresponding product documentation or ask your database administrator to create one for you.

If you using an Oracle database as the vCenter Chargeback database, you must configure the database to use the Unicode (AL32UTF8) character set to support the following scenarios:

- You want to deploy the vCenter Chargeback database in a non-English environment.
- You want to synchronize the vCenter Chargeback database with a vCenter Server database that has non-English data.

After you create the vCenter Chargeback database, you must also create a database user to access this database. Ensure that the database user has the privileges to create and delete schema, as well as read from and write to the database.

You must provide the details of this vCenter Chargeback database and database user when installing vCenter Chargeback. The installer will use these details to create the database schema and objects. Also, vCenter Chargeback will log in to the vCenter Chargeback database using the details of this database user and perform the necessary database operations.

NOTE Instead of using the default database users, such as `sa`, `SYS`, and `SYSTEM`, create a database user with just the required privileges and access the database with this users credentials. This is a good security practice.

- **Check Whether the Ports are Free**

Ensure that the ports that you specify during the installation are free. While installing you must specify the port numbers for the following:

- **HTTP port:** This port is used by vCenter Chargeback for communication using the HTTP protocol. The default port number is 8080.
- **Load-balancer port:** This port is used by vCenter Chargeback to communicate with the load balancer. The default port is 8009.
- **HTTPS port:** This port is used by the load balancer to listen for user requests. The default port is 443.

If any of the specified port is also configured for another service and the service is not running, then the installer will use the specified port. However, this might result in a port conflict and either of the configured services might fail.

- **Set a Static IP Address on the Machine**

Before you install the vCenter Chargeback application on a machine, you must obtain a static IP address from your network administrator. Set this IP address on the machine on which you are going to install vCenter Chargeback. Preferably, obtain and set static IP addresses on all the servers and databases that the application communicates with.

- **Ensure that System Time of all the Servers and Databases are in Sync**

You must ensure that the system time of the machines on which you install vCenter Chargeback and vCenter Chargeback database are in sync. If you plan to install a separate data collector on a different machine, then the system time of this machine must be in sync with that of the other machines.

- **Ensure that MSI Installation is Enabled.**

Before you start the installation, you must ensure that MSI installation is enabled on the machine. If not, you must manually install Microsoft Visual C++ 2005 Redistributable Package (x86) before running the vCenter Chargeback installer.

- **Ensure that Port Exceptions are Configured on the Windows Firewall**

If the Windows Firewall is enabled, you must set the port exceptions for the HTTP, load balancer, and HTTPS ports on the Windows Firewall. If these exceptions are not set, the application will be not be usable.

Pre-Installation Checklist

The checklist provided in [Table 2-1](#) helps you ensure that you have all the required information and have performed the necessary pre-install tasks.

Table 2-1. vCenter Chargeback Pre-Install Checklist

Item	Requirement	Checked
Hardware Configuration		
CPU	2.0GHz or faster Intel or AMD x86 processor	
RAM	3.0 GB or more	
Disk space	Minimum 1.1 GB; Recommended 2.0 GB or more	
Card	10/100 Ethernet adapter (Gigabit recommended)	

Table 2-1. vCenter Chargeback Pre-Install Checklist (Continued)

Item	Requirement	Checked
Network Configuration		
Static IP Address	Write down the IP address of the machine on which you plan to install vCenter Chargeback. Ensure that the machine has a static IP address.	
Port Numbers	HTTP Port (default: 8080) Load-balancer Port (default: 8009) HTTPS Port (default: 443)	
Database Configuration		
Type	Microsoft SQL Server 2005 or later Oracle Database 10g or later	
Database name	Create a database for vCenter Chargeback and note down the database name	
URL	IP address of the vCenter Chargeback database Ensure that the machine on which the database is installed has a static IP address. TNS listener port for Oracle database Database instance name for SQL Server database	
Database user name and password	User name of the database user who has privileges to create and delete schema, as well as to read from and write to the database Password for this user	
Software Configuration		
Microsoft SQL Server	Ensure that the SQL Server Browser service is running	
MSI Installation	Is MSI installation enabled? If not, install Microsoft Visual C++ 2005 Redistributable Package (x86)	
Port Exceptions on Windows Firewall	If you have enabled Windows Firewall, you must set the port exceptions for the HTTP port, load balancer port, and HTTPS port.	

NOTE Prior to starting the installation, check whether the default ports are free. If not, ensure that you provide alternative port numbers during the installation.

Install vCenter Chargeback

This section covers the following installation scenarios:

- [“Basic Installation or First-Time Installation”](#) on page 16
- [“Cluster Installation”](#) on page 18
- [“Basic Installation Using Existing Database Schema”](#) on page 20

Download the installer file, `vCenter-CB-1.0.0-<build_number>.zip`, and extract the content of this ZIP file to the machine on which you want to install the application. If you try to run the installer from a shared location on the network, the installer might fail.

Basic Installation or First-Time Installation

When you install the product for the first time, the installer performs the following tasks:

- Connects to the database and creates a schema for the application data.
- Installs the application.
- Installs the load balancer, which receives and routes all user requests to the application.
- Installs the data collector, which synchronizes the vCenter Chargeback database with the vCenter Server databases.

To install the application

- 1 Run the vCenter-CB.exe file.

The installation wizard is displayed.

- 2 Click **Next** on the Introduction screen.
- 3 Accept the end-user license agreement, and click **Next**.
- 4 Provide the path for the installation directory, and click **Next**.

Ensure that the installation directory path has at least one directory (for example, C:\vCenterChargeback10\) and does not point to just a drive (for example, C:\). If the specified installation directory exists, ensure that it is empty. If the specified installation directory does not exist, the installer will create the directory.

- 5 Provide the following vCenter Chargeback database-related information, and click **Next**:

- **Database Type:** The type of database used to create the vCenter Chargeback database. This can be either **SQL SERVER** or **ORACLE**.
- **Database URL:** The IP address of the system on which the vCenter Chargeback database is installed along with the port at which the database listener service is running or the vCenter Chargeback database instance name.

For Oracle Database, the database URL can be in any of the following formats:

```
<IP Address>:<TNS Listener Port>
<Host Name>:<TNS Listener Port>
```

For SQL Server, the database URL can be in any of the following formats:

```
<IP Address>\<Database Instance Name>
<Host Name>\<Database Instance Name>
```

- **Database Name:** Name of the database in which vCenter Chargeback stores the application-specific data.
- **Database Username:** Name of the database user. The database user must have privileges to create and delete schema, as well as read from and write to the database.
- **Database Password:** Password for the user name that you have provided.

If the installer successfully connects to the database, the next screen is displayed.

- 6 Provide the following information for the vCenter Chargeback application, and click **Next**:

- **IP Address:** Static IP address of the machine on which you are installing vCenter Chargeback. Do not use `localhost` instead of the IP address.
- **HTTP Port:** An unused HTTP port through which vCenter Chargeback can communicate.
- **Load-Balancer Port:** An unused port through which vCenter Chargeback can communicate with the load balancer (Apache Server).
- **Server Instance Name:** A user-defined name for the vCenter Chargeback instance. This name is used by the load balancer to identify the instance.

If the specified ports are free, the next screen is displayed.

- 7 Provide the following details for installing the load balancer, and click **Next**:

- **IP Address:** Static IP address of the machine on which you are installing vCenter Chargeback. Do not use `localhost` instead of the IP address.
- **Admin Email Address:** Email address of the server administrator.
- **HTTPS Port:** An unused port through which the Apache Server can communicate. The load balancer listens on this port for user requests.

If the specified port is free, the next screen is displayed.

- 8 Enter a user name and password for the vCenter Chargeback administrative account, and click **Next**.
The password must not exceed 24 characters in length.
- 9 (Optional) Choose to install the data collector and click **Next**.
The **Install Data Collector** option is selected by default. You must have at least one instance of the data collector that is running and registered with the application for the database synchronization jobs to run.
- 10 Review the information displayed on the Pre-Installation Summary screen, and click **Install**.
The installer starts installing the various components and creating the database schema. If the installation is successful, the URL for accessing the vCenter Chargeback application is displayed.
- 11 Note this URL, and click **Done**.

NOTE If the installation fails due to some reason, the uninstaller is invoked automatically and all the components installed till the failure occurred is removed.

Ensure that the system time of vCenter Chargeback, vCenter Chargeback database, and the data collector are in sync.

Cluster Installation

When you install the vCenter Chargeback application for the first time on a machine, a load balancer is also installed. The existence of the load balancer enables you to have more than one instance of the vCenter Chargeback application running, with each instance accessing the same vCenter Chargeback database. These vCenter Chargeback instances form a cluster. All user requests are routed through the load balancer. Also, all the instances in the cluster share the same administrative account information.

The load balancer ensures that no single vCenter Chargeback instance is loaded disproportionately with user requests. Also, if one of the instances fails, any request currently being serviced by that instance is automatically redirected to another instance in the cluster. For the failover to happen successfully, you must ensure the following:

- All the vCenter Chargeback instances in the cluster, the vCenter Chargeback database, and the data collectors have the same system time. That is, the system times are in sync.
- All the vCenter Chargeback instances in the cluster are in the same network domain.
- Multicasting must be enabled on the machine on which the vCenter Chargeback instance is installed.

To install the application

- 1 Run the vCenter-CB.exe file.
The installation wizard is displayed.
- 2 Click **Next** on the Introduction screen.
- 3 Accept the end-user license agreement, and click **Next**.
- 4 Provide the path for the installation directory, and click **Next**.

Ensure that the installation directory path has at least one directory (for example, C:\vCenterChargeback10\) and does not point to just a drive (for example, C:\). If the specified installation directory exists, ensure that it is empty. If the specified installation directory does not exist, the installer will create the directory.

- 5 Provide the following vCenter Chargeback database-related information, and click **Next**:
- **Database Type:** The type of database used to create the vCenter Chargeback database. This can be either **SQL SERVER** or **ORACLE**.
 - **Database URL:** The IP address of the system on which the vCenter Chargeback database is installed along with the port at which the database listener service is running or the vCenter Chargeback database instance name. Ensure that the specified database URL points to the vCenter Chargeback database that an existing vCenter Chargeback instance is already using.

For Oracle Database, the database URL can be in any of the following formats:

```
<IP Address>:<TNS Listener Port>
<Host Name>:<TNS Listener Port>
```

For SQL Server, the database URL can be in any of the following formats:

```
<IP Address>\<Database Instance Name>
<Host Name>\<Database Instance Name>
```

- **Database Name:** Name of the existing vCenter Chargeback database.
- **Database Username:** Name of the database user. The database user must have privileges to create and delete schema, as well as read from and write to the database.
- **Database Password:** Password for the user name that you have provided.

If the installer connects to the database and detects a vCenter Chargeback schema, a dialog is displayed.

- 6 Click **Use it**.

The vCenter Chargeback instance will use this existing vCenter Chargeback database.

- 7 Provide the following information for the vCenter Chargeback application, and click **Next**:

- **IP Address:** Static IP address of the machine on which you are installing vCenter Chargeback. Do not use `localhost` instead of the IP address.
- **HTTP Port:** An unused HTTP port through which vCenter Chargeback can communicate.
- **Load-Balancer Port:** An unused port through which vCenter Chargeback can communicate with the load balancer (Apache Server).
- **Server Instance Name:** A user-defined name for the vCenter Chargeback instance. This name is used by the load balancer to identify the instance.

If the specified ports are free, the next screen is displayed.

- 8 Ensure that the **Install Load Balancer Server** option is not selected, and click **Next**.

- 9 (Optional) Choose to install the data collector and click **Next**.

The **Install Data Collector** option is selected by default. You must have at least one instance of the data collector that is running and registered with the application for the database synchronization jobs to run.

- 10 Review the information displayed on the Pre-Installation Summary screen, and click **Install**.

The installer starts installing the various components. If the installation is successful, the URL for accessing the vCenter Chargeback application and the information required to add this installed instance to the cluster is displayed.

- 11 Note this information, and click **Done**.

The administrative account for accessing this instance will be same as the one used by the existing vCenter Chargeback instance.

NOTE If the installation fails, the uninstaller starts automatically and removes all the components installed.

After successfully installing the application, you must add this vCenter Chargeback instance to a cluster by running the `ModifyLBWorkers.bat` file on the machine on which the load balancer is installed.

To add an application instance to a cluster

- 1 In a command-line window, enter the following command:

```
cd <Installation_Folder>/vCenter-CB-Tools/load-balancer/bin/
```

here, <Installation_Folder> is the complete folder path provided during the vCenter Chargeback installation.
- 2 Run the following command:

```
ModifyLBWorkers <Host IP Address> <Load-Balancer Port> <Server Instance Name>
```

where:

 - **Host IP Address:** The IP address of the machine on which the new vCenter Chargeback instance is installed.
 - **Load-Balancer Port:** The port through which the application instance communicates with the load balancer. This is same as the port configured during the new vCenter Chargeback installation.
 - **Server Instance Name:** The name of the new vCenter Chargeback instance that you want to add to the cluster. This is the name that you have provided during the installation.
- 3 Restart the Load Balancer service from the **Start > Programs > VMware > VMware vCenter Chargeback > vCenter Chargeback Services** menu.

Basic Installation Using Existing Database Schema

You can install a stand-alone vCenter Chargeback instance that uses an existing vCenter Chargeback schema.

To install the application

- 1 Run the vCenter-CB.exe file.

The installation wizard is displayed.
- 2 Click **Next** on the Introduction screen.
- 3 Accept the end-user license agreement, and click **Next**.
- 4 Provide the path for the installation directory, and click **Next**.

Ensure that the installation directory path has at least one directory (for example, C:\vCenterChargeback10\) and does not point to just a drive (for example, C:\). If the specified installation directory exists, ensure that it is empty. If the specified installation directory does not exist, the installer will create the directory.
- 5 Provide the following vCenter Chargeback database-related information, and click **Next**:
 - **Database Type:** The type of database used to create the vCenter Chargeback database. This can be either **SQL SERVER** or **ORACLE**.
 - **Database URL:** The IP address of the system on which the vCenter Chargeback database is installed along with the port at which the database listener service is running or the vCenter Chargeback database instance name. Ensure that the specified database URL points to a database that has a vCenter Chargeback schema and is not being used by any vCenter Chargeback instance.

For Oracle Database, the database URL can be in any of the following formats:

```
<IP Address>:<TNS Listener Port>  
<Host Name>:<TNS Listener Port>
```

For SQL Server, the database URL can be in any of the following formats:

```
<IP Address>\<Database Instance Name>  
<Host Name>\<Database Instance Name>
```
 - **Database Name:** Name of the existing vCenter Chargeback database.

- **Database Username:** Name of the database user. The database user must have privileges to create and delete schema, as well as read from and write to the database.
- **Database Password:** Password for the user name that you have provided.

If the installer connects to the database and detects a vCenter Chargeback schema, a dialog is displayed.

6 Click **Use it**.

The vCenter Chargeback instance will use this existing vCenter Chargeback database.

If you click **Create new schema**, the existing schema is overwritten.

7 Provide the following information for the vCenter Chargeback application, and click **Next**:

- **IP Address:** Static IP address of the machine on which you are installing vCenter Chargeback. Do not use `localhost` instead of the IP address.
- **HTTP Port:** An unused HTTP port through which vCenter Chargeback can communicate.
- **Load-Balancer Port:** An unused port through which vCenter Chargeback can communicate with the load balancer (Apache Server).
- **Server Instance Name:** A user-defined name for the vCenter Chargeback instance. This name is used by the load balancer to identify the instance.

8 Provide the following details for installing the load balancer, and click **Next**:

- **IP Address:** Static IP address of the machine on which you are installing vCenter Chargeback. Do not use `localhost` instead of the IP address.
- **Admin Email Address:** Email address of the server administrator.
- **HTTPS Port:** An unused port through which the Apache Server can communicate. The load balancer listens on this port for user requests.

9 (Optional) Choose to install the data collector and click **Next**.

The **Install Data Collector** option is selected by default. You must have at least one instance of the data collector that is running and registered with the application for the database synchronization jobs to run.

10 Review the information displayed on the Pre-Installation Summary screen, and click **Install**.

The installer starts installing the various components. If the installation is successful, the URL for accessing the vCenter Chargeback application is displayed.

11 Note this URL, and click **Done**.

The administrative account for accessing this instance will be same as the one used during the original installation when the existing vCenter Chargeback database schema was created.

NOTE If the installation fails, the uninstaller starts automatically and removes all the components installed.

Starting the vCenter Chargeback Application

All the services required for successfully running and accessing vCenter Chargeback are configured to start automatically when the machine is powered on and the operating system is started. You can also manually control these services.

The related services are:

- **VMware vCenter Chargeback Service:** Starting this service starts the application.
- **VMware vCenter Chargeback Load Balancer Service:** Starting this service starts the load balancer. This service must be running so that the load balancer can receive user requests and route them to the application for them to be serviced.

- **VMware vCenter Chargeback DataCollector - Embedded:** Starting this service starts the Data Collector instance that was installed along with the vCenter Chargeback application.
- **VMware vCenter Chargeback DataCollector - Individual:** Starting this service starts the Data Collector instance that was installed individually (in this case, the name of the instance is DataCollector) and not with the application.

You can also start and stop the related services from the **Start > Programs > VMware > VMware vCenter Chargeback > vCenter Chargeback Services** menu. The menu provides shortcuts to start and stop the following services:

- vCenter Chargeback service
- Data Collector service
- Load Balancer service

The data collectors that are installed individually and not along with the application can be managed from the **Start > Programs > VMware > VMware vCenter Chargeback DataCollector** menu.

If all the required services are running, you can access vCenter Chargeback through a supported Web browser.

To access the vCenter Chargeback application:

- 1 Click **Launch Chargeback Homepage** from the **Start > Programs > VMware > VMware vCenter Chargeback** menu.
A login page is displayed.
- 2 Enter the login credentials, and click **Login**.

Downloading and Installing Data Collector

You can download the data collector installer from the vCenter Chargeback application.

To download the installer:

- 1 Log in to the vCenter Chargeback application.
- 2 Click the **Settings** tab.
- 3 Click **Data Collectors**.
- 4 Click the **Download Data Collector** link.
- 5 In the download dialog box, click **Save File**. The installer (vCenter-CB-DC.zip) is downloaded and saved on your system.

To install the Data Collector:

- 1 Extract and run the vCenter-CB-DC.exe file.
- 2 Click **Next** on the Introduction screen.
- 3 Accept the end-user license agreement, and click **Next**.
- 4 If a data collector instance exists on the machine, the installer allows you to:
 - Create a new data collector instance
 - Upgrade the existing data collector instance

If you choose to create a new instance, you must provide a unique name for the instance. The default name is DataCollector. Click **Next**.

NOTE This screen appears only for second and subsequent installations of the data collector on the same machine.

- 5 Provide the path for the installation directory, and click **Next**.

Ensure that the installation directory path has at least one directory (for example, C:\vCenterChargeback10\) and does not point to just a drive (for example, C:\). If the specified installation directory exists, ensure that it is empty. If the specified installation directory does not exist, the installer will create the directory.

- 6 Provide the following vCenter Chargeback database-related information, and click **Next**:

- **Database Type:** The type of database used to create the vCenter Chargeback database. This can be either **SQL SERVER** or **ORACLE**.
- **Database URL:** The IP address of the system on which the vCenter Chargeback database is installed along with the port at which the database listener service is running or the vCenter Chargeback database instance name.

For Oracle Database, the database URL can be in any of the following formats:

```
<IP Address>:<TNS Listener Port>
<Host Name>:<TNS Listener Port>
```

For SQL Server, the database URL can be in any of the following formats:

```
<IP Address>\<Database Instance Name>
<Host Name>\<Database Instance Name>
```

- **Database Name:** Name of the vCenter Chargeback database.
- **Database Username:** Name of the database user. The database user must have privileges to create and delete schema, as well as read from and write to the database.
- **Database Password:** Password for the user name that you have provided.

NOTE Ensure that you provide the details of the vCenter Chargeback database that the data collector must synchronize with the vCenter Server databases.

If the installer connects to the database and detects a vCenter Chargeback schema, a dialog is displayed.

- 7 Click **OK**.
- 8 Review the information displayed on the Pre-Installation Summary screen, and click **Install**.

The installer starts installing the data collector. If the installation is successful, the URL for accessing vCenter Chargeback is displayed.

- 9 Note this URL, and click **Done**.

NOTE If the installation fails, the uninstaller starts automatically and removes all the components installed.

After you install a separate data collector, the Data Collector service starts and runs automatically. You can manually start and stop the service from the **Start > Programs > VMware > VMware vCenter Chargeback DataCollector** menu.



CAUTION The data collector system time must be the same as the vCenter Chargeback and vCenter Chargeback database system time. That is, the system time of all these machines should be in sync.

Deploying vCenter Chargeback as a Virtual Appliance

You can deploy a vCenter Chargeback instance as a virtual appliance. To do this, you must first download the `cbm-ovf-1.0.0--<build_number>.zip` file and extract the contents. This ZIP file contains the following files:

- `system.vmdk`: The virtual machine disk file for the virtual appliance.
- `vCenterChargeback.ovf`: The virtual appliance deployment file.

The vCenter Chargeback virtual appliance is only for evaluation purpose. You must, therefore, use only evaluation licenses.

To deploy a vCenter Chargeback virtual appliance using VI Client

- 1 Start VI Client and log in to a VirtualCenter Server or ESX Server.
- 2 Select **File > Virtual Appliance > Import**.
The Import Virtual Appliance Wizard is displayed.
- 3 Select **Import from file**, enter the path of the vCenterChargeback.ovf file, and click **Next**.
- 4 Confirm the virtual appliance details, and click **Next**.
- 5 Accept the end-user license agreement, and click **Next**.
- 6 Provide a name for the virtual machine, and click **Next**.
- 7 Select the ESX Server host or resource pool on which the virtual machine should be deployed, and click **Next**.
- 8 Select the required data store, and click **Next**.
- 9 Review the information displayed on the summary screen, and click **Finish**.
- 10 VI Client starts importing the virtual appliance. Click **OK**.
- 11 After the import is complete, power on the virtual machine.

If you are using vCenter Converter to deploy the virtual appliance, ensure that you use the vCenter Converter 4.0.1 standalone client or a later release. You can also deploy the virtual appliance using vSphere Client 4.0.

To configure the virtual appliance on first boot:

- 1 On the command prompt, type **yes** and press Enter to accept EULA.
- 2 Select the time zone and click **OK**.
Ensure that the vCenter Chargeback virtual appliance is in sync with the vCenter Chargeback database and the vCenter Server instances that you want to add to it.
- 3 For specifying a static IP address, type **n** and enter the IP address, Netmask, Gateway, DNS Server 1, and DNS Server 2 details.
For specifying a DHCP address, type **y**.
- 4 If a proxy is required to reach the internet, type **y** and then provide the proxy details.
- 5 Type **y** to confirm the network configuration.
- 6 Select the database type of the vCenter Chargeback database.
The default is Microsoft SQL Server.
- 7 Provide the IP address of the vCenter Chargeback database.
- 8 (optional) Provide the database instance name.
You are prompted to enter this information only if you have selected the database type as Microsoft SQL Server.
- 9 Provide the database listener port number.
If the database instance name is not provided, you must provide the port number, else the default port number displayed on the screen is considered.
- 10 Provide the name of the vCenter Chargeback database, the database user name, and the password.
- 11 Select the required option for cleaning the database.
The default is **yes (1)**.

- 12 Provide the user name and password for the application.
- 13 Confirm the password.

After the virtual machine has booted, the screen displays the URL similar to `http://<IP address>:8080/cbmui/index.htm` for accessing the vCenter Chargeback application.

Managing the vCenter Chargeback Virtual Appliance

After the vCenter Chargeback virtual appliance is deployed and the virtual machine has booted, you can log in to the virtual machine using the following credentials:

- User name: `root`
- Password: `vmware`

After you have logged in to the virtual machine, you can manage the Data Collector and Apache Tomcat services.

You can perform the following actions on the Data Collector service:

- Start the Data Collector service by running the following command:


```
service vCenter-DC start
```
- Stop the Data Collector service by running the following command:


```
service vCenter-DC stop
```
- Restart the Data Collector service by running the following command:


```
service vCenter-DC restart
```

You can perform the following actions on the Apache Tomcat service:

- Start the Apache Tomcat service by running the following command:


```
service cbm-tomcat start
```
- Stop the Apache Tomcat service by running the following command:


```
service cbm-tomcat stop
```
- Restart the Apache Tomcat service by running the following command:


```
service cbm-tomcat restart
```

You can also modify the time zone set on the virtual appliance by running the following command from the command prompt:

```
bash /opt/vmware/cbm/scripts/reset-timezone.sh
```

Uninstalling vCenter Chargeback

You can uninstall a vCenter Chargeback instance, by starting the uninstaller from the **Start > Programs > VMware > VMware vCenter Chargeback > Uninstall VMware vCenter Chargeback** menu. If you remove the application using Add/Remove Programs, the application is not removed cleanly and you might have to manually delete some files that were not deleted during the uninstall.

If you uninstall an instance that is part of a cluster, ensure that you manually remove the entries corresponding to the instance from the `worker.properties` file located at `<Installation_Directory>\Apache2.2\conf\` on the machine that the load balancer is running on. For example, if the instance name is `chargeTest`, you must remove the following section from the `worker.properties` file:

```
# Set properties for chargeTest (ajp99)
worker.chargeTest.type=ajp99
worker.chargeTest.host=90.0.1.1
worker.chargeTest.port=8009
worker.chargeTest.lbfactor=1
```

The entry `(ajp99)`, in this case, is the AJP port of the load balancer.

You must also remove the instance name from the list of instances included in the `worker.balancer.balance_workers` parameter under the `Define the LB worker` section. For the previous example, the entry might be as follows:

```
# Define the LB worker
worker.balancer.type=lb
worker.balancer.sticky_session = 1
worker.balancer.method=R
worker.balancer.balance_workers=worker1,worker2,chargeTest,sample0
```

Delete the `chargeTest` entry from the list of instances.

If you uninstall the vCenter Chargeback instance that was initially installed, the load balancer is also uninstalled. If this instance is part of a cluster, then all the other vCenter Chargeback instances in the cluster must first be uninstalled before this instance is uninstalled.

Configuring Administration Settings

After you install and run the application, log in to the application by using the administrative user account details provided during the installation. 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 the administrative tasks described in this chapter, you must have the Super User role.

This chapter covers the following administrative tasks:

- [“Enter License Key”](#) on page 27
- [“Configure Generic Settings”](#) on page 27
- [“Manage vCenter Servers”](#) on page 31
- [“Manage Data Collectors”](#) on page 33
- [“Manage License”](#) on page 35
- [“Manage Report Template”](#) on page 36
- [“Manage Attributes”](#) on page 37
- [“Manage System Health Thresholds”](#) on page 38

Enter License Key

When you log in to vCenter Chargeback for the first time, you will be prompted to enter the license key. On the Add License screen, enter the license key and click **Add**. The details about this license is stored in the application and can be accessed from the **License** page of the **Settings** tab.

Configure Generic Settings

Before you start using the various features of vCenter Chargeback, you must configure the LDAP and SMTP servers in the application. You can optionally set the currency type and the log level. These settings can be configured from the **Settings** tab. This section covers the following:

- [“Configure the LDAP Server Setting”](#) on page 28
- [“Configure the SMTP Server Settings”](#) on page 29
- [“Set Currency”](#) on page 30
- [“Set Log Level”](#) on page 30

Configure the LDAP Server Setting

You must configure the LDAP Server setting to enable Windows Active Directory users to access the application using their Windows Active Directory login credentials. vCenter Chargeback supports Microsoft Windows Server 2003 Active Directory and Microsoft Windows Server 2008 Active Directory.

To configure the LDAP server setting

- 1 In the **Settings** tab, click **General**.
- 2 Click **Add** in the LDAP Setting section.
The Manage LDAP Server screen is displayed.
- 3 Enter the following information for the LDAP server:
 - **Server Address:** 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).
 - **User Name:** The LDAP account to authenticate in to the LDAP server. The user name can be of the formats `user_name@domain_name` or `domain_name\user_name`. Preferably, use the User Principal Name (UPN).
 - **Password:** Password for the user name provided.
 - **BaseDN:** The Distinguished Name (DN) of a LDAP server directory entry. The base dn entry should be of the form `dc=<domain_name>,dc=com`. Only the groups and users defined under this entry in the Active Directory hierarchy can be added to the application.
 - **Port:** Port on which the LDAP service is listening.
 - **LDAP Limit:** The maximum number of Windows Active Directory users or groups to be fetched and displayed in the Add Users Account screen of the application.
- 4 Click **Add**.

On successfully configuring the LDAP server setting, the IP address of the LDAP server is displayed in the LDAP Setting section. You can now add the Windows Active Directory users and groups to vCenter Chargeback 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 [“Create User”](#) on page 39.

If the LDAP user account password is changed on the LDAP server, you must also reflect this change in vCenter Chargeback.

After you have configured the LDAP server settings, you can change these settings any time, provided you have the required privileges.

To edit the LDAP server setting

- 1 In the **Settings** tab, click **General**.
- 2 Click **Edit** in the LDAP Setting section.
The Manage LDAP Server screen is displayed.
- 3 Modify the required information.
- 4 Click **Edit**.

NOTE Changes to the LDAP server settings might impact the users and groups that are already added to the application.

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

To remove an LDAP server

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

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

Configure the SMTP Server Settings

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

To configure the SMTP server settings

- 1 In the **Settings** tab, click **General**.
- 2 Click **Add** in the Email Setting section.
The Manage Email Server screen is displayed.
- 3 Enter the following information for the SMTP server:
 - **Server HostName:** Static IP address of the SMTP server. If the sever does not have a static IP address, ensure that you provide the FQDN.
 - **Server Port:** Port number on which the SMTP server is listening for requests.
 - **SMTP Address:** Email address that the application must use to send emails.
 - **Authentication Type:** Type of authentication to be used to access the SMTP server. The default is Anonymous.
 - **User Name:** User name to be used for authentication, if authentication type is Require Login.
 - **Password:** Password for the user name provided above.

- 4 Click **Add**.

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

If the SMTP user account password is changed on the SMTP server, you must also reflect this change in vCenter Chargeback.

After configuring the SMTP server settings, you can change these settings any time, provided you have the required privileges.

To edit the SMTP server settings

- 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 information.
- 4 Click **Edit**.

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

To remove an SMTP server

- 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 Currency

The default currency set in the application is US Dollar.

To modify the currency setting

- 1 In the **Settings** tab, click **General**.
- 2 In the Currency Setting section, select the required currency from the **Select Currency** list.
- 3 Click **Apply**.

Set Log Level

By default, the log level for the application is set at the info level.

To modify the log level

- 1 In the **Settings** tab, click **General**.
- 2 In the Log Setting section, select the required log level from the **Select Log level** list.

The following logging levels are available:

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

- 3 Click **Apply**.

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

Manage vCenter Servers

To determine the computing resources utilization for the virtual machines and calculate the total costs, you must first add the vCenter Server instances in your virtualized environment to the vCenter Chargeback application. This section covers the following topics:

- [“Add vCenter Server Information”](#) on page 31
- [“Edit vCenter Server Information”](#) on page 32
- [“Delete vCenter Server Information”](#) on page 32

Add vCenter Server Information

You can add one or more vCenter Servers to the vCenter Chargeback application. Ensure that the vCenter Servers are accessible over the network.

To add a vCenter Server

- 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 the following information:

- **vCenter Server Hostname/IP:** FQDN or IP address of the vCenter Server.
- **vCenter Server Display Name:** A display name for the vCenter Server.
- **vCenter Server Description:** A description of the vCenter Server. This is optional.
- **vCenter Server Username:** User name to access the vCenter Server.
- **vCenter Server Password:** Password for the user name entered.
- **Database URL:** URL to access the vCenter Server database.

For Oracle Database, this URL must have the format:

```
<IP address/host name>:<TNS listener port>
```

For example:

```
123.123.123.123:1521
```

For Microsoft SQL Server, this URL must have the format:

```
<IP address/host name>\<database instance name>
```

For example:

```
123.123.123.123\chargeback_db
```

- **Database Name:** Name of the vCenter Server database. For example, `vim_vcdb`, which is the default name given by vCenter Server.
- **Database Username:** A database user name to access the vCenter Database.
- **Database Password:** Password for the database user name entered.
- **Database Type:** The database type can be either SQL Server (default) or Oracle.
- **vCenter Server View Type:** The type of view to be used to display the entities in the vCenter Server hierarchy. This can be either **Hosts and Clusters** or **Virtual Machines and Templates**. These view types are same as the corresponding vCenter Server view types, and the entities in the vCenter Server hierarchy will be displayed in a similar manner. Once set, this option cannot be edited for the vCenter Server.

- **Register As VI Client Plugin:** Select this option if you would like to register vCenter Chargeback as a plug-in to VI Client. If this option is selected, each time you log in to this vCenter Server using the VI Client, the vCenter Chargeback plug-in will be displayed on the VI Client. You can access the vCenter Chargeback application from the VI Client as a vCenter Server user. Ensure that you do not register more than one vCenter Chargeback instance as a plug-in for a single vCenter Server.
- **Enable Stats Replication:** Select this option if you want the resource usage statistics from the vCenter Server Database to be replicated in the vCenter Chargeback Database.

IMPORTANT Ensure that the servers and databases have static IP addresses. If not, provide the FQDN for such servers and databases.

4 Click **Add**.

The vCenter Server is added to the application and included in the table listing the vCenter Server instances. Ensure that the system time on the vCenter Server, vCenter Server database, vCenter Chargeback, and vCenter Chargeback database, and data collector are in sync.

If the vCenter Server user account password is changed on the vCenter Server, you must also reflect this change in vCenter Chargeback. If the password for the vCenter Server database user is changed in the vCenter Server database, you must also reflect this change in vCenter Chargeback.

Edit vCenter Server Information

If there is a change in the vCenter Server configuration (for example, a change in the vCenter Server database URL), you must make the corresponding changes in the vCenter Chargeback application. However, you cannot modify the vCenter Server ID, host name or IP address of the vCenter Server, the vCenter Server version number, and the vCenter Server View Type.

To modify a vCenter Server

- 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 details and click **Edit**.

Delete vCenter Server Information

If you do not 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 application.

To remove a vCenter Server

- 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. You can remove the entities from the hierarchy permanently by clicking **Delete all these entries**. 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.

- 3 Click the appropriate option on the Manage linked entities screen.

A dialog box confirming the delete action is displayed.

- 4 Click **OK** to confirm the deletion.

Manage Data Collectors

When you install vCenter Chargeback, you can optionally install a data collector. You can also register more than one data collector to a vCenter Chargeback installation.

This section covers the following topics:

- [“View Data Collectors”](#) on page 33
- [“Enable Data Collector”](#) on page 34
- [“Disable Data Collector”](#) on page 34
- [“Delete Data Collector”](#) on page 34

View Data Collectors

You can see all the data collectors registered with the application by clicking **Data Collectors** in the **Settings** tab. A table listing all the data collectors registered with the application is displayed. The table lists all the synchronization jobs that each data collector is running for each vCenter Server added to the application. You can have more than one data collector. If there are multiple data collectors running, synchronization jobs are equally distributed among them.

The Data Collectors page displays the following information:

- **Data Collector ID:** The ID of the data collector.
- **Data Collector Heart Beat:** The time stamp when the data collector was last known to be running. The data collector updates this information with the application every 30 seconds. If there is no update from the data collector for more than 150 seconds, the data collector is considered to be down and all jobs are reassigned to other running data collectors, if any.
- **Data Collector Host Name:** The host name of the data collector.
- **Registered:** Indicates if the data collector is enabled or disabled.
- **Data Collector Name:** The name of the data collector provided during the installation.
- **vCenter Synchronize ID:** A system-defined unique identifier for each synchronization job.
- **vCenter Server Hostname/IP:** The host name or IP address of the vCenter Server.
- **Job Type:** The type of the synchronization job. These are:
 - **Storage Syncing Job:** The data collector obtains the storage information for all the virtual machines managed by the VirtualCenter Server or vCenter Server. Thin provisioning and linked clones are considered when calculating the storage utilization. The first run of this job might fail if the first run of the Inventory Syncing Job take more than 5 minutes to complete. In vSphere 4.0, the VMware VirtualCenter Management Webservices service must be running on the vCenter Server machine for the storage synchronization to complete successfully.
 - **Inventory Syncing Job:** The data collector copies the vCenter Server inventory in to the vCenter Chargeback database. This synchronization job ensures that the inventory information in the vCenter Chargeback database is in sync with the corresponding information in the vCenter Server database.
 - **Stats Syncing Job:** If the **Enable Stats Replication** option is selected for a vCenter Server added to the application, all the vital statistics required for cost calculation is replicated in the vCenter Chargeback database. This synchronization job ensures that the statistics information in the vCenter Chargeback database is in sync with the corresponding information in the vCenter Server database.

IMPORTANT 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.

- **Job Interval:** The interval between consecutive job runs. The values can be:
 - -1: special code for jobs that run eternally.
 - Positive number: A positive value indicating 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 entered in this field.
- **Last Synchronize Time:** The time stamp when the synchronization job was last completed.
- **Job State:** The status of the synchronization job. The displayed values are:
 - Running: The job is in progress.
 - Waiting: The job is not started yet. It is either waiting to be assigned to a data collector or waiting for the assigned data collector to start it.
 - Failed: The job has failed. If the job has failed, the job is reassigned to a data collector after 10 minutes.
 - Done: Refers to jobs that are run at specific intervals and the previous run is complete.

Enable Data Collector

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

To enable a data collector

- 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

After a data collector is installed, it is registered with the application and is enabled by default. You can disable this data collector from the application.

To disable a data collector

- 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**.

Delete Data Collector

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

To delete a data collector

- 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.

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 database will not be in sync with the data in the vCenter Server databases.

Manage License

You can view the details of the current vCenter Chargeback application license by clicking **License** on the **Settings** tab. The page displays the following license information:

- **License Key:** The current license key used to access the application.
- **Activated On:** The date and time when the application was activated using the current license key.
- **Expiry Date:** The date on which the existing license will expire.
- **Current ESX Host CPUs:** The total number of CPUs of all the powered-on ESX hosts that are currently added to the chargeback hierarchies defined in the application. If all the virtual machines in an ESX host are powered off, the CPUs in the ESX host are not considered in this count.
- **Maximum ESX Host CPUs:** vCenter Chargeback provides CPU-based licensing. This entry indicates the maximum number of ESX host CPUs that the current license is valid for.
- **Is Valid:** Whether the current license is valid or not.

This section covers the following topics:

- [“Replace License”](#) on page 35
- [“Delete License”](#) on page 35

Replace License

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

To replace an existing license

- 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 the license key and click **Replace**.

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

Delete License

An existing license can be removed from the application.

To remove a license

- 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 Template

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 in the Body section is defined when generating 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.

The application provides a report template that is used by all the generated reports. You can configure the Header, Title, and Footer sections of the report template to display a specific set of information.

To configure the report template

- 1 In the **Settings** tab, click **Report Template**.

- 2 Select **Header**.

The Header section of the report template displays four sub-sections.

- 3 Select a sub-section from the Header section of the report template.

- 4 Select an option from the Header Settings section to display the required information in the selected sub-section.

The available options are:

- **Text:** The text that you want the report header to contain. For example, the name of the organization.
- **Image:** An image that you want the header section to display. For instance, the company logo. Ensure that the image size does not exceed 1MB.
- **Report Name:** The name of the report entered when generating the report.
- **Report Description:** A description of the report provided when generating the report.
- **None:** (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.

The available options are:

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

The available options are:

- **Copyright:** The copyright information that you want to include in the report.
- **Page Number:** Selecting this option ensures that each page of the report is numbered.
- **Report Creation Time:** Date and time of report generation. This is the system date and time on the machine on which the application is installed.
- **None:** (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 Click **Save**.

The template 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.

Manage 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 know more about assigning attributes to entities, see [“Assign Attributes”](#) on page 54.

This section covers the following topics:

- [“Add Attribute”](#) on page 37
- [“Delete Attribute”](#) on page 37

Add Attribute

You can define one or more attributes in vCenter Chargeback.

To add an attribute

- 1 In the **Settings** tab, click **Manage Attributes**.
- 2 Click **Create**.

The Create a static 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.

Delete Attribute

The attributes that are not required can be deleted from the application. When you delete an attribute, it is permanently deleted along with the corresponding values set on the entities.

To remove an attribute

- 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**.

You can also delete attributes that are imported from the vCenter Server. Deleting these attributes from the application will not delete them for the vCenter Server.

Manage System Health Thresholds

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

To set the response time limits

- 1 In the **Settings** tab, click **System Health Thresholds**.
- 2 In the vCenter Chargeback Server section, set the **Normal Response Time Limit** and the **Alert Response Time Limit**.

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

- **Normal:** (0, normal response time limit). If the response time is in the Normal latency range, the server is responding fine.
- **Warning:** (normal response time limit + 1, alert response time limit). 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.
- **Alert:** (alert response time limit + 1, ...). 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 Database section, set the **Normal Response Time Limit** and the **Alert Response Time Limit**.

The Normal, Warning, and Alert latency ranges for the vCenter Chargeback database are defined using these limits.

- 4 In the vCenter Server Settings section, set the **Normal Response Time Limit** and the **Alert Response Time Limit**.

The Normal, Warning, and Alert latency ranges for the vCenter Server are defined using these limits.

- 5 In the vCenter Server Database Settings section, set the **Normal Response Time Limit** and the **Alert Response Time Limit**.

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 be used on the System Health tab to show the health of the different servers and databases.

Authenticating and Managing Users, Roles, and Permissions

4

vCenter Chargeback provides user management features that enable you to manage the various users and roles created in the application. The application defines some permissions and roles. In addition, it allows you to create roles and users as per your requirements. This chapter includes the following topics:

- [“Users”](#) on page 39
- [“Permissions”](#) on page 41
- [“Roles”](#) on page 45
- [“Authentication”](#) on page 47

Users

During the installation, 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 instance. You can create more users in the application. As a user having the Super User role, you can perform the following tasks:

- [“Create User”](#) on page 39
- [“Modify User”](#) on page 41
- [“Delete User”](#) on page 41

Create User

You can create the following types of users and groups in the application:

- **Local:** This is a vCenter Chargeback user whose details are defined in vCenter Chargeback.
- **LDAP User:** This is a Windows Active Directory user. The LDAP server must be configured in vCenter Chargeback to add such a user. The details of the user are defined in the Windows Active Directory.
- **LDAP Group:** This is a Windows Active Directory group. The LDAP server must be configured in vCenter Chargeback to add such a group. The group details are defined in the Windows Active Directory.

To create a Local user

- 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 following information:
 - **User Type:** The user type must be **Local**.
 - **User Name:** A unique user name to identify the user. The user name cannot exceed 255 characters in length.
 - **Password:** A password to authenticate the user. The password must not exceed 24 characters in length.
 - **Confirm Password:** Re-enter the password.
- 4 (Optional) Select the **Assign the Super User Role to the user** option to grant the privileges defined in the Super User role to this user.
- 5 Click **Add**.

To create a user of the type LDAP User

- 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.
If the LDAP server is configured in vCenter Chargeback, the LDAP Users section of the screen displays a table listing the Active Directory users defined in the configured LDAP server. The number of users listed in this table is limited by the LDAP Limit set in the LDAP Server configuration.
If no LDAP Server is configured in vCenter Chargeback, an error message stating the same is displayed.
- 4 Select the required user from the LDAP Users section.
You can 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 (sam account name in Windows Active Directory) and Common Name values in the Windows Active Directory and return all the users that match the search string. You can add multiple users at the same time by selecting each of the required users from the LDAP Users section.
- 5 (Optional) Select the **Assign the Super User Role to the user** option to grant the privileges defined in the Super User role to this user.
- 6 Click **Add**.

To add an LDAP group to vCenter Chargeback

- 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.
If the LDAP server is configured in vCenter Chargeback, the LDAP Groups section of the screen displays a table listing all the Active Directory groups defined in the configured LDAP server. The number of groups displayed is limited by the LDAP Limit set in the LDAP Server configuration.
If no LDAP server is configured in vCenter Chargeback, an error message stating the same is displayed.

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

You can 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 (sam account name in Windows Active Directory) and Common Name values in the Windows Active Directory and return all the groups that match the search string. You can add multiple groups at the same time by selecting each of the required groups from the LDAP Groups section.

- 5 (Optional) Select the **Assign the Super User Role to the user** option to grant the privileges defined in the Super User role to this group.
- 6 Click **Add**.

Any permission or role set on an LDAP Group is also applied to all the users in that group. After a 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 newly created users are added to the table displaying the set of users added to or created in the application.

Modify 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.

To modify a Local user

- 1 In the **Users & Roles** tab, click **Users**.
A table listing all the users created in the application is displayed.
- 2 Select the user name and click **Edit**.
The Edit User Account screen is displayed.
- 3 Modify the password and click **Edit**.

Delete User

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

To delete a user

- 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**.
A dialog box confirming the action is displayed.
- 3 Click **OK**.

Permissions

A permission defines a right to perform a task. vCenter Chargeback provides some predefined permissions that can be classified under five categories. This section covers the following:

- [“Permission Types”](#) on page 42
- [“Permissions to Access User Interface Tabs”](#) on page 43
- [“Manage Permissions”](#) on page 43

Permission Types

The permissions defined in vCenter Chargeback can be classified under five categories.

Global Permissions

The Manage Admin Console permission is the only global permission defined in vCenter Chargeback. Users with this permission can perform various administrative tasks, such as add vCenter Servers to the application, manage licenses, manage data collectors, and configure LDAP and SMTP servers.

Hierarchy Permissions

vCenter Chargeback defines the following hierarchy-related permissions:

- **Create Chargeback Hierarchy:** Users with this permission can create a chargeback hierarchy in the application.
- **Manage Chargeback Hierarchy:** Users with this permission can add and delete entities from a chargeback hierarchy. They can also rename the chargeback hierarchy and the entities in the hierarchy.
- **Delete Chargeback Hierarchy:** A user must have this permission to delete a chargeback hierarchy from the application.
- **View Chargeback Hierarchy:** Users with this permission can only view a chargeback hierarchy and the entities defined in the hierarchy.
- **Update Cost Parameters for an Entity in the Chargeback Hierarchy:** A user must have this permission to edit the cost configuration details for individual entities in a hierarchy.

Cost Permissions

The Updates Cost Models, Cost Templates, and Global List of Fixed Cost Line Items permission is the only cost-related permission defined in vCenter Chargeback. Users with this permission can perform various cost configuration tasks, such as create and edit cost models, define global and local fixed costs, and create cost templates. You must have this permission to perform the tasks covered in [Chapter 6, "Creating and Configuring a Cost Model,"](#) on page 57.

Reporting Permissions

vCenter Chargeback defines the following reporting permissions:

- **Generate Cost Report:** Users with this permission can generate cost reports.
- **View Archived Cost Report:** Users with this permission can view archived cost reports.
- **Archive Cost Report:** Users with this permission can archive the cost reports.
- **Delete Archived Cost Report:** Users with this permission can delete an archived cost report.
- **Schedule Cost Report:** Users with this permission can schedule the generation of a cost report.
- **Reschedule Cost Report:** Users with this permissions can reschedule the generation of cost reports.
- **Delete Cost Report Schedule:** Users with this permission can delete a schedule that has been created for generating cost reports.
- **Configure Report Template:** Users with this permission can configure the report template.

Role-Based Access Control Permissions

The Manage Users, Roles, and Privileges permission is the only Role-Based Access Control (RBAC) permission defined in vCenter Chargeback. Only users with this permission can perform the various user management tasks, such as creating users and roles, modifying users and roles, and giving different permissions to users at various levels of a chargeback hierarchy. You must have this permission to perform the tasks covered in this chapter.

Permissions to Access User Interface Tabs

On the product user interface, the tabs that a user can access depends on the role or permissions assigned to the user. Only users having the Super User role can access all the tabs and all the features available on each tab. A user with any other role or permission assigned can access only the following tabs:

- **Getting Started**
- **Manage Hierarchy**
- **Configure Cost**
- **Reports**

Although the users have access to the above mentioned tabs, the actions that they can perform on each tab depend on the actual role or permissions assigned on them.

Manage Permissions

When you create a user, no roles or permissions are assigned to it by default. You can assign different permissions and roles to a user on a given hierarchy. However, you cannot create or define any new permission. This section covers the following tasks:

- [“Assign the Super User Role to a User”](#) on page 43
- [“Assign a Role to a User on a Hierarchy”](#) on page 43
- [“Modify Permissions at Entity Level”](#) on page 44
- [“Revoke Roles and Permissions Assigned to a User”](#) on page 45

Assign the Super User Role to a User

Assigning the Super User role to a user, provides the user with full access to the application.

To assign the Super User role to a user

- 1 In the **Users & Roles** tab, click **Permissions**.
A page listing all the users, their user type, and whether the user is a Super User is displayed.
- 2 Select the user to which you want to assign the Super User role.
You can select multiple users by holding down the CTRL key while selecting the required users.
- 3 Select the **Assign the Super User role to the selected users/groups** option under Set/Unset Super User Role.
- 4 Click **Apply**.
A dialog confirming the action is displayed.
- 5 Click **OK**.
The selected user is assigned the Super User role and the same is reflected in the table on the page.

Assign a Role to a User on a Hierarchy

A user can have different roles on different chargeback hierarchies.

To assign a role to a user

- 1 In the **Users & Roles** tab, click **Permissions**.
A page listing all the users, their type, and whether the user is a Super User is displayed. The page also provides an option to select a hierarchy.
- 2 Select the required hierarchy from the list of hierarchies.
The right most pane on the page displays a list of the roles defined in the application.

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

If any role has already been assigned to the user on the selected hierarchy, the same is displayed under Currently Assigned Role.

You can select multiple users by holding down the CTRL key while selecting the required users.

- 4 Select the required role from the list under Set Role.

NOTE You can set only a single role on a user for a hierarchy. If the user already has a role assigned to it for the given hierarchy, the same is removed and the new role is set on the user for the hierarchy.

- 5 Click **Apply**.

The Roles column in the table listing the users displays a tick mark corresponding to the user to which the role is assigned.

The role set on the user is applicable only for the selected hierarchy. You must individually assign roles to the user to access the various hierarchies created in the application. You can set a role on a user only at the hierarchy level and not for individual entities.

Modify Permissions at Entity Level

After a user is created, you can assign permissions to the user on the entities in a hierarchy. You can also reassign a new set of permissions to a user after a role is assigned to the user.

The permissions defined in the application do not have any hierarchical structure. That is, each permission is an independent permission. For example, assigning the Manage Chargeback Hierarchy permission on a user does not mean that the user also has the View Chargeback Hierarchy permission. You must, therefore, ensure that individual permissions are separately assigned to the user.

To assign a permission to a user on an entity in the hierarchy

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

A page listing all the users, their type, and whether the user is a Super User is displayed. The page also provides an option to select a hierarchy.

- 2 Select the required hierarchy from the list of hierarchies.

The right most pane on the page displays a list of the roles defined in the application.

- 3 Expand the hierarchy and select to the entity for which you want to assign permissions.

The right most pane on the page displays a set of permissions that can be assigned to any user for that entity.

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

You can select multiple users by holding down the CTRL key while selecting the required users.

- 5 Select the required permissions from the **Set Permissions** pane.

- 6 Click **Apply**.

The permissions are set on the user for that entity and its child entities. You can assign additional permissions to the user on the child entities.

Revoke Roles and Permissions Assigned to a User

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

To remove the role assigned to a user

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

A page listing all the users, their type, and whether the user is a Super User is displayed. The page also provides an option to select a hierarchy.

- 2 Select the required hierarchy from the list of hierarchies.

The right most pane on the page displays a list of the roles defined in the application.

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

- 4 Select **No Role** from the list under **Set Role**.

- 5 Click **Apply**.

The Roles column in the table listing the users displays a cross mark corresponding to the user whose role you revoked.

Revoking a role from a user on a hierarchy does not remove the permissions separately assigned to the user at the entity level of the hierarchy.

To revoke individual permissions assigned to a user

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

A page listing all the users, their user type, and whether the user is a Super User is displayed. The page also provides an option to select a hierarchy.

- 2 Select the required hierarchy from the list of hierarchies.

The right most pane on the page displays a list of the roles defined in the application.

- 3 Expand the hierarchy and traverse to the entity for which you want to revoke the permissions of the user.

The right most pane on the page displays a set of permissions that can be assigned to any user for that entity.

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

- 5 In the Set Permissions pane, deselect the permissions that you want to remove.

- 6 Click **Apply**.

The user's permissions are revoked for that entity and its child entities.

Roles

A role is a set of permissions assigned to a user. This section covers the following:

- [“Predefined Roles”](#) on page 45
- [“Create a Role”](#) on page 46
- [“Modify a Role”](#) on page 47
- [“Delete a Role”](#) on page 47

Predefined Roles

vCenter Chargeback has the following predefined roles:

- Super User
- Hierarchy Manager

- Report Viewer
- Entity Cost Manager

Table 4-1 lists these predefined roles and the permissions that have been set on them.

Table 4-1. Roles and the Corresponding Permissions

Permission	Super User	Hierarchy Manager	Report Viewer	Entity Cost Manager
Manage Admin Console	Yes	No	No	No
Create Chargeback Hierarchy	Yes	No	No	No
Manage Chargeback Hierarchy	Yes	Yes	No	No
Delete Chargeback Hierarchy	Yes	No	No	No
View Chargeback Hierarchy	Yes	Yes	Yes	Yes
Update Cost Parameters for an Entity in the Chargeback Hierarchy	Yes	Yes	No	Yes
Update Cost Models, Cost Templates, and Global List of Fixed Cost Line Items	Yes	No	No	No
Generate Cost Report	Yes	Yes	Yes	Yes
Archive Cost Report	Yes	Yes	Yes	Yes
View Archived Cost Report	Yes	Yes	Yes	Yes
Delete Archived Cost Report	Yes	Yes	No	Yes
Schedule Cost Report	Yes	Yes	No	Yes
Reschedule Cost Report	Yes	Yes	No	Yes
Delete Cost Report Schedule	Yes	Yes	No	Yes
Configure Report Template	Yes	No	No	No
Manage Users, Roles, and Privileges	Yes	No	No	No

Create a Role

You can define custom roles in vCenter Chargeback. You must have the Super User role to perform this task.

To create a role

- 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 the following information:

- **Role Name:** 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.
- **Role Description:** 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 255 characters.

- 4 Select the hierarchy and reporting permissions that you want to assign to the role.

Ensure that you add the View Chargeback Hierarchy permission to each newly created role. Without this permission, a user cannot view any hierarchy and, therefore, cannot perform any task.

NOTE The application allows you to assign only those permissions that are defined at the entity level of a hierarchy. You cannot assign any of the global, cost, or RBAC permissions.

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

To modify a role

- 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.

NOTE You cannot modify any of the predefined roles.

- 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 **Edit**.

Delete a Role

You can delete any of the custom roles created in the application. You must have the Super User role to perform this task.

To delete a role

- 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.

NOTE You cannot delete any of the predefined roles.

- 3 Click **OK**.

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 a LDAP user. If you are logging in as a LDAP user, you must provide the login credentials defined in the Windows Active Directory. The LDAP user login name should be the FQDN (for example, `username@example.com`). 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.

To log in to the application

- 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 following details on the login screen:
 - **User name:** The user name of a user
 - **Password:** Password for the user
 - **Login in to:** The user type
- 3 Click **OK**.

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

You can also access the application from the VI Client as a vCenter Server user, provided the application is registered with vCenter Server. The Entity Cost Manager role is the default role assigned to the vCenter Server user. To know about registering an application with vCenter Server, see [“Add vCenter Server Information”](#) on page 31.

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

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

To change the password

- 1 Click **More** on the top right corner of the screen.
- 2 Select **Change Password**.
The Change Password screen is displayed.
- 3 Enter the following information:
 - **Old Password:** The existing password
 - **New Password:** The desired new password. The password must not exceed 24 characters in length.
 - **Confirm New Password:** Re-enter the new password.
- 4 Click **Change**.

Managing Chargeback Hierarchies

vCenter Chargeback 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 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 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 entities are custom entities that could represent a logical parent for the vCenter Server entities. For example, the vCenter Chargeback entities could represent the departments, cost centers, or business units in an organization. A vCenter Chargeback entity can contain one or more vCenter Server entities and vCenter Chargeback entities.

This chapter includes the following topics:

- [“Create a Chargeback Hierarchy”](#) on page 49
- [“Manage a Chargeback Hierarchy”](#) on page 51

Create a Chargeback Hierarchy

You can create one or more chargeback hierarchies 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. You can create a chargeback hierarchy in the following ways:

- [“Create a Custom Chargeback Hierarchy”](#) on page 49
- [“Synchronize a Chargeback Hierarchy with a vCenter Server”](#) on page 50
- [“Import a Chargeback Hierarchy from a CSV File”](#) on page 50

Create a Custom Chargeback Hierarchy

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

To create a custom chargeback hierarchy

- 1 In the **Manage Hierarchy** tab, click **Create Chargeback 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. To add entities to this hierarchy and manage the hierarchy, see [“Manage a Chargeback Hierarchy”](#) on page 51.

Synchronize a Chargeback Hierarchy with a vCenter Server

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

To create a chargeback hierarchy and synchronize it with a vCenter Server

- 1 In the **Manage Hierarchy** tab, click **Create Chargeback 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 vCenter Server from the drop-down list.
The drop-down list displays only those vCenter Servers that you have added to the application. The vCenter Server should be running to complete the hierarchy creation. To know more about how to add a vCenter Server to the application, refer to [“Add vCenter Server Information”](#) on page 31.
- 5 Click **Create**.

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.

You can modify the chargeback hierarchy as per your requirements. To know more about editing a chargeback hierarchy, refer to [“Manage a Chargeback Hierarchy”](#) on page 51.

Import a Chargeback Hierarchy from a CSV File

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

To import a hierarchy:

- 1 In the **Manage Hierarchy** tab, click **Create Chargeback 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**.
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 51.
- 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.

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

Format of the CSV File

The format of the entries in the CSV file should be as follows:

```
<UniqueId>, <ChildName>, <ParentId>, <ChildEntityType> [[, <description>] [, <vcId>,
    {<vcEntityId> | <vcEntityMoId>} ] ]
```

In this format:

- **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 0.
- **ChildEntityType:** The type of the entity. If the entity is a vCenter Chargeback 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.
- **vcId:** The ID of the vCenter Server in the vCenter Chargeback application. If the entity is a vCenter Server entity, the **vcId** must be specified.
- **vcEntityId:** The ID of the vCenter Server entity in the vCenter Chargeback application. If the entity is a vCenter Server entity, the **vcEntityId** must be specified.
- **vcEntityMoId:** The **moid** (managed object ID) of a virtual machine as defined in the vCenter Server. For a vCenter Server entity, either the **vcEntityId** or the **vcEntityMoId** must be specified.

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

```
1,CB-folder,0,101
2,CB-folder-1,1,101,vCenter Chargeback entity
3,vc-entity-1,1,0,1,10
4,vc-entity-2,2,0,1,vm-61
```

IMPORTANT Ensure that there are no blank rows in the `.csv` file. vCenter Chargeback throws an error if there are any blank rows in the file and the hierarchy creation process fails.

Manage 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, and manage attributes for individual entities in the hierarchy.

This section covers the followings tasks:

- [“View a Chargeback Hierarchy”](#) on page 52
- [“Add a vCenter Server Entity”](#) on page 52
- [“Add a vCenter Chargeback Entity”](#) on page 53
- [“Rename a Chargeback Hierarchy or a Chargeback Entity”](#) on page 53
- [“Delete an Entity from the Hierarchy”](#) on page 53
- [“Delete a Chargeback Hierarchy”](#) on page 54
- [“Assign Attributes”](#) on page 54
- [“Move Entities Within a Hierarchy”](#) on page 55
- [“Share Virtual Machine Cost”](#) on page 55
- [“View Properties of a vCenter Server Entity”](#) on page 56

View a Chargeback Hierarchy

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

To view a chargeback hierarchy

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list 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 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.

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

Add a vCenter Server Entity

You can modify a chargeback hierarchy by adding various entities to the hierarchy. You can add vCenter Server entities, such as ESX Server hosts and virtual machines, and vCenter Chargeback entities.

To add a vCenter Server entity

- 1 Click the **Manage Hierarchy** tab.
 - 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
 - 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.
 - 4 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.
 - 5 (Optional) Select the **Import vCenter Server entity attributes** option at the bottom of the right pane.
Selecting this option ensures that the attributes, if any, defined on the vCenter Server entities are imported along with the other details. These attributes provide additional information about the vCenter Server entities and can also be displayed in the chargeback reports. You can overwrite the values for these attributes in vCenter Chargeback. However, these new attribute values will not reflect in the vCenter Server.
-
- NOTE** The imported attributes are not refreshed with the updates that happen on the vCenter Server.
-
- 6 Select the vCenter Server from the drop-down list on the right pane.
The vCenter Server is displayed.
 - 7 Expand the vCenter Server hierarchy and select the entity that you want to add to the chargeback hierarchy.
The name and icon of the selected vCenter Server entity is displayed next to the cursor indicating that the entity is selected and available for adding to the chargeback hierarchy.
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 entity to which you want to add this vCenter Server entity.
The selected vCenter Server entity is 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.

Add a vCenter Chargeback Entity

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

To add a vCenter Chargeback entity to a hierarchy

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 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.
- 4 Right-click the entity to which you want to add a vCenter Chargeback entity and select **New Chargeback Folder** from the pop-up menu.
- 5 Provide a name for the 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.

Rename a Chargeback Hierarchy or a Chargeback Entity

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

To rename a hierarchy or a chargeback entity

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 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.
- 4 Right-click the entity and select **Edit label** from the pop-up menu.
- 5 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.

To delete an entity from a chargeback hierarchy

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 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.

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

A dialog confirming the action is displayed

- 5 Click **OK**.

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

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

Delete a Chargeback Hierarchy

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

To delete a chargeback hierarchy

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 3 Right-click the hierarchy and select **Delete this hierarchy** from the pop-up menu.
A dialog box confirming the action is displayed.

- 4 Click **OK**.

The chargeback hierarchy is deleted permanently from the application.

Assign Attributes

You can associate attributes with one or more entities. For example, you can create an attribute called `Geo_location` and then add it to the required entities and give it the value that indicates their geographical location.

To assign attributes to an entity

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 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.

- 4 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 entities created in the application and the entities imported from the vCenter Server.

- 5 Enter the values for the attributes that you want to assign to the entity.

You can overwrite the values of the attributes imported from the vCenter Server. However, these changes will not be reflected in the vCenter Server.

- 6 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.

To move an entity within the hierarchy

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 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.
- 4 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 entities created in the hierarchy and the vCenter Server entities that are directly added to the hierarchy.

- 5 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.

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.

To share a virtual machine cost

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 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.
- 4 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.

- 5 Click **OK** on the information dialog box.
- 6 Right-click the vCenter Chargeback 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.
- 7 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 reshare the virtual machine with more entities, by performing the same steps. You must, however, select the shared virtual machine that does not display the share percentage next to it.

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.

To view the properties of a vCenter Server entity

- 1 Click the **Manage Hierarchy** tab.
- 2 Select the chargeback hierarchy from the drop-down list on the left pane of the page.
The collapsed view of the chargeback hierarchy is displayed.
- 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.
- 4 Right-click the vCenter Server entity and select **Properties** from the pop-up menu.
The Properties screen displays the vCenter Server to which the entity belongs and the complete inventory path of the vCenter Server entity.

Creating and Configuring a Cost Model

6

This chapter includes the following topics:

- [“vCenter Chargeback Cost-Related Elements”](#) on page 57
- [“Manage Cost Models”](#) on page 60
- [“Manage Global Fixed Costs”](#) on page 62
- [“Manage Cost Templates”](#) on page 63
- [“Configure Cost at the Entity Level”](#) on page 66

vCenter Chargeback Cost-Related Elements

This section introduces you to the cost-related elements of vCenter Chargeback. The various vCenter Chargeback cost-related elements are:

- [“Chargeable Computing Resource”](#) on page 57
- [“Base Rate”](#) on page 58
- [“Rate Factor”](#) on page 58
- [“Fixed Cost”](#) on page 58
- [“Billing Policy”](#) on page 58
- [“Cost Model”](#) on page 59
- [“Cost Template”](#) on page 59

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 accounts for the following computing resources:

- CPU: The CPU usage is measured in GHz.
- Memory: The memory usage is measured in GB.
- Network bandwidth: The network usage (both upload and download) is measured in GB/hour.
- Storage: The usage is measured in GB.
- Disk Read and Write: The usage is measured in GB/hour.

Base Rate

Base rate is a global rate that you want to charge for a unit of chargeable computing resource used or allocated. For example:

Chargeable Resource	Unit	Base Rate (\$ per unit)
CPU	GHz-Hour	0.0399
Memory	GB-Hour	0.0048
Network Received and Transmitted	GB	0.0008
Storage	GB-Hour	0.0013
Disk Read and Write	GB	0.0008

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. 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. For example:

Chargeable Resource	Base Rate (\$ per unit)	Rate Factor	Total Charge (\$ per unit)
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

Fixed Cost

A fixed cost is a definite cost that can be charged on an entity. vCenter Chargeback lets you create two types of fixed costs: global fixed cost and local fixed cost.

Global fixed cost is a periodically charged cost for a resource or a service. 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 global fixed costs in the application. 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.

Local fixed cost is a cost that is specific to an entity, a group of entities, or to an entire hierarchy. For example, the real estate cost for physical storage of the servers. This cost differs based on the actual geographic location.

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 provides the following billing policies:

- **Fixed Cost:** 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.
- **Actual Usage:** 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.
- **Reservation:** 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.

- **CPU Reservation:** 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.
- **Memory Reservation:** 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.
- **Maximum of Usage and Reservation:** 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.
- **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.
- **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.
- **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 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.
- **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.
- **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.

Cost Model

A cost model defines base rates for the chargeable computing resources and the billing policy to be used for calculating the total 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 set it on one or more entities or hierarchies.

Cost Template

A cost template consists of entity-specific cost configuration details. These are rate factors for the chargeable computing resources, global fixed costs, and local fixed costs. You can set these values in a cost template and use the template to configure the costs at the entity level.

Manage Cost Models

vCenter Chargeback provides a default cost model called Default Chargeback Cost Model. You can start using the application by creating a chargeback hierarchy and generating basic reports using this cost model. You can modify this cost model as per your requirements. You can also create and manage multiple other cost models. This section covers the followings tasks:

- [“Create a Cost Model”](#) on page 60
- [“Modify a Cost Model”](#) on page 61
- [“Delete a Cost Model”](#) on page 62

Create a Cost Model

You can create multiple cost models in vCenter Chargeback. 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.

To create a cost model

- 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 Enter the following information in the **General** tab:

- **Name:** Name for the cost model. This is mandatory information. The character limit for the cost model name is 255 characters.
- **Description:** An optional description of the cost model. The character limit for the description is 255 characters.

- 4 Select the **Billing Policy** tab.

- 5 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 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 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.

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

To know about each billing policy, refer to [“Billing Policy”](#) on page 58.

- 7 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 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 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.

- 8 Set the base rate for the following:
- **CPU:** Charge for the CPU usage per hour.
 - **Disk Read and Write:** Charge for the disk read and write operation per hour.
 - **Disk Read:** Charge for only the disk read operations per hour.
 - **Disk Write:** Charge for only the disk write operations per hour.
 - **Memory Usage:** Charge for the memory used per hour.
 - **Network Received and Transmitted:** Charge for the data received and transmitted over the network per hour.
 - **Network Received:** Charge for only the data received over the network per hour.
 - **Network Transmitted:** Charge for only the data transmitted over the network per hour.
 - **Storage:** Charge for the storage used per hour.

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

- 9 Click **Create**.

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

Modify a Cost Model

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

To modify a cost model

- 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 (Optional) In the **General** tab, modify the name and description.

- 4 (Optional) In the **Billing Policy** tab, modify the billing policy and the effective duration.

You can fetch the current billing policies set in the cost model by specifying the time period in the **Update for the effective period** field and then clicking **Get**.

You can retain the currently set billing policies and add more policies for different time periods in the same cost model. To add another billing policy, select the effective duration and the billing policy and then click **Set**. Repeat this for each billing policy you want to add to the cost model.

- 5 (Optional) In the **Base Rates** tab, modify the base rates for the chargeable computing resources and the effective duration.

- 6 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.

To delete a cost model

- 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.

NOTE The Default Chargeback Cost Model cannot be deleted.

- 3 Click **OK**.
The cost model is deleted from the application and, consequently, from the table listing the cost models.



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.

Manage Global Fixed Costs

This section covers the following tasks:

- [“Create a Global Fixed Cost”](#) on page 62
- [“Modify a Global Fixed Cost”](#) on page 63
- [“Delete a Global Fixed Cost”](#) on page 63

Create a Global Fixed Cost

Creating global fixed costs enables you to define costs that must be uniformly charged on all the entities and hierarchies. These costs can include periodically charged costs and one time costs.

To create a global fixed cost

- 1 In the **Manage Cost** tab, click **Global Fixed Cost**.
A table listing all the global fixed costs created in the application is displayed.
- 2 Click **Create**.
The Create Global Fixed Cost screen is displayed.
- 3 Enter the following information:
 - **Name:** A name for the global fixed cost. The character limit for the global fixed cost name is 255 characters.
 - **Value:** Fixed cost value.
 - **Description:** An optional description of the global fixed cost. The character limit for the description is 255 characters.
 - **Duration:** A duration specifying how often the cost is incurred. The duration can be Daily, Weekly, Monthly, Quarterly, Half-yearly, or Yearly.

NOTE 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.

- 4 Click **Create**.
The newly created global fixed cost is added to the table listing the global fixed costs.

After a global 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. Global fixed costs can also be added to a template and then set on an entity or a hierarchy.

Modify a Global Fixed Cost

You can modify the global fixed costs as and when required.

To edit a global fixed cost

- 1 In the **Manage Cost** tab, click **Global Fixed Cost**.
A table listing all the global fixed costs created in the application is displayed.
- 2 Select the global fixed cost that you want to modify and click **Edit**.
The Edit Global Fixed Cost screen is displayed.
- 3 Modify the necessary information, and click **Edit**.
The modified global fixed cost is displayed in the table listing the global fixed costs.

Delete a Global Fixed Cost

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

To delete a global fixed cost

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



CAUTION Deleting a global fixed cost also removes it from the entities on which it was configured. This deleted cost will not reflect in the report. Only the global fixed costs that exist in the application at the time of report generation will be included in the report.

Manage Cost Templates

vCenter Chargeback enables you to create cost templates that contain entity-specific cost configuration details. This section covers the following tasks:

- [“Create a Cost Template”](#) on page 63
- [“Modify a Cost Template”](#) on page 65
- [“Delete a Cost Template”](#) on page 65

Create a Cost Template

A cost model contains the base rates and billing policies that are global to the application. 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.

To create a cost template

- 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 Enter the following information in the **General** tab:

- **Name:** A name for the cost template. The character limit for the cost template name is 255 characters.
- **Description:** An optional description of the cost template. The character limit for the description is 255 characters.

- 4 Click the **Rate Factors** tab and set the rate factors for the following:

- **CPU:** The rate factor to be used for calculating the total cost for CPU usage per hour.
- **Disk Read and Write:** The rate factor to be used for calculating the total cost for disk read and write operations per hour.
- **Disk Read:** The rate factor to be used for calculating the total cost for disk read operations per hour.
- **Disk Write:** The rate factor to be used for calculating the total cost for disk write operations per hour.
- **Memory Usage:** The rate factor to be used for calculating the total cost for memory usage per hour.
- **Network Received and Transmitted:** The rate factor to be used for calculating the total cost for data received and transmitted over the network per hour.
- **Network Received:** The rate factor to be used for calculating the total cost for data received over the network per hour.
- **Network Transmitted:** The rate factor to be used for calculating the total cost for data transmitted over the network per hour.
- **Storage:** The rate factor to be used for calculating the total cost for storage used per hour.

The rate factor value can be between 0 and 999.99. The application considers a precision of up to two decimal places.

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

- 6 Add the required global fixed costs to the template as follows:

- a Select **Global**.
- b Select the global fixed cost from the **Select Global Fixed Cost** list.
The global fixed cost details are displayed in the fields below the list.
- c Click **Add**.

The global fixed cost is added to the list of fixed costs displayed in the **Selected Global and Local Fixed Costs** section of the tab. For each global fixed cost that you want to include in the cost template, repeat [Step b](#) and [Step c](#).

- 7 Add the required local fixed costs to the template as follows:

- a Select **Local**.
- b Enter the name and amount of the local fixed cost, and select a duration indicating how often the cost is incurred. You can optionally provide a description of the local fixed cost.

Ensure that the local fixed cost name is non-numeric. A numeric name might result in an error when the total cost is calculated.

NOTE 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.

- c Click **Add**.

The local fixed cost is added to the list of fixed costs displayed in the **Selected Global and Local Fixed Costs** section of the tab. For each local fixed cost that you want to include in the cost template, repeat [Step b](#) and [Step c](#).

- 8 Click **Create**.

The cost template is added to the application and is displayed in the table listing the created cost templates.

Modify a Cost Template

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

To modify a cost template

- 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 required information.

You can edit generic information such as name and description in the **General** tab. To modify the rate factors for the computing resources, select the **Rate Factors** tab and make the necessary modifications. You can modify the global and local fixed costs in the **Fixed Costs** tab.

NOTE The name of the cost template is mandatory information and does not have any default values.

- 4 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.

To delete a cost template

- 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.

NOTE Deleting a cost template does not remove the entity-specific cost settings applied on the entities using the cost template.

Configure 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 real time, 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 some global fixed costs and entity-specific local fixed costs for some of the entities.

This section covers the following topics:

- [“View Cost Configuration of an Entity”](#) on page 66
- [“Edit Cost Configuration of an Entity”](#) on page 66

View Cost Configuration of an Entity

You can view entity-specific cost configuration details in the **Configure Cost** tab.

To view the cost configuration at the entity level

- 1 In the **Configure Cost** tab, click **View Entity Cost Configuration**.
- 2 Select a hierarchy from the list of hierarchies.
- 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 cost model and 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.

To configure the cost at the entity level

- 1 In the **Configure Cost** tab, click **Edit Entity Cost Configuration**.

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.

- 2 Select the required hierarchy from the list of hierarchies.
- 3 Expand the hierarchy and select the entity for which you want to configure the costs.
- 4 From the **Cost Model** list, select the cost model that you want to apply on the 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 infinity.

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 infinity. You can view the existing cost configuration details for the specified time period by clicking **Fetch**.

- 6 Select one of the following billing settings:
 - **Don't change** (default): Select this option if you do not want to change billing setting.

- **Enable:** Select this option if you want to enable 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.
- **Disable:** Select this option if you want to disable billing on the entity for the specified time period.

7 (Optional) Select a cost template from the **Apply Cost Template** list.

The rate factors and fixed costs defined in the cost template are populated in the corresponding fields on the screen. You can modify the rate factors for individual resources. You can also add or remove the fixed costs.

NOTE If you want to set only the fixed costs defined in the cost template on the entity and not the rate factors, deselect **Update Rate Factors**.

8 Select **Update Rate Factors** and enter the required rate factors for the computing resources.

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 will consider the rate factor to be 1.

If you do not want the rate factors to be considered, ensure that the **Update Rate Factors** option is not selected.

9 Select **Update Fixed Costs** to apply the fixed costs on the entity.

If this option is not selected, none of the fixed costs defined in next two steps will be set on the entity.

10 Add the required global fixed costs as follows:

- a Select **Global**.
- b Select the global fixed cost from the **Select Global Fixed Cost** list.
The global fixed cost details are displayed in the corresponding fields.
- c Click **Add**.
The global fixed cost is added to the list of fixed costs displayed in the table.
- d (Optional) To distribute this fixed cost among the child entities of the selected entity, select the corresponding check box in the Distribute column of the table.
For each global fixed cost that you want to include, repeat [Step b](#), [Step c](#) and [Step d](#).

11 Add the required local fixed costs as follows:

- a Select **Local**.
- b Enter the name and amount of the local fixed cost and select a duration indicating how often the cost is incurred.
Ensure that the local fixed cost name is non-numeric. A numeric name might result in an error when the total cost is calculated.

NOTE 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.

- c Click **Add**.
The local fixed cost is added to the list of fixed costs displayed in the table.
- d (Optional) To distribute this fixed cost among the child entities of the selected entity, select the corresponding check box in the Distribute column of the table.
For each local fixed cost that you want to include, repeat [Step b](#), [Step c](#) and [Step d](#).

12 Click **Update**.

The cost configuration details are set on the entity for the selected duration and cost model. You must repeat this procedure for each cost model that you want to configure on the entity.

Generating Reports

After you have configured the application, created and configured chargeback hierarchies, and defined cost models, you can generate various cost reports and cost comparison reports. This chapter includes the following topics:

- [“About Reports”](#) on page 69
- [“Generate a Cost Report”](#) on page 70
- [“Generate Cost Comparison Report”](#) on page 71
- [“Create Report Generation Schedules”](#) on page 72
- [“Manage Reports”](#) on page 75
- [“Manage Archived Reports”](#) on page 76

About Reports

vCenter Chargeback enables you to generate cost reports and cost comparison reports for a chargeback hierarchy and for entities in the hierarchy. A cost report provides the following information:

- **Report summary:** This section appears immediately below the report title on the first page of the report. It includes the name and description of the report, which is provided while creating the report. The report summary also includes the billing date, which is the report generation date, and the billing period, which is the period for which the resources are charged and the applicable fixed costs are considered. The section also provides the total cost of the entity on which the report was generated.
- **Cost summary:** This section specifies the cost model used for calculating the costs. It also specifies the total cost for the entity and 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.
- **Resource summary:** This section provides cost for each chargeable computing resource, the fixed costs, and the total cost for the entity and all its child entities. All the fixed costs for an entity are added and reported as Other Costs in the report. The costs displayed in the report for each entity and for each resource are the rolled-up costs at that entity level. For virtual machines, the summary also displays the actual resource usage values along with the costs.
- **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, usage reservation, and total cost for each computing resource of each virtual machine.
- A cost comparison report enables you to compare the costs for 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.
 - The remaining sections appear individually for each cost model.

Generate a Cost Report

You can generate cost reports for an hierarchy and for individual entities in a hierarchy.

To generate a cost report

- 1 In the **Reports** tab, click **Create Reports**.
- 2 Select the required chargeback hierarchy from the drop-down list 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 entity for which you want to generate the report and select **Generate Report on this Entity** from the pop-up menu.

The Create Report screen is displayed.

You can also generate a cost report for the entire hierarchy by right-clicking the hierarchy and selecting **Generate Report on this Hierarchy**.

- 4 Enter the following information on the **General** tab:
 - **Name:** Enter a meaningful name for the report. The character limit for the report name is 255 characters.
 - **Description:** Provide an optional description of the report. The character limit for the report description is 255 characters.
 - **Select a cost model:** Select the cost model to be used for generating the report from the list of cost models.
 - **Computation Resources:** Select the resources to be considered for calculating the costs and to be reported. You can either select **Disk Read** and **Disk Write** to be reported individually or to be reported in total as **Disk Read and Write**. Similarly, the data traffic over the network can be either reported separately as **Network Received** and **Network Transmitted** or in total as **Network Received and Transmitted**.
 - **Generate this report now:** (default) Specify the effective 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 applicable during this time period will also be used. Ensure that the dates are entered in the mm/dd/yyyy format.
- 5 Select the **Cost Info** tab and provide the following information:
 - **Include cost summary in report:** Select this option to include the summary of the costs in the report. You must also select the type of cost summary to be reported. The cost summary can either be **Basic** (default) or **Complete**. A basic cost summary includes the cost summary for the entity and its immediate child in the report. A complete cost summary provides the cost summary for the selected entity and all its child entities.
 - **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, like cost summary, can be either **Basic** (default) or **Complete**. If you select this option, you must also select the resources whose cost summary have to be reported. For virtual machines, apart from cost, the resource usage details are also displayed.
 - **Show these details in report:** Select this option if you want to include information about the selected cost model or the entity attributes, or some information messages in the Cost Details section of the report. The selected information can be displayed for the selected entity and its immediate child entities or for the selected entity and all the entities that are under it in the chargeback hierarchy.

- **Show these columns in the usage table:** This option is available only if the **Show these details in report** option is selected. 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.
 - **Show fixed cost in report:** This option is available only if the **Show these details in report** option is selected. 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.
- 6 Click **Generate Report**.

The generated report is displayed on the right pane.

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.

To generate a cost comparison report

- 1 In the **Reports** tab, click **Create Report**.
- 2 Select the required chargeback hierarchy from the drop-down list on the left pane of the page.

The collapsed view of the chargeback hierarchy is displayed. To generate the report for an entity in the hierarchy, 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 entity for which you want to generate the report and select **Generate Comparison Report on this Entity** from the pop-up menu.

The Create Report screen is displayed.

You can also generate a cost comparison report for the entire hierarchy by right-clicking the hierarchy and selecting **Generate Comparison Report on this Hierarchy**.

- 4 Enter the following information on the **General** tab:
 - **Name:** Enter a meaningful name for the report. The character limit for the report name is 255 characters.
 - **Description:** Provide an optional description of the report. The character limit for the report description is 255 characters.
 - **Cost Models:** Select the two different cost models to be used for generating the comparison report from the lists.
 - **Computation Resources:** Select the resources to be considered for calculating the costs and to be reported. You can either select **Disk Read** and **Disk Write** to be reported individually or to be reported in total as **Disk Read and Write**. Similarly, the data traffic over the network can be either reported separately as **Network Received** and **Network Transmitted** or in total as **Network Received and Transmitted**.
 - **Generate the report now:** (default) Specify the effective 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 applicable during this time period will also be used. Ensure that the dates are entered in the mm/dd/yyyy format.
- 5 Select the **Cost Info** tab and provide the following information:
 - **Include cost summary in report:** Select this option to include the summary of the costs in the report. You must also select the type of cost summary to be reported. The cost summary can either be **Basic** (default) or **Complete**. A basic cost summary includes the cost summary for the entity and its immediate child in the report. A complete cost summary provides the cost summary for the selected entity and all its child entities.

- **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, like cost summary, can be either **Basic** (default) or **Complete**. If you select this option, you must also select the resources whose cost summary have to be reported. For virtual machines, apart from cost, the resource usage details are also displayed.
 - **Show these details in report:** Select this option if you want to include information about the selected cost model or the entity attributes, or some information messages in the report. The selected information can be displayed for the selected entity and its immediate child entities or for the selected entity and all the entities that are under it in the chargeback hierarchy.
 - **Show these columns in the usage table:** This option is available only if the **Show these details in report** option is selected. 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.
 - **Show fixed cost in report:** This option is available only if the **Show these details in report** option is selected. 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.
- 6 Click **Generate Report**.

The generated cost comparison report is displayed on the right pane.

Create Report Generation Schedules

When generating a cost report or a cost comparison report, you can choose to schedule the report to be generated periodically. vCenter Chargeback provides various scheduling parameters for scheduling a report.

This section discusses the following topics:

- [“Scheduling Parameters”](#) on page 72
- [“Schedule Report Generation”](#) on page 73
- [“Manage Report Generation Schedules”](#) on page 73

Scheduling Parameters

You can set the following scheduling parameters while scheduling a report:

- **Report Creation Time:** This is the time of the day when the report has to be generated.
- **Recurrence Pattern:** This defines how often the report has to be generated. The available options are:
 - **Daily:** A report is generated daily. The report is generated for the previous day's resource utilization or reservation, as per the billing policy set.
 - **Weekly:** 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.
 - **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 on the second Sunday of January for the earlier year. 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:** In this case, you can set a custom billing period by specifying the starting date billing 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 generating a report, you can choose to schedule the report generation from the **Create Report** screen.

To schedule report generation

- 1 Select the **Schedule this report** option on the **General** tab of the Create Report screen.
- 2 Select the **Schedule** tab and set the following scheduling parameters:
 - **Report Creation Time:** When the report has to be generated.
 - **Recurrence Pattern:** How often the report has to be generated.
 - **Range of Recurrence:** Till when the report has to be generated periodically.

To know more about these scheduling parameters, refer to [“Scheduling Parameters”](#) on page 72.

IMPORTANT You must provide the schedule information. The application does not define any default values for the schedule information.

- 3 Click **Generate Report**.

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.

After a report has been scheduled, the report schedule can be accessed from the Schedule Reports page of the **Reports** tab. This page lists all the active report schedules. If a report schedule has expired, the same would be automatically removed from the table listing all the active report schedules on this page. 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 by the user from the Archived Reports page of the **Reports** tab.

Manage Report Generation Schedules

You can perform the following actions on the report generation schedules:

- [“Reschedule Report Generation”](#) on page 74
- [“Remove a Schedule”](#) on page 74
- [“Email a Scheduled Report”](#) on page 74

Reschedule Report Generation

A report generation schedule can be modified to define a new schedule.

To change a report generation schedule

- 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 the relevant values for the following scheduling parameters:

- **Report Creation Time:** When the report has to be generated.
- **Recurrence Pattern:** How often the report has to be generated.
- **Range of Recurrence:** Till when the report has to be generated periodically.

To know more about these scheduling parameters, refer to [“Scheduling Parameters”](#) on page 72.

- 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.

To remove a report generation schedule

- 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 delete icon (a red cross) above the table.

A dialog confirming the action is displayed.

- 4 Click **OK**.

The report generation schedule is removed permanently from the application.

NOTE Deleting a schedule does not delete the reports generated and archived as per the schedule.

Email a Scheduled Report

A scheduled report can be automatically sent through an email to the required recipients when the report gets generated.

To email a scheduled report

- 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 Enter the following details:
 - **To:** The email address of the recipients. The email addresses should be separated by commas.
 - **Subject:** A subject for the email.
 - **Body:** The body text for the email.
- 5 Click **Save**.

Manage Reports

After you generate a report, you can perform the following tasks:

- [“Archive Report”](#) on page 75
- [“Schedule Report”](#) on page 75
- [“Email Report”](#) on page 76
- [“Export Report”](#) on page 76

Archive Report

A generated report can be archived and stored in the application. After you generate a report, the application displays the generated report.

To archive the report

- 1 Click the archive 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. To know more about viewing and managing archived reports, see [“Manage Archived Reports”](#) on page 76.

Schedule Report

You can also schedule report generation immediately after a report has been generated.

To schedule a generated report

- 1 Click the scheduler icon above the generated report.
The Schedule Report screen is displayed.
- 2 Enter the relevant values for the following scheduling parameters:
 - **Report Creation Time:** When the report has to be generated.
 - **Recurrence Pattern:** How often the report has to be generated.
 - **Range of Recurrence:** Till when the report has to be generated periodically.

To know more about these scheduling parameters, refer to [“Scheduling Parameters”](#) on page 72.

- 3 Click **Schedule**.
The report is generated periodically as per the schedule options set.

Email Report

After a report is generated, you can send it to one or more recipients through an email.

To email a generated report

- 1 Click the mail icon above the generated report.
The Email Report screen is displayed.
- 2 Enter the following details:
 - **To:** The email address of the recipients. The email addresses should be separated by commas.
 - **Subject:** A subject for the email.
 - **Body:** The body text for the email.
- 3 Click **Send**.
The report is attached to the email and sent to the marked recipients.

NOTE The report is emailed only if the SMTP server has been configured. To know more about configuring the SMTP server, see [“Configure the SMTP Server Settings”](#) on page 29.

Export Report

After a report is generated, you can export it to .rtf, .pdf, and .csv formats.

To export a report

- 1 Click the Microsoft Word document icon to export the report to the .rtf format. 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 Report format screen is displayed.
- 2 Select the **Click to download** link.

The application generates the report in the specified format. You can choose to open or save the file.

If you have chosen to view the report in the .rtf format, an Opening <filename>.rtf dialog is displayed. You can either chose to open the file with a supported application or save the file on the system.

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, the report is opened for viewing. To save the file in the PDF format, click the save icon in the PDF viewer and save it on to the system.

If you have chosen to view the report in the .csv format, an Opening <filename>.csv dialog is displayed. You can either chose to open the file with a supported application or save the file on the system.

Manage Archived Reports

The Archived Reports page of the **Reports** tab displays a table listing all the reports archived in the application. This includes scheduled reports as well as reports that have been manually generated and saved. All the reports generated by a single schedule have the same name but a different **Create Time** value. The reports listed in the table are listed in the ascending order of their creation time. You can also sort the reports based on the report name or page count.

This section covers the following topics:

- [“View Archived Report”](#) on page 77
- [“Reschedule Archived Report”](#) on page 77
- [“Email Archived Report”](#) on page 78
- [“Delete Archived Report”](#) on page 78

View Archived Report

After a report is generated and archived, it can be viewed any time.

To view an archived report

- 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 Click the Microsoft Word document icon to view the report in the `.rtf` format. If you want to view the report in the `.pdf` format, click the Adobe PDF icon. If you want to view the report in the `.csv` format, click the Microsoft Excel icon.

The Report format screen is displayed.

- 4 Select the **Click to download** link.

- 5 The application generates the report in the specified format. You can choose to open or save the file.

If you have chosen to view the report in the `.rtf` format, an Opening `<filename>.rtf` dialog is displayed. You can either choose to open the file with a supported application or save the file on the system.

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, the report is opened for viewing. You can save this report on to the system by clicking the save icon in the PDF viewer.

If you have chosen to view the report in the `.csv` format, an Opening `<filename>.csv` dialog is displayed. You can either choose to open the file with a supported application or save the file on the system.

Reschedule Archived Report

An archived report can be rescheduled for generation.

To reschedule an archived report

- 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 reschedule for generation.

- 3 Click the scheduler icon.

The Schedule Report screen is displayed.

- 4 Enter the relevant values for the following scheduling parameters:

- **Report Creation Time:** When the report has to be generated.
- **Recurrence Pattern:** How often the report has to be generated.
- **Range of Recurrence:** Till when the report has to be generated periodically.

To know more about these scheduling parameters, refer to [“Scheduling Parameters”](#) on page 72.

- 5 Click **Schedule**.

Email Archived Report

After a report is generated and archived, you can send it through email to one or more recipients.

To send an archived report over email

- 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 mail icon.
The Email Report screen is displayed.
- 4 Enter the following details:
 - **To:** The email address of the recipients. The email addresses should be separated by commas.
 - **Subject:** A subject for the email.
 - **Body:** The body text for the email.
- 5 Click **Send**.
The report is attached to the email and sent to the marked recipients.

NOTE The report is emailed only if the SMTP server has been configured. To know more about configuring the SMTP server, see [“Configure the SMTP Server Settings”](#) on page 29.

Delete Archived Report

You can clear the archive by deleting unwanted reports.

To delete an archived report

- 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 confirming the action is displayed.
- 4 Click **OK**.
The archived report is permanently deleted from the application.

System Health, Utilities, and Troubleshooting

8

vCenter Chargeback 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 and should be able to troubleshoot the issues, if any. This chapter includes the following topics:

- [“System Health”](#) on page 79
- [“Events”](#) on page 80
- [“Utilities”](#) on page 80
- [“Troubleshooting”](#) on page 85

System Health

The **System Health** tab acts as a dashboard, providing you with information about and status of the entire system. The dashboard shows colored status indicators next to the URL for each server and service. The significance of the colors is as follows:

- **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. 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 38.

The information on the page is classified into six sections:

- **vCenter Chargeback Servers:** Displays a list of all the vCenter Chargeback Server instances included in the cluster. 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 name of the server, status of the server, response time, and product build number.
- **Other Servers:** Displays the status and URL for the vCenter Chargeback database, the LDAP server, and the SMTP server. When you move the cursor over the database URL, a tool tip displays the name, status, and response time of the vCenter Chargeback database. If you move the cursor over the LDAP or SMTP URL, a tool tip displays the name and status of the server.
- **vCenter Servers:** Displays a list of all the vCenter Servers added to the application instances. When you move the cursor over a vCenter Server name, a tool tip displays the name, status, response time, and the vCenter Server version.
- **Data Collectors:** Displays all the Data Collector instances installed. When you move the cursor over the Data Collector name, a tool tip displays the connection and status. The connection includes an ID that helps you identify the Data Collector instance.

- **General Info:** This section provides information about the number of vCenter Servers added to the application and the number of vCenter Chargeback hierarchies and entities created. It also displays the URL and port details for the SMTP and LDAP servers. This section displays the total number of CPUs of all the powered-on ESX hosts that are currently added to the chargeback hierarchies defined in the application. If all the virtual machines in an ESX host are powered off, the CPUs in the ESX host are not considered in this count. It also displays the maximum number of ESX host CPUs that the current license is valid for.
- **vCenter Server Databases:** Displays the names of the vCenter Server databases for each vCenter Server added to the application. When you move the cursor over the database name, a tool tip displays the name of the database, the name of the corresponding vCenter Server, the status of the database, and its response time.

If the System Health tab is the active tab, then the user session will not time out. On all other tabs, if there is no action, the user session times out after 30 minutes.

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-left corner of the screen. The panel displays a table with the following columns:

- **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.

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 instances in a cluster are not in sync, the Event Details tab does not display any event messages.

Utilities

vCenter Chargeback provides a few utilities and database management scripts that enable you to manage the application efficiently. This section covers the following:

- [“Troubleshooting Utility”](#) on page 80
- [“Database Password Change Utility”](#) on page 81
- [“Database Management Scripts”](#) on page 82

Troubleshooting Utility

vCenter Chargeback is bundled with a troubleshooting utility.

To run the troubleshooting utility:

- 1 Run the troubleshooting script.
 - On Windows, run the following commands from the command prompt:

```
cd <Installation_Directory>\vCenter-CB-Tools\troubleshooting\bin
vCenterCB-support.bat
```

The user running this utility must belong to the Administrators group.

You can also run this utility by selecting **Collect Chargeback Logs** from the **Start > Programs > VMware > VMware vCenter Chargeback > vCenter Chargeback Tools** menu.

- On Linux (vCenter Chargeback virtual appliance), run the following commands:

```
cd /opt/vmware/cbm/vCenter-CB-Tools/troubleshooting/bin
bash vCenter-CB-support.sh
```

You must log in as **root** to successfully run this utility.

- 2 Provide the folder name and directory path where the generated logs have to be stored when prompted.
- 3 You can choose to collect the system event logs.

On Windows the Application log and System log is collected. On Linux `/var/log/messages` is collected.

- 4 Enter the number of stand-alone data collector instances (not embedded) installed on the same machine.
- 5 If you have a standalone Data Collector instance running, you must provide the path of each data collector installation.

NOTE [Step 3](#), [Step 4](#), and [Step 5](#) are not applicable for the vCenter Chargeback virtual appliance.

The utility generates a ZIP file with the name `vCenter-CB-TroubleshootInfo-<date>.zip` and stores it in the specified destination folder. The ZIP file contains the following:

- A `.csv` file for each table in the vCenter Chargeback database that stores event-related information.
- The system logs.
On Windows, `Application.log` and `System.log`
On Linux, the `/var/log/messages` file
- Configuration files for data collector, installation, load balancer, vCenter Chargeback server (Tomcat Server), and the vCenter Chargeback application.
- Log files for data collector, installation, load balancer, and vCenter Chargeback server (Tomcat Server) and application.

Database Password Change Utility

vCenter Chargeback also provides a utility to change the password of the vCenter Chargeback 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 database, you must manually copy the updated `hibernate.cfg.xml` file to each of the corresponding data collector folders.

The utility is available in the folder.

To change the password of vCenter Chargeback database user

- 1 Run the password change utility.

- On Windows, run the following commands from the command prompt:

```
cd <Installation_Directory>\vCenter-CB-Tools\database-update\bin
UpdateChargebackDatabaseCredentials.bat
```

The user running this utility must belong to the Administrators group.

You can also run this utility by selecting **Update Chargeback Database Credentials** from the **Start > Programs > VMware > VMware vCenter Chargeback > vCenter Chargeback Tools** menu.

- On Linux (vCenter Chargeback virtual appliance), run the following commands:

```
cd /opt/vmware/cbm/vCenter-CB-Tools/database-update/bin
bash UpdateChargebackDatabaseCredentials.sh
```

You must log in as **root** to successfully run this utility.

- 2 Enter the following information:
 - Existing password
 - New password
 - Confirmation of the new password
- 3 Restart the vCenter Chargeback service and the data collector services.

Database Management Scripts

vCenter Chargeback provides SQL scripts that can help database administrators to manage the vCenter Chargeback database. These SQL scripts can be run by a database user with the required permissions from the SQL prompt. These scripts are available at the following location:

- For SQL Server
 - <Installation_Directory>/vCenter-CB-Scripts/v0.0.0-v1.0.0/mssql/db-management
 - The script names are of the form <script_name>_mssql.sql.
- For Oracle
 - <Installation_Directory>/vCenter-CB-Scripts/v0.0.0-v1.0.0/oracle/db-management
 - The script names are of the form <script_name>_oracle.sql.

These scripts can be classified as follows:

- [“Generic Scripts”](#) on page 82
- [“Space Calculation Scripts”](#) on page 82
- [“Data Purging and Restoring Scripts”](#) on page 83

Generic Scripts

vCenter Chargeback provides three generic scripts. You must have the SELECT permission on the tables in the vCenter Chargeback 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 database in the SQL scripts. The generic scripts provided are as follows:

- **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

These scripts enable you to calculate the space that can be retrieved by purging the old data from the database tables in to CSV files. You must have the SELECT permission on the tables in the vCenter Chargeback database to run these scripts. The v_months_in_history parameter for Oracle scripts and the @MONTHS_IN_HISTORY parameter for SQL Server scripts is set to 6 months by default. You can change this in the scripts to the desired number of months. The space calculation scripts provided are:

- **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 `CB_VC_PERFORMANCE_STAT` table) that is older than the specified date and has the specified sample interval. The date and interval values can be set through the `v_purge_before` and `v_req_interval` parameters in the Oracle scripts and the `$PURGE_BEFORE` and `@REQ_INTERVAL` parameters in the SQL Server scripts.

Data Purging and Restoring Scripts

The purging scripts enable you to remove data older than the specified number of months from the database tables and save them in CSV files. To run these scripts you must have the `SELECT`, `INSERT`, and `DELETE` permissions on the database tables. For running the scripts in an Oracle database, you must also have the `SELECT` permission on the external tables (`EXT_CB_*`), which are created by the `makeExternalTables_oracle.sql` script. For running the scripts in an SQL Server database, you must also have the `CREATE TABLE` and `DROP TABLE` permissions in the database.

NOTE The data purging scripts are supported only on 32 bit database instances.

Before you run the purging scripts in SQL Server, you must perform the following tasks:

- 1 Create a folder where the CSV files can be saved.
- 2 Copy the `Schema.ini` and `makeCSVfiles.bat` files in to the created folder.
These files are available at the following location:
`<Installation_Directory>/vCenter-CB-Scripts/v0.0.0-v1.0.0/mssql/db-management`
- 3 Run the `makeCSVfiles.bat` file from the command prompt.
Ensure that you have permission to execute BAT files. This script creates empty CSV files, one for each of the vCenter Chargeback database tables from which data can be purged.
- 4 Set the value for the `@datasrc` parameter in the `makeArchServer_mssql.sql` script.
The value for this parameter must be the complete path of the folder that is created for the CSV files.
- 5 Login to the SQL Server Management Studio console, and run the `makeArchServer_mssql.sql` script.
The script creates a linked server.

Before you run the purging scripts in Oracle, you must perform the following tasks:

- 1 Login to the SQL Developer console and run the `csvproc_oracle.sql` script.
This file is available at the following location:
`<Installation_Directory>/vCenter-CB-Scripts/v0.0.0-v1.0.0/oracle/db-management`
The procedure for purging data from the vCenter Chargeback database tables into the CSV files is created.
- 2 Set the `EXT_TABLE_DIR_STR` parameter in the following files to the complete path of the folder in which the CSV files should be saved:
 - `makeExternalTables_oracle.sql`
 - `purgeCostData_oracle.sql`
 - `purgeHierarchyData_oracle.sql`
 - `purgeReportData_oracle.sql`
 - `purgeTables_oracle.sql`
- 3 Run the `makeExternalTables_oracle.sql` script.
The external tables are created and linked to the corresponding CSV files. The CSV are created when the purge scripts are run for the first time.

The data purging scripts provided are:

- **purgeCostData:** This script removes the cost-related data that is older than the specified number of months. The number of months is specified using the `MONTHS_IN_HISTORY` parameter in the Oracle script and the `@MONTHS_IN_HISTORY` 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:

- `CB_BASE_RATE`
- `CB_BILLING_POLICY`
- `CB_ENTITY_METERING`
- `CB_RATE_FACTOR`
- `CB_FIXED_COST`

The script correspondingly moves the data to the following CSV files:

- `CBBaseRate.csv`
- `CBBillingPolicy.csv`
- `CBEntityMetering.csv`
- `CBRateFactor.csv`
- `CBFixedCost.csv`

- **purgeHierarchyData:** This script removes the hierarchy-related data that is older than the specified number of months. The number of months is specified using the `MONTHS_IN_HISTORY` parameter in the Oracle script and the `@MONTHS_IN_HISTORY` 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:

- `CB_VC_ENTITY_RELATION`
- `CB_VC_ENTITY_PROPERTY`
- `CB_VC_ENTITY_MAPPING`
- `CB_HIERARCHY_RELATION`

The script correspondingly moves the data to the following CSV files:

- `CBVCEntityRelation.csv`
- `CBVCEntityProperty.csv`
- `CBVCEntityMapping.csv`
- `CBHierarchyRelation.csv`

- **purgeReportData:** This script removes the report-related data that is older than the specified number of months. The number of months is specified using the `MONTHS_IN_HISTORY` parameter in the Oracle script and the `@MONTHS_IN_HISTORY` parameter in the SQL Server script. You can set this parameter appropriately before running the script. The script removes the data from the `CB_REPORT` table and moves it to the `CBReport.csv` file.
- **purgeTables:** This script is a superset of the `purgeCostData`, `purgeHierarchyData`, and `purgeReportData` scripts. The script removes the cost, hierarchy, and report related data that is older than the specified number of months. The number of months is specified using the `MONTHS_IN_HISTORY` parameter in the Oracle script and the `@MONTHS_IN_HISTORY` parameter in the SQL Server script. The script removes the data from the vCenter Chargeback tables and moves it to the corresponding CSV files.
- **purgeStatsData:** This script removes the performance statistics data that is older than the specified date has the specified sample interval. The date is specified using the `PURGE_BEFORE` parameter in the Oracle script and the `$PURGE_BEFORE` parameter in the SQL Server script. The interval is specified using the `REQ_INTERVAL` parameter in the Oracle script and the `@REQ_INTERVAL` parameter in the SQL Server script. You can set these parameters appropriately before running the script. The script removes the data from the `CB_VC_PERFORMANCE_STAT` table and moves it to the `CBVCPPerformanceStat.csv` file.

The data restoring scripts provided are:

- **restoreTablesData:** This script restores the data from the cost, hierarchy, and report related CSV files to the corresponding vCenter Chargeback database tables. In the SQL Server script, you must set the @ARCH_DIR parameter to the complete path of the folder in which the CSV files and the Schema.ini file are saved. You must also set the @REQ_FROM_DATE parameter to the date from which the data must be restored from the CSV files. In the Oracle script, you must set the FROM_DATE parameter to the date from which the data must be restored from the CSV files. The value of the END_TIME field in the CSV files is compared with this specified date to identify the data that has to be restored.
- **restoreStatsData:** This script restores the data from the CBVCPerformanceStat.csv file to the CB_VC_PERFORMANCE_STAT table. In the SQL Server script, you must set the @ARCH_DIR parameter to the complete path of the folder in which the CSV file and the Schema.ini file are saved. You must also set the @REQ_FROM_DATE parameter to the date from which the data must be restored from the CSV file and the @REQ_INTERVAL parameter to the required sample interval. In the Oracle script, you must set the FROM_DATE parameter to the date from which the data must be restored from the CSV file and the REQ_INTERVAL parameter to the required sample interval.

Troubleshooting

This section describes some of the issues that you might face, the probable reasons for their occurrence, and solution or workaround for the issues, if any. The following issues are covered:

- [“Unable to Send Report Through Email”](#) on page 86
- [“Storage Syncing Job Fails”](#) on page 86
- [“Unable to use Custom SSL Certificates”](#) on page 86
- [“Unable to View the vCenter Chargeback Plug-In in the VI Client”](#) on page 86
- [“Report Does not Display the Memory Usage Value and the Corresponding Cost”](#) on page 87
- [“Report Does not Display the Network Transmitted and Network Received Stats”](#) on page 87
- [“Report Does not Display the Disk Read and Disk Write Stats”](#) on page 87
- [“Unable to Add vCenter Server in vCenter Chargeback”](#) on page 87
- [“Changed Timezone Setting is not Reflected”](#) on page 87
- [“Installer Throws the SQL Driver not Found Error”](#) on page 88
- [“Status of Failed Data Collector is not Reflected Immediately on the System Health tab”](#) on page 88
- [“Non-English Characters are not Correctly Stored in the vCenter Chargeback Database”](#) on page 88
- [“Service Temporarily Unavailable Error Thrown when Accessing vCenter Chargeback”](#) on page 88
- [“Text and Messages on the vCenter Chargeback User Interface are not Correctly Displayed”](#) on page 88
- [“Error Occurs While Importing a Hierarchy from a CSV File”](#) on page 88
- [“Changes to Chargeback Hierarchy are not Reflected in the Concurrent User-Sessions”](#) on page 88
- [“Changes to the vCenter Server Hierarchy are not Reflected in vCenter Chargeback”](#) on page 89
- [“Unable to Fetch the Primary Group of a LDAP User”](#) on page 89

Unable to Send Report Through Email

The probable reasons might be:

- The SMTP server is not configured.
Check whether the SMTP server is configured on the application.
- The SMTP server is not reachable.
Ensure that the SMTP server is reachable over the network.
- A third-party application is blocking vCenter Chargeback from sending email.
Ensure that no third-party application, such as an anti-virus application, is blocking vCenter Chargeback from sending emails. If there is such an application running and has the option of excluding some applications from being blocked, include the application `tomcat6.exe` in the excludes list.

Storage Syncing Job Fails

A probable reason might be that the VirtualCenter Management Webservices service is stopped. Check whether the VirtualCenter Management Webservices service is started and running on the machine on which the vCenter Server is installed. Ensure that this service is running on all the vCenter Server machines that are added to the application.

Unable to use Custom SSL Certificates

vCenter Chargeback is shipped with default SSL certificates, which are generated using OpenSSL.

To use custom SSL certificates do the following:

- 1 Replace the security-related files, `default.cert` and `default.key`, with the custom SSL files.

The `default.cert` and `default.key` files are stored in the following directory:

```
<Installation_Directory>/Apache2.2/conf/ssl
```

- 2 In the `<Installation_Directory>/Apache2.2/conf/httpd.conf` file, modify the following entries:

```
SSLCertificateFile conf/ssl/default.cert
SSLCertificateKeyFile conf/ssl/default.key
```

In the above entries, replace the default security-related file names with the custom SSL file names.

Unable to View the vCenter Chargeback Plug-In in the VI Client

The probable reasons might be:

- vCenter Chargeback is not registered as a plug-in with the vCenter Server.
- Check whether the application has been registered as a plug-in with the vCenter Server. This information can be obtained from the vCenter Server Accounts page of the **Settings** tab of the application. The Plugin Registered column in the table on this page should have the value `true` for this vCenter Server. If the value is not set to true, edit this vCenter Server entry and select the **Register As Plugin** option.
- The VI Client is unable to communicate with vCenter Chargeback.
- Try to connect to vCenter Chargeback from a Web browser. The VI Client machine and the vCenter Chargeback machine should be on the same network domain.
- vCenter Chargeback SSL certificate was not accepted on the VI Client.
- After you log in to the VI Client, a Security Warning message is displayed for the vCenter Chargeback SSL certificate. You must either install the certificate or click **Ignore** on the message window. If you click **Cancel**, you must restart the VI Client and accept the certificate.

- The VI Client was open and connected to the vCenter Server when the application was registered with the vCenter Server instance.

Restart the VI Client and connect to the vCenter Server. Accept the vCenter Chargeback SSL certificate. The plug-in should now appear in the VI Client.

- You logged in to the VI Client by specifying the IP address of the vCenter Server as `localhost`.

If the vCenter Server and the VI Client are on the same machine, and you try to access the vCenter Server on this machine by using the VI Client, you must specify the actual IP address of the machine and not use `localhost`, so that the plug-in appears in the VI Client.

Report Does not Display the Memory Usage Value and the Corresponding Cost

A probable reason might be that the statistics collection level is not properly set on the vCenter Server. For vCenter Server 2.5 Update 3 and Update 4, the statistics collection level must be set to 2 or above for the average memory consumed counter to be available. For vCenter Server shipped with vSphere 4.0, the statistics collection level can be set to 1 or above.

Report Does not Display the Network Transmitted and Network Received Stats

A probable reason might be that the statistics collection level is not properly set on the vCenter Server. For vCenter Server 2.5 Update 3, vCenter Server 2.5 Update 4, and vCenter Server shipped with vSphere 4.0, the statistics collection level must be set to 3 or above for the average network transmitted and received counters to be available.

Report Does not Display the Disk Read and Disk Write Stats

A probable reason might be that the statistics collection level is not properly set on the vCenter Server. For vCenter Server 2.5 Update 3, vCenter Server 2.5 Update 4, and vCenter Server shipped with vSphere 4.0, the statistics collection level must be set to 3 or above for the average disk read and write counters to be available.

Unable to Add vCenter Server in vCenter Chargeback

The probable reasons might be:

- The vCenter Server is not running.

Ensure that the vCenter Server is started and running before you add it to vCenter Chargeback.

- The vCenter Server is not reachable on the network.

Ensure the vCenter Server is reachable over the network.

- The proxy settings on the Web browser are inappropriate.

If you have configured the proxy server settings on the Web browser and included the IP address of the vCenter Chargeback machine in the bypass proxy list (**No Proxy for or Exceptions**), ensure that the complete IP address or the FQDN of the vCenter Chargeback machine is entered in the list and not a partial address. For example, if the IP address of the machine is `90.0.1.1` and the host name is `chargeserver`, you must provide the full IP address and not `90.0.*.*`, or the FQDN `chargeserver.example.com`.

Changed Timezone Setting is not Reflected

Changes to the timezone setting on the vCenter Chargeback machine might not reflect automatically in the application. You must restart the vCenter Chargeback service for this change to be reflected in the application.

Installer Throws the SQL Driver not Found Error

If you are running the installer from a shared location on the network, the installer might fail with the following error:

```
SQL driver not found.
```

You must copy the installer files on to the local machine and then run the installer. A probable alternative is to map this shared location to a network drive and then run the installer.

Status of Failed Data Collector is not Reflected Immediately on the System Health tab

The data collector heart beat is set to 30 seconds. If the data collector fails, vCenter Chargeback waits for at least 90 seconds before updating the status of the data collector in the application. Therefore, the System Health tab does not reflect the failed status of the data collector immediately.

Non-English Characters are not Correctly Stored in the vCenter Chargeback Database

If you using an Oracle database as the vCenter Chargeback database, you must configure the database to use the Unicode (AL32UTF8) character set to support the following scenarios:

- You want to deploy the vCenter Chargeback database in a non-English environment.
- You want to synchronize the vCenter Chargeback database with a vCenter Server database that has non-English data.

Service Temporarily Unavailable Error Thrown when Accessing vCenter Chargeback

A probable reason might be the relevant services are not running. Check whether the services related to vCenter Chargeback are running. If you have just started the system or virtual machine on which vCenter Chargeback is installed, you might have to wait for few minutes for the relevant services to start before accessing the application.

Text and Messages on the vCenter Chargeback User Interface are not Correctly Displayed

If vCenter Chargeback is installed on a non-English operating system (for example, Japanese Windows XP), you must set the Web browser encoding to Unicode (UTF-8) on the client machine for the texts and messages to appear correctly in the user interface.

Error Occurs While Importing a Hierarchy from a CSV File

A probable reason could be that the CSV file has a blank row. If the CSV file contains any blank rows, the hierarchy import fails with an error stating that the specified columns are less than the required columns.

Changes to Chargeback Hierarchy are not Reflected in the Concurrent User-Sessions

Creation, deletion, and renaming of a chargeback hierarchy by a user are not automatically reflected in the concurrent user-sessions. The concurrent users must log out and then log in again to see these changes. Any other change to the chargeback hierarchy, such as adding or deleting an entity, might not reflect immediately in the concurrent user-sessions. After a change is made to the chargeback hierarchy, the hierarchy must be manually refreshed in the concurrent user-sessions. Users can refresh the chargeback hierarchy by clicking the refresh button next to the chargeback hierarchy or by loading another chargeback hierarchy and then reloading the required chargeback hierarchy.

Changes to the vCenter Server Hierarchy are not Reflected in vCenter Chargeback

If there are changes to the vCenter Server hierarchy, these changes can be viewed by clicking the refresh button next to the vCenter Server hierarchy in the vCenter Chargeback application. This refresh button is displayed only if there is a change in the vCenter Server hierarchy and the Hierarchy Manager tab is refreshed. The tab can be refreshed by user actions, such as clicking another tab of the application and then clicking the Manage Hierarchy tab.

Unable to Fetch the Primary Group of a LDAP User

A probable reason could be that the primary group does not come under the provided base DN. Only the groups and users defined under the specified DN in the Active Directory hierarchy can be viewed from and added to vCenter Chargeback.

Unable to Access the vCenter Chargeback Application

Check whether all the relevant services are running. The following services must be started and running:

- VMware vCenter Chargeback Service
- VMware vCenter Chargeback Load Balancer Service
- VMware vCenter Chargeback DataCollector

If all the required services are started and running, check whether the Windows Firewall is enabled on the machine on which vCenter Chargeback and the load balancer is installed and running. If Windows Firewall is enabled, ensure that port exceptions are added for the HTTP, load balancer, and HTTPS ports that are configured for vCenter Chargeback during the installation.

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