

Veritas CommandCentral™ Enterprise Reporter User's Guide

for Microsoft Windows and Solaris

5.2

CommandCentral Enterprise Reporter User's Guide

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350 Ellis Street
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Introducing CommandCentral Enterprise Reporter

This chapter includes the following topics:

- [About Veritas CommandCentral Enterprise Reporter](#)
- [What you can do with CommandCentral Enterprise Reporter](#)
- [Logging in to CommandCentral Enterprise Reporter](#)
- [Logging out of CommandCentral Enterprise Reporter](#)
- [Changing your password](#)

About Veritas CommandCentral Enterprise Reporter

Veritas CommandCentral Enterprise Reporter by Symantec (Enterprise Reporter) improves storage service management by aligning IT to business objectives. Enterprise Reporter offers business information executives and storage administrators the following:

- Global views of storage assets mapped to your organization
- Business insights into inventory utilization
- On-demand customized reporting
- Personalized dashboards for multiple users

Enterprise Reporter includes a central reporting interface for your storage infrastructure that unifies information from multiple data centers and organizes

it along the lines of your business. If you are a business information executive, you can use Enterprise Reporter to view your storage environment at the enterprise level. You can then drill down into your organization's hierarchy, which could be organized by location, departments, or any other logical business unit. This summarized information enables you to assess trends in your storage environment, which you can then analyze to assign responsibility.

If you are a storage administrator, you can use Enterprise Reporter to identify capacity trends, review storage inventory, and determine your storage costs per business unit. With this information, you can promote storage accountability and decrease costs.

Figure 1-1 Report types and scopes

	Report Type	Scope
View	<ul style="list-style-type: none"> • Unclaimed Storage • Capacity Trending • DB/FS/VM Utilization • Burn Rate • Billing Detail • Inventory Report 	<ul style="list-style-type: none"> • Enterprise • Geography • Application • Business Unit • Application Group • Storage Tier • Vendor • Array

Use Enterprise Reporter to answer questions like the following:

- Which applications are growing out of control?
- What will my tier 1 storage growth look like next year?
- How is capacity trending in North America versus Europe?
- How is storage allocated in the finance department?
- Which department uses the highest percentage of tier 1 storage in the Toronto data center?

Storage administrators and business users operate Enterprise Reporter with CommandCentral Storage. While CommandCentral Storage provides storage reporting for a single data center and is used at an operational level, Enterprise Reporter lets you aggregate storage information from multiple data centers and view storage assets by a variety of business dimensions. For example, if you are a business information executive, you could use Enterprise Reporter to identify the trend of unclaimed tier 1 storage in your New York and Zurich data centers. You could then ask the storage administrators at each site to use CommandCentral Storage to drill down to the details of which arrays or LUNs are unclaimed.

What you can do with CommandCentral Enterprise Reporter

Enterprise Reporter includes a global view of storage with the ability to roll up information from multiple data centers into a single comprehensive view – organized by lines of business, geography, application, or other customized views. It can help you compare trends across continents, find the application consuming the most storage in a particular data center, or locate the business unit consuming more than its fair share of storage.

Storage administrators can use Enterprise Reporter along with CommandCentral Storage. While CommandCentral Storage provides an operational view of storage data primarily for storage administrators, Enterprise Reporter summarizes this data across data centers and integrates business information, giving CIOs, directors, and business unit leaders a more global view.

For example, business leaders use Enterprise Reporter to identify storage trends (such as an alarming regional growth rate of tier 1 storage). Then, administrators use CommandCentral Storage to help ensure that the appropriate storage service is being delivered to the business.

Business executives and storage administrators can use Enterprise Reporter to do the following:

- Develop highly customizable business views of data from multiple data sources. For example, administrators can discover global storage usage trends and drill down to identify high consumers across geographic or business units.
- Create storage tiers that match business needs and associate costs with each tier. Administrators can then identify where storage is allocated appropriately to costly tiers.
- Create ad hoc reports quickly by inserting data fields (such as host attributes, array attributes, allocated capacity, and claimed capacity) into a report table. Add selectable and customizable filters to narrow the focus or display data visually using charts for quick interpretation. To focus on specific business units, users can drag customized business view options into the report, easily grouping data into business units.
- Create advanced reports incorporating more advanced layout options, such as maps, images, and HTML. Also, add multiple queries to reports or insert prompts that request report users to select the report focus that they want before running the report.
- Generate reports automatically with a specified schedule and set automated distribution through email.

- Develop a personalized dashboard in Cognos Connection containing customized reports that display answers you need quickly.
- Select a sample report or report you created as the default report for the Enterprise Reporter Dashboard.

Logging in to CommandCentral Enterprise Reporter

After you install Enterprise Reporter, you can log in to the Console.

See Web browser requirements in the *CommandCentral Enterprise Reporter Release Notes*.

To log in to the Enterprise Reporter Console

- 1 On a client system that has a network connection to the Enterprise Reporter host, open a Web browser.
- 2 In the browser's address field, type the following URL and press Enter:

```
https://hostname:8443/
```

where *hostname* is the fully-qualified hostname on which Enterprise Reporter is installed.

- 3 In the Login page, type your user name and password in the respective fields. User names are case-sensitive.
- 4 Click **Login**.

The Enterprise Reporter Console displays.

Logging out of CommandCentral Enterprise Reporter

When you are finished using the Console, use this procedure to exit it.

See "[Logging in to CommandCentral Enterprise Reporter](#)" on page 14.

To log out of Enterprise Reporter

- 1 In the Console header, click **Logout**.
- 2 After the Console disconnects from the Enterprise Reporter host, close your Web browser.

Changing your password

You should periodically change your Enterprise Reporter password.

Note: If you change passwords for the `admin` user (Settings > User Management) or change passwords for specific users in the Oracle database, you must also run the `er_password.pl` script. This script updates the user password in the Oracle database, Cognos, Enterprise Reporter, and the processes that extract, transform, and load data. If you do not run this script, users might encounter errors when they run reports or access data.

Users with the appropriate privileges can also change other users' passwords using the same procedure.

To change the password that you use to log in to the Enterprise Reporter Console

- 1 In the Console, click **Settings > User Management**.
- 2 In the Users table, check the user whose password you want to reset.
- 3 In the **More** drop-down list, click **Change Password**.
- 4 In the Reset Password dialog box, enter the required information and click **Ok**.

See "[Reset Password options](#)" on page 15.

A message dialog box indicates that you successfully reset the password.

Reset Password options

Use this dialog box to reset a user's password.

Table 1-1 Options

Field	Description
Old Password	Enter the current password for the user account.
New Password	Enter the new password for the user account. Passwords are case-sensitive and must be at least five characters.
Retype-Password	Enter the new password for the user account.

Using the CommandCentral Enterprise Reporter Dashboard

This chapter includes the following topics:

- [About the CommandCentral Enterprise Reporter Dashboard](#)
- [Opening reports from the Dashboard](#)
- [Managing reports](#)
- [Customizing the Dashboard with your report](#)
- [Dashboard options](#)

About the CommandCentral Enterprise Reporter Dashboard

After you log in, you see the Dashboard, which describes the categories of sample reports that are included with Enterprise Reporter. Use the Dashboard to access sample reports, create custom reports, and manage those reports.

The following table lists the tasks that you can perform from the Dashboard.

Table 2-1 Tasks that you can perform from the Dashboard

Task	Topic
Open sample reports or reports that you stored in My Folder.	See “Opening reports from the Dashboard” on page 18.

Table 2-1 Tasks that you can perform from the Dashboard (*continued*)

Task	Topic
Manage reports by copying, deleting, running, scheduling, or storing them in different folders.	See “Managing reports” on page 19.
Edit reports in the tool used to create the report. For example, if you create a report using Query Studio, you edit it there.	See “Editing an ad hoc report” on page 48.
Create ad hoc reports.	See “Creating ad hoc reports” on page 34.
Create advanced reports.	See “About reports” on page 23.
Customize the Dashboard to show either a specific sample report or a report that you created.	See “Customizing the Dashboard with your report” on page 20.

Note: To create, edit, or delete reports, you must have read-write privileges. For information about user roles and privileges, see the *CommandCentral Enterprise Reporter Administrator’s Guide*.

Opening reports from the Dashboard

From the Enterprise Reporter Dashboard, you can open the sample reports provided by Enterprise Reporter, as well as reports that you create. In the left pane of the Dashboard, the **View Reports List** includes a **Sample Reports** folder and **My Folders**, where you can store custom reports.

To open reports from the Dashboard

- 1 In the Dashboard’s **View Reports List** on the left, click on either **Sample Reports** or **My Folder**.
- 2 In the list of reports that appears, click on the report that you want to open. The report appears on the right of the Dashboard. You can perform the following tasks:
 - Set this report as your default Dashboard report.
See [“Customizing the Dashboard with your report”](#) on page 20.
 - Edit the report in the tool that was used to create it.
See [“Editing an ad hoc report”](#) on page 48.
 - Email the report.
See [“Emailing ad hoc reports”](#) on page 50.

- Run the report, gathering up-to-date data.
See [“Running an ad hoc report”](#) on page 47.
- Generate the report in additional formats; for example, HTML, PDF, or XML.
See [“Generating ad hoc reports in alternate formats”](#) on page 49.

Managing reports

You can perform many tasks related to reports, such as select output formats (PDF, HTML, XML, Excel, or comma-delimited), schedule reports, change the report language, add reports to your browser's bookmarks, or save them to different folders.

To manage reports

- 1 In the upper right of the Dashboard, click the **Manage Reports** icon.
- 2 To select the type of report you want to work with, do one of the following:
 - Click **Public Folders > Sample Reports**. To manage sample reports, continue clicking through the folders until you display a report name. (The icon changes from a folder to a report icon.)
 - Click **My Folders**.

- 3 Check the report and at the upper right, click one of the options, such as **Refresh**, **Copy**, and **Paste**.

See “[Query Studio options](#)” on page 51.

- 4 At the end of the row for that report, click one of the following options:

Set Properties	Click this to select the report language, change the report name, include a screen tip for the report, add a description, limit the number of histories saved, limit the number of report outputs saved, and change permissions on who can edit the report.
Run with options	Click this to generate the report in different outputs (such as HTML, Excel, PDF, XML, or comma-separated text) or select a language.
Open with Query Studio	Click this to edit an ad hoc report in Query Studio.
Create a report view of this report	Click this to create a second view of the report, where you can specify options, format, or language for the report view that differ from the original. For example, you might want to create a source report that generates a PDF weekly, but create another view of the report and specify an XML output that runs daily. Because users cannot edit a report view, you might also want to create a view that others can run but cannot modify.
Schedule	Click this to schedule when the report should run automatically.
More	Click this to run the report in other formats (HTML, Excel, PDF, XML, or comma-separated text) select a language, create shortcuts to the report, or add this report to your browser's bookmarks.

Customizing the Dashboard with your report

By default, the Dashboard shows report categories and their descriptions. However, you can customize the Dashboard to show any report, including one that you created. You can also create a report showing multiple bar charts and set it as the default.

To customize the Dashboard with your report

- 1 In the **View Reports List** on the left, click either the **Sample Reports** folder or **My Reports** folder.
- 2 In the **View Reports List**, click the report that you want to use as the Dashboard report.
- 3 In the upper right, click the **Set This as Home Report** icon.
- 4 In the confirmation message, click **OK**.

To reset the report category descriptions as the default Dashboard

- 1 In the **View Reports List** on the left, click the **Sample Reports** folder.
- 2 Click **Sample Reports Overview**.

Dashboard options

There are several options that you can use to manage your dashboard.

[Table 2-2](#) describes the dashboard options.

Table 2-2 Dashboard options

Option	Icon	Description
Set This as Home Report		Sets the current report as the default report.
Edit Report		Loads the current report in Query Studio or Report Studio for editing.
Manage Reports		Loads Cognos Connection which you can use to manage reports.
Create Ad Hoc Report		Loads Query Studio which you can use to create ad hoc reports.
Create Advanced Report		Loads Report Studio which you can use to create advanced reports.

Using CommandCentral Enterprise Reporter reports

This chapter includes the following topics:

- [About reports](#)
- [Using sample reports](#)
- [Choosing a reporting tool](#)
- [About packages and namespaces](#)
- [Limiting access to specific reports](#)
- [Exporting and importing reports](#)
- [Report Viewer options](#)

About reports

Depending on the type of information you need and how often you need it, Enterprise Reporter includes the following reporting options:

- Use sample reports to answer common business questions. These predesigned reports let you view usage, storage, inventory, operational, and administrative information.
See [“Using sample reports”](#) on page 24.
- Build and customize simple ad hoc reports quickly using Query Studio.
See [“About ad hoc reports”](#) on page 33.
- Create advanced reports using Report Studio.
See [“Choosing a reporting tool”](#) on page 25.

Using sample reports

Enterprise Reporter provides sample reports that you can use to make more informed business decisions about datacenter storage. You can enhance sample reports by making changes, such as the following:

- Apply your organization's specific geographical and business views to the data.
- Customize the styles and colors to match your corporate standards.
- Use the reports as the basis for a new set of reports.

The various sample reports fall into the following major categories:

Utilization	Get insight into how efficiently you are running your storage environment. Includes array, host, switch, and database utilization subcategories.
Storage Allocation and Chargeback	View the allocation of array storage to hosts by tiers. You can also see storage allocation costs.
Inventory	List the objects in your storage environment by object type (array, switch, operating system, and database).
Network Appliance	View information about NetApp storage devices and associated file data in your storage environment.
Operational	Interact with lists that give you detailed insight into databases, file systems, and switches that are running low on resources.
Administrative	View information about the running of Enterprise Reporter, such as rollup status.

To run sample reports

- 1 From the Enterprise Reporter Console, in the View Reports tree at the left, expand the folders to see the report categories.
- 2 Click a report.
The report displays in the workspace on the right.
- 3 Optionally, do any of the following:
 - To email the report, in the top right of the workspace, click the **Email** icon. See “[Report Viewer options](#)” on page 31.
 - To run the report with updated data or to run the report and display any prompts that were set with the report, click the **Run** icon. See “[Report Viewer options](#)” on page 31.

- To generate the report in other formats, click the **View in HTML**, **View in PDF**, **View in Excel**, or **View in XML** icons.
See “[Report Viewer options](#)” on page 31.

Choosing a reporting tool

You can use both Query Studio and Report Studio to create custom reports that go beyond the scope of Enterprise Reporter's sample reports.

The following table shows the differences between report types.

Table 3-1 Ad hoc and advanced report comparison

	Ad hoc reports in Query Studio	Advanced reports in Report Studio
Create quick reports	X	
Display real-time values	X	
Create advanced charts		X
Format reports with advanced options <ul style="list-style-type: none"> ■ Maps ■ Images ■ HTML ■ Headers and footers 		X
Create multiple queries per report		X
Use with Internet Explorer	X	X
Use with Firefox	X	
Create charts without first creating a table		X
Create basic calculations	X	X
Create advanced calculations		X
Validate reports	X	X
Customize report queries via prompts		X
Create templates		X
View in XML, CSV, Excel, or PDF	X	X

About packages and namespaces

When you create an ad hoc report or an advanced report, you first choose a package. A package contains the hierarchy or logic of the metrics, calculations, filters, and views that you use in reports.

Enterprise Reporter includes the following packages.

Table 3-2 Package descriptions

Package	Description
Advanced Report	Use this package only when you create Advanced reports using Report Studio, which enables queries from multiple namespaces. In a query used in an Ad hoc or Advanced report, use metrics or views from just a single namespace. Do not mix metrics, views, or filters from multiple namespaces in a single query.
Application Group Consumption	View metrics that explain how application groups use their allocated storage.

Table 3-2 Package descriptions (continued)

Package	Description
Array Analysis	<p>View metrics related to an individual array to determine how that array is using its storage. This package does not include metrics about the consumption of the allocated storage. Avoid double-counting certain capacities; be aware of the effect of any virtualized storage in the environment. One way to handle this issue is to apply the Exclude Visualizers filter, which lets you see the aggregate capacities for all the back-end arrays. Viewing metrics related to front-end or virtualized arrays is more complex.</p> <p>The Array Analysis package includes the following sets of metrics:</p> <ul style="list-style-type: none"> ■ Array Analysis metrics <p>Note: Rather than use these array metrics, we recommend using the Storage Analysis package, which includes Array Analysis metrics.</p> ■ Storage Array metrics <p>Storage Array metrics include the following:</p> <ul style="list-style-type: none"> ■ Storage capacity metrics, which are equivalent to the Array Analysis package metrics. ■ SAN and DAS storage metrics, which are equivalent to the allocated storage metrics in the Array Analysis package. ■ NAS Storage metrics, which include NAS volume capacity data and NAS inventory data for volumes, qtrees, volumes, shares, folders, files, and users. <p>You can filter ad hoc reports. For example, you may want to use a filter to find only virtualization arrays.</p> <p>See “Filtering ad hoc reports” on page 40.</p>
Chargeback Analysis	<p>View storage relationships at the file system, volume, or LUN level. View the data associated with hosts, file systems, and volumes in tiers, and in business views.</p> <p>When you view file system or volume utilization metrics from the host perspective, include object-oriented views (such as file system or volume attributes or business views related to these objects).</p> <p>When you view metrics related to allocation from the file system perspective, be sure to apply the filter Exclude Duplicate Clustered File Systems to avoid double counting.</p>

Table 3-2 Package descriptions (*continued*)

Package	Description
Host Consumption	<p>View metrics that explain how file systems and databases are using their allocated storage.</p> <p>Note: Currently, you cannot create a single view showing how both file systems and databases use allocated storage on a single host.</p>
Host Storage Allocation	<p>View metrics related to the LUNs that are allocated directly to hosts from arrays. This package lets you apply tiers and storage costs to hosts or groups of hosts. Although the granularity of this namespace is at the LUN level, it is most useful when aggregating those LUNs by one or more hosts.</p> <p>The following metrics are available in thin provisioning environments: Consumed Physical Capacity, Consumed Capacity Allocated to Hosts Directly, Consumed Adjusted Allocated Capacity, and Consumed Capacity Total Cost.</p> <p>View metrics related to allocation by host, including host-oriented views; for example, host attributes or business views related to hosts.</p> <p>To view metrics related to allocation from the array perspective (allocated to hosts directly or to a virtualizer), apply the Exclude Virtualized LUNs to avoid double-counting.</p>
Switch Analysis	View metrics related to switches.
Tiered Storage Analysis	View from the array’s perspective all the LUNs that have been created and are either allocated or ready to be allocated. You can also view this data by the LUN’s tier. Although the granularity of this namespace is at the individual LUN level, it is most useful when aggregating the data by one or more arrays.

A package contains one or more namespaces. While the Advanced Reporting Package contains multiple namespaces, all other Enterprise Reporter packages contain only one namespace. When you open a namespace, you see the metrics, calculations, filters, and views in the left pane as items that you can select when creating your report.

In Query Studio ad hoc reports, you create a query using metrics and objects from one namespace. You can create multiple queries in Report Studio; however, you still must use only one namespace for each query.

See [“Query Studio metric definitions”](#) on page 59.

Each namespace includes the following filters:

- Attribute filters appear for each resource; for example, switch, array, or LUN. For example, you can apply a filter that displays only those switches from specific vendors, displays only physical switches, or excludes switches with virtual support.
- Historical analysis filters apply to each type of resource; for example, historical analysis filters for switches, arrays, or storage allocation. You can display information by year, month, week, or day.
- Two unique filters, the Most Recent Metrics and the Most Recent Inventory, exist for every namespace.
See [“Using the Most Recent Metrics or the Most Recent Inventory filters”](#) on page 42.

See [“Filtering ad hoc reports”](#) on page 40.

Each namespace also includes one or more views. You can apply existing attribute views or create custom business views that align report results with your information needs. For example, if you are designing a switch analysis report that shows unused ports and also want to see data by discovery state, include a switch discovery view. Alternatively, you could create a report that shows unclaimed storage and apply a business unit view to see which business unit could improve its storage utilization.

See [“Selecting views in ad hoc reports”](#) on page 39.

Receiving updated packages

Periodically, you might receive updated packages.

In Query Studio, reports use the most recent version of the package. If the package is republished, you are notified that the report will use the newest version of the package. You must save the report to complete the update. Changes to the package can affect reports.

If you open a saved report after its package is updated, one of the following happens:

- If the original version of the package still exists, the report runs against the original version.
- If the original version of the package no longer exists, the report is updated to run against the most recent version.

Note: When you edit an existing business view, then modify a report in Report Studio, you receive a warning message about updated packages. This standard message occurs if the business view or namespace changes. Click **OK** to continue editing the report.

Limiting access to specific reports

You can prevent users from reading, modifying, or running specific reports.

To prevent a user from reading, modifying, or running a report

- 1 Open an Enterprise Reporter Console and log on as a user with administrator-level privileges.
See [“Logging in to CommandCentral Enterprise Reporter”](#) on page 14.
- 2 In the upper right corner of the dashboard, click on the **Manage Reports** icon.
- 3 In the Cognos Connection window, click on the folder that contains the report permissions that you want to modify.
- 4 In the Actions column for the report, click the **Set Properties** icon.
- 5 In the Set Properties window, do the following:
 - Click the **Permissions** tab.
 - Check **Override the access permissions acquired from the parent entry**.
 - To add the user whose permissions you want to edit, click the **Add...** link.
- 6 In the Select Entries window, do the following:
 - Check **Show users in the list**.
 - In the **Available entries** table, select the user(s).
 - Click the **Add** icon.
 - Click **OK**.
- 7 In the Set Properties window, do the following:
 - In the table on the left, select the user(s).
 - In the box on the right, check **Deny** for the Read, Write, or Execute options.
 - Click **OK** to save changes.

Exporting and importing reports

You can export and import the reports that you create.

To export a report

- 1 In the Enterprise Reporter Console, open the report in Report Studio.
See “[Managing reports](#)” on page 19.
- 2 Click **Tools > Copy Report to Clipboard**.
- 3 Copy the report from the clipboard to a text file.
- 4 Save the text file.

To import a report

- 1 Open the saved text file.
- 2 Copy the contents of the file.
- 3 In the Enterprise Reporter Console, open Report Studio.
- 4 Click **Tools > Open Report from Clipboard**.
- 5 Save the report.

Report Viewer options

Report Viewer lets you to perform many options with new, existing, and sample reports.

[Table 3-3](#) describes those options.

Note: Some option icons are available in drop-down lists.

Table 3-3 Report Viewer options

Option	Drop-down list	Icon	Description
Save Report	Keep this version		Saves a report currently in progress.
Save as Report View	Keep this version		Saves a current report view.
Email Report	Keep this version		Emails a report.
Run	N/A		Runs the current report.

Table 3-3 Report Viewer options (*continued*)

Option	Drop-down list	Icon	Description
View in HTML Format			Returns the report to the standard view after converting the report to PDF, Excel, CSV, or XML formats.
View in PDF Format			Opens the current report in PDF format.
View in XML Format			Opens the current report in XML format.
View in Excel Options			Opens a secondary menu from which you can select to view the current report in various Excel formats or in CSV format.

Creating and managing ad hoc reports using Query Studio

This chapter includes the following topics:

- [About ad hoc reports](#)
- [Creating ad hoc reports](#)
- [Running an ad hoc report](#)
- [Editing an ad hoc report](#)
- [Generating ad hoc reports in alternate formats](#)
- [Scheduling ad hoc reports](#)
- [Emailing ad hoc reports](#)
- [Creating a chart](#)
- [Query Studio options](#)

About ad hoc reports

Administrators can create ad hoc reports quickly by inserting data metrics (such as host attributes, array attributes, allocated capacity, and claimed capacity) into a report table.

You can customize reports further by incorporating some of the following features:

- To narrow the focus, add selectable and customizable filters.

- To focus on specific business units, insert customized business view options into the report, easily grouping data into business units, locations, applications, or other views you establish.
- To display data visually for quick interpretation, incorporate bar and line charts.

Although you can create ad hoc reports quickly and see data immediately using Query Studio, you can also create more advanced reports using Report Studio.

See [“Choosing a reporting tool”](#) on page 25.

Creating ad hoc reports

[Table 4-1](#) summarizes the steps typically used to build an ad hoc report.

Table 4-1 Process to create an ad hoc report

Task	Explanation	Topic
Select a package.	Identifies the area of study and provides the metrics, views, and filters for that study.	See “Opening Query Studio and selecting a package” on page 38.
Select one or more metrics.	Places data columns in the report.	See “Working with columns in ad hoc reports” on page 38.
Optionally, add a view.	<p>Focuses the report on specific object attributes, business views, or historical trends. For example, in a switch analysis report, select one or more of the following views:</p> <ul style="list-style-type: none"> ■ Switch-specific attributes (for example, switch key, discovery state, display name, or virtual support) ■ Business views (for example, business units, applications, or geographic locations) ■ Historical views (year, quarter, month, or day) 	See “Selecting views in ad hoc reports” on page 39.

Table 4-1 Process to create an ad hoc report (*continued*)

Task	Explanation	Topic
<p>Optionally, select filters.</p> <p>Typically, you should apply the Most Recent Metrics and Inventory filters to obtain accurate results.</p>	<p>Limits the results in the report. For example, in a switch analysis report, show only physical switches or switches from a specific vendor.</p> <p>Select two unique sample filters stored in most namespaces: Most Recent Host Consumption Metric and Most Recent Host Consumption Inventory.</p>	<p>See “Filtering ad hoc reports” on page 40.</p> <p>See “Using the Most Recent Metrics or the Most Recent Inventory filters” on page 42.</p>
<p>Optionally, format the data.</p>	<p>Changes the display of the data. For example, change the number of decimal places or currency.</p>	<p>See “Formatting data in ad hoc reports” on page 45.</p>
<p>Optionally, sort the data in a column.</p>	<p>Arranges data in ascending or descending order.</p>	<p>See “Sorting data in ad hoc reports” on page 43.</p>

Creating your first ad hoc report

Follow along with the instructions in this section to create an ad hoc report quickly. While there are alternate ways to perform some of these tasks, this section provides only one method so that you can get going quickly.

Note: This section provides step-by-step instructions on how to create a specific report. Other sections in this chapter describe how to use the features for all reports.

The report will provide an answer to the following question: Show all my vendor-specific switches (for example, Brocade and McDATA switches) with 8 or more unused ports and show the data by discovery state.

Figure 4-1 Ad-hoc report showing switches with 8 or more unused ports by selected vendors

Switches with more than 8 unused ports by vendor

▼ [Vendor: Brocade Communications Systems, Inc., McDATA Corporation](#)
 ▼ [Unused Ports: Greater than or equal to 8 AND Most Recent Switch Analysis Metrics AND Most Recent Switch Analysis Inventory](#)

Vendor	Total Port Count	Unused Ports	Discovery State
Brocade Communications Systems, Inc.	848	321	Discovered
	112	92	Full
	136	86	Partial
Brocade Communications Systems, Inc.	1,096	499	
McDATA Corporation	64	64	Full
	436	418	Missing
	32	30	Partial
McDATA Corporation	532	512	
Summary	1,628	1,011	

To create your first ad hoc report

- 1 From the Enterprise Reporter Console, click the **Create Ad-Hoc Report** icon in the upper right corner.
- 2 In the Select a package view, select the **Switch Analysis** package.
- 3 In Query Studio, expand the **Switch Analysis** tree.
- 4 Expand **Switch Analysis Metrics** to reveal specific switch metrics.
- 5 If you are using Internet Explorer, drag **Total Port Count** into the report workspace on the right. Otherwise, select the metric and click **Insert**.
 Drag-and-drop features operate only in Internet Explorer.
- 6 If you are using Internet Explorer, drag **Unused Ports** to the right of Total Port Count in the report. A vertical line appears in a blank space indicating where the column will appear. If you are using other browsers, select the metric and click **Insert**.

To add vendor and discovery state views

- 1 In the namespace tree on the left, expand **Switch Analysis Views** to reveal the views.
- 2 Expand **By Switch Attributes** to reveal the switch attributes.
- 3 Expand **Switch** to reveal the switch-specific views.
- 4 If you are using Internet Explorer, drag **Vendor** to the left of Total Port Count. Otherwise, select the metric and click **Insert**.
- 5 If you are using Internet Explorer, drag **Discovery State** to the right of Unused Ports. Otherwise, select the metric and click **Insert**.

To add a vendor only filter

- 1 In the Query Studio page showing your report, right-click on the Vendor column in your report.
- 2 Select **Filter**.
- 3 In the Filter panel, check the vendors you want to see; for example, **Brocade Communications** and **McData Corporation**.
- 4 Click **OK**.

To group the results by vendor

- 1 In the Query Studio page showing your report, click the Vendor column.
- 2 In the toolbar, click the **Group** icon.
 See [“Query Studio options”](#) on page 51.

To add a filter for the number of unused ports

- 1 In the Query Studio page showing your report, right-click the Unused Ports column.
- 2 Click **Filter**.
- 3 In the Filter panel, in the From box, type **8** as the bottom part of the range.
- 4 In the To box, leave the "Highest value" option selected. This will create the 8 or more unused ports filter.
- 5 Click **OK**.
- 6 In the Combine filters panel on the Summary tab, click **OK**.

To add the Most Recent Metric and Inventory filters

- 1 In the namespace tree on the left, expand the **Switch Analysis Filters** section of the namespace tree to reveal filters.
 Typically, you should apply the Most Recent Metrics and Inventory filters to any report to obtain accurate results.
 See [“Using the Most Recent Metrics or the Most Recent Inventory filters”](#) on page 42.
- 2 If you are using Internet Explorer, drag the **Most Recent Switch Analysis Metrics** filter to the report. Otherwise, select the filter and click **Insert**.
- 3 In the Combine filters panel in the Summary tab, click **OK**.
- 4 If you are using Internet Explorer, drag the **Most Recent Switch Analysis Inventory** filter to the report. Otherwise, select the filter and click **Insert**.
- 5 In the Combine filters panel in the Summary tab, click **OK**.

To add a title

- 1 In the Query Studio page showing your report, double-click the **Title** element in the report workspace.
- 2 In the Edit title area panel, enter title and subtitle text.
- 3 Click **OK**.

Opening Query Studio and selecting a package

Create ad hoc reports using Query Studio, a Cognos reporting application. You can access Query Studio either from Cognos Connection or from the Enterprise Reporter Console, which is the preferred method. You are prompted to select a package. You can select a recently used-package or another package.

To access Query Studio from the Enterprise Reporter Console

- 1 From the Enterprise Reporter Console, in the upper right corner, click the **Create Ad-Hoc Report**.
- 2 In the **Select a package** panel, select a package from those available in the **Recently used packages** list or the **List of all packages** list.

To access Query Studio from Cognos Connection

- 1 From the Enterprise Reporter Console, in the upper right corner, click the **Manage Reports**.
- 2 In Cognos Connection, in the **Launch** drop-down list, click **Query Studio**.
- 3 In the **Select a package** panel, select a package from those available in the **Recently used packages** list or the **List of all packages** list.

Working with columns in ad hoc reports

The columns in your report display data that can help answer your business questions. To display the data in columns, you choose metrics from the namespace tree on the left.

To add a column

- 1 In the Query Studio page showing your report, in the namespace tree on the left, click on the Metrics folder to show the columns you can choose. For example, in the Host Storage Allocation package, click **Host Storage Allocation Metrics** to display several metrics.
- 2 To add a column, do one of the following:
 - Double-click the metric.
 - Drag the metric into the report workspace.

Drag-and-drop features operate only in Internet Explorer.

- Select the metric and click **Insert**.
- 3 To add another column, insert the metric to the right or left of the metric already in the report.
 - If you are using Internet Explorer and you drag the metric into its proposed location, a vertical line appears inside a small box indicating where the column will appear.
 - If you are using other browsers, because Enterprise Reporter inserts a column to the left of a selected column, click the column to the right of where you want to insert a column. In the namespace tree on the left, click the metric you want to insert and click **Insert**.
 Repeat this action for as many columns as necessary to customize your report.

To delete a column

- 1 In the Query Studio page showing your report, select the column you want to delete.
- 2 Do one of the following:
 - Press **Delete**.
 - Right-click and select **Delete** from the menu.
 - After highlighting the column, from the **Standard Toolbar** at the top of the screen, click the **Delete** icon.
 See [“Query Studio options”](#) on page 51.

To rename a column

- 1 In the Query Studio page showing your report, double-click the header of the column you want to rename.
- 2 In the **Rename** panel, type the new column name.
- 3 Click **OK**.

Selecting views in ad hoc reports

After you select a package for your report, you can select a view that focuses your report. Each package includes attribute-specific views and historical views.

You can also use custom business views created for your organization. Business views allow you to display data about a specific business unit, geographic location, or other objects you designate. For example, you might want to display a report that breaks down the unclaimed capacity in Europe and Asia and calculates a

charge. You would select Host Consumption as the package, unclaimed capacity as a metric, and your customized business division as the view.

You can also add custom attributes to your Enterprise Reporter reports. They appear in the list of storage object views with the prefix of "Custom Attribute."

To select a view

- 1 In the Query Studio page showing your report, in the namespace tree on the left, expand the **Views** folder that corresponds to the selected package.

For example, to see custom attributes in the Switch Analysis Package, select **Switch Analysis Views > by Switch Attributes > Switch**.
- 2 Insert a view from the tree into the report.

Grouping data in ad hoc reports

Grouping organizes data into logical and easily accessible sections in the report. Grouping data is a good way to compare performance between members of the same subset.

To group data

- 1 In the Query Studio page showing your report, click on the heading of the column that you want to group.
- 2 Click the **Group** icon.

See "[Query Studio options](#)" on page 51.

Filtering ad hoc reports

You can use filters in Query Studio to limit the data that your report displays. You can apply filters in the following ways:

- Place a filter on a column by entering a value. For example, enter 8 as the lowest limit on an Unused Ports column.
- Select sample filters included in each namespace. For example, the Host Consumption package includes host attribute filters, such as Exclude User-Created Hosts.
- Select two unique sample filters stored in most namespaces: Most Recent Host Consumption Metric and Most Recent Host Consumption Inventory. Typically, you should apply the Most Recent Metrics and Inventory filters to obtain accurate results.

See "[Using the Most Recent Metrics or the Most Recent Inventory filters](#)" on page 42.

To filter column data

- 1 In the Query Studio page showing your report, do one of the following:
 - Right-click the heading of the column that you want to filter and select **Filter** from the menu.
 - Click the column that you want to filter and click the **Filter** icon. See “[Query Studio options](#)” on page 51.
- 2 In the Filter panel, in the Condition drop-down list, select whether you want to show or exclude the data that meets the criteria.
- 3 The fields that appear differ depending on the data you selected to filter.
 - If you selected a numeric value, in the From and To fields, enter the data range to show or exclude. To specify a value, enter the value in the box; otherwise, use the default of Lowest or Highest Value. For example, to show switches with 8 or more unused ports, in the From box type **8**, and in the To box click **Highest value**.
 - If you selected a text value, check the items you want include or exclude.
- 4 In the Apply the filter to field, select one of the following:
 - **Values in the report:** Applies the filter to aggregated values generated in the report, but not to individual values in the data source. For example, if you wanted to filter on the total number of switches in Europe with 8 or more unused ports, select Values in the report and apply the filter to the European count.
 - **Individual values in the data source:** Applies the filter to each item in the data source. For example, if you want to filter on each switch that has 8 or more unused ports, apply the filter to the individual switch values in the data source.
 If you selected a text value to filter, this is the only option.
- 5 Click **Missing values** and select one of the following. By default, Query Studio leaves out the missing values.
 - To include missing values, click **Include missing values**.
 - To exclude missing values, click **Leave out missing values**.
 - To display only the missing values, click **Show only missing values**.

To use a sample filter

- 1 From the Query Studio page showing your report, in the namespace tree, expand the namespace to show the object filters. For example, expand the Host Consumption namespace to show Host Consumption Filters.
- 2 Insert the filter onto the report. If using Internet Explorer, drag the filter onto the report. Otherwise, click the filter and click **Insert**.

The filter description appears at the top of the report.

Using the Most Recent Metrics or the Most Recent Inventory filters

Packages include several predefined filters, including the following unique filters. Typically, you should apply these Most Recent Metrics and Inventory filters to obtain accurate results.

- **Most Recent [object] Metrics**, for example, **Most Recent Switch Analysis Metrics**. This filter shows the current object count; it does not include historical counts.
- **Most Recent [object] Inventory**, for example, **Most Recent Switch Analysis Inventory**. This filter shows the cumulative object count including historical inventory.

Using these filters, you can target the results of your report. Although you can apply one of these filters to a report, you typically apply both. The following example illustrates the use of no filters, one filter, and both filters.

For example, the Toronto data center wants to show the number of unused ports for two switches. Over the course of several months, the number of unused ports for Switch 1 increases, while the number for Switch 2 decreases as shown in the following table:

Table 4-2 Unused ports across five months

	Jan	Feb	March	April	May
Switch 1	4	6	8	0	0
Switch 2	4	4	4	3	2

Applying no filters, one filter, or both filters produces these results:

Table 4-3 Unused ports using no filters, one filter, or both filters

	No filters	Most Recent Metric filter	Most Recent Inventory filter	Both filters
Switch 1	18	8	0, Not included	0, Not included

Table 4-3 Unused ports using no filters, one filter, or both filters (*continued*)

	No filters	Most Recent Metric filter	Most Recent Inventory filter	Both filters
Switch 2	17	2	17	2

Analyzing these results, you can see that applying both filters typically is the result you want:

No filters	This displays the total cumulative count for both switches, 18 for Switch 1 and 17 for Switch 2.
Most Recent Metric filter	This displays the count on the most recent day when there was inventory, which is 8 for Switch 1 in March and 2 for Switch 2 in May.
Most Recent Inventory filter	This displays the total from January through April, if there is inventory. Switch 1 has no inventory in April and so it shows 0 for the most recent inventory. Switch 2 has inventory in April, so it shows the cumulative inventory count of 17.
Both filters	This displays the count on the most recent month, May. In May, Switch 1 shows 0 unused ports and Switch 2 shows 2 unused ports. Typically, this is the data that you want to display on a report.

Sorting data in ad hoc reports

You can sort report data in either ascending or descending order.

To sort data

- 1 In the Query Studio page showing your report, do one of the following:
 - Right-click the column heading that you want to filter and from the menu click **Sort**.
 - Select the column that you want to filter and click the **Sort** icon. See “[Query Studio options](#)” on page 51.
- 2 In the Sort panel, click **Ascending** or **Descending**.
- 3 Click **OK**.

Summarizing data in ad hoc reports

You can summarize data on columns in your report. Summarizing data places counts of the data in each section of your report and at the bottom of your report.

Note: Reports display a maximum of fifteen lines per screen. If your table has more than fifteen entries, click the **Bottom** link to see summaries.

To add a data summary

- 1 In the Query Studio page showing your report, do one of the following:
 - Right-click the column heading that you want to filter and from the menu select **Summarize**.
 - Click the column that you want to filter and click the **Summarize** icon. See “[Query Studio options](#)” on page 51.
- 2 In the Summarize panel, select a type of summary.
- 3 Click **OK**.

Adding a calculated value in ad hoc reports

You can add calculated values to your ad hoc reports. You can include arithmetic operations, such as multiplication and rounding, as well as analytic operations, such as average, minimum/maximum, percentile, and rank. You can also perform percentage operations.

For example, you could include a calculation to determine charges for unclaimed capacity by using this formula: Unclaimed capacity x \$7.50

To add a calculated value

- 1 In the Query Studio page showing your report, do one of the following:
 - Right-click the heading of the column on which you want to perform a calculation and from the menu select **Calculate**.
 - Click the column on which you want to perform a calculation and click the **Calculate** icon. See “[Query Studio options](#)” on page 51.
- 2 In the Calculate panel, from the **Operation type** drop-down list, select the type of calculation.
- 3 If the calculation requires a value, type the value in the Number box.
The value appears in the Expression box, which you cannot edit directly.

Adding a title to an ad hoc report

You can add a title and a subtitle to your report.

To add a title

- 1 From the Query Studio page showing your report, double-click the **Title** link.
- 2 In the Edit title area panel, in the **Title** text box, enter the title of your report.
- 3 In the **Subtitle** text box, enter the subtitle of your report, if applicable.
- 4 Select whether or not to **Show filters** and/or **Show sorts** in the report header.
- 5 Click **OK**.

Formatting data in ad hoc reports

You can format your data to improve its presentation. For example, you can set the number of decimal places, select the currency, and indicate whether you want to show negative values in parentheses or preceded by a minus sign, as in (123) or -123.

To format data

- 1 In the Query Studio page showing your report, right-click the column whose data you want to format.
- 2 From the menu, click **Format**.
- 3 Specify how you want the data to appear.
- 4 Click **OK**.

Defining conditional styles in ad hoc reports

Conditional styles let you highlight specific data in your report. For example, you might want to show all unclaimed capacity above 25,000 GB in red. You can change the background color, text alignment, text effects (underline, overline, and strikethrough), and font attributes (size, family, color, and weight).

The following image shows how the values above 90% are in red, while the values above 80% but below 90% are in yellow. The grouped fabrics in bold font do not display in color.

Figure 4-2 Sample report showing results of conditional styles

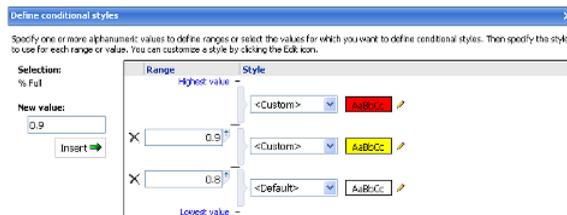
Fabrics with Switches that are at least 75% Full

▼ % Full: Greater than or equal to 75%
 ⬆ % Full: Descending order

Fabric Name	Display Name	Total Port Count	Used Ports	% Full ▼
SW3250	br3251	48	36	75%
SW3250		48	36	75%
br381	br381	96	90	94%
br381		96	90	94%
brocade6	brocade6	96	84	88%
brocade6		96	84	88%
dur-qlogic4	dur-qlogic4	48	36	75%
dur-qlogic4		48	36	75%
emc01gh-p2(FCIP-ALP-GH-P2)	emc01gh-p2(FCIP-ALP-GH-P2)	24	24	100%

To define a conditional style

- 1 In the Query Studio page showing your report, right-click on the column with the data you want to conditionalize.
- 2 From the menu, select **Define Conditional Styles**.
- 3 In the value box, type the first conditional value. For example, if you want to show all data above 90 in red, type 90.
- 4 Click **Insert**.
- 5 In the Style section, select whether above or below that range is excellent to poor.
- 6 In the Style section, click the pencil icon to change the font, font color, background color, and other styles associated with this range.



- 7 Click **OK**.

Saving an ad hoc report

You can save an ad hoc report in a public folder to share your report with others. You can also save reports in your private folder so that only you can see them.

To save a report

- 1 In the Query Studio page showing your report, from the Keep this version drop-down list, click the **Save** or **Save as** icon.
See [“Query Studio options”](#) on page 51.
- 2 If this is the first time you are saving the report or if you clicked Save as, in the **Save as** panel, in the **Name** text box, enter a name.
- 3 Optionally, enter a description of the report. This description appears in the report list.
- 4 Optionally, enter a screen tip.
- 5 Select a location or folder where you will save the report. To share reports, select a public folder. Otherwise, select **My Folder**.
- 6 Click **OK**.

Running an ad hoc report

Although Query Studio shows data results immediately without running the report, you might want to collect new data and refresh the report. Also, run the report to show any report prompts that request the user to make selections before running the report.

You can run the report in Query Studio while you are working on the report. Alternatively, after you have saved the report, you can run the report from Enterprise Reporter and Cognos Connection.

Note: For accurate results, you should typically apply the Most Recent Metric and Inventory filters.

See [“Using the Most Recent Metrics or the Most Recent Inventory filters”](#) on page 42.

To run a newly created report

- 1 In the Query Studio page showing your report, from the **Menu** option at the left, click **Run Report**.
- 2 Select one of the report run options. For example, select one of the following:
 - To run the report and show all data, click **Run with All Data**.
 - To show only a subset of the data while you are testing the report, click **Run with Limited Data**.

- To display the report as an Adobe PDF file, in the toolbar, from under the **View in HTML format** icon, click **View in PDF Format**.

To run an existing report from Query Studio

- ◆ In the Query Studio page showing your report, at the top of the report, click the **Run** icon.

See “[Query Studio options](#)” on page 51.

To run a report from Enterprise Reporter Console

- 1 From the Enterprise Reporter Console, in the View Reports List tree on the left, expand the folder containing your report. For example, click **My Folders**.
- 2 In the tree on the left, click the report name.
The report and data appear on the right.
- 3 Optionally, in the toolbar, click the **Run** icon to initiate any prompts you might have included in your report.

See “[Report Viewer options](#)” on page 31.

To run an existing report from Cognos Connection

- 1 From the Enterprise Reporter Console, click **Manage Reports**.
- 2 In Cognos Connection, click the **Public Folders** or **My Folders** tab to locate your report.
- 3 In the Name column, check the report you want to run.
- 4 In the Actions column, click the **Run with Options** icon.
- 5 In the Run with options panel, choose the options. Typically, you can accept the default values.
- 6 Click **Run**.

See “[Report Viewer options](#)” on page 31.

Editing an ad hoc report

You can edit a report by launching it from Cognos Connection public or private folders. If you customized a Cognos dashboard, you can launch the report from there.

To edit a report from Cognos Connection

- 1 From the Enterprise Reporter Console, click **Manage Reports**.
- 2 In Cognos Connection, click the Public Folders or My Folders tab to locate your report.

- 3 In the **Name** column, click the report that you want to edit.
- 4 In Query Studio, make the changes to your report.
- 5 Click **Save**.

Generating ad hoc reports in alternate formats

You can produce ad hoc reports in the following formats:

- PDF
- Excel
- HTML
- XML
- Comma-separated values (CSV)

To produce your report in alternate formats from Query Studio

- 1 From the Enterprise Reporter Console, click **Manage Reports**.
- 2 In Cognos Connection, click the Public Folders or My Folders tab to locate your report.
- 3 In the **Name** column, click the report that you want to edit.
- 4 In Query Studio in the menu at the left, click **Run Report**.
- 5 In the toolbar, from under the **View in HTML format** icon, select one of the view format options. For example, View in PDF Format, View in XML Format, or View in Excel Format.

To produce your report in alternate formats from Cognos Connection

- 1 From the Enterprise Reporter Console, click **Manage Reports**.
- 2 In Cognos Connection, click the Public Folders or My Folders tab to locate your report.
- 3 In the row showing the report you want, in the Actions column, click the **Run with options** icon.
- 4 Choose the format and options.
- 5 Click **Run**.

Scheduling ad hoc reports

You can schedule ad hoc reports to run at specific times. For more information, see the Cognos documentation.

To schedule ad hoc reports to run later

- 1 From the Enterprise Reporter Console, click **Manage Reports**.
- 2 In Cognos Connection, click the **Public Folders** or **My Folders** tab to locate your report.
- 3 In the row showing the report you want, in the Actions column, click the **Schedule** icon.
- 4 Choose the schedule options.
- 5 Click **OK**.

Emailing ad hoc reports

You can distribute reports by email. For example, you can create a PDF and email it, or email a report directly from the Enterprise Reporter Console.

To email a PDF report from Query Studio

- 1 From the Enterprise Reporter Console, click **Manage Reports**.
- 2 In Cognos Connection, click the **Public Folders** or **My Folders** tab to locate your report.
- 3 In the **Name** column, click the report that you want to edit.
- 4 In Query Studio, in the menu at the left, click **Run Report**.
- 5 In the toolbar, from under the **View in HTML format** icon, select **View in PDF Format**.
- 6 From the PDF displayed in Cognos Viewer, click the **Email** icon.

To email a report from the Enterprise Reporter Console

- 1 From the Enterprise Reporter Console, open the report you want to distribute.
- 2 In the toolbar, from the **Keep this version** drop-down list, click the **Email Report**.
See “[Report Viewer options](#)” on page 31.
- 3 In the **Set the email options** panel, enter the recipients in the **To** and **Cc** fields.
- 4 In the **Subject** box, type a title for your email.
- 5 In the **Body** box, type a message to accompany your report.
- 6 Optionally, do the following:
 - To include only a link to the report in the email, check **Include a link to the report**.

- To attach the report to the email, check **Attach the report**.
- 7 Click **OK**.

Creating a chart

You can create simple charts in Query Studio to display your report data visually.

To create a chart

- 1 From the Query Studio page showing your report, open and run the report you want to chart.
- 2 Click the **Chart** icon.
See “[Query Studio options](#)” on page 51.
- 3 In the **Chart** panel, select the **Chart type**.
- 4 Select the specific chart to create.
- 5 If desired, check the **Show the values on the chart** box.
- 6 Under **Show the following in the report**, select whether to show the chart and table or the chart only in the report.
- 7 Click **OK**.

Query Studio options

Query Studio provides many options that you can use to design reports. The following table describes those options.

Table 4-4 Query Studio options

Option	Icon	Description
New Report		Creates a new report.
Save		Saves the report. The first time that you save the report, you are prompted to specify a name and location.
Save As		Saves the report to a location you specify.
Cut		Removes the selected column from the report and places it on the Clipboard for pasting.

Table 4-4 Query Studio options (*continued*)

Option	Icon	Description
Paste		Places a cut column back into the report to the left of your cursor.
Delete		Removes the selected column from the report.
Undo		Returns the report to the way it looked before the last action.
Redo		Performs the last undone action again.
Run with all data and Re-prompt		<p>A Query Studio report retrieves data as soon as you open or modify it. However, you can run a report to retrieve any recently updated data.</p> <p>Running a report with all data could take some time, depending on the data.</p> <p>You can add prompts to reports that request that the user make selections about the contents of the report before the report is run. Clicking this icon displays the prompts.</p>
Filter		Limits the report results for data in selected column.
Sort		Orders the data in a selected column in either ascending or descending order.
Summarize		<p>Calculates the total, count, maximum, minimum, or average of the values in individual report items. There are many predefined summary features.</p> <p>See the <i>Cognos Query Studio User Guide</i> or online help.</p>
Calculate		Performs a calculation on a selected column.
Drill down		Drills into a related drillable data.
Drill up		From a drilled-down data item, returns to the data on an upper level.

Table 4-4 Query Studio options (*continued*)

Option	Icon	Description
Go to		Goes to another report either in Query Studio or Report Studio.
Chart		Creates a chart based on the report data.
Group		Sorts the data and suppresses duplicate values in a selected column.
Pivot		Changes a sectioned report to a crosstab report.
Ungroup		Restores the duplicate values in a grouped column.
Create Sections		Makes different sections of the data based on column selected. For example, if you select the Switch Analysis > Discovery State column, different state sections are created: Discovered, Full, Missing, and Partial.
Swap Rows and Columns		Changes column data to row data and row data to column data in crosstab reports or charts based on crosstab reports.
Collapse Group		Collapses a report's details, making it easier to find higher levels.
Expand Group		Expands the collapsed levels of a report.

Using business views for chargeback reporting

This chapter includes the following topics:

- [About using business views for chargeback reporting](#)
- [Creating a hierarchy of levels and instances](#)
- [Assigning storage assets to instances](#)
- [Creating chargeback reports](#)

About using business views for chargeback reporting

You can use business views for chargeback reporting. Business views retrieve information about storage usage, and you can use that information to bill customers or track usage within a business entity. Business views allow you to retrieve usage data from specific hosts, volumes, virtualization servers, or file systems within a hierarchy that you define (such as business entities within an organization, or locations within a geographical structure).

Using business views, you can analyze chargeback at the host level (assigning owners to entire hosts) or, in the case of a shared host environment, at the file system or volume level.

For information on using business views for chargeback reporting, see the following sections, which outline the steps in the process:

- See [“Creating a hierarchy of levels and instances”](#) on page 56.
- See [“Assigning storage assets to instances”](#) on page 56.
- See [“Creating chargeback reports”](#) on page 57.

For detailed information on creating and updating business views, see *CommandCentral Enterprise Reporter Administrator's Guide*.

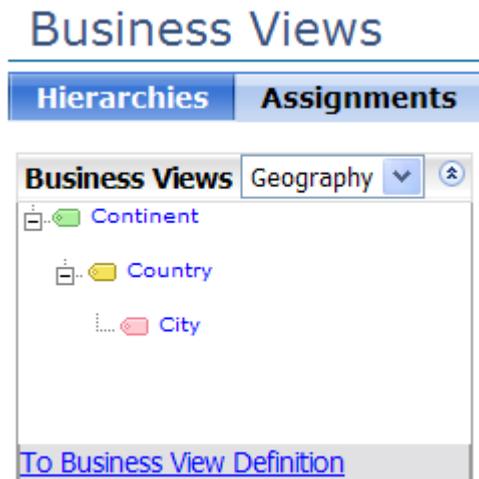
Creating a hierarchy of levels and instances

Use the options on the Enterprise Reporter **Business Views** tab to create a business view.

For details on creating business views, see *CommandCentral Enterprise Reporter Administrator's Guide*.

When you create a business view, you define a hierarchy that makes sense for the entities for which you want to set up chargeback. For example, you can create an organizational hierarchy or a geographical hierarchy.

Figure 5-1 Geographical business view hierarchy



When you create business views and define hierarchies, Enterprise Reporter updates the metamodel and populates Cognos with the business view and its levels and the business view is available for reporting in Query Studio and Report Studio.

Assigning storage assets to instances

On the Business Views **Assignments** tab, you can assign assets (also known as "objects") to the instances in your business view hierarchy. The assets (objects) are rolled up into Enterprise Reporter and grouped by object type (such as Array, File System, and Host).

For details on assigning assets to business views, see *CommandCentral Enterprise Reporter Administrator's Guide*.

Creating chargeback reports

Use the Query Studio reporting capabilities to create ad hoc chargeback reports. The chargeback reports can show the consumed capacity for physical hosts, volumes, file systems, or virtual machines. The process involves creating an example business view called *Geography*, and creating an ad hoc report called *Chargeback by Country*. The ad hoc report will contain levels and instances from the business view.

Note: In this example, the chargeback analysis does not include virtual machines.

For information on creating business views, see *CommandCentral Enterprise Reporter Administrator's Guide*.

See [“About ad hoc reports”](#) on page 33..

Creating an example *Geography* business view

- 1 Define the business view and add levels for *Continent* and *Country*.
- 2 Add instances for *Asia* and *North America* to the Continent level.
- 3 Add instances for India and the United States to the Country level.
- 4 Assign all the storage objects to the instances in the business view.

Creating an example host-level *Chargeback by Country* ad hoc report

- 1 Open Query Studio.
- 2 In Query Studio, expand the **Host storage Allocation** tree.
- 3 Drag the following metrics into the report workspace on the right: **Country**, **Physical Capacity**, **Consumed Physical Capacity**, **Total Cost**, and **Consumed Total Cost**. Otherwise, select each metric and click **Insert**.

Drag-and-drop features only work in Internet Explorer.

- 4 Title the report *Chargeback by Country*.
- 5 Expand the Host Storage Allocation Views folder.
- 6 Expand the Host by Geography view.
- 7 Drag the United States and India instances into the Country column.

CommandCentral Enterprise Reporter metric definitions

This appendix includes the following topics:

- [Query Studio metric definitions](#)

Query Studio metric definitions

For definitions of the metrics used in reporting packages, see the following topics:

- [Application Group Consumption reporting package](#)
- [Array Analysis reporting package](#)
- [Chargeback Analysis](#)
- [Host Consumption reporting package](#)
- [Host Storage Allocation reporting package](#)
- [Switch Analysis reporting package](#)
- [Tiered Storage Analysis reporting package](#)

Application Group Consumption reporting package

The Application Group Consumption report package lets you view metrics that explain how application groups are using their allocated storage.

Table A-1 Application Group Consumption (Application Group Capacity Metrics)

Metric	Description
Allocated Capacity (GB)	The amount of storage allocated to the application group. This value is a sum of the storage capacities of all the file systems and databases assigned to the application group. This amount can include storage from arrays, NAS, and directly attached disks.
Undiscovered Capacity (GB)	The amount of storage allocated to the application group that is not discovered because a CommandCentral Storage agent is not running on the host of one or more of the application group's file systems or databases.
Used Capacity (GB)	The amount of storage allocated to the application group that is being used; that is, data that is written to the disk. This amount combines storage used by file systems as well as non-overlapping storage used by databases and other discovered applications.
Unused Capacity (GB)	The amount of storage allocated to the application group that is not being used; that is, data that is not written to the disk. This amount combines storage allocated to an application group's file systems that is not being used as well as non-overlapping storage allocated to the application group's databases and other discovered applications that is not being used.

Array Analysis reporting package

The Array Analysis reporting package lets you view metrics related to an individual array to get a complete picture of how it is using its storage. This reporting package does not include metrics related to how consumers use the allocated storage. To avoid double-counting of certain capacities, you should be aware of the effect of any virtualized storage in the environment. One way to handle this issue is to apply the filter “Exclude Virtualizers,” which enables you to safely see the aggregate capacities for all the back-end arrays while removing the front-end array counts. Viewing metrics related to front-end (also called virtualized) arrays is more complex.

Note: Rather than use this package for array metrics, we recommend using the Storage Analysis package, which includes Array Analysis metrics and more.

Tiered Storage Analysis

The tiered storage metrics that are part of the Array Analysis package are also part of the Tiered Storage Analysis package.

See [“Tiered Storage Analysis reporting package”](#) on page 74.

Array Analysis

The Array Capacity metrics provide details about the amount of configured and unconfigured storage capacity within an array.

Table A-2 Array Analysis (Array Capacity Metrics)

Metric	Description
Total Array Capacity (GB)	The total amount of storage the array has, both external (virtual) storage as well as internal (physical) storage.
External Capacity (GB)	The total amount of storage that the array is receiving virtually from other sources.
Internal Physical Capacity (GB)	The total amount of storage physically on the array.
Configured Capacity (GB)	The amount of usable and formatted array storage.
Unconfigured Capacity (GB)	The amount of unformatted array storage.
% Total Array Capacity Configured	The percentage of an array's storage that is usable and formatted. This value is calculated by dividing Configured Capacity (GB) by Total Array Capacity (GB).
% Total Array Capacity Unconfigured	The percentage of an array's total unformatted storage. This value is calculated by dividing Unconfigured Capacity (GB) by Total Array Capacity (GB).

Array Analysis (Configured Capacity Metrics)

Configured Capacity metrics provide details about allocated and unallocated storage capacity on an array.

Table A-3 Array Analysis (Configured Capacity Metrics)

Metric	Description
Total Allocated Capacity (GB)	<p>The complete amount of storage that the array has allocated both to virtualizers as well as directly to hosts.</p> <ul style="list-style-type: none"> ■ Capacity Allocated to Hosts Directly (GB) - The amount of configured array storage (internal or external) that is allocated to hosts directly (i.e., not through a virtualizer). ■ Capacity Allocated to Hosts Through Virtualizer (GB) - The amount of configured array storage (internal or external) that is allocated to a host through a virtualizer. ■ Capacity Available to Hosts Through Virtualizer (GB) - The amount of configured array storage (internal or external) that is allocated to a virtualizer but that has not yet been allocated to a host.
Capacity Reserved for Overhead (GB)	<p>Configured array storage that is reserved for RAID overhead and other administrative uses. This amount is a combination of RAID Overhead Capacity (GB), Replication Capacity (GB) and Administrative Capacity (GB).</p> <ul style="list-style-type: none"> ■ RAID Overhead Capacity - The amount of configured storage that is set aside by the array for RAID techniques such as mirroring and striping. CommandCentral Storage calls this amount "Logical: Overhead." ■ Replication Capacity (GB) - The amount of configured storage set aside for maintaining replication techniques such as snapshot reserves and WAFL. CommandCentral Storage calls this amount "Logical: Replication." ■ Administrative Capacity (GB) - The amount of configured storage set aside by the array for administrative uses, not including RAID overhead. In snapshot or replication scenarios, this value includes target LUNs for storing copied or replicated data. CommandCentral Storage calls this amount "Logical: Administrative."

Table A-3 Array Analysis (Configured Capacity Metrics) (*continued*)

Metric	Description
Capacity Available for Allocation (GB)	<p>Configured array storage that is currently not yet in use. This amount is a combination of Unallocated LUN Capacity (GB) and Available Configured Capacity.</p> <ul style="list-style-type: none"> ■ Unallocated LUN Capacity (GB) - The amount of configured storage that has been "carved into LUNs" and yet these LUNs are not associated with any host as of yet. CommandCentral Storage calls this amount "Logical: Unallocated." ■ Available Configured Capacity (GB) - The amount of configured storage that has been formatted but not yet carved into LUNs. CommandCentral Storage calls this amount "Logical: Available."
Undiscovered Configured Capacity (GB)	Configured array storage that is not discovered by CommandCentral Storage. CommandCentral Storage calls this amount "Logical: Unknown."
% Configured Capacity Allocated	The percentage of configured array storage that is allocated to either hosts or virtualizers. This value is calculated by dividing Total Allocated Capacity (GB) by Configured Capacity (GB).
% Configured Capacity Reserved for Overhead	The percentage of configured array storage that is reserved for RAID, replication, and other administrative uses. This value is calculated by dividing Capacity Reserved for Overhead (GB) by Configured Capacity.
% Configured Capacity Available for Allocation	The percentage of configured array storage that is not in use but is available for allocation. This value is calculated by dividing Capacity Available for Allocation (GB) by Configured Capacity (GB).
% Configured Capacity Undiscovered	The percentage of configured array storage that is not known because CommandCentral Storage is not able to discover it. This value is calculated by dividing Undiscovered Configured Capacity (GB) by Configured Capacity (GB)
Total Allocated Capacity Detail Metrics	<p>These metrics provide details on how allocated and available capacity is distributed to hosts:</p> <ul style="list-style-type: none"> ■ Capacity Allocated to Hosts Directly (GB) ■ Capacity Allocated to Hosts Through Virtualizer (GB) ■ Capacity Available to Hosts Through Virtualizer (GB)

Table A-3 Array Analysis (Configured Capacity Metrics) *(continued)*

Metric	Description
Capacity Reserved for Overhead Detail Metrics	<p>These metrics provide details on the specific purposes for which capacity reserved for overhead is allocated:</p> <ul style="list-style-type: none"> ■ RAID Overhead Capacity (GB) ■ Replication Capacity (GB) ■ Administrative Capacity (GB)
Capacity Available for Allocation Detail Metrics	<p>These metrics provide the following status information on configured storage capacity that is available for allocation:</p> <ul style="list-style-type: none"> ■ Unallocated LUN capacity (GB) ■ Available Configured Capacity (GB)

Array Analysis (Allocated Storage Metrics)

Allocated storage metrics provide details about claimed and unclaimed storage capacity that is allocated to hosts.

Table A-4 Array Analysis (Allocated Storage Metrics)

Metric	Description
Claimed Capacity (GB)	The amount of array storage that has been allocated to hosts and that host's OS has written a device handle to the LUN. CommandCentral Storage calls this amount "Claimed Status: Claimed."
Unclaimed Capacity (GB)	The amount of array storage allocated to hosts that in which the host's OS has not written a device handle to the LUN. CommandCentral Storage calls this amount "Claimed Status: Unclaimed."
Undiscovered Allocated Capacity (GB)	The amount of array storage allocated to a host that is currently not being discovered by CommandCentral Storage. CommandCentral Storage calls this amount "Claimed Status: Unknown."
% Capacity Allocated to Hosts Claimed	The percentage of storage allocated to host in which a host's OS has written a device handle to the LUN. This value is calculated by dividing "Claimed Capacity (GB)" by the sum of "Capacity Allocated to Hosts Directly (GB)" and "Capacity Allocated to Hosts Through Virtualizer (GB)."

Storage Analysis

Storage Capacity metrics provide information about configured and unconfigured storage capacity on an array, and if that storage capacity is internal or external to the array.

Table A-5 Storage Analysis (Storage capacity Metrics)

Metric	Description
Total Array Capacity (GB)	The total amount of storage the array has, both external (virtual) storage and internal (physical) storage.
External Capacity (GB)	The amount of storage that the array is receiving virtually from other sources.
Internal Physical Capacity (GB)	The amount of physical storage on the array.
Configured Capacity (GB)	The amount of formatted and usable array storage.
Unconfigured Capacity (GB)	The amount of unformatted array storage.
% Total Array Capacity Configured	The percentage of the array's total storage that is formatted and is usable. This value is calculated by dividing Configured Capacity by Total Array Capacity.
% Total Array Capacity Unconfigured	The percentage of the array's total storage that is unformatted. This value is calculated by dividing Unconfigured Capacity by Total Array Capacity.

Table A-6 Storage Analysis (SAN & DAS Storage)

Metric	Description
Configured Capacity Metrics	<p>The Configured Capacity Metrics include the following:</p> <ul style="list-style-type: none"> ■ Total Allocated Capacity (GB) ■ Capacity Reserved for Overhead (GB) ■ Capacity Available for Allocation (GB) ■ Undiscovered Configured Capacity (GB) ■ % Configured Capacity Allocated ■ % Configured Capacity Reserved for Overhead ■ % Configured Capacity Available for Allocation ■ % Configured Capacity Undiscovered <p>Total Allocated Capacity Detail Metrics</p> <ul style="list-style-type: none"> ■ Capacity Allocated to Hosts Directly (GB) ■ Capacity Allocated to Hosts Through Virtualizer (GB) ■ Capacity Available to Hosts Through Virtualizer (GB) <p>Capacity Reserved for Overhead Detail Metrics</p> <ul style="list-style-type: none"> ■ RAID Overhead Capacity (GB) ■ Replication Capacity (GB) ■ Administrative Capacity (GB) <p>Capacity Available for Allocation Detail Metrics</p> <ul style="list-style-type: none"> ■ Unallocated LUN Capacity (GB) ■ Available Configured Capacity (GB)
Allocated Storage Metrics	<p>The Allocated Storage Metrics include the following:</p> <ul style="list-style-type: none"> ■ Claimed Capacity (GB) ■ Unclaimed Capacity (GB) ■ Undiscovered Allocated Capacity (GB) ■ % Capacity Allocated to Hosts Claimed

NAS Storage metrics include NAS volume capacity data and NAS inventory data for volumes, qtrees, volumes, shares, folders, files, and users.

Table A-7 Storage Analysis (NAS Storage)

Metric	Description
NAS Volume Capacity Metrics	The NAS Volume Capacity Metrics include the following: <ul style="list-style-type: none"> ■ Volume Capacity (GB) ■ Volume Used Capacity(GB) ■ Volume Available Capacity(GB) ■ Consumption (GB)
NAS Object Inventory Metrics	The NAS Object Inventory Metrics include the following: <ul style="list-style-type: none"> ■ Number of Volumes ■ Number of Qtrees ■ Number of Shares ■ Number of Files ■ Number of Folders ■ Number of Users ■ Number of File Systems

NAS Analysis packages

The NAS reporting package includes NAS data about unified storage devices, such as Multistore Virtual Systems, volumes, qtrees, and shares.

Table A-8 NAS Usage Analysis

Metric	Description
NAS Usage Capacity Metrics	Includes the following: <ul style="list-style-type: none"> ■ Total Volume Capacity (GB) ■ Used Volume Capacity (GB) ■ Available Volume Capacity (GB) ■ Physical Volume Capacity (GB) ■ Total File System Capacity (GB) ■ Used File System Capacity (GB) ■ Free File System Capacity (GB) ■ Physical File System Capacity (GB) ■ Quota Limit ■ Quota Used

Table A-9 NAS Volume Analysis

Metric	Description
NAS Volume Capacity Metrics	Includes the following: <ul style="list-style-type: none"> ■ Total Volume Capacity ■ Used Volume Capacity ■ Available Volume Capacity ■ Total Files Size ■ DM Data Age ■ Physical Capacity (GB)
NAS Volume Inventory Metrics	Includes the following: <ul style="list-style-type: none"> ■ Number of Files ■ Number of Folders ■ Number of Users ■ Number of Qtrees

Table A-10 NAS QTree Analysis

Metric	Description
NAS Qtree Capacity Metrics	Includes the following: <ul style="list-style-type: none"> ■ Total Volume Capacity ■ Total Files Size ■ DM Data Age ■ Quota Limit ■ Quota Used
NAS Qtree Inventory Metrics	Includes the following: <ul style="list-style-type: none"> ■ Number of Files ■ Number of Folders ■ Number of Users

Table A-11 NAS Share Analysis

Metric	Description
NAS Share Capacity Metrics	Includes the following: <ul style="list-style-type: none"> ■ Total Files Size ■ DM Data Age

Table A-11 NAS Share Analysis (*continued*)

Metric	Description
NAS Share Inventory Metrics	Includes the following: <ul style="list-style-type: none">■ Number of Files■ Number of Folders■ Number of Users

Table A-12 NAS File Classification Analysis

Metric	Description
NAS File Category Metrics	Includes the following: <ul style="list-style-type: none">■ Number of Files■ Total Files Size■ DM Data Age

Table A-13 NAS Volume File Classification Analysis

Metric	Description
NAS Volume File Category Capacity Metrics	Includes the following: <ul style="list-style-type: none">■ Number of Files■ Total Files Size■ DM Data Age

Table A-14 NAS QTree File Classification Analysis

Metric	Description
NAS QTree File Category Metrics	Includes the following: <ul style="list-style-type: none">■ Number of Files■ Total Files Size■ DM Data Age

Table A-15 NAS Share File Classification Analysis

Metric	Description
NAS Share File Category Metrics	Includes the following: <ul style="list-style-type: none"> ■ Total Files Size ■ Number of Files ■ DM Data Age

Table A-16 NAS File System Analysis

Metric	Description
NAS File System Category Metrics	Includes the following: <ul style="list-style-type: none"> ■ Total File System Capacity (GB) ■ Used File System Capacity (GB) ■ Free File System Capacity (GB) ■ Physical File System Capacity (GB)

Chargeback Analysis

In a chargeback analysis, you retrieve usage data so that you can bill customers for storage used, or track usage within a business unit or other entity.

Table A-17 Chargeback Analysis (Volume Capacity Metrics and File System Capacity Metrics)

Metric	Description
Volume Size (GB)	The size of the volume.
File System Total Capacity (GB)	The total storage capacity allocated to the file system. The allocated capacity can include storage from arrays, NAS, and directly-attached disks.
File System Free Capacity (GB)	The storage capacity that is not in use (no data is written to it) but allocated to the file system.
File System Used Capacity (GB)	The storage capacity allocated to the file system that is in use (data is written to it). This includes data in use by applications and databases.

Host Consumption reporting package

With this reporting package, you can view metrics that explain how file systems and databases are using their allocated storage.

Table A-18 Host Consumption Capacity Metrics

Metric	Description
Allocated Capacity (GB)	The amount of storage allocated to the host. This amount can include storage from arrays, NAS, and directly attached disks.
Claimed Capacity (GB)	The amount of storage allocated to a host in which that host's operating system has written a device handle to the LUN.
Unclaimed Capacity (GB)	The amount of storage allocated to a host in which that host's operating system has not written a device handle to the LUN.
Undiscovered Allocated Capacity (GB)	The amount of storage comprised of LUNs that have been masked to hosts that are not functioning as CommandCentral Storage managed hosts, or LUNs allocated to virtualization servers that cannot be discovered by CommandCentral Storage.
% Allocated Capacity Claimed	The percentage of a host's allocated capacity that has a device handle written to it. This value is calculated by dividing the Claimed Capacity (GB) by Allocated Capacity (GB).
% Allocated Capacity Unclaimed	The percentage of a host's allocated capacity that does not have a device handle written to it. This value is calculated by dividing the Unclaimed Capacity (GB) by Allocated Capacity (GB).
% Allocated Capacity Undiscovered	The percentage of a host's allocated capacity that is not being discovered by CommandCentral Storage. This value is calculated by dividing the Undiscovered Capacity (GB) by Allocated Capacity (GB).
Allocated SAN	The fiber channel (SAN) storage capacity allocated to the host.
Claimed SAN	The fiber channel (SAN) storage capacity allocated to a host where the host's operating system has written a device handle to the LUN.
Allocated DAS	The directly-attached storage (DAS) that is allocated to the host.
Allocated IDE	The IDE storage capacity allocated to the host.
Allocated ISCSI	The ISCSI storage capacity allocated to the host.

Table A-18 Host Consumption Capacity Metrics (*continued*)

Metric	Description
Allocated File Storage	The file-based storage capacity allocated to the host. This is NAS storage capacity and storage capacity allocated to a non-global zone through the global zone.
Claimed Loop	The Arbitrated Loop (AL) attached storage capacity allocated to a host where the host's operating system has written a device handle to the LUN.
Allocated Loop	The Arbitrated Loop (AL) attached storage capacity allocated to a host.
Claimed ISCSI	The ISCSI storage capacity allocated to a host where the host's operating system has written a device handle to the LUN.
Claimed File Storage	The file storage capacity allocated to a host where the host's operating system has written a device handle to the LUN.
Virtual Pool Allocated Capacity	The storage capacity that comes directly from the storage pool that is allocated to the virtual machine.
Storage (LUN) Capacity Directly Allocated to Virtual Machine	The storage capacity that is allocated when LUNs are directly allocated to the virtual machines, or by VIO servers and ESX servers.

Host Storage Allocation reporting package

With this reporting package, you can view metrics related to the LUNs that are allocated directly to hosts from arrays. This package includes the ability to apply tiers as well as storage costs to hosts or groups of hosts. Although the granularity of this namespace is at the LUN level, it will be most useful when aggregating those LUNs by one or more host.

Table A-19 Host Storage Allocation (Host Storage Allocation Metrics)

Metric	Description
Capacity Allocated to Hosts Directly (GB)	The total amount of LUN storage allocated directly to a host.
Total Cost	The cost associated with the capacity of the allocated LUN, as defined by the storage tier.

Table A-19 Host Storage Allocation (Host Storage Allocation Metrics) (*continued*)

Metric	Description
Allocated Host Count	The number of hosts that has had the LUN allocated to it. This can be useful for determining how many other hosts “share” the LUN. For example, you might want to divide the Total Cost by the Allocated Host Count.
Claiming Host Count	The number of hosts that are claiming (i.e. the host’s OS has written a device handle to) the LUN.
Adjusted Allocated Capacity	The distributed storage capacity of LUNs masked to multiple hosts within a clustering environment, and the exclusive capacity apportioned to LUNs designated for use by specific hosts.
Physical Capacity	The total physical capacity used by the LUN.
Consumed Physical Capacity	Stores the physical capacity of the allocated LUN. This capacity is only applicable to thin LUNs. The capacity is based on a LUN’s consumed capacity.
Consumed Capacity Total Cost	The cost associated with the usable capacity of allocated LUNs, based on storage tiers. This cost is only applicable to thin LUNs. It is based on a LUN’s consumed capacity.
Consumed Capacity Allocated to Host Directly	The total amount of LUN storage, in gigabytes, that is allocated directly to a host. For each LUN, this value is the same as the LUN Capacity (if LUNs are allocated directly to hosts), or 0 (if LUNs are used for administrative purposes or are unallocated). This capacity is only applicable to thin LUNs. It is based on a LUN’s consumed capacity.
Consumed Adjusted Allocated Capacity	The distributed storage capacity, in gigabytes, of LUNs that are masked to multiple hosts within a clustering environment; and exclusive capacity that is apportioned to LUNs designated for use by specific hosts. This capacity is only applicable to thin LUNs. It is based on a LUN’s consumed capacity.

Switch Analysis reporting package

The Switch Analysis reporting package lets you view metrics related to switches.

Table A-20 Switch Analysis (Switch Analysis Metrics)

Metric	Description
Total Port Count	The number of ports in a switch. These include used and unused ports.
Unused Ports	The number of ports in a switch that are not being used.
Used Ports	<p>The number of ports in a switch that are being used. These used ports include inter-switch links (ISLs), ports connected to an array, and ports connected to an HBA.</p> <ul style="list-style-type: none"> ■ ISL Ports - The number of E_ports in a switch that are connected to another switch. ■ Array Ports - The number of ports connected to an array port. ■ Host Ports - The number of ports connected to an HBA. ■ Other Used Ports - The number of ports that are being used to connect to something that CommandCentral Storage cannot discover.
% Ports Unused	The percentage of total switch ports that are not being used. This value is calculated by dividing Unused Ports by the Total Port Count.
% Ports Used	The percentage of total switch ports that are being used. This value is calculated by dividing Used Ports by the Total Port Count.

Tiered Storage Analysis reporting package

The Tiered Storage Analysis reporting package lets you view metrics from the array’s perspective all the LUNs that have been created and are either allocated or ready to be allocated. You can also view this data by the LUN’s tier, as defined in Settings > Storage Tiers. Although the granularity of this namespace is at the individual LUN level, it is most useful when aggregating the data by one or more arrays.

Table A-21 Tiered Storage Analysis (Tiered Storage Metrics)

Metric	Description
LUN Capacity (GB)	The total size of a LUN.
Total Cost	The cost associated with the usable LUN capacity, as defined by the LUN’s storage tier.
Allocated Hosts	The number of hosts that a LUN is allocated to (i.e. the LUN is masked to the host).

Table A-21 Tiered Storage Analysis (Tiered Storage Metrics) (*continued*)

Metric	Description
Claimed Hosts	The number of hosts for which the host's OS has written a device handle to the LUN.
Physical Capacity	The total physical capacity used by the LUN.
Consumed LUN Capacity	The total LUN capacity consumed on this LUN by writes from the host file systems.
Consumed Physical Capacity	The physical capacity of the allocated LUN. This metric does not apply to thin LUNs. For thin LUNs, this capacity is based on a LUN's consumed capacity.
Consumed Allocated to Host Directly	<p>The total amount of LUN storage capacity, in gigabytes, allocated directly to a host. For LUNs allocated directly to hosts, this value is the same as the LUN capacity. This value is zero if the LUNs are unallocated or used for administrative purposes.</p> <p>This capacity is only applicable for thin LUNs, and it is based on a LUN's consumed capacity.</p>
Consumed Adjusted Allocated Capacity	<p>The amount of distributed storage capacity, in gigabytes, of LUNs that are masked to multiple hosts in a clustering environment. It also includes exclusive capacity that is apportioned into LUNs designated for use by specific hosts.</p> <p>This capacity is only applicable for thin LUNs, and it is based on a LUN's consumed capacity.</p>
Adjusted Allocated Capacity	The amount of distributed storage capacity, in gigabytes, of LUNs that are masked to multiple hosts in a clustering environment. It also includes exclusive capacity that is apportioned into LUNs designated for use by specific hosts.
Usable LUN Capacity Detail Metrics	<ul style="list-style-type: none"> ■ Allocated to Hosts Directly (GB) – The total amount of LUN storage allocated directly to a host. For each individual LUN, this value is either the same as "Usable LUN Capacity (GB)" (in the case of LUNs allocated directly to hosts), or zero (in the case of other LUNs such as administrative or unallocated). ■ Unallocated (GB) – The total amount of LUN storage that is not directly allocated to a host. For each individual LUN, this value is either the same as "Usable LUN Capacity (GB)" (in the case of LUNs not allocated directly to hosts), or zero (in the case of LUNs directly allocated to hosts).

Ad hoc reports for server virtualization, thin provisioning, and storage categorization

This appendix includes the following topics:

- [About the reports](#)
- [Server virtualization reports](#)
- [Thin provisioning reports](#)
- [Storage Categorization Reports](#)

About the reports

You can create specific ad hoc reports for virtualization servers and thin LUNs. You can also create ad hoc reports to categorize storage (as allocated and claimed SAN storage, and allocated DAS storage for example).

Server virtualization reports

Enterprise Reporter supports server virtualization reporting for VMWare hosts and Solaris zones. The ad hoc host consumption reports include information about virtual pools and the storage capacity that is directly allocated to virtual machines.

For more information on creating ad hoc reports, see See [“Creating ad hoc reports”](#) on page 34.

In Query Studio, the Host Consumption reports provide server virtualization metrics and filters. [Table B-1](#) shows the virtualization server metrics.

Table B-1 Virtualization server metrics

Metric	Definition
Virtual Pool Allocated Capacity	The total amount of storage capacity that is designated for use by virtual pools.
Storage (LUN) Capacity Directly Allocated to Virtual Machines	The total amount of storage capacity that is directly allocated to virtual machines.

[Table B-2](#) shows the host consumption attribute filters.

Table B-2 Host consumption attribute filters

Use this filter	To display
Only VMWare Hosts	VMWare hosts only
Only Solaris Hosts	Solaris hosts only

Thin provisioning reports

Enterprise Reporter provides visibility into thin provisioning. Thin provisioning optimizes the utilization of available storage. Thin provisioning is a virtualization technology that allows physical storage capacity to be allocated only when needed from a pool of free storage. Thin provisioning extracts the full value of thin provisioned arrays. Thin storage environments allocate physical storage upon writes in a fixed size.

Thin provisioning addresses the problem of underutilization of available array capacity. Thin provisioning creates virtual disks and LUNs that appear much larger to hosts and applications than the physical storage that is allocated to them. The virtual LUNs available for thin provisioning are *thin LUNs*. A *thin pool* is a virtual pool of free storage available for thin provisioning.

Enterprise Reporter supports the following thin provisioning storage systems:

- Hitachi Universal Storage Platform V
- EMC Symmetrix DMX-3 and DMX-4
- EMC Symmetrix V-MAX

■ IBM XIV

The ad hoc host consumption reports include information about the consumed capacities of thin LUNs and thin pool source LUNs. (The consumed capacity is the actual amount of storage in use for the thin device.)

For more information on creating ad hoc reports, see See “[Creating ad hoc reports](#)” on page 34.

In Query Studio, the Host Storage Allocation reports provide thin provisioning metrics and filters. Table B-3 provides metrics for the thin provisioning capacities and costs.

Table B-3 Thin provisioning capacity and cost metrics

Metric	Definition
Consumed Physical Capacity	The physical capacity of the allocated LUN. This capacity is only applicable to thin LUNs, and is based on the thin LUNs' consumed capacity.
Consumed Capacity Total Cost	The cost that is associated with the usable capacity of the allocated LUNs. This cost is based on storage tiers. This cost is only applicable to thin LUNs, and is based on the LUNs' consumed capacity.
Consumed Capacity Allocated to Host Directly	<p>The total amount of LUN storage capacity that is allocated directly to a host. For each LUN, this value is one of the following:</p> <ul style="list-style-type: none"> ■ Equal to the LUN capacity (for LUNs that are allocated directly to hosts) ■ Zero (for LUNs that are unallocated, and LUNs that are used for administrative purposes) <p>This capacity is only applicable to thin LUNs, and is based on the LUNs' consumed capacity.</p>

Table B-3 Thin provisioning capacity and cost metrics (*continued*)

Metric	Definition
Consumed Adjusted Allocated Capacity	<p>The amount of storage capacity, in gigabytes, including the following:</p> <ul style="list-style-type: none"> ■ LUNs that are masked to multiple hosts in a clustering environment ■ The exclusive capacity that is apportioned into LUNs designated for use by specific hosts. <p>This capacity is only applicable to thin LUNs, and is based on the LUNs' consumed capacity.</p>

The Host Storage Allocation, Tiered Storage Analysis, and Chargeback Analysis packages provide a **Thin Status** attribute. Use this attribute to determine which LUNs are thin LUNs. From any of those packages, expand the **Host** view and the **LUN** view to see the **Thin Status** attribute.

Table B-4 shows the thin provisioning LUN attribute filters.

Table B-4 Thin provisioning LUN attribute filters

Use this filter	To display
Only Thin Pool Source LUNs	Only LUNs that are part of a thin pool
Only Thin LUNs	Only LUNs that support thin provisioning

Storage Categorization Reports

Enterprise Reporter provides ad hoc storage categorization reports for tracking different types of storage.

For more information on creating ad hoc reports, see See [“Creating ad hoc reports”](#) on page 34.

In Query Studio, the Host Consumption reports provide storage categorization metrics. [Table B-5](#) shows the metrics.

Table B-5 Host consumption storage categorization metrics

Metric	Definition
Allocated SAN	<p>The amount of SAN-based storage that is apportioned into LUNs and designated for use by specific hosts. This amount includes the following:</p> <ul style="list-style-type: none"> ■ Array LUNs masked to hosts ■ The LUNs on the JBODs, SCSI disks, and IDE disks that the hosts claim <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p> <p>This value does not include the following:</p> <ul style="list-style-type: none"> ■ LUNs designated for replication ■ LUNs allocated to a virtualization array, such as a TagmaStore (if CommandCentral Storage also discovers the virtualization array) <p>In NetApp filers, allocated storage only applies to storage that is configured for block (FC) mode.</p>
Allocated DAS	<p>The amount of directly-attached storage that is apportioned into LUNs and designated for use by specific hosts. This amount includes the following:</p> <ul style="list-style-type: none"> ■ Array LUNs masked to hosts ■ The LUNs on the JBODs, SCSI disks, and IDE disks that the hosts claim <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p>

Table B-5 Host consumption storage categorization metrics (*continued*)

Metric	Definition
<p>Allocated IDE</p>	<p>The amount of IDE storage that is apportioned into LUNs and designated for use by specific hosts. This amount includes the following:</p> <ul style="list-style-type: none"> ■ Array LUNs masked to hosts ■ The LUNs on the JBODs, SCSI disks, and IDE disks that the hosts claim <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p> <p>This value does not include the following:</p> <ul style="list-style-type: none"> ■ LUNs designated for replication ■ LUNs allocated to a virtualization array, such as a TagmaStore (if CommandCentral Storage also discovers the virtualization array) <p>In NetApp filers, allocated storage only applies to storage that is configured for block (FC) mode.</p>
<p>Allocated Loop</p>	<p>The amount of arbitrated loop-allocated storage that is apportioned into LUNs and designated for use by specific hosts. This amount includes the following:</p> <ul style="list-style-type: none"> ■ Array LUNs masked to hosts ■ The LUNs on the JBODs, SCSI disks, and IDE disks that the hosts claim <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p> <p>This value does not include the following:</p> <ul style="list-style-type: none"> ■ LUNs designated for replication ■ LUNs allocated to a virtualization array, such as a TagmaStore (if CommandCentral Storage also discovers the virtualization array) <p>In NetApp filers, allocated storage only applies to storage that is configured for block (FC) mode.</p>

Table B-5 Host consumption storage categorization metrics (*continued*)

Metric	Definition
Allocated ISCSI	<p>The amount of ISCSI-based storage that is apportioned into LUNs and designated for use by specific hosts. This amount includes the following:</p> <ul style="list-style-type: none"> ■ Array LUNs masked to hosts ■ The LUNs on the JBODs, SCSI disks, and IDE disks that the hosts claim <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p> <p>This value does not include the following:</p> <ul style="list-style-type: none"> ■ LUNs designated for replication ■ LUNs allocated to a virtualization array, such as a TagmaStore (if CommandCentral Storage also discovers the virtualization array) <p>In NetApp filers, allocated storage only applies to storage that is configured for block (FC) mode.</p>
Allocated File Storage	<p>The amount of NAS or file-based storage that is apportioned into LUNs and designated for use by specific hosts. This amount includes the following:</p> <ul style="list-style-type: none"> ■ Array LUNs masked to hosts ■ The LUNs on the JBODs, SCSI disks, and IDE disks that the hosts claim <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p> <p>This value does not include the following:</p> <ul style="list-style-type: none"> ■ LUNs designated for replication ■ LUNs allocated to a virtualization array, such as a TagmaStore (if CommandCentral Storage also discovers the virtualization array) <p>In NetApp filers, allocated storage only applies to storage that is configured for block (FC) mode.</p>
Claimed SAN	<p>The SAN-based LUNs in arrays and unified storage devices the host claims.</p> <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p>

Table B-5 Host consumption storage categorization metrics (*continued*)

Metric	Definition
Claimed Loop	<p>The arbitrated loop-discovered LUNs in the arrays and unified storage devices that the host claims.</p> <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p>
Claimed ISCSI	<p>The ISCSI-based LUNs in the arrays and unified storage devices that the host claims.</p> <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p>
Claimed File Storage	<p>The NAS or file storage that the host claims (when the file system is mounted on to the host).</p> <p>A host claims a LUN if the operating system writes a device handle for the LUN.</p>
Virtual Pool Allocated Capacity	<p>The amount of storage that comes directly from the storage pool that is allocated to the virtual machine.</p>
Storage Capacity Directly Allocated to Virtual Machine	<p>The amount of storage that is apportioned into LUNs and designated for use by specific hosts.</p> <p>The LUNs are directly allocated to the virtual machines or LPARS by VIO servers and ESX servers.</p>

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