

EMC ControlCenter
5.2 Service Pack 4

STORAGESCOPE REFERENCE GUIDE

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As part of its effort to continuously improve and enhance the performance and capabilities of the EMC product line, EMC periodically releases new versions of EMC ControlCenter. Therefore, some functions described in this guide may not be supported by all versions of EMC ControlCenter currently in use. For the most up-to-date information on product features, see your product release notes.

If an EMC ControlCenter feature does not function properly or does not function as described in this guide, please contact the EMC Customer Support Center for assistance.

Audience This guide documents the reporting capabilities provided by this EMC ControlCenter StorageScope product. It is part of the EMC ControlCenter documentation set and is intended for users of StorageScope reports.

Organization Here is an overview of where information is located in this guide.

- ◆ Chapter 1, *Introduction to StorageScope*, provides an introduction to StorageScope features and functionality.
- ◆ Chapter 2, *Multisite Reporting*, describes the optional Multisite reporting feature and give procedures to enable, disable and customize the feature.
- ◆ Chapter 3, *Report Summary*, provides a description of each StorageScope report. In addition, the report title, report layouts that are available, and a recommendation for the best use of each report are provided.

- ◆ Chapter 4, *Scheduling Backup Reports*, describes guidelines for scheduling backup jobs and StorageScope reports in order to ensure accurate and timely data.
- ◆ Chapter 5, *Creating Graphs*, provides guidelines for creating effective custom graphs.
- ◆ Chapter 6, *Customizing StorageScope*, describes StorageScope configuration properties that you can modify.
- ◆ Chapter 7, *Troubleshooting Tips*, addresses some frequently asked technical questions about StorageScope.
- ◆ Chapter 8, *Frequently Asked Questions*, provides StorageScope troubleshooting tips.

Related Documentation

You can access ControlCenter publications from the:

- ◆ *Documentation /Help* CD (provided with your EMC ControlCenter installation kit)
- ◆ *ControlCenter Documentation Library* (available from the StorageScope UI)
- ◆ *EMC Powerlink Documentation Library*
(<http://powerlink.emc.com>)

Conventions Used in This Guide

EMC uses the following conventions for notes and cautions.

A note presents information that is important, but not hazard-related.



CAUTION

A caution contains information essential to avoid data loss or damage to the system or equipment. The caution may apply to hardware or software.

Typographical Conventions

EMC uses the following type style conventions in this guide:

AVANT GARDE	Keystrokes
Palatino, bold	◆ Dialog box, button, icon, and menu items in text ◆ Selections you can make from the user interface, including buttons, icons, options, and field names
<i>Palatino, italic</i>	◆ New terms or unique word usage in text ◆ Command line arguments when used in text ◆ Book titles
Courier, italic	Arguments used in examples of command line syntax.
Courier	System prompts and displays and specific filenames or complete paths. For example: <pre>working root directory [/user/emc]: c:\Program Files\EMC\Symapi\db</pre>
Courier, bold	◆ User entry. For example: sympoll -p ◆ Options in command line syntax

Where to Get Help

Obtain technical support by calling your local sales office.

For service, call:

United States: (800) 782-4362 (SVC-4EMC)

Canada: (800) 543-4782 (543-4SVC)

Worldwide: (508) 497-7901

and ask for Customer Support.

Sales and Customer Service Contacts

For the list of EMC sales locations, please access the EMC home page at:

<http://emc.com/contact/>

For additional information on the EMC products and services available to customers and partners, refer to the EMC Powerlink Web site at:

<http://powerlink.emc.com>

Your Comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Please send a message to **techpub_comments@emc.com** with your opinions of this guide.

Introduction to StorageScope

This chapter provides an introduction to StorageScope features and functionality. Topics include:

◆ What's New in StorageScope	1-2
◆ Before You Begin	1-3
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What's New in StorageScope

EMC ControlCenter® StorageScope offers the following new features and functionality:

- ◆ A StorageScope™ home page has been redesigned to list the following:
 - Reports by category. Each category contains reports about a specific type of managed object or a specific business objective.
 - The 10 reports most recently viewed in this browser on this machine. Each report title in the list is a link that takes you directly to that report.
- ◆ Historical reporting has been enhanced to give you access to data from any single date over the past two year period. In addition, graphing data is now possible. To do so, select a single date and a report for only that day is generated (you cannot access a single report for a range of days).
- ◆ Totals for most numeric and capacity columns are now displayed at the end of each report. In addition, you have the option of displaying subtotals for those columns.
- ◆ Two additional fields have been added to the Hosts report (Last Discovered On and Days Since Last Discovered). These fields can help identify hosts that have not been updated recently and may be reporting stale data so that you can take corrective action in the ControlCenter. New columns have also been added to various Host reports to show maximum and minimum usage of file systems, logical volumes, and volume groups during the previous calendar day.
- ◆ A variety of new reports about Content Addressed Storage (CAS) clusters, pools, and storage nodes have been added.
- ◆ A new Array RAID Groups report has been added.
- ◆ Each Combined report (for example, All in Multiple Groups) now shows additional managed object types as well information about the managed object on which the object resides (the Container Object). For example, the host on which a file system resides will be shown for that file system.
- ◆ Custom fields that have been created in ControlCenter are now reported in StorageScope report.

Before You Begin

StorageScope configuration (.properties) files contain information about your specific StorageScope implementation. Some information, such as the Repository host name, is automatically entered into the appropriate configuration file when you install and start StorageScope. Some information, such as the names of custom report layouts, is automatically entered into the appropriate configuration file when the layouts are created. In addition, you can change some properties in the configuration files to customize your StorageScope application (see Chapter 6, *Customizing StorageScope*).

After you install and start StorageScope, but before you begin to use it, EMC highly recommends that you back up each configuration file and put the copy in a secure location. Backing up the files ensures that if for some reason a file is deleted or becomes corrupted, you can replace it with the backup copy. EMC also highly recommends that you periodically update your backup copies to keep them current.

Back up your StorageScope configuration file directory to a secure location:

The StorageScope directory under the ControlCenter root installation directory (ECC\StorageScope, for example) is the default location of the files you need for localization.

```
<Install_Root>\StorageScope\config\*
```

StorageScope Home Page

The StorageScope home page provides access to all StorageScope reports and administrative functions. The home page is the first page you see if you log in to StorageScope directly from your browser or you launch StorageScope from the ControlCenter Console.

The major components of the home page include:

- ◆ Navigation bar
- ◆ Report date
- ◆ Report site
- ◆ Report categories
- ◆ My recently viewed reports

Navigation Bar

The blue navigation bar at the top of the home page provides:

- ◆ Tabs that allow you to toggle between the Reports pages and the Administration pages
- ◆ Links that allow you to return to the home page from any other page, get help, access the ControlCenter Documentation Library, and log off StorageScope

Report Date

The **Report Date** box shows you the currently selected report date. Click the calendar icon next to the date to display the calendar. You can scroll through the calendar from year to year or month to month to select a specific report date.

Report Site

If Multisite reporting is enabled and at least one remote site has been added, a **Report Site** box allows you select the site for which you want to view reports. You can select **All Sites** or a specific site.

Report Categories

To make it easier for you to display a group of reports relevant to your specific needs or objectives, the leftmost side of the home page contains the reports organized into the following three major categories:

- ◆ Reports by Object

Reports in this section are grouped by the type of object (hosts, file systems, arrays, switches, and NAS file servers), from the perspective of that object. Each report appears in only one category.

- ◆ Reports by Use

Reports in this section are grouped to help you find answers to business questions. A single report may contain data that is useful for several purposes, in which case it appears in several categories.

- ◆ All Reports

This category contains all reports and all custom report layouts that have been created on the StorageScope server.

Each subcategory of reports listed under the major categories is a link that you select to display the specific reports in the subcategory. By default, the Array reports are displayed on the home page when you log in to StorageScope and whenever you return to the home page from another page. You can change this default to any subcategory. For example, you can change the default so that the reports used for Chargeback are displayed whenever you log in to StorageScope or return to the home page from any other page.

To get a description of the reports in each category, click the **Where do I find the reports I need?** button above the report categories.

My Recently Viewed Reports

This section on the rightmost side of the home page lists the 10 reports most recently viewed in this browser on this machine.

- ◆ The report title and layout is listed.
- ◆ Each layout (predefined or custom) is considered a separate report. For example, if you access both the Accessible and the Accessible No File System layouts of the Array Devices report is accessed, each is listed separately.
- ◆ Up to 10 reports are listed with the most recent at the top of the list. When the eleventh report is accessed, it appears at the top of the list and the report on the bottom of the list is removed.
- ◆ Reports are not repeated in the list. If a report is accessed a second time, the name of that report moves to the top of the list.
- ◆ Each report in the list is a link. Selecting a report link in the list takes you directly to that report and layout.

Getting Help

If you need more information about StorageScope, many resources are available to you, including the following:

- ◆ Online help
- ◆ Tooltips

StorageScope Online Help

Online help topics include detailed procedures and reference information about each report. You can access the online help in the following ways:

- ◆ Click **Help** in the blue navigation bar at the top of any StorageScope page. A new browser window opens. The online help Table of Contents is displayed in the left pane along with Index, Search, and Glossary tabs. The Index provides an alphabetized list of topics and keywords in the online help. The Search facility allows you to find topics that contain specific keywords. The Glossary contains brief definitions for terms used throughout the StorageScope user interface and documentation.
- ◆ Click **About this page ?**. A new browser window opens with the help topic for the specific page you are viewing. On the report-specific help page, you can expand the links or click the image icon next to a link to get to get additional information about a column.

Tooltips

To get a brief description of the data in a specific column of a report or Administration table, position the cursor over the column header.

Navigating the Reports

Throughout the reports, you will see managed objects and groups of objects in table cells that are hyperlinked. Selecting one of these links allows you to jump to another report that provides more details about the hyperlinked object or group. For example:

- ◆ Selecting a hyperlink in the Groups column on the Arrays by Group report takes you to a detailed Arrays by Group report for that group.
- ◆ Selecting a link in the Host column on the Hosts report displays the Configuration report for the specific host.
- ◆ Selecting a link in the # NAS File Systems column on the File Systems Group List report takes you to File Systems report for those file systems.

Dates and Times

Each time you start a new StorageScope session (that is, log into StorageScope), StorageScope establishes an *in-session* date and time. The default in-session date and time is the last date and time for which reports are available.

If no reports are available (for example, if this is a new StorageScope installation and reports have not yet been run), no in-session date or time is set until reports are run for the first time, and then you can select a date.

StorageScope maintains this in-session date and time throughout your session until you select a different date and/or time. The new date and/or time that you select becomes the in-session date and time until you change it again.

The Calendar

The calendar shows you the current in-session date. The date is highlighted with a blue background. The current in-session date is also displayed in the **Report Date** box on each report page. Other conventions used on the calendar are as follows:

- ◆ A red box highlights today's date.
- ◆ A hyperlinked date means that reports are available for that date.

Time

The current in-session time is displayed in the **Time** drop-down list box on each report page. The default in-session time is the time of the last report run for the selected date.

If for any reason the selected report is not available (for example, if Multisite is enabled, the Repository is not available, or the report failed for some other reason), this list box will be empty. You will also see a *Report Unavailable* error message.

How Dates and Times Are Calculated

Report dates and times are displayed in terms of local time. StorageScope takes the GMT time stamp on the report and applies the time zone offset set on the local machine to convert GMT into local time. When you launch reports directly in your browser, the browser supplies StorageScope with the time zone offset that is set on the browser's local machine. When you launch reports from ControlCenter, the time zone offset is based on the setting for the local machine on which the ControlCenter Console (Java or Web) is installed.

Exceptions to this local time rule are noted in the tooltip for the specific column. In addition, dates and times on the Report History page are displayed in GMT, not local time.

Seasonal Time Changes

It is important to note that when you select a report to display, StorageScope dynamically calculates the local time at which the report was run. This means that, in those locations that observe seasonal time changes, reports that are run prior to a time change and are then displayed after the time change will display a time relative to the current time zone offset and not the offset at the time the report was run.

For example, suppose that reports are run at 4:00 a.m. local time at a location that observes daylight savings changes. After the time change, those reports will display a time one hour earlier or later than the original 4:00 a.m. report time.

About Tree Table Reports

Tree table reports show you how ControlCenter managed objects have been grouped in ControlCenter for reporting purposes. The by Group reports are tree table reports (for example, Arrays by Group). The Host Chargeback report is also a tree table report, but slightly different from the other tree reports in that the groups in the tree table can include unlike objects (for example, databases, volume groups, and file systems).

Tree table reports do not support sorting data in columns or filtering data in custom report layouts.

The All Groups Group

When a tree table report is first displayed, you see the All Groups group under which all parent groups appear. The All Groups group is created by StorageScope to contain the groups you create in ControlCenter. The All Groups group always has a Group ID of -99999. From a parent group, you can drill down to its subgroups and then to the individual objects that belong to each subgroup.

If Multisite is enabled, site names replace the All Groups group. For more information, see Chapter 2, *Multisite Reporting*.

Tree Table Reports and Report Layouts

Similar to all other reports, the selected report layout (and any associated graph) persists in a tree table report until you select a different layout or access a different report. If you select a subgroup in the tree table, a report for that subgroup is displayed in the currently selected layout.

Graphing Tree Table Reports

A graph for a tree table report depicts the aggregate data for each group or subgroup rather than data for the individual objects that make up each group. Therefore, you can only create a custom graph for a group or subgroup that contains other subgroups.

However, the graph icon appears next to the **Layout** box if a custom graph has been created for any group in the tree table report. This means that if you create a custom report layout for a subgroup that does not contain any subgroups, you may see the graph icon even if no graph is available for that subgroup.

Although you can create multivariate trend graphs for tree table reports, it is not recommended for reports with a large number of groups and subgroups. The more groups in the report, the more objects that need to be displayed in the legend leaving less room for the graph itself. EMC recommends that you do not use multivariate trend graphs for more than 10 groups.

For more information about custom graphs, see Chapter 5, *Creating Graphs*.

Printing Tree Table Reports

The only **Print** option available for tree table reports (both in HTML format and PDF) is **This Page** (the currently displayed page). The tree in a tree table report is always fully expanded in the print document. If you have a report with many groups that contain many objects, it may take some time for the print document to display.

Exporting Tree Table Reports

You can export tree table reports in much the same way that you export other reports into CSV or XML format. As when you print a tree table report, the tree is always fully expanded in the export document.

Because tree table reports contain data for both groups of objects and individual objects, a special Basic (for Export) layout is provided. This export layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are:

- ◆ **Object Type** — Identifies whether the report row represents a group or subgroup (Group) or an object (host, storage array, NAS file system, and so on)
- ◆ **Group Path** — The complete path to the group or managed object through all its parent groups
- ◆ **# Subgroups** — The number of subgroups in the group

Although you can export any tree table report layout and can create custom report layouts for export, it is highly recommended that you include the three columns described above in the layout to maintain the hierarchical structure of the report and the relationships between groups and objects.

If you export a tree table report that was generated with a version of StorageScope previous to 5.1.2, the Object Type and Group Path columns will be empty.

Totals and Subtotals

By default, StorageScope displays totals for most numeric and capacity columns. In addition, you have the option of displaying subtotals for those columns.

Whether or not subtotals can be displayed depends on certain report conditions which are described in *Subtotals* below.

Totals

By default, totals are automatically calculated for most numeric and capacity columns, and then displayed in the last row of the report. The following is a list of important things you should know about how totals operate.

- ◆ The totals row only appears as the last row in the report even in multipage reports.
- ◆ Totals do not appear on the General tab of configuration reports.
- ◆ The totals row is not displayed in tree table reports, but totals are provided through the grouping mechanism.
- ◆ Totals are simple totals, that is the sum of the values in the column excluding subtotals. Double counting is not eliminated.
- ◆ Totals are recalculated and redisplayed whenever you apply new filters to the report or you change the report date and/or time.
- ◆ The number (count) of items included in each total is displayed.
- ◆ The totals row does not affect (decrease) the maximum number of rows allowed per report page.
- ◆ Totals cannot be exported.
- ◆ Totals only print in HTML format if they are displayed on the page you are printing.

Subtotals

When you begin a StorageScope session, subtotalling is off by default. To turn subtotalling on for the current session, the following conditions must be met:

1. The report must contain at least one column for which totals can be calculated.
2. The report must contain at least one column that supports subtotalling and the report must be sorted by such a column.

To find out if a column supports subtotalling, see the online help topic for the column in the StorageScope online help.

The following is a list of important things you should know about how subtotals operate.

- ◆ When the two conditions mentioned above are met, the subtotals icon appears to the left of the **Layout** box. The icon reflects the current state of subtotals for the report currently being viewed. Click the icon to toggle the subtotal display ON (depressed) and OFF (not depressed).
- ◆ Subtotalling is turned off when the session is terminated.
- ◆ Subtotals do not appear on the **General** tab of the configuration reports or in tree table reports.
- ◆ Subtotal rows do not affect (decrease) the maximum number of rows allowed per report page.
- ◆ In HTML format, subtotals only appear in the print document if they appear on the page you are printing.
- ◆ If a report contains more than 5000 rows, subtotals will not be provided in the print document.
- ◆ Subtotals cannot be exported.

Important

Different agents may report different strings for the same data. Since subtotalling is based on unique sort values, this means you may get several subtotals for the same data.

For example, if the sort column is Array Device Type and the storage agents return the same exact string for RAID 0 devices you will get one subtotal. However, if the Storage Agent for Symmetrix® agent returns RAID0, the Storage Agent for CLARiiON® returns RAID-0, and the Storage Agent for HDS return RAID:0, then you are going to get three different subtotals.

Agents and Data Accuracy

Agents are processes that run on hosts and manage your storage environment. Which agents you install determines not only the kind of data collected and reported in StorageScope reports, but also the completeness and accuracy of that data. Agents and their data collection policies (DCPs) are managed in ControlCenter. The following sections provide general guidelines about the agents you need to get complete and accurate data in the StorageScope reports.

Host Data

To get accurate data about a host (that is, data about the host itself), the appropriate host agent must be installed and running on the host.

To get accurate data in the Hosts reports about an array that the host is accessing, that array and (if applicable) the fabric to which the array is connected must first be discovered. Until the array and fabric have been discovered, you will not get data about storage on that array that is allocated to or accessible to the host.

For example, if the host agent is run but the appropriate storage agents are not run, Host – Accessible – Used capacity (array capacity accessible to the host that is assigned to host file systems or databases) may be greater than Host – Accessible – Usable capacity (array device capacity on which the host can perform I/O operations) since array device capacity has not been collected by the storage agent.

Data for Manually Created Hosts

When you manually create a host in the ControlCenter Console, only HBAs that you assign to the host when it is created are reported in StorageScope. Both capacity data (including accessible and allocated metrics) and host-to-array path relationships for manually created hosts are derived from the LUN masking information for those HBAs and fabric information from the Fibre Channel Connectivity (FCC) agent.

Array Data

To get accurate data about an array (that is, data about the array itself), the array must first be discovered by the storage agent for that array.

Array information related to device allocation may be incorrect if the fabric is not discovered. Not only should the FCC agent be installed and running, but you should also use it to discover the fabric.

However, even with both the storage agent and FCC agent installed, you will not get host data about SCSI connected hosts or hosts to which HDS and ESS arrays are connected by a direct fibre connection. In this case, in order to get host data about the storage used, the appropriate host agent must be installed and running on the host.

Symmetrix LUN Masking Data

In addition to the other requirements for obtaining array data, the Symmetrix SDM agent is required in order to get Symmetrix LUN masking data and port WWNs.

Database Data

The Database Agent for Oracle is required for information about Oracle databases. The Database Agent for DB2 collects information about DB2 databases that reside on mainframes. For all other types of databases (Informix, Sybase, SQL Server, and DB2 on UNIX platforms), the Common Mapping Agent collects database information.

NAS Data

In addition to the Storage Agent for NAS, you need the Storage Agent for Symmetrix, and the Storage Agent for CLARiiON®, in order to fully populate the NAS File Server Storage Devices report for Symmetrix and CLARiiON arrays.

About Clusters

StorageScope reports on array-based shared volume groups as well as the logical volumes, file systems, databases, and database datafiles residing on those shared volume groups. These types of host entities are typically found in clustered host configurations.

Shared Concurrent Mode Clusters

For a cluster operating in shared concurrent mode, metrics for any shared resources are reported for each node in the cluster. For example, a cluster operating in shared concurrent mode contains Host A and Host B. These nodes share two volume groups (vg00 and vg01). In the Host Volume Groups report there would be four records for the cluster: Host A/vg00, HostA/vg01, HostB/vg00, and HostB/vg01.

The Shared Volume Group Set column identifies which volume groups are shared. Shared volumes groups will have the same Set number (for example, Set 1).

Shared Exclusive Mode Clusters

For a cluster operating in shared exclusive mode, only the active node in the cluster has access to shared volume groups and the managed objects (logical volumes, file systems, databases, and database datafiles) residing on those volume groups.

If failover occurs, the formerly active (now passive) node will continue to be reported until its host agent (and the database agent if databases are shared) rediscovers that node. In order for the newly active node to be reported, it also must be rediscovered by its host agent.

Group Reports

In the group reports (for example, Hosts by Group), each node in a cluster operating in shared concurrent mode is listed under each group to which it belongs. If both nodes belong to the same group, only the volume group record with the most recent time stamp is used when the group total is calculated so there is no double-counting. However, if the nodes belong to different groups, the shared volume group would be counted in the total for each of those groups. This calculation method also applies to other shared resources.

Check the Last Update Date column to see which shared volume group record has the most recent time stamp.

For a cluster operating in shared exclusive mode, only the currently active node and the shared resources it is accessing are reported and included in group totals.

Partially Shared Volume Groups

Partially shared volume groups (volume groups in which only some host devices are shared) are double-counted in group totals. To prevent double-counting in group totals EMC recommends that you do the following:

- ◆ When configuring the default volume group, do not include shared devices.
- ◆ If you do accept the default when creating this volume group, move shared devices out of it.

If a volume group is partially shared, Other appears in the Volume Group Shared? column. Refer to the documentation for your volume manager for more information about default volume groups and shared devices.

Raw Devices and Logical Volumes

In a cluster environment, StorageScope does not support databases that use raw devices or raw logical volumes. As a result:

- ◆ In the Host Database Datafiles report, all datafiles on those raw logical volumes will have a value of Unknown in the Resides On column for the passive node.
- ◆ In the Hosts Databases report, Database - Total and Database - Used capacities will be shown for the passive node.
- ◆ In the Host Chargeback and Hosts by Group reports, there will be double-counting when databases using raw devices or raw logical volumes on both active and passive nodes are assigned to the same group.

Host Databases Report

If a database instance resides on a cluster operating in concurrent mode, you will see an entry for each node accessing the database. If a database instance resides on a cluster operating in shared exclusive mode with failover, you may see multiple entries for that instance: one for the currently active node and one for the passive node if it was active at any time. Database capacities for the passive node will be 0 (zero).

Tablespaces and Oracle Parameters Reports

Since the Database Agent for Oracle cannot remove database attributes for the passive node from the Repository, all attributes of shared Oracle databases in both active and passive nodes are reported.

Host Chargeback Report

It is possible to assign shared managed objects to different groups. You can even assign a shared managed object to multiple chargeback groups. In this case the shared managed object is counted in each group (but only once) to which it belongs. For example, a cluster operating in shared concurrent mode contains Host A and Host B. These nodes share a volume group (vg00) and a file system (fs1) on that volume group. Host A is assigned to the Accounting chargeback group and Host B is assigned to the IT chargeback group. In this case, the shared volume group (vg00) and the shared file system (fs1) would be counted in the totals for both the Accounting group and the IT group.

Volume Group Shared?

This column indicates if the volume group is shared by multiple hosts and the following values may appear:

- ◆ Yes — The volume group is shared
- ◆ Other
 - The volume group resides on a Volume Configuration Management Database (VCMDB) device
 - The volume group is the Cluster Lock VG
 - The volume group is an LVM mirrored volume group
 - The volume group was created with an unsupported volume manager
 - Blank (null) — The volume group is not shared or it cannot be determined if it is shared

Shared Volume Group Set

This column helps you identify which volume groups are shared by which nodes in a cluster. Each time you run StorageScope reports, each shared volume group is dynamically assigned an identifier in the form Set x (for example, Set 1). This identifier is dynamically and sequentially assigned and may change from report run to report run to account for volume groups that may no longer be shared or have been removed.

SMI-S Support

The Storage Agent for SMI collects generic information about arrays that have Storage Management Initiative Specification (SMI-S) support. However, the current SMI-S does not support all features of specific array types. As a result, some data for arrays discovered by the Storage Agent for SMI is not reported.

Data not reported for arrays discovered by the Storage Agent for SMI is also not included in the corresponding host reports. This means that if a host is connected to multiple arrays, data such as allocation and replica capacities will only be reported for those arrays discovered by native storage agents.

Multisite Reporting

This chapter describes the optional Multisite reporting feature and give procedures to enable, disable and customize the feature.

- ◆ Overview2-2
- ◆ Setting Up Multisite Reporting2-6
- ◆ Customizing Multisite Reporting2-9

Overview

Multisite reporting is an optional StorageScope feature that allows you to retrieve, consolidate, and view report data from multiple StorageScope sites on a single StorageScope site (Figure 2-1).

- ◆ When Multisite reporting is enabled, the administrator can add sites, change information about sites, and delete sites (except the Master Site which cannot be deleted). If more than one site exists, users can select the sites for which they want to view reports. See *Enabling Multisite Reporting* on page 2-6.
- ◆ When Multisite reporting is disabled, you can only change information about and view reports for the Master Site. See *Disabling MultiSite Reporting* on page 2-6.
- ◆ If you disable Multisite reporting after it has been enabled, any sites that were added will no longer be visible in the UI. However, any remote site information or report data stored on the Master Site will be retained. If you re-enable Multisite reporting at a future date, the remote sites will be visible again and any stored report data for the sites will be available.
- ◆ By default, a StorageScope site accepts any request for data from any other StorageScope site that has Multisite reporting enabled and to which it has been added as a remote site. To prevent a specific StorageScope site from responding to requests from other sites regardless of whether it has been added as a remote site, you must disable site-to-site communication on that site. See *Disabling Site-to-Site Communication* on page 2-7 and *Enabling Site-to-Site Communication* on page 2-8.

The StorageScope online help provides the procedures to perform the day-to-day tasks of managing and using the Multisite reporting feature in the StorageScope UI.

About the Master Site

Each StorageScope server views itself and the specific Repository it accesses as a Master Site. However, in any discussions of Multisite reporting in this guide or in the StorageScope online help, the Master Site refers to the StorageScope server on which Multisite reporting is enabled and the Repository that it accesses.

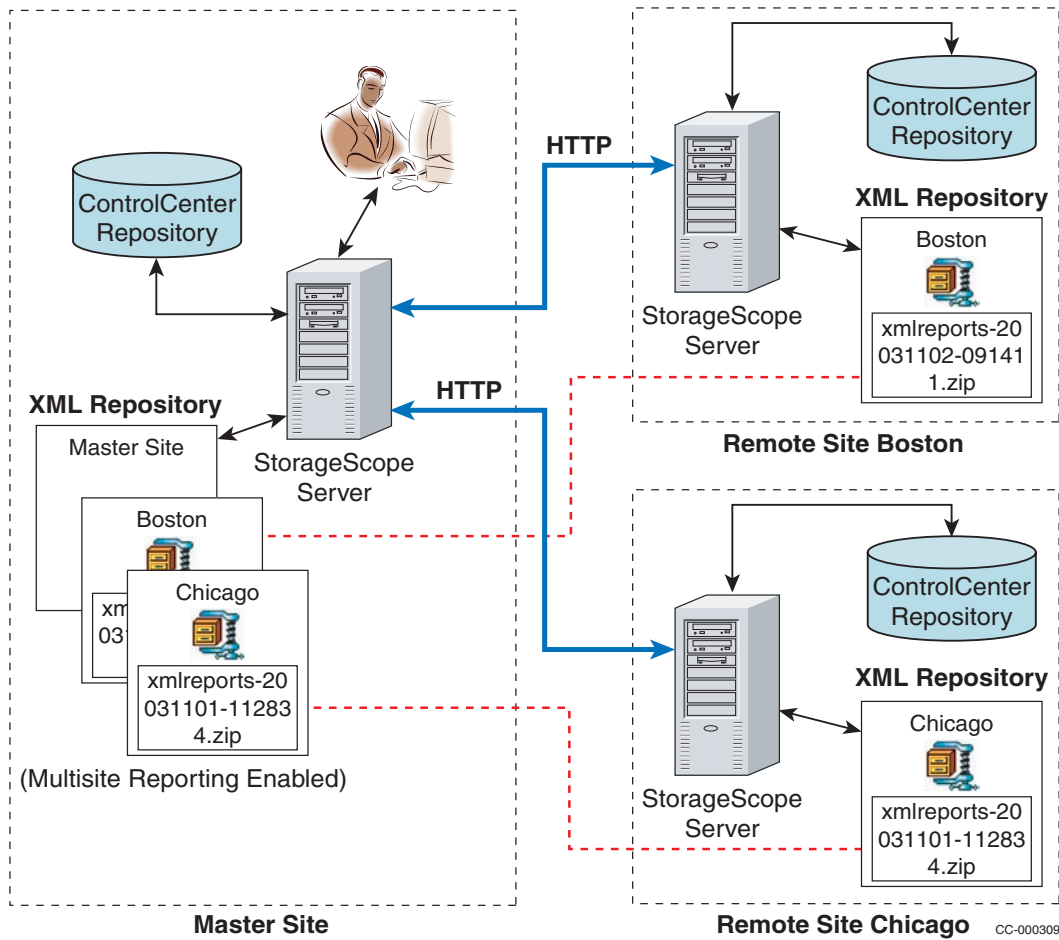


Figure 2-1 Multisite Reporting Overview

About the Multisite Report Data

It is important to note that the Master Site does not validate, check, or manipulate the report data it retrieves from remote sites. This means that it is possible that data about the same managed object, retrieved from different sites, may vary in terms of completeness.

For example, suppose a Symmetrix® array can be seen by two hosts, each host within a different ControlCenter infrastructure. The Storage Agent for Symmetrix is installed on one host, but only the host agent is installed on the other. As a result, data about the array when discovered by the host agent may be incomplete as compared to the data when discovered by the storage agent. If you select to view an **All Sites** report that contains that array, data from both sites will be reported and the differences will be more apparent.

How Data Is Retrieved

Each time the Master Site runs its own reports (either on schedule or manually) against the Repository, it also connects to any remote sites that have been added and requests archived report data from them.

This data is duplicated on the Master Site so that it does not have to contact the remote site each time a user selects a report to view.

Reports are retained on the Master Site according to the Master Site's retention policy. By default, all reports are kept indefinitely but you can change this default on the **Schedule and Retention** page on the StorageScope UI.

How Much Data Is Retrieved

By default, the request for report data sent to a remote site by the Master Site contains the most recent date for which the Master Site has reports from the remote site, as well as the maximum number of days worth of report data the Master Site wants. By default, the Master Site requests up to seven days worth of report data (one report run per day).

If no report data exists on the remote site which is more recent than the report date sent in the request, the remote site tells the Master Site that no report data is available. However, if there is more recent report data available on the site, it will return the most recent reports (up to seven days worth, one per day).

You can change the number of days worth of data requested by the Master Site. For example, you could specify that the Master Site request remote sites to return up to 30 days worth of data instead of just seven. See *Customizing Multisite Reporting* on page 2-9 for the procedure to change this parameter.

All Sites Reports

You can choose to view reports for a single selected site or for **All Sites**. In an **All Sites** report, the most recent report for the selected date from each site is displayed together. Data in an **All Sites** report is sorted by the site name.

By default, if no data is available from a site for a given date, that site's data is not included in the report. However, you can configure StorageScope on the Master Site to search its archives for data for that site to include in the report even if the only data available is from a previous date. See *Search for Report Data* on page 2-10 for the procedure to configure this behavior.

Setting Up Multisite Reporting

The Multisite reporting is disabled by default when you first install StorageScope. To use the feature, you must enable it on the StorageScope server that you want to collect report data from remote sites.

Enabling Multisite Reporting

The property that enables and disables Multisite reporting is in the `sites.properties` file in the `<Install_Root>\StorageScope\config` directory. The default for Multisite reporting is *disabled*.

To enable Multisite reporting:

1. Make a backup copy of the `sites.properties` file in case you need to restore the original.
2. Stop the StorageScope service.
3. Open the `sites.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:
`services.SiteManagementService.enableMultisite=false`
5. Change **false** to **true**. For example:
`services.SiteManagementService.enableMultisite=true`
6. Save and close the file.
7. Start the StorageScope service.

Disabling MultiSite Reporting

The property that enables and disables Multisite reporting is in the `sites.properties` file in the `<Install_Root>\StorageScope\config` directory. The default for Multisite reporting is *disabled*.

To disable Multisite reporting:

1. Make a backup copy of the `sites.properties` file in case you need to restore the original.

2. Stop the StorageScope service.
3. Open the `sites.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:

```
services.SiteManagementService.enableMultisite=true
```
5. Change the **true** to **false**. For example:

```
services.SiteManagementService.enableMultisite=false
```
6. Save and close the file.
7. Start the StorageScope service.

Adding Remote Sites

After you enable the feature, you can use the **Add Site** page in the UI to add the remote sites from which you want report data retrieved. When you first add a site, no reports are yet available for the site. Before you can view any reports from the site, they must be retrieved by the Master Site. This should happen automatically within 15 minutes of adding the site. Alternatively, you can manually force reports to be retrieved right away.

See the StorageScope online help for the procedures to add and delete remote sites.

Disabling Site-to-Site Communication

The property that controls site-to-site communication is in the `stsapplication.properties` file in the `<Install_Root>\StorageScope\config` directory. The default for site-to-site communication is *enabled*.

To disable site-to-site communication:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore the original.
2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.

4. Find the following property:

```
services.XMLDataManagementService.enableSiteToSite=true
```

5. Change the value **true** to **false**. For example:

```
services.XMLDataManagementService.enableSiteToSite=false
```

6. Save and close the file.
7. Start the StorageScope service.

Enabling Site-to-Site Communication

The property that controls site-to-site communication is in the `stsapplication.properties` file in the `<Install_Root>\StorageScope\config` directory. The default for site-to-site communication is *enabled*.

To enable site-to-site communication:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore the original.
2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:

```
services.XMLDataManagementService.enableSiteToSite=false
```

5. Change the value **false** to **true**. For example:

```
services.XMLDataManagementService.enableSiteToSite=true
```

6. Save and close the file.
7. Start the StorageScope service.

Customizing Multisite Reporting

You can change the following properties to customize Multisite reporting for your specific needs and environment:

- ◆ How many days worth of report data (one report run per day) is requested from each remote site
- ◆ How far in the past StorageScope searches its archives for remote site reports
- ◆ How long StorageScope waits to establish a connection with a remote site before timing out

These properties are located in the `stsapplication.properties` file. By default, this file resides in the `<Install_Root>\StorageScope\config` directory.

How Much Report Data

To specify the number of days worth of report data requested from remote sites:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore the original.
2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:

```
services.XMLDataManagementService.siteToSiteFileCount=7
```

5. Specify the number of days worth of reports. A day consists of the reports from one report run. The default is 7 days. The maximum is 60 days.
6. Save and close the file.
7. Restart the StorageScope service.

Search for Report Data

In an **All Sites** report, if no report data is available for a site for the selected report date, by default no data for the site is included in the report. However, you can configure StorageScope on the Master Site to search its archives for data for that site to include in the report even if the only data available is from a previous date.

To specify how many days in the past the Master Site should search its archives for report data:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore the original.
2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:

```
services.XMLDataManagementService.maxAgeOfSiteData=0
```

5. Specify how many days in the past that the Master Site should search its archive for report data for a site. The default is 0 (zero) which means do not include a site's data.
6. Save and close the file.
7. Restart the StorageScope service.

Remote Site Connection Time-out

By default, the StorageScope waits 10 seconds to establish a connection with a remote site and to begin data transfer. If the 10-second interval expires, StorageScope aborts the attempt.

StorageScope will retry the connection two more times if necessary. This means that there could be a delay of up to three times the time-out value before you see a time-out error message.

To specify how long StorageScope waits to establish a connection with a remote site:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore the original.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:
`services.SiteManagementService.httpTimeout=10`
5. Specify how many seconds the Master Site should wait to establish a connection with a remote site. The default is 10 seconds and the maximum is 120 seconds.
6. Save and close the file.
7. Restart the StorageScope service.

Report Summary

This chapter provides a description of each StorageScope report. In addition, the report title, a list of available report layouts, and recommendations for the best uses of each report are provided.

◆ Array Reports	3-2
◆ Connectivity Reports	3-11
◆ Host Reports	3-16
◆ Backup Reports	3-27
◆ NAS Reports	3-30
◆ File Summary Reports	3-36
◆ CAS Clusters	3-44
◆ Combined Reports	3-48

Array Reports

The Array reports contain detailed information about your storage arrays, including array properties, capacity and utilization metrics, storage devices, ports, storage pools, and replicas.

by Group

Report Title Arrays by Group – *Layout*

General Description Provides a list of user-defined array groups and the arrays that belong to each group with the attributes for and capacities of each group and each array. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.

Predefined Layouts

Layout	Description
Allocation vs. Utilization	Summary of allocated and used array capacity. Metrics include how much storage is allocated and usable, how much allocated storage is accessible to hosts, and how much accessible storage has been set aside for file systems and databases.
Basic (for export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type — Identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path — The complete path to the group or managed object through all its parent groups • # Subgroups — The number of subgroups in the group
Configuration	Snapshot of general array hardware and software properties.
Raw Summary	High-level summary of raw total, configured, unconfigured, allocated, and unallocated array capacities.
Raw Detail	Details about raw array capacities both allocated and unallocated. Raw allocated capacities are broken down by logical device type (Primary, Local Replica, and Remote Replica).
Raw and Usable	Summary of raw and usable array capacities.
Usable Summary (default)	Summary of usable array capacities including configured, unconfigured, allocated, and unallocated capacities.

Layout	Description
Usable Detail	Details about usable total and allocated array capacities by device type (Primary, Local Replica, and Remote Replica). This layout also includes a summary of unallocated usable capacities.
Utilization Summary	Summary of accessible array capacities including used and free accessible capacity.
Utilization Detail	Details about accessible array capacities including used and free accessible capacity. This layout also includes a summary of the numbers of accessible devices.

Best Use of Report

- ◆ Capacity planning
- ◆ Determine a baseline of usable capacity
- ◆ Review your infrastructure for storage use

All Arrays

Report Title Arrays – Layout

General Description Provides a list of arrays with the attributes for and capacities of each array including array and replica capacity and allocation.

Predefined Layouts

Layout	Description
Allocation vs. Utilization	Summary of allocated and used array capacity. Metrics include how much storage is allocated and usable, how much allocated storage is accessible to hosts, and how much accessible storage has been set aside for file systems and databases.
Configuration	Snapshot of general array hardware and software properties.
Raw Summary	High-level summary of raw total, configured, unconfigured, allocated, and unallocated array capacities.
Raw Detail	Details about raw array capacities both allocated and unallocated. Raw allocated capacities are broken down by logical device type (Primary, Local Replica, and Remote Replica).
Raw and Usable	Summary of raw and usable array capacities.
Usable Summary (default)	Summary of usable array capacities including configured, unconfigured, allocated, and unallocated capacities.
Usable Detail	Details about usable total and allocated array capacities by device type (Primary, Local Replica, and Remote Replica). This layout also includes a summary of unallocated usable capacities.

Layout	Description
Utilization Summary	Summary of accessible array capacities including used and free accessible capacity.
Utilization Detail	Details about accessible array capacities including used and free accessible capacity. This layout also includes a summary of the numbers of accessible devices.
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report Compare capacity and allocation metrics for all arrays.

Group List

Report Title Array Group List – Layout

General Description Provides a list of user-defined array groups (parent and subgroup) and details about each group.

Predefined Layouts

Layout	Description
Allocation vs. Utilization	Summary of allocated and used array capacity. Metrics include how much storage is allocated and usable, how much allocated storage is accessible to hosts, and how much accessible storage has been set aside for file systems and databases.
Raw and Usable	Summary of raw and usable array capacities.
Raw Summary	High-level summary of total, configured, unconfigured, allocated, and unallocated raw array capacities.
Raw Detail	Details about raw array capacities both allocated and unallocated. Raw allocated capacities are broken down by logical device type (Primary, Local Replica, and Remote Replica).
Usable Summary (default)	Summary of usable array capacities including configured, unconfigured, allocated, and unallocated capacities.
Usable Detail	Details about total and allocated usable array capacities by device type (Primary, Local Replica, and Remote Replica). This layout also includes a summary of unallocated usable capacities.

Layout	Description
Utilization Summary	Summary of accessible array capacities including used and free accessible capacity.
Utilization Detail	Details about accessible array capacities including used and free accessible capacity. This layout also includes a summary of the numbers of accessible devices.
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report

- ◆ View allocation and utilization details for groups and subgroups
- ◆ Compare metrics across groups over time
- ◆ Determine which groups are running out of accessible capacity or are underutilizing accessible capacity
- ◆ Capacity planning

Device Allocation

*Report Title*Array Device Allocation – *Layout**General Description*

Lists all array devices and provides details about each device including the capacity of the device (raw and usable), whether the device is allocated, and whether it is accessible to hosts.

Predefined Layouts

Layout	Description
All Devices	Configuration and capacity details for array devices that are accessible to hosts and are used by file systems.
3rd. Party Storage – All Devices	Configuration and capacity details for all array devices on third-party storage (HDS, HP XP, IBM ESS, and HP StorageWorks).
CLARiiON® – All Devices	Configuration and capacity details for all array devices on CLARiiON arrays.
Host Accessible	Configuration and capacity details for array devices that are accessible to hosts.
Accessible Unused Devices	Configuration and capacity details for array devices that are accessible to hosts but are not used by any file systems.
Accessible Used Devices	Configuration and capacity details for array devices that are accessible to hosts and are used by file systems.
Array Allocated	Configuration and capacity details for all array devices that are allocated for use by the array.
Host Allocated (default)	Configuration and capacity details for all array devices that are allocated to hosts.

Layout	Description
Host Allocated Local Replica Dev.	Configuration and capacity details for local replica array devices that are allocated to hosts.
Host Allocated Primary Devices	Configuration and capacity details for primary array devices that are allocated to hosts.
Host Allocated Remote Replica Dev.	Configuration and capacity details for remote replica array devices that are allocated to hosts.
Host Unallocated Devices	Configuration and capacity details for all array devices that are not allocated to hosts.
Host Unallocated Local Repl. Dev.	Configuration and capacity details for local replica array devices that are not allocated to hosts.
Host Unallocated Remote Repl. Dev.	Configuration and capacity details for remote replica array devices that are not allocated to hosts.
LUN Masked Devices	Configuration and capacity details for all array devices that are LUN masked.
LUN Masked, Not Connected	Configuration and capacity details for array devices that are LUN masked and are mapped to access-controlled front-end ports that are not physically connected.
LUN Masked, Not Mapped	Configuration and capacity details for array devices that are LUN masked but are not mapped to front-end ports.
Mapped Devices	Configuration and capacity details for all array devices that are mapped to front-end ports.
Mapped, Masked, Not Accessible	Configuration and capacity details for all array devices that are LUN masked and are mapped to front-end ports that are not physically connected.
Mapped, Not LUN Masked	Configuration and capacity details for array devices that are mapped to front-end ports but are not LUN masked.
Symmetrix – All Devices	Configuration and capacity details for all array devices on Symmetrix arrays.
UnAccessible Dev in Consistency Group	Configuration and capacity details for Symmetrix array devices in a Consistency Group that are not accessible to hosts. These devices may be incorrectly configured in the Consistency Group.
Reserved Devices	Shows all devices that have been reserved for future use by an application and identifies those applications so that device capacity can be accounted for by storage administrators.

Best Use of Report

- ◆ Asset management
- ◆ Chargeback
- ◆ Find unallocated storage and storage that is not accessible to hosts

Devices

<i>Report Title</i>	Array Devices – <i>Layout</i>
<i>General Description</i>	Provides configuration and capacity details about all array devices, including meta devices.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Accessible	Capacity information about all host accessible array devices.
Accessible No Volume Group	Capacity information about all host accessible array devices on which no volume groups reside.
Accessible No File System	Capacity information about all host accessible array devices on which no file systems reside.
Reserved Devices	Shows all devices that have been reserved for future use by an application and identifies those applications so that device capacity can be accounted for by storage administrators.

<i>Best Use of Report</i>	Asset management
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Expanded Logical Devices

<i>Report Title</i>	Array Expanded Logical Devices - <i>Layout</i>
<i>General Description</i>	Provides a list of all Symmetrix, CLARiiON, and HDS/StorageWorks XP expanded logical devices that have been discovered by their storage agents. Expanded logical device is a generic term for a group of devices accessed as a single logical device. Depending on the type of array, an expanded logical device is also called: ◆ Meta device (Symmetrix) ◆ Meta LUN (CLARiiON) ◆ Logical unit size expansion (LUSE) volume (HDS/StorageWorks XP)
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Identify meta group configurations

Disks

<i>Report Title</i>	Array Disks – <i>Layout</i>
<i>General Description</i>	Provides configuration and capacity information about each physical disk in a Symmetrix array.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Asset management

Custom Field Legend

<i>Report Title</i>	Array Custom Field Legend – <i>Layout</i>
<i>General Description</i>	Provides a legend for the custom fields that appear in the array reports. The legend allows you to correlate the custom field data in a report with the name of the custom field.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Determine the values of the custom field column labels

RAID Groups

<i>Report Title</i>	Array RAID Groups – <i>Layout</i>
<i>General Description</i>	Provides details about all CLARiiON RAID groups.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Asset management

Ports

<i>Report Title</i>	Array Ports – <i>Layout</i>
<i>General Description</i>	Provides details about the configuration of all array front-end adapters.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Asset management ◆ Determine if port flags are set appropriately ◆ Troubleshoot problems

Ports to Devices

<i>Report Title</i>	Array Ports to Devices – <i>Layout</i>
<i>General Description</i>	Provides a list of all array ports and the array devices that are mapped to the port. Port to device relationships are not reported for CLARiiON or IBM ESS arrays.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Asset management ◆ Determine if device is mapped to the correct port ◆ Troubleshoot problems

Port Connections

<i>Report Title</i>	Array Port Connections – <i>Layout</i>
<i>General Description</i>	Provides details about array front-end port connections.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Review array connectivity ◆ Troubleshoot problems

LUN Masking

<i>Report Title</i>	Array LUN Masking – <i>Layout</i>
<i>General Description</i>	Provides information about each array device that is LUN masked to a host.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Asset management ◆ Trace which hosts can see which devices through which ports ◆ Troubleshoot problems

Storage Pools

<i>Report Title</i>	Array Storage Pools – <i>Layout</i>
<i>General Description</i>	Shows details about all defined array storage pools. A storage pool is a grouping hierarchy for storage devices. A storage pool can contain storage devices or other pools (subpools), but not both.
<i>Predefined Layouts</i>	Basic (default)

- Best Use of Report*
- ◆ Asset management
 - ◆ Chargeback

Replicas

- Report Title* Array Replicas – *Layout*
- General Description* Provides information about Symmetrix array replicas.
- Predefined Layouts* Basic (default)
- Best Use of Report*
- ◆ Asset management
 - ◆ Troubleshoot problems

Array Configuration

To see this report for a specific array, access an array report and select the array in the **Array** column.

- Report Title* Array Configuration – *Tab – Layout (Array)*
- General Description* Provides detailed configuration and capacity information about a specific array.
- Detail Tabs* General, Groups, Ports, Devices, Expanded Logical Devices, Disks, RAID Groups, LUN Masking, Hosts
- Best Use of Report*
- ◆ Asset management
 - ◆ Troubleshoot problems

Connectivity Reports

The Connectivity reports provide information about the fibre channel switches in your environment. Available details include switch properties, ports, zones, and fabrics.

Switches by Group

<i>Report Title</i>	Switches by Group – <i>Layout</i>
<i>General Description</i>	Provides a list of user-defined switch groups and the switches belonging to each group. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Basic (for export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type — Identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path — The complete path to the group or managed object through all its parent groups • # Subgroups — The number of subgroups in the group

<i>Best Use of Report</i>	◆ Compare switch port allocation across groups ◆ Track how switch ports have been allocated over time ◆ Asset management ◆ Capacity planning
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All Switches

<i>Report Title</i>	Switches – <i>Layout</i>
<i>General Description</i>	Provides a list of switches and the attributes for each switch including switch port connectivity details.

Predefined Layouts Basic (default) and the following:

Layout	Description
Details	Detailed information about switch port connectivity including the number of ports connected to arrays, the number of inter-switch links, and the number of free ports.
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report

- ◆ Track how switch ports have been allocated over time
- ◆ Asset management
- ◆ Capacity planning

Switch Group List

Report Title Switch Group List – *Layout*

General Description Provides a list of user-defined switch groups (parent and subgroup) and the switches that belong to each group.

Predefined Layouts Basic (default) and the following:

Layout	Description
Details	Detailed information about switch port connectivity for each switch group including the number of ports connected to arrays, the number of inter-switch links, and the number of free ports.
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report

- ◆ Compare switch port allocation across all groups
- ◆ Track how switch ports have been allocated over time
- ◆ Asset management
- ◆ Capacity planning

Switch Ports

Report Title Switch Ports – *Layout*

General Description Identifies each switch port and provides details about its configuration and the nodes to which it is connected.

Predefined Layouts Basic (default) and the following:

Layout	Description
Cabling	Details about the nodes to which each switch port is connected.
Unidentified Ports	Lists switch ports connected to unidentified ports and provides details about those unidentified ports.

Best Use of Report

- ◆ Track switch usage, connectivity, and configuration over time
- ◆ Asset management
- ◆ Capacity planning
- ◆ Disaster recovery planning

Custom Field Legend

Report Title Switch Custom Field Legend – *Layout*

General Description Provides a legend for the custom fields that appear in the Connectivity reports. The legend allows you to correlate the custom field data in a report with the name of the custom field.

Predefined Layouts Basic (default)

Best Use of Report Determine the values of the custom field column labels.

Fabrics

Report Title Fabrics – *Layout*

General Description Provides detailed information about the fabrics in your storage environment.

For Cisco switches, the fabrics that are reported are the VSANs defined on the physical switches. For all other switches (for example, Brocade and McData), the physical fabrics are reported. In the report, no distinction is made between VSANs and physical fabrics except that Not Applic. will appear in the VSAN ID column for a non-Cisco fabric.

Predefined Layouts Basic (default) and the following:

Layout	Description
Capacity	Details about port usage in each fabric. It allows you to compare the total number of switch ports in each fabric to the number of ports in use.

Best Use of Report

- ◆ Track fabric usage over time
- ◆ Asset management
- ◆ Capacity planning
- ◆ Disaster recovery planning

Active Zone Sets

Report Title Active Zone Set Members – *Layout*

General Description Provides a list of the members of all active zone sets in your storage environment.

Predefined Layouts Basic (default) and the following:

Layout	Description
Switch Zoning	Details about switch port zoning.

Best Use of Report

- ◆ Track switch zoning configurations
- ◆ Identify what has changed over time
- ◆ Plan for disaster recovery

Unzoned End Ports

Report Title Unzoned End Node Ports – *Layout*

General Description Lists end node ports that are connected to a switch, but are not in a zone set (active or inactive).

Predefined Layouts Basic (default)

Best Use of Report

- ◆ Track unzoned end port usage over time
- ◆ Asset management
- ◆ Capacity planning
- ◆ Disaster recovery planning

Zones (pre 5.2 report)

Report Title	Switch Zone Members – Layout
General Description	This report is no longer active. However, if there is a Switch Zone Members report still in the report archives (xmlrepository) for the selected report date, you can see that report. In StorageScope 5.2, this report has been replaced by the Active Zone Set Members report.

Switch Configuration

	To see this report, access a connectivity report and select the switch in the Switch column.
Report Title	Switch Configuration – Tab – Layout (Switch)
General Description	Provides general configuration and capacity (port usage) information about the selected switch.
Detail Tabs	General, Groups, Ports, and Zones (pre 5.2 report)
Best Use of Report	Track switch usage, connectivity, and configuration over time.

Host Reports

The Host reports contain detailed information about your hosts, including host properties, capacity and utilization metrics, file systems, databases, volume groups, and HBAs.

Hosts by Group

<i>Report Title</i>	Host by Group – <i>Layout</i>
<i>General Description</i>	Provides a visual summary of how hosts have been organized into user-defined groups. It also provides detailed allocation and utilization metrics for group and individual hosts. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Allocation – Array/Internal	High-level summary of array-based and internal/JBOD-based host allocated capacities.
Allocation Summary	Internal/JBOD and array-based host allocated capacities. Array based capacities are broken down by device type.
Allocation Detail	Host allocated capacities in both usable and raw terms broken down by device type.
Basic (for Export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type - identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path - the complete path to the group or managed object through all its parent groups • # Subgroups - the number of subgroups in the group
Configuration	Snapshot of general host hardware and software properties.
Databases	Details about host database capacities that reside on arrays and on internal disks/JBOD.
File Systems	Details about host file systems that reside on arrays and on internal disks/JBOD.
Utilization – Array/Internal	Details about used host volume group and file system capacity.

Layout	Description
Utilization Summary	Summary of total and used host accessible, volume group, and file system capacity.
Utilization Detail	Details about total, used, and free host capacities including volume group, database, and file system capacities.
Volume Groups	Details about total, used, and free volume group capacities.

- Best Use of Report*
- ◆ View total, accessible, free, and used capacity for each group, subgroup, and host.
 - ◆ Compare metrics across groups over time.
 - ◆ Determine which groups, subgroups, and hosts are running out of accessible capacity or are underutilizing accessible capacity.
 - ◆ Chargeback
 - ◆ Capacity planning

All Hosts

Report Title Hosts – Layout

General Description Provides a list of hosts and the attributes for each host, including allocation and utilization metrics. With this, report you can:

- ◆ View total, accessible, free, and used capacity for each host.
- ◆ Compare metrics across hosts over time.
- ◆ Determine which hosts are running out of accessible capacity or are underutilizing accessible capacity.

Predefined Layouts Basic (default) and the following:

Layout	Description
Allocation – Array/Internal	High-level summary of array-based and internal/JBOD-based host allocated capacities.
Allocation Summary	A summary of internal/JBOD and array-based host allocated capacities. Array-based capacities are broken down by device type.
Allocation Detail	Details about host allocated capacities in both usable and raw terms broken down by device type.
Configuration	Snapshot of general host hardware and software properties.

Layout	Description
Last Discovery > 7 Days Ago	Lists hosts that have not been discovered by their agents in more than 7 days. This may indicate that the StorageScope report data for these hosts is stale and corrective action needs to be taken in the Console.
Last Discovery > 30 Days Ago	Lists hosts that have not been discovered by their agents in more than 30 days. This may indicate that the StorageScope report data for these hosts is stale and corrective action needs to be taken in the Console.
Databases	Details about host database capacities that reside on arrays and on internal disks/JBOD.
File Systems	Details about host file systems that reside on arrays and on internal disks/JBOD.
Utilization – Array/Internal	Details about used host volume group and file system capacity.
Utilization Summary	Summary of total and used host accessible, volume group, and file system capacity.
Utilization Detail	Details about total, used, and free host capacities including volume group, database, and file system capacities.
Volume Groups	Details about total, used, and free volume group capacities
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

Group List

Report Title Host Group List – *Layout*

General Description Provides a list of user-defined host groups (parent and subgroup) and allocation and utilization metrics for each group. With this report, you can:

- ◆ View allocation and utilization details for each parent and subgroup.
- ◆ Compare metrics across groups over time.
- ◆ Determine which groups are running out of accessible capacity or which hosts are underutilizing accessible capacity.

Predefined Layouts Basic (default) and the following:

Layout	Description
Allocation – Array/Internal	High-level summary of array-based and internal/JBOD-based host allocated capacities.
Allocation Summary	A summary of internal/JBOD and array-based host allocated capacities. Array-based capacities are broken down by device type.
Allocation Detail	Details about host allocated capacities in both usable and raw terms broken down by device type.
Configuration	Snapshot of general host hardware and software properties.
Databases	Details about host database capacities that reside on arrays and on internal disks/JBOD.
File Systems	Details about host file systems that reside on arrays and on internal disks/JBOD.
Utilization – Array/Internal	Details about used host volume group and file system capacity.
Utilization Summary	Summary of total and used host accessible, volume group, and file system capacity.
Utilization Detail	Details about total, used, and free host capacities including volume group, database, and file system capacities.
Volume Groups	Details about total, used, and free volume group capacities
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

Chargeback

Report Title Host Chargeback – Layout

General Description Provides service-related capacity information for user-defined groups of storage consumers and assets, including hosts, file systems, databases, logical volumes, volume groups, and host devices. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.

Predefined Layouts Basic (default) and the following:

Layout	Description
Allocation Summary	A summary of internal/JBOD and array-based host allocated capacities. Array-based capacities are broken down by device type.
Allocation Detail	Details about host allocated capacities in both usable and raw terms broken down by device type.
Allocation – Array/Internal	High-level summary of array-based and internal/JBOD-based host allocated capacities.
Basic (for export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type — Identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path — The complete path to the group or managed object through all its parent groups • # Subgroups — The number of subgroups in the group
Databases	Details about host database capacities that reside on arrays and on internal disks/JBOD.
File Systems	Details about host file systems that reside on arrays and on internal disks/JBOD.
Utilization – Array/Internal	Details about used host volume group and file system capacity.
Utilization Summary	Summary of total and used host accessible, volume group, and file system capacity.
Utilization Detail	Details about total, used, and free host capacities including volume group, database, and file system capacities.
Volume Groups	Details about total, used, and free volume group capacities.

Best Use of Report Chargeback

Devices

Report Title Host Devices – *Layout*

General Description Provides information about the host devices in each host. Host devices include internal disks as well as disks derived from storage arrays.

Predefined Layouts Basic (default) and the following:

Layout	Description
Connected to Hosts (default)	Details about array devices that are accessible by hosts, HBAs, iSCSI ports, and internal devices.
All Devices	Details about all host devices.
Connected to HBAs	Details about devices accessible by HBAs.
Connected to iSCSI	Details about devices accessible by iSCSI ports.
All Host Devices	List of all host devices.

Best Use of Report Asset management

Shared Devices

Report Title Host Shared Devices – *Layout*

General Description Provides information about array devices shared by more than one host.

Predefined Layouts Basic (default) and the following:

Layout	Description
Allocated	Details about allocated array devices shared by more than one host.

Best Use of Report Identify array devices used in clustered environments

Ports

Report Title Host Ports – *Layout*

General Description Provides information about the host ports that each host uses to connect to networked storage.

Predefined Layouts Basic (default)

Best Use of Report Asset management

Paths

<i>Report Title</i>	Host Paths – <i>Layout</i>
<i>General Description</i>	Provides information about paths from hosts to arrays. With this report, you can view: ◆ The HBA the host is using. ◆ The switch port to which the host is connected. ◆ The array front-end port to which the switch (or host in the case of direct connect) is connected.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Asset management of hosts, switches, and arrays ◆ Identify the physical path between a host, switch, and array in case of failure or interruption in storage availability to the host

Arrays

<i>Report Title</i>	Host Arrays – <i>Layout</i>
<i>General Description</i>	Provides information about arrays on which devices have been made accessible or are allocated to each host whether or not the host is connected to the array. The report also show arrays on which devices have been LUN masked to the host. In this case you will see information about the array, but all other columns (for example, the accessible and allocated columns) will be empty. To find out which arrays the host is actually connected to, use the Host Paths report.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Utilization	Details about host accessible, host file system, and raw database capacities for each host.

<i>Best Use of Report</i>	Asset management
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Volume Groups

Report Title Host Volume Groups – *Layout*

General Description Provides information about the volume groups associated with hosts. With this report, you can:

- ◆ View the size of each volume group and which host has access to that volume group.
- ◆ Compare metrics across volume groups over time.

Predefined Layouts Basic (default) and the following:

Layout	Description
Shared Volume Groups	Details about volume groups shared by multiple hosts.
Max/Min Used	Minimum and maximum capacity information for the volume groups associated with hosts.

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

Logical Volumes

Report Title Host Logical Volumes – *Layout*

General Description Provides information about the logical volumes. Logical volumes are created and managed by third-party logical volume managers on the host. Logical volumes are organized into volume groups. With this report, you can:

- ◆ View the size of each logical volume, the volume group to which the logical volume belongs, and which hosts have access to the logical volume.
- ◆ Compare metrics across logical volumes over time.

Predefined Layouts Basic (default) and the following:

Layout	Description
Shared Logical Volumes	Details about logical volumes that reside on shared volume groups.
Max/Min Used	Minimum and maximum capacity information for the logical volumes.

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

File Systems

<i>Report Title</i>	Host File Systems – <i>Layout</i>
<i>General Description</i>	Provides list of and details about local file systems on Windows and UNIX hosts. With this report, you can: ◆ Determine which file systems are running out of allocated capacity or are underutilizing accessible capacity. ◆ Compare metrics across file systems over time.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Shared File Systems	Details about file systems that reside on shared volume groups.
Max/Min Used	Minimum and maximum capacity information for the local file systems.

<i>Best Use of Report</i>	◆ Chargeback ◆ Capacity planning
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File Systems to Devices

<i>Report Title</i>	Host File Systems to Devices – <i>Layout</i>
<i>General Description</i>	Provides information about local file systems on Windows and UNIX hosts. You can use this report to map a file system to a physical array to find out where the file system accesses its storage. With this report, you can view: ◆ File system capacity. ◆ Capacity utilization. ◆ Physical device on which the file system resides.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Shared File Systems	Details about file systems that reside on shared volume groups.

<i>Best Use of Report</i>	Map a file system to a physical array to find out where the file system accesses its storage.
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Databases

<i>Report Title</i>	Host Databases – <i>Layout</i>
<i>General Description</i>	Provides information about databases on a host. With this report, you can: ◆ Compare metrics across databases over time. ◆ Determine which databases are running out of allocated capacity or underutilizing accessible capacity.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Chargeback ◆ Capacity planning

Database Datafiles

<i>Report Title</i>	Host Database Datafiles – <i>Layout</i>
<i>General Description</i>	Provides information about host databases and their associated datafiles.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Shared Database Datafiles	Details about database datafiles that reside on shared volume groups.

<i>Best Use of Report</i>	◆ Trace database datafile configurations over time (for example, location of raw or cooked datafiles) ◆ Troubleshoot database problems
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Tablespaces

<i>Report Title</i>	Host Tablespaces – <i>Layout</i>
<i>General Description</i>	Provides information about tablespaces and their corresponding datafiles.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Trace database configurations (for example, tablespace sizes, how much space is allocated to each tablespace, the last time analyzed) and capacities over time ◆ Capacity planning ◆ Chargeback

Oracle Parameters

<i>Report Title</i>	Host Oracle Parameters – <i>Layout</i>
<i>General Description</i>	Provides information about parameters defined for Oracle database instances.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Trace Oracle database parameter changes over time ◆ Troubleshoot database problems

Custom Field Legend

<i>Report Title</i>	Host Custom Field Legend – <i>Layout</i>
<i>General Description</i>	Provides a legend for the custom fields that appear in the Host reports. The legend allows you to correlate the custom field data in a report with the name of the custom field.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Determine the values of the custom field column labels.

Host Configuration

	To see this report for a specific host, access a host report and select the host in the Host column.
<i>Report Title</i>	Host Configuration – <i>Tab – Layout (Host)</i>
<i>General Description</i>	Provides general and specific information about an individual host.
<i>Predefined Layouts</i>	Basic (default)
<i>Basic Tabs</i>	General, Groups, Host Ports, Storage Arrays, File Systems, Databases, Volume Groups, Logical Volumes, Devices, FLS Age Summary
<i>Best Use of Report</i>	◆ Asset management ◆ Troubleshoot problems ◆ Track the mapping of logical to physical devices over time

Backup Reports

The Backup reports provide information about backup servers, the clients for whom the servers perform backup jobs, and details about each backup job.

Servers

<i>Report Title</i>	Backup Servers – <i>Layout</i>
<i>General Description</i>	Provides information about the backup servers performing backup jobs including details about the number and size of jobs performed by each backup server during the 48-hour period before the selected report date.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Review: ◆ Backup configuration at the enterprise level ◆ Backup status (# Jobs, # Failures, and so on) for the past 48 hours at the enterprise level ◆ Backup successes and failures over time

Clients

<i>Report Title</i>	Backup Clients – <i>Layout</i>
<i>General Description</i>	Provides detailed information about the backup and restore jobs performed for each client during the 48-hour period before the selected report date.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Review: ◆ Backup configuration at the enterprise level ◆ Backup status (# Jobs, # Failures, and so on) for the past 48 hours at the enterprise level ◆ Backup successes and failures over time

Data Sets

<i>Report Title</i>	Backup Data Sets – <i>Layout</i>
<i>General Description</i>	Provides detailed information about the Configuration Items and Data Sets for each job on the backup server host.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Review: ◆ Backup configuration at the enterprise level ◆ Backup status (# Jobs, # Failures, and so on) for the past 48 hours at the enterprise level ◆ Backup successes and failures over time

Job Details

<i>Report Title</i>	Backup/Restore Job Details – <i>Layout</i>
<i>General Description</i>	Provides details about each backup and restore job performed during the 48-hour period before the selected report date.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Review: ◆ Backup configuration at the enterprise level ◆ Backup status (# Jobs, # Failures, and so on) for the past 48 hours at the enterprise level ◆ Backup successes and failures over time

Job Errors

<i>Report Title</i>	Backup Job Errors – <i>Layout</i>
<i>General Description</i>	Provides details about backup jobs that have failed or raised an exception during the 48-hour period before the selected report date.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Review: ◆ Backup configuration at the enterprise level ◆ Backup status (# Jobs, # Failures, and so on) for the past 48 hours at the enterprise level ◆ Backup successes and failures over time

Schedule

<i>Report Title</i>	Backup Schedule – <i>Layout</i>
<i>General Description</i>	Provides details about backup job schedules including information about catalogs. Catalogs are internal databases that contain information about configurations, media, devices, status, errors, and the files and directories stored in the backup images.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Review: ◆ Backup configuration at the enterprise level ◆ Backup status (# Jobs, # Failures, and so on) for the past 48 hours at the enterprise level ◆ Backup successes and failures over time

NAS Reports

The NAS reports provide historical details about NAS file servers, Data Movers, and NAS file systems.

File Systems by Group

<i>Report Title</i>	NAS Files Systems by Group – <i>Layout</i>
<i>General Description</i>	Provides a list of user-defined NAS file system groups and the file systems that belong to each group. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Basic (for export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type — Identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path — The complete path to the group or managed object through all its parent groups • # Subgroups — The number of subgroups in the group

<i>Best Use of Report</i>	◆ Compare metrics across NAS file system groups over time ◆ Capacity planning ◆ Asset management
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All File Systems

<i>Report Title</i>	NAS File Server File Systems – <i>Layout</i>
<i>General Description</i>	Provides capacity and utilization information for all file systems on all file servers. With this report, you can: ◆ View which NAS file systems are running out of or are underutilizing available capacity. ◆ View which NAS file systems belong to which file servers. ◆ Compare metrics across NAS file systems over time.

Predefined Layouts Basic (default) and the following:

Layout	Description
All File Systems	Displays information for all file systems, including those beginning with root_.
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report Asset management

File Systems Group List

Report Title NAS File Systems Group List – *Layout*

General Description Provides a list of user-defined NAS file system groups (parent and subgroups) and capacity details for each group. With this report, you can:

- ◆ View which NAS file systems are running out of or are underutilizing available capacity
- ◆ View which NAS file systems reside on which file servers
- ◆ Compare metrics across NAS file systems over time

Predefined Layouts Basic (default) and the following:

Layout	Description
Utilization	Shows total and used NAS file system and snapshot capacity
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report Asset management

Data Movers

Report Title NAS File Server Data Movers – *Layout*

General Description Provides information about each Data Mover on each file server, including the file server on which the Data Mover resides and capacity details for the Data Mover and associated file systems.

Predefined Layouts Basic (default)

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

Data Movers to File Systems

<i>Report Title</i>	NAS File Server Data Movers to File Systems – <i>Layout</i>
<i>General Description</i>	Provides information about the file systems mounted on each data mover. With this report, you can: ◆ View on which Data Mover each NAS file system is built and on which NAS file server the Data Mover resides ◆ Compare metrics across NAS file systems over time ◆ Locate NAS file systems that are running out of or underutilizing available capacity
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
All File Systems	Displays information for all file systems, including those beginning with root_.

<i>Best Use of Report</i>	◆ Asset management ◆ Chargeback ◆ Determine the status of each Data Mover over time
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IP Interfaces

<i>Report Title</i>	NAS File Server IP Interfaces – <i>Layout</i>
<i>General Description</i>	Provides information about the IP interfaces in each file server.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Asset management ◆ Troubleshoot NAS file server problems

Servers by Group

<i>Report Title</i>	NAS File Servers by Group – <i>Layout</i>
<i>General Description</i>	Provides a list of user-defined file server groups and the file servers belonging to each group. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.

Predefined Layouts Basic (default) and the following:

Layout	Description
Basic (for export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type — Identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path — The complete path to the group or managed object through all its parent groups • # Subgroups — The number of subgroups in the group

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

All Servers

Report Title NAS File Servers – *Layout*

General Description Provides capacity and utilization information about each file server and file server snapshot. Also provides information about the file systems and Data Movers associated with each file server.

Predefined Layouts Basic (default) and the following:

Layout	Description
Details	Details about total, used, and allocated file server capacities as well as the number of Data Movers and file systems on each file server.
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

Server Group List

Report Title NAS File Server Group List – *Layout*

General Description Provides a list of user-defined file server groups (parent and subgroups), as well as information about the file systems and Data Movers associated with each group

Predefined Layouts Basic (default) and the following:

Layout	Description
Details	Details about file server and file system capacities as well as the number of file servers, data movers and file systems for each group of file servers.
Custom Fields	Lists custom fields defined for the managed object.

Best Use of Report

- ◆ Chargeback
- ◆ Capacity planning

Exports

Report Title NAS File System Exports – *Layout*

General Description Provides information about each NAS file system exports.

Predefined Layouts Basic (default) and the following:

Layout	Description
All File Systems	Displays information for all file systems, including those beginning with root_.

Best Use of Report Track which file systems have been made accessible and their properties

Storage Devices

Report Title NAS File System Storage Devices – *Layout*

General Description Provides information about the storage devices that each file server can access.

Predefined Layouts Basic (default) and the following:

Layout	Description
List of Devices	Displays filtered information about a storage device and the Data Mover to which it is connected so that only one row (Data Mover) appears for a storage device. The Data Mover displayed is the first data mover found alphabetically in the list of Data Movers corresponding to that storage device.

Best Use of Report

- ◆ Track which arrays each file server is accessing
- ◆ Collect information for disaster recovery planning

Custom Field Legend

<i>Report Title</i>	NAS Custom Field Legend
<i>General Description</i>	Provides a legend for the custom fields that appear in the NAS reports. The legend allows you to correlate the custom field data in a report with the name of the custom field.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Determine the values of the custom field column labels.

NAS File System Configuration

To see this report, access a NAS report, and then click a file system name.

<i>Report Title</i>	NAS File System Configuration – <i>Tab – Layout (NAS file system)</i>
<i>General Description</i>	Provides information about an individual NAS file system.
<i>Predefined Layouts</i>	Basic (default)
<i>Basic Tabs</i>	General, Groups, Data Movers, NAS File Systems, IP Interfaces, Storage Devices
<i>Best Use of Report</i>	◆ Asset management ◆ Troubleshoot file system problems ◆ Track the mapping of logical to physical devices over time

File Summary Reports

The File Summaries reports provide file-level summary details at the enterprise, host, and file system level. The reports contain file age and capacity distribution statistics as well as information about file sets.

Layouts for File Summary Reports

By Age

Enterprise File Sets

<i>Report Title</i>	Enterprise File Set Age Summary – <i>Layout</i>
<i>General Description</i>	Provides size information about the file sets in the enterprise. The data is broken down into modified files and accessed files by age distribution (for example, files in the file set modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file set storage.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Modified Date Details	Detailed size information about modified files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.
Access Date Details	Detailed size information about accessed files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.

<i>Best Use of Report</i>	◆ Evaluate storage usage at the enterprise level ◆ View age distribution and total consumption of a particular file set across applications ◆ Determine storage use of an application by file size ◆ Identify hosts with old or infrequently accessed files to determine possible candidates for migration or deletion
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Host File Sets

<i>Report Title</i>	Host File Sets Age Summary – <i>Layout</i>
<i>General Description</i>	Provides size information about the file sets on each host in the enterprise for which file summary reporting is defined. For each file

set, the data is broken down into modified files and accessed files by age distribution (for example, files in the file set modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file set storage.

Predefined Layouts Basic (default) and the following:

Layout	Description
Modified Date Details	Detailed size information about modified files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.
Access Date Details	Detailed size information about accessed files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.

- Best Use of Report*
- ◆ View age distribution and total consumption of a particular file set for individual hosts
 - ◆ Determine storage use of an application by file size
 - ◆ Identify hosts with old or infrequently accessed files to determine possible candidates for migration or deletion

Host Files

Report Title Host Files Age Summary – Layout

General Description Provides size information about the files on each host in the enterprise for which file level summary reporting is defined. The data is broken down into modified files and accessed files by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.

Predefined Layouts Basic (default) and the following:

Layout	Description
Modified Date Details	Detailed size information about modified files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.
Access Date Details	Detailed size information about accessed files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.

- Best Use of Report*
- ◆ View age distribution and total consumption of a particular file set for individual hosts
 - ◆ Identify hosts with old or infrequently accessed files to determine possible candidates for migration or deletion

File System Files

Report Title File System Files Age Summary – *Layout*

- General Description* Provides size information about the file systems on each host in the enterprise for which file level summary reporting is defined. The data is broken down into modified files and accessed files by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.
- ◆ To get file system reports, the reporting level in the file level reporting DCP must be set to file system. See the ControlCenter online help for detailed information about DCPs.
 - ◆ Only file systems that have been discovered by the host's Windows agent are reported.

Predefined Layouts Basic (default) and the following:

Layout	Description
Modified Date Details	Detailed size information about modified files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.
Access Date Details	Detailed size information about accessed files or file systems by age distribution (for example, files modified in the past 61 to 90 days). File size is expressed in terms of both total size in GB and as a percentage of total used file system storage.

Basic (default), Modified Date Details, Access Date Details

- Best Use of Report*
- ◆ View age distribution and total consumption of a particular file set for individual hosts
 - ◆ Identify file systems with old or infrequently accessed files to determine possible candidates for migration or deletion

By Size

Enterprise File Sets

<i>Report Title</i>	Enterprise File sets Size Summary – <i>Layout</i>
<i>General Description</i>	Provides size information about the file sets in the enterprise distributed by file size. The data is broken down into the number of files, total file size in GB, and the percentage of used file set storage.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Evaluate storage usage at the enterprise level ◆ View total consumption of a particular file set across applications ◆ Determine storage use of an application by file size ◆ Identify hosts with high percentages of large files to determine possible candidates for migration or deletion

Host File Sets

<i>Report Title</i>	Host File Sets Size Summary – <i>Layout</i>
<i>General Description</i>	Provides size information about the file sets on each host in the enterprise for which file level summary reporting is defined. The data is broken down into the number of files, total file size in GB, and the percentage of used file set storage.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ View total consumption of a particular file set for individual hosts ◆ Determine storage use of an application by file size ◆ Identify hosts with high percentages of large files to determine possible candidates for migration or deletion

Host Files

<i>Report Title</i>	Host Files Size Summary – <i>Layout</i>
<i>General Description</i>	Provides size information about the files on each host in your enterprise for which file level summary reporting is defined. The data is broken down into the number of files, total file size in GB, and the percentage of used file system storage.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ View size distribution of files for individual hosts ◆ Identify hosts with high percentages of large files to determine possible candidates for migration or deletion

File System Files

<i>Report Title</i>	File System Files Size Summary – <i>Layout</i>
<i>General Description</i>	Provides size distribution information about the files in each file system on each host for which file level summary reporting has been defined. Data is broken down into total file size in GB, percentage of used file system storage, and number of files. ◆ To get file system reports, the reporting level in the file level reporting DCP must be set to file system. See the ControlCenter online help for detailed information about DCPs. ◆ Only file systems that have been discovered by the host's Windows agent are reported.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ View size distribution of files for individual hosts ◆ Identify hosts with high percentages of large files to determine possible candidates for migration or deletion

Top 10 Largest Files

Enterprise

<i>Report Title</i>	Enterprise Top 10 Largest Files – <i>Layout</i>
<i>General Description</i>	Provides a list of the 10 largest files on the hosts in your enterprise for which file level summary reporting has been defined. The top 10 largest files are ranked in order from largest (1) to smallest (10).
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Evaluate storage usage at the enterprise level ◆ Identify the top 10 largest files across multiple hosts ◆ Identify large files to determine possible candidates for migration or deletion

Host

<i>Report Title</i>	Host Top 10 Largest Files – <i>Layout</i>
<i>General Description</i>	Provides a list of the 10 largest files on the hosts in your enterprise for which file level summary reporting has been defined. For each host, the top 10 largest files are ranked in order from largest (1) to smallest (10).
<i>Predefined Layouts</i>	Basic (default)

- Best Use of Report*
- ◆ Identify the top 10 largest files for individual hosts
 - ◆ Identify large files to determine possible candidates for migration or deletion

File System

- Report Title* File System Top 10 Largest Files – *Layout*
- General Description* Provides a list of the 10 largest files in each file system on each host in your enterprise for which file level summary reporting has been defined. For each file system, the top 10 largest files are ranked in order from largest **(1)** to smallest **(10)**.
- ◆ To get file system reports, the reporting level in the file level reporting DCP must be set to file system. See the ControlCenter online help for detailed information about DCPs.
 - ◆ Only file systems that have been discovered by the host's Windows agent are reported.
- Predefined Layouts* Basic (default)
- Best Use of Report*
- ◆ Identify the top 10 largest files for individual file systems
 - ◆ Identify large files to determine possible candidates for migration or deletion

Top 10 Largest Directories

Enterprise

- Report Title* Enterprise Top 10 Largest Directories – *Layout*
- General Description* Provides a list of the 10 largest directories on the hosts in your enterprise for which file level summary reporting has been defined. The top 10 largest directories are ranked in order from the largest **(1)** to smallest **(10)**.
- Predefined Layouts* Basic (default)
- Best Use of Report*
- ◆ Evaluate storage usage at the enterprise level
 - ◆ Identify the top 10 largest directories across multiple hosts
 - ◆ Identify directories to determine possible candidates for migration or deletion

Host

- Report Title* Host Top 10 Largest Directories – *Layout*
- General Description* Provides a list of the 10 largest directories on each host in your enterprise for which file level summary reporting has been defined.

For each host, the top 10 largest directories are ranked in order from the largest (1) to smallest (10).

Predefined Layouts

Basic (default)

Best Use of Report

- ◆ Identify the top 10 largest directories for individual hosts
- ◆ Identify directories to determine possible candidates for migration or deletion

File System

Report Title

File System Top 10 Largest Directories – *Layout*

General Description

Provides a list of the 10 largest directories for each file system on each host in your enterprise for which file level summary reporting has been defined. For each file system, the top 10 largest directories are ranked in order from the largest (1) to smallest (10).

- ◆ To get file system reports, the reporting level in the file level reporting DCP must be set to file system. See the ControlCenter online help for detailed information about DCPs.
- ◆ Only file systems that have been discovered by the host's Windows agent are reported.

Predefined Layouts

Basic (default)

Best Use of Report

- ◆ Identify the top 10 largest directories for individual file systems
- ◆ Identify large files to determine possible candidates for migration or deletion

Top 10 Most Dormant Files

Dormancy is defined as the length of time since the file has been accessed, so the most dormant file is the file that has not been accessed in the longest amount of time.

Enterprise

Report Title

Enterprise Top 10 Most Dormant Files – *Layout*

General Description

Provides a list of the 10 most dormant files on the hosts in your enterprise for which file level summary reporting has been defined. The top 10 dormant files are ranked in order from most dormant (1) to least dormant (10).

Predefined Layouts

Basic (default)

- Best Use of Report*
- ◆ Evaluate storage usage at the enterprise level
 - ◆ Identify the top 10 least frequently accessed files across multiple hosts
 - ◆ Identify old or infrequently accessed files that may be candidates for migration or deletion

Host

- Report Title* Host Top 10 Most Dormant Files – *Layout*
- General Description* Provides a list of the 10 most dormant files on each host in your enterprise for which file level summary reporting has been defined. For each host, the top 10 dormant files are ranked in order from most dormant (1) to least dormant (10).
- Predefined Layouts* Basic (default)
- Best Use of Report*
- ◆ Identify the top 10 least frequently accessed files for individual hosts
 - ◆ Identify old or infrequently accessed files that may be candidates for migration or deletion

File System Top 10 Most Dormant Files

- Report Title* File System Top 10 Most Dormant Files – *Layout*
- General Description* Provides a list of the 10 most dormant files in each file system on each host in your enterprise for which file level summary reporting has been defined. For each file system, the top 10 dormant files are ranked in order from most dormant (1) to least dormant (10).
- ◆ To get file system reports, the reporting level in the file level reporting DCP must be set to file system. See the ControlCenter online help for detailed information about DCPs.
 - ◆ Only file systems that have been discovered by the host's Windows agent are reported.
- Predefined Layouts* Basic (default)
- Best Use of Report*
- ◆ Identify the top 10 least frequently accessed files for individual file systems
 - ◆ Identify old or infrequently accessed files that may be candidates for migration or deletion

CAS Clusters

The CAS reports provide capacity and utilization metrics and properties information for CAS Clusters. CAS is a category of automated networked storage established to store large volumes of fixed content. Each data object gets a unique identifier, or Content Address, derived from its digital content. The Content Address allows access to the data independent of its physical location, guarantees data authenticity and ensures that each object will be stored only once. An EMC Centera™ is an example of a CAS system.

A cluster is one or more racks whereby the nodes are clustered. Clustered nodes are automatically aware of nodes that attach to and detach from the cluster.

CAS Clusters by Group

Report Title CAS Clusters by Group – *Layout*

General Description Provides a list of user-defined groups of CAS clusters and the clusters that belong to each group with the attributes of each group and each cluster. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.

Predefined Layouts Basic (default) and the following:

Layout	Description
Basic (for export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type — Identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path — The complete path to the group or managed object through all its parent groups • # Subgroups — The number of subgroups in the group

Best Use of Report

- ◆ Storage utilization
- ◆ Capacity planning
- ◆ Asset management

All CAS Clusters

<i>Report Title</i>	CAS Cluster – <i>Layout</i>
<i>General Description</i>	Provides a list of CAS clusters with the attributes for each cluster.
<i>Predefined Layouts</i>	

Layout	Description
Utilization (default)	Details about total, used, offline, and free capacities of the CAS cluster.
Configuration	Snapshot of the general hardware and software properties of the CAS cluster.

<i>Best Use of Report</i>	◆ Storage utilization ◆ Capacity planning ◆ Asset management ◆ Troubleshooting problems
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CAS Cluster Group List

<i>Report Title</i>	CAS Cluster Group List – <i>Layout</i>
<i>General Description</i>	Provides a list of user-defined groups (parent and subgroups) of CAS clusters and details about each group.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ View utilization for groups and subgroups ◆ Capacity planning

Storage Nodes

<i>Report Title</i>	CAS Storage Nodes – <i>Layout</i>
<i>General Description</i>	Shows details about each CAS storage node.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Troubleshooting problems

CAS Pools by Group

<i>Report Title</i>	CAS Pools by Group – <i>Layout</i>
<i>General Description</i>	Provides a list of user-defined groups of CAS pools with the attributes of each group and each pool. This report is in tree table format so that you can expand and collapse groups and subgroups to see the arrays belonging to each group.
<i>Predefined Layouts</i>	Basic (default) and the following:

Layout	Description
Basic (for export)	General configuration and capacity (if appropriate) information. To facilitate exporting this report into CSV or XML format, this layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are: • Object Type — Identifies whether the report row represents a group or subgroup (Group) or a managed object (Host, Storage Array, Switch, NAS File System, and so on) • Group Path — The complete path to the group or managed object through all its parent groups • # Subgroups — The number of subgroups in the group

<i>Best Use of Report</i>	◆ Storage utilization ◆ Capacity planning ◆ Asset management
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All CAS Pools

<i>Report Title</i>	CAS Pools – <i>Layout</i>
<i>General Description</i>	Provides a list of CAS pools and the attributes of each pool.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ Storage utilization ◆ Capacity planning ◆ Asset management ◆ Troubleshooting problems

CAS Pools Group List

<i>Report Title</i>	CAS Pool Group List – <i>Layout</i>
<i>General Description</i>	Provides list of user-defined groups of CAS pools and details about each group.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	◆ View utilization for groups and subgroups ◆ Capacity planning

Combined Reports

The Combined reports list the objects on which StorageScope is reporting. Objects can belong to multiple groups or no groups and still be reported on by StorageScope. The Combined reports can help you quickly find information about any of these objects to help with asset management and with grouping or ungrouping objects to meet changing business needs.

Group List (All)

<i>Report Title</i>	Group List (All) – <i>Layout</i>
<i>General Description</i>	Shows properties for all groups that contain ControlCenter objects on which StorageScope reports.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Identify and manage storage consumers and assets

All

<i>Report Title</i>	All – <i>Layout</i>
<i>General Description</i>	Shows properties for all ControlCenter objects on which StorageScope reports whether they belong to a group or not.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Identify and manage storage consumers and assets

Custom Field Legend (All)

<i>Report Title</i>	Custom Field Legend – All – <i>Layout</i>
<i>General Description</i>	Provides a legend for the custom fields that appear in the Array, Connectivity, Host, and NAS reports.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Correlate custom field data in a report with the name of the custom field.

All in Multiple Groups

<i>Report Title</i>	All in Multiple Groups – <i>Layout</i>
<i>General Description</i>	Shows properties for ControlCenter objects on which StorageScope reports that belong to more than one group.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Identify and manage storage consumers and assets

All not in a Group

<i>Report Title</i>	All not in a Group – <i>Layout</i>
<i>General Description</i>	Shows properties for all ControlCenter objects on which StorageScope reports that do not belong to any group.
<i>Predefined Layouts</i>	Basic (default)
<i>Best Use of Report</i>	Identify and manage storage consumers and assets

Scheduling Backup Reports

This chapter provides information about and guidelines for scheduling backup jobs and StorageScope reports in order to ensure accurate and timely data.

- ◆ Introduction4-2

Introduction

To accurately report on backup jobs in StorageScope, it is crucial that the ControlCenter backup agents have collected backup job data and written this data to the Repository before StorageScope reports are run. To ensure this, consider the following:

- ◆ When backup jobs are scheduled to run and the duration of the backup jobs
- ◆ When the backup agent collects backup data and writes it to the Repository
- ◆ When StorageScope reports are scheduled to run

Running Backup Jobs

By default, the DCP for each ControlCenter backup agent specifies that the agent collect backup data daily at 4:00 a.m. local time. After the agent collects its data, the data is written to the Repository. A backup agent bases its data collection on the end time of the backup job. This means that if a backup job is running and active when the backup agent wakes up at 4:00 a.m., the agent will not capture the current backup job until the next time it collects data.

Running StorageScope Reports

By default, StorageScope also run its reports against the Repository daily at 4:00 a.m. local time. When StorageScope runs the backup report, it collects information about backup jobs that have completed within the 48 hours prior to the current point in time.

Scheduling Guidelines

If StorageScope runs backup reports before the backup agent has populated the Repository, no backup data will be captured. Therefore it is essential to schedule events to occur in the following order:

1. The backup job runs.
2. The backup agent collects and writes data to the Repository.
3. StorageScope reports run.

To ensure the correct sequence of events, do the following:

- ◆ In ControlCenter, define the DCP of the backup agent so that the backup job runs and the data is written to the Repository before StorageScope reports run. Refer to ControlCenter Console online help for the procedure to edit a backup agent DCP.
- ◆ In StorageScope, change the scheduled time at which reports run so reports do not run before the backup agent DCP is scheduled to run.

Keep in mind that when you run StorageScope reports manually or run a backup job manually, you will also encounter this timing issue.

This chapter provides guidelines for and examples of effective custom graphs.

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- ◆ Selecting a Graph Type.....5-12
- ◆ Creating Graphs over Time5-15
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Introduction

Some predefined report layouts have an associated predefined graph. For most reports, you can also create a custom graph for a custom report layout. If a custom report layout can be graphed, you can graph any of the metrics in the custom report layout.

Some reports cannot be graphed. Either the report contains no metrics or the metrics are not appropriate to graph in the context of this report. If a report cannot be graphed, a message to that effect is displayed on the **Graph** tab when you create the custom report layout.

Turning Graphs On and Off

By default, graphs are turned off when you start a StorageScope session. Use the Graph icon on the **Reports** home page to toggle graphs on and off for the current StorageScope session.



If a report layout has a graph (predefined or custom) associated with it, the **Graph** icon appears next to the **Layout** box when the report layout is selected. You can also click this icon to toggle the graphing on and off.

Basic Graph Components

The three basic components of a graph are:

- ◆ The metrics (or report columns) being graphed
- ◆ The type of graph (for example, bar, line, or pie chart)
- ◆ The time interval being graphed (for example, the current report date, the past 7 days, or the past 60 days)

Graph Category

Each graph has a default category by which the data in the graph is grouped. For example:

- ◆ The category on which a custom graph for the **Host Devices** report is based is **Host Device**.
- ◆ The category on which a custom graph for the **Array Disks** report is based is **Disk Name**.

In the case of a bar or line graph, the category forms the x-axis or y-axis of the graph. In the case of a pie chart, the pie as a whole represents the category and the slices represent the metric being graphed.

Tree Table Report Graphs

A graph for a tree table report depicts the aggregate data for each group or subgroup rather than data for the individual objects that make up each group. Therefore, you can only create a custom graph for a group or subgroup that contains other subgroups.

However, the graph icon appears next to the Layout box if a custom graph has been created for any group or subgroup in the tree table report. This means that if you create a custom report layout for a subgroup that does not contain any other subgroups, you may see the graph icon even if no graph is available for that specific subgroup.

Graphs and Report Rows

By default, the maximum number of report rows that can appear on any one page is 50, but you can change this default (see *Changing Report Display Properties* on page 6-10).

The number of report rows that can be displayed on a report page with a graph depends on the type of graph and the time interval being graphed. For graphs over time intervals other than the current report date (for example, the past 7 days), the maximum number of report rows that can be displayed also depends on the number of metrics you are graphing.

Current Report Date Graphs

Table 5-1 lists the maximum number of report rows that can appear on a report page with a specific type of graph for the current report date.

Table 5-1 Maximum Number of Report Rows – Current Date Graph

Graph Type	Max. Number of Report Rows
Vertical Bar	30
Stacked Vertical Bar	36
Horizontal Bar	12
Stacked Horizontal Bar	30
Line	30
Pie	16

Multidate Graphs

Table 5-2 lists the maximum number of report rows that can be displayed at the same time as a multidate graph given the number of metrics that are being graphed.

For multidate graphs, the only choice for graph type is a line graph. The maximum number of lines that can be displayed in a line graph is 15. The 15 lines can be any combination of rows and metrics. When creating a line graph, the more metrics you choose, the fewer report rows you will see on the page.

Table 5-2 Maximum Number of Report Rows – Multidate Line Graph

No. of Metrics	No. of Lines on Graph	No. of Report Rows Displayed
1	15	15 (maximum)
2	14	7
3	15	5
4	12	3
5	15	3
6	12	2
7	14	2
8	8	1
9	9	1
10	10	1
11	11	1
12	12	1
13	13	1
14	14	1
15 (maximum)	15	1

Selecting Metrics

Which metrics you select to graph greatly impacts the relevance and usability of the graph. Some of the variables that may reduce the relevance and usability of a graph are:

- ◆ Selecting too many metrics. In general, the most visually effective graphs present a maximum of three to four related metrics.
- ◆ Selecting unrelated metrics (for example, Data Mover capacity and Data Mover memory size). Rather than graph all the metrics in the report, pick a few related metrics (for example, total NAS file system capacity and used NAS file system capacity).
- ◆ Selecting metrics that have a substantially disparate or wide range of values (one metric has very low values and the other metric has much higher values). Because a graph is scaled based on the range of data for all the selected metrics and the size of the graph is fixed, a wide range of data values will be compressed.

When you graph a metric with a very large range of numeric values (for example from 0 to 18.5 million), the values in the upper end of the range are presented in scientific notation.

A wide range in values is most likely to occur if the metrics are expressed in substantially different units of measurement.

- ◆ Selecting a column that has numerical data but is not a true metric. For example, port number is a numerical column but using this type of column in creating a graph is likely to distort the graph in such a way as to make comparing real metrics difficult.

Effective Selection of Metrics

Figures 5-1 through 5-3 are examples of effective selection of metrics for graphing. Each graph shows different types of related utilization metrics for the All Hosts report.

The default category on which these Host graphs are based is the Host column. (The Host column name is defined by the user in ControlCenter.)

Example Figure 5-1 shows total and used file system capacity for each host, in gigabytes (GB).

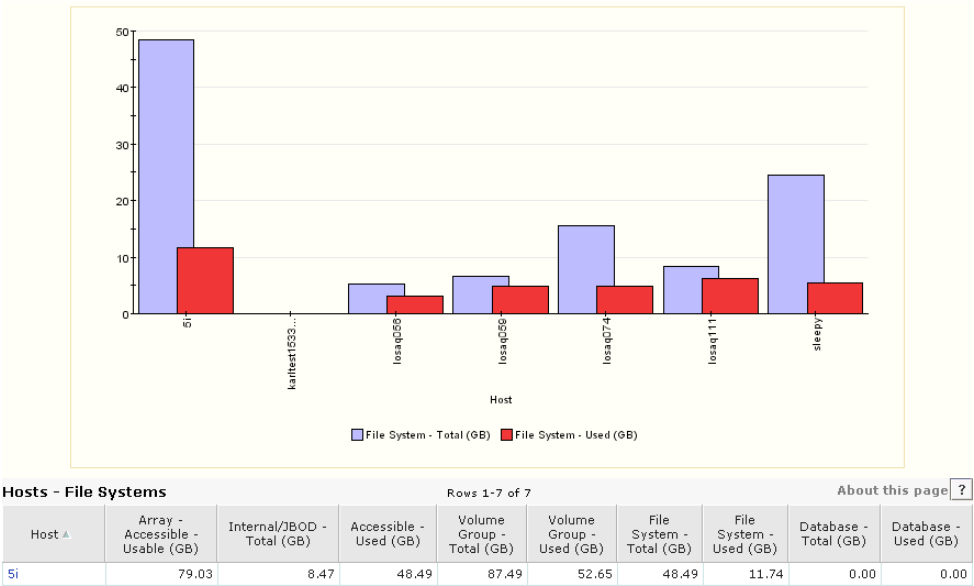


Figure 5-1 Host Utilization – File Systems Graph

Example Figure 5-2 shows total internal/JBOD, volume group, file system, and database capacity for each host, in GB.

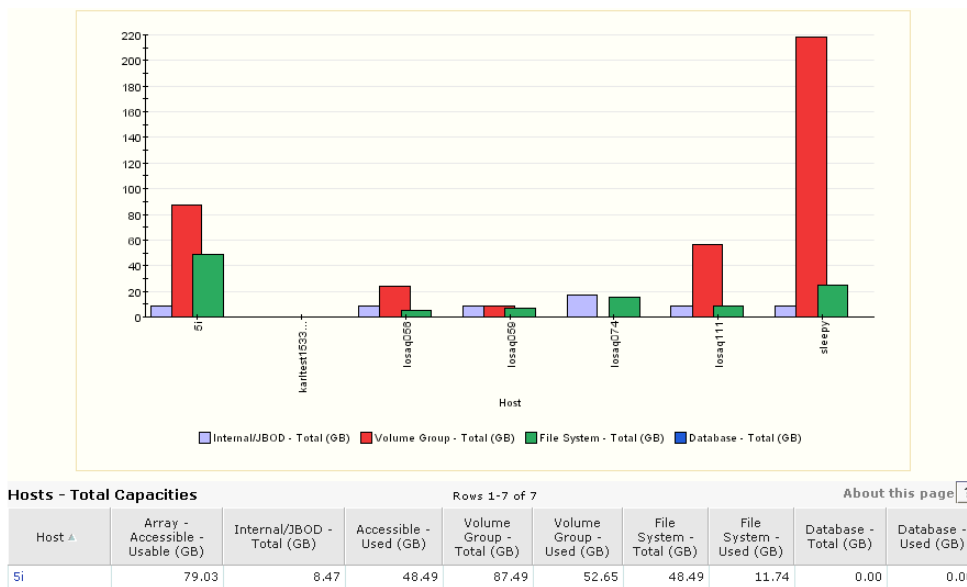


Figure 5-2 Host Utilization – Total Capacity Graph

Example Figure 5-3 shows used accessible, volume group, file system, and database capacity for each host, in GB.

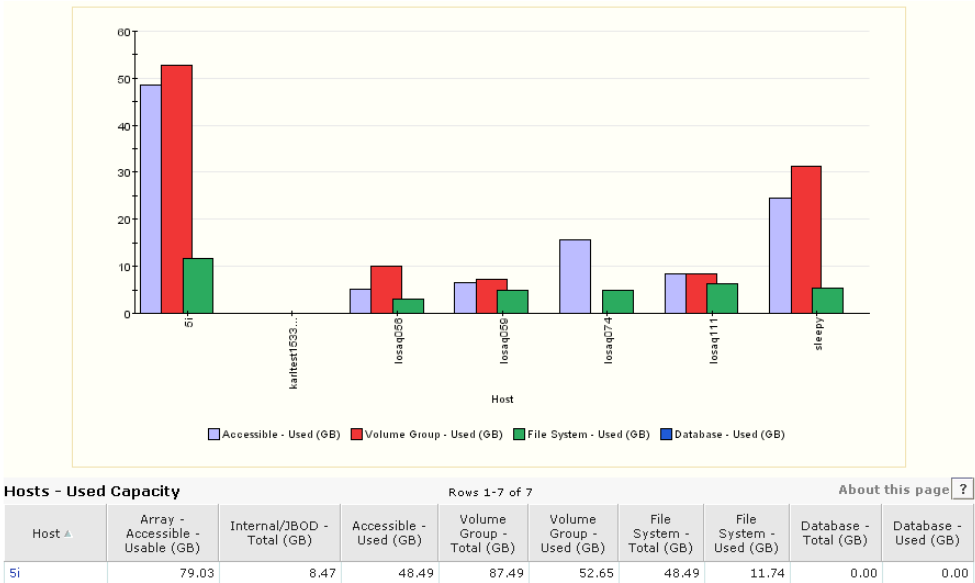


Figure 5-3 Host Utilization – Used Capacity Graph

Ineffective Selection of Metrics

Adding an additional metric that has a different unit of measure than the other metrics being graphed can distort the range of data.

Figures 5-4 through 5-5 show how a disparate metric can distort a graph.

Example

Figure 5-4 is an effective representation of data because the metrics chosen for the graph are all related to array capacity (unconfigured and configured), and are all expressed in gigabytes (GB).



Figure 5-4 Effective Array Capacity Graph

Example Figure 5-5 shows the number of cache slots has been added to the graph layout. In this case, because the values for number of cache slots is expressed in decimal and is larger than the values for capacity, in GB, the capacity metrics seem to disappear from the graph.

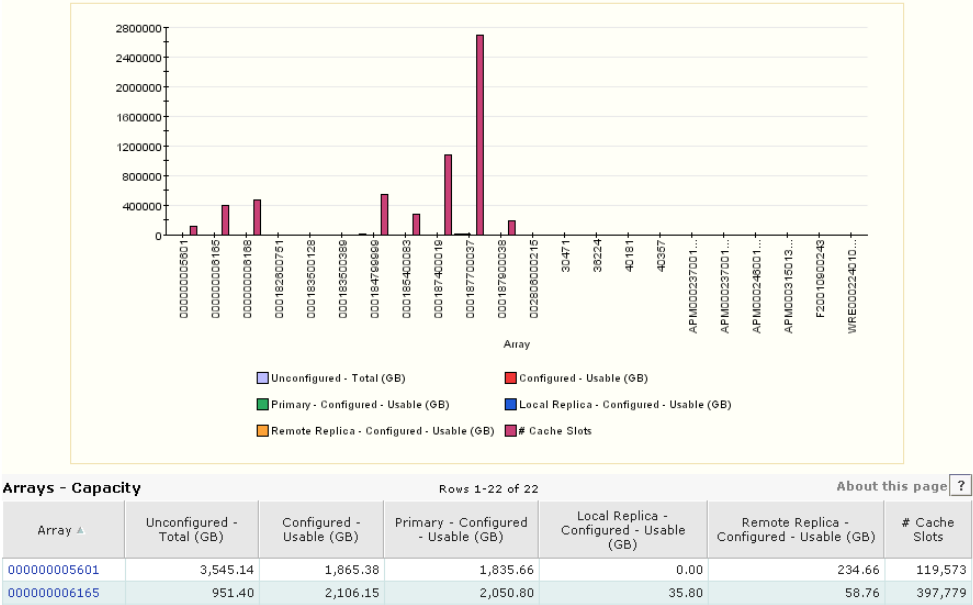


Figure 5-5 Distorted Array Capacity Graph

Selecting a Graph Type

The type of graph you select depends on the amount of data and the range of values that you want to graph. Use the following guidelines when selecting a type of graph.

The type of graph you select is one factor in the number of report rows that can be displayed on a single report page when the graph is turned on. See *Graphs and Report Rows* on page 5-3.

Horizontal Graphs

Since data on a horizontal graph is not as compressed as on a vertical graph, a horizontal graph is a good choice if:

- ◆ The report you want to graph only has a few rows
- ◆ The range of values for the selected metrics is narrow

Example

Figure 5-6 is a good example of using a horizontal graph to graph a few report rows where the range of metric values is narrow.

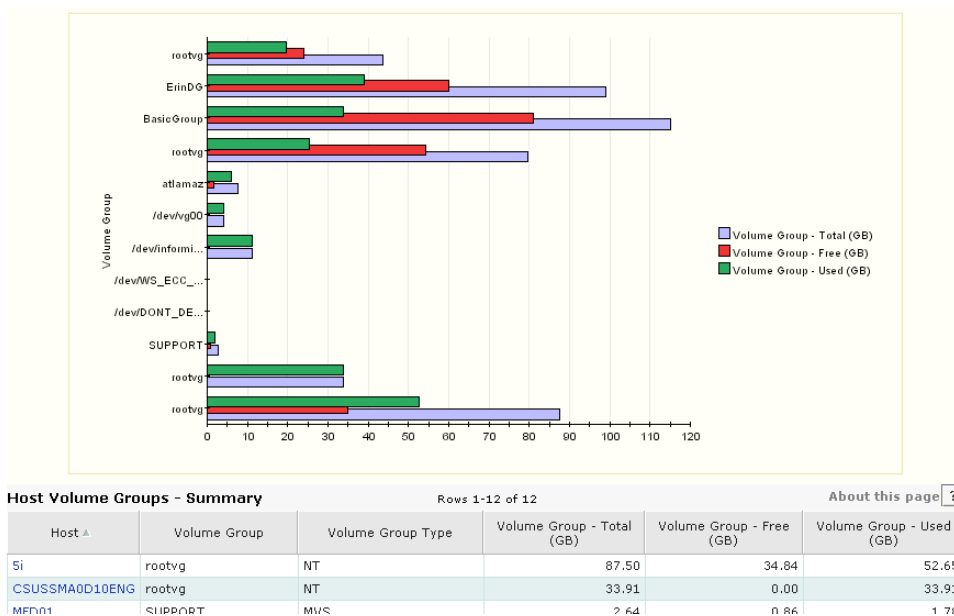


Figure 5-6 Horizontal Graph

Vertical Graphs

A vertical graph is a good choice if:

- ◆ The report you want to graph has many rows
- ◆ The range of values for the different metrics is wide

Example Figure 5-7 is a good example of using a vertical graph to graph many report rows where there is a wide range of data values.

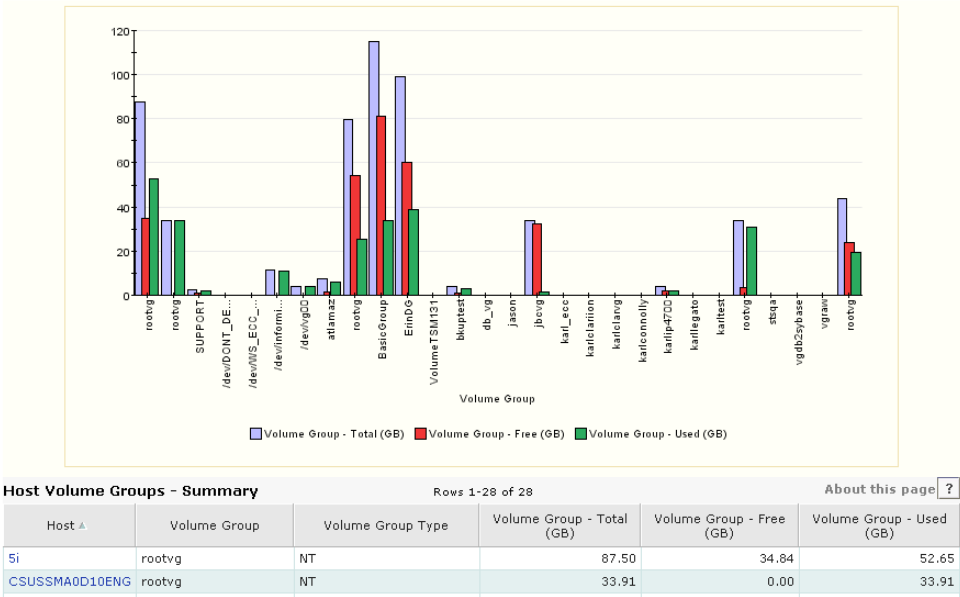


Figure 5-7 Vertical Graph

Pie Graph

A pie graph represents only one metric. If you create or edit a graph that has several metrics selected and you change the graph type to pie, you must then select only one of those metrics.

If you create a pie graph for a report that contains only one row, the entire graph area will represent the selected metric for that row. In other words, the graph will show only one color.

Example

Figure 5-8 is a good example of a pie graph that shows total capacity for each volume group, in GB.

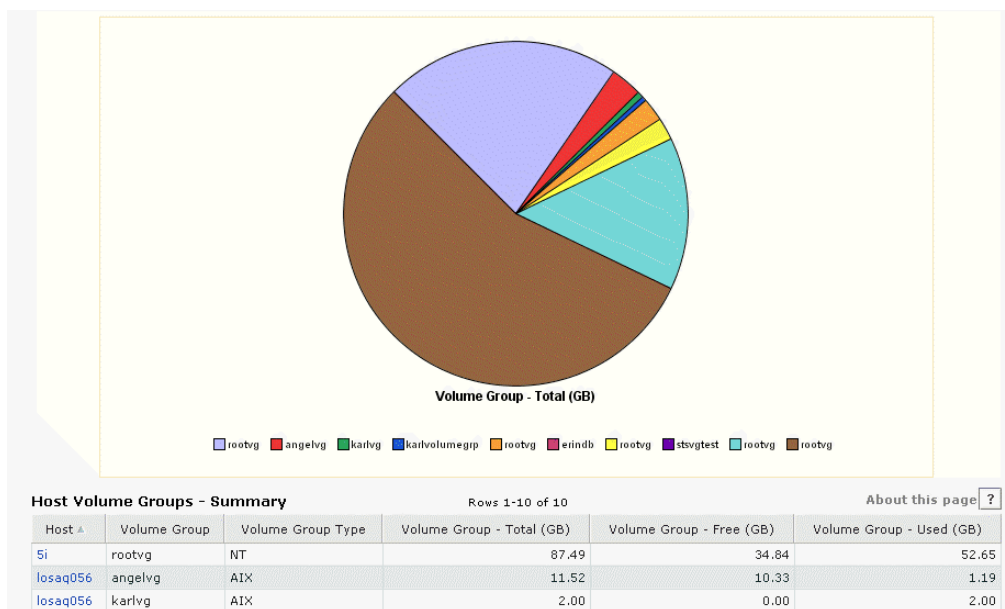


Figure 5-8 Pie Graph

Creating Graphs over Time

For graphs over time, the only choice for graph type is a line graph. The maximum number of lines that can be displayed in a line graph is 15. The 15 lines can be any combination of rows and metrics. When creating a line graph, the more metrics you choose, the fewer report rows you will see on the page.

See *Graphs and Report Rows* on page 5-3 for a complete list of the metric to report row ratios for line graphs.

For weekly reports (the past 60 or 90 days), the data points are collected once a week starting with the current report date.

A data point is a weekly point-in-time snapshot of data, not an average for the week.

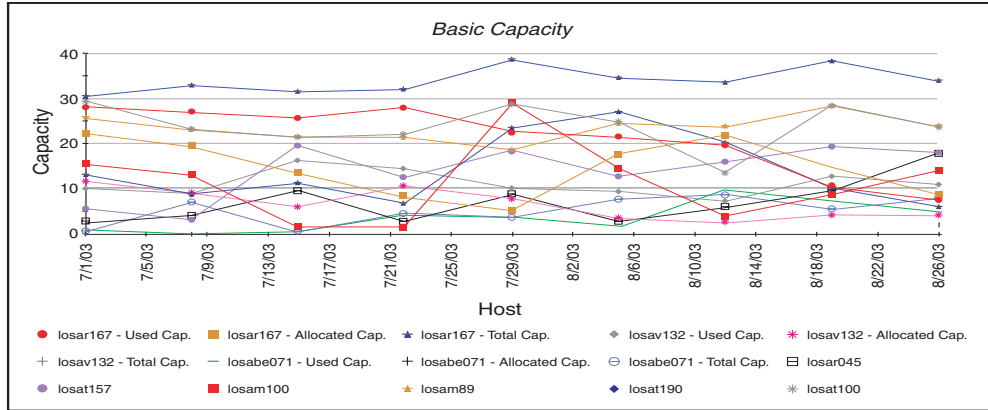
Tips for Creating Graphs over Time

Some tips for creating effective graphs over time are:

- ◆ Filter columns so that only one row (managed object) in the report is displayed, and then select multiple metrics to graph.
- ◆ Select a single metric to graph for multiple rows (managed objects).
- ◆ Filter columns to only show data that changes over time.

Example

Figure 5-9 is an effective graph over time that shows basic capacity for hosts over the past 60 days (weekly). It also shows the maximum number of lines (15) that can be graphed.



CC-000226

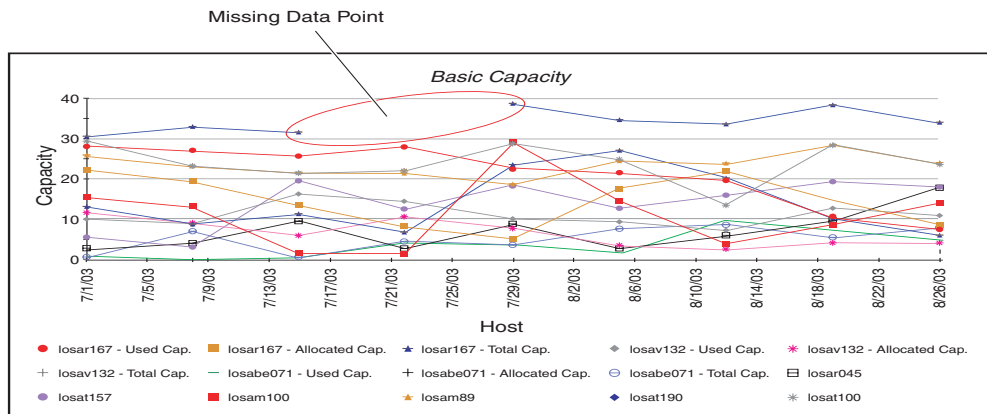
Figure 5-9 Effective Graph over Time

Missing Datapoints

If there is no data for a particular date, either because no report was run for that date or there is no data for that date, there will be a break in the line.

Example

Figure 5-10 illustrates a graph over time with a missing data point.



CC-000227

Figure 5-10 Graph with Missing Data Point

Creating Trendlines

StorageScope allows you to display report metrics as trendlines. A trendline for a metric represents the trend of the historical data over time and uses that historical data to project into the future. One trendline is associated with each metric that you select to graph.

StorageScope employs the Simple Linear Regression Model to model and predict the trendline. The approach is similar to the one that is used by Microsoft Excel for linear regression and forecasting.

How Trendline Co-ordinates Are Calculated

Trendline co-ordinates are calculated as follows:

- ◆ Co-ordinates for a trendline are calculated from the data that is available for the selected time interval using the Simple Linear Regression Model.
- ◆ Trendlines are plotted starting from the first available historical data point.
- ◆ Missing values (after the first available data point) are not considered in calculations.
- ◆ For plotting the graph into the future, the co-ordinates of the trendline are calculated for an additional period equal to half the selected time interval.

How Trendlines Are Displayed

- ◆ One trendline is associated with each metric that you select to graph. If you do not want to see a trendline for a specific metric, deselect that metric in the graph layout.
- ◆ A trendline for a metric is shown in the same color as the historical data for the metric, but without symbols and as a dashed line. The graph legend indicates if there are trendlines for the graph, but each individual trendline is not represented in the legend.
- ◆ Since trendlines represent the trend of historical data, if the data does not change or vary with time, the trendline data points are superimposed on the existing data.

- ◆ A linear trendline has either a positive slope or a negative slope. A trendline with positive slope indicates an increase in metric demand over time. Similarly, a trendline with negative slope indicates a decrease in metric demand over time.
- ◆ The period of the trendline is based on the selected report date. To change the trendline period, select a new report date.
- ◆ Trendlines will never go below 0 (zero). If the slope of a line indicates that the line would go below 0 for the selected time interval, the trendline will bottom out at 0 and continue at 0 to the end of the projection period.

If you install and start ControlCenter and StorageScope at the same time, the first StorageScope reports that are run may contain numerous 0s (zeros) since the Repository tables are not yet fully populated. In this case, any trendline for that data may be skewed until sufficient data is available which is dependent on the data collection policies (DCPs) set for the ControlCenter agents.

Tips for Effective Trendlines

Tips for effective trendlines include:

- ◆ Filter the report data to show a minimal number of managed objects (report rows).
- ◆ Select a minimal number of metrics.
- ◆ Select meaningful metrics that can be compared (or associated) with each other. For example, comparing Total Accessible Capacity with Number of Databases may not render meaningful data and trends.
- ◆ Select metrics with data that has enough of a range of value. Datapoints that are too close together will clutter the graph.
- ◆ Select an appropriate period in the custom layout.

Trendline Periods

When you select a time interval for trendlines, remember that trendlines are projected one half of that time interval into the future.

Table 5-3 lists how far into the future the trend is projected depending on the time interval you select.

Table 5-3 Time Interval for Trendlines

Select Time Interval	Future Projection Period	Total Trendline Period
Past 7 Days	4 days	11 days
Past 14 Days	7 days	21 days
Past 30 Days	15 days	45 days
Past 60 Days (weekly)	4 weeks	12 weeks
Past 90 Days (weekly)	6 weeks	18 weeks

Example Figure 5-11 illustrates trendlines for total file system capacity during the past seven days.

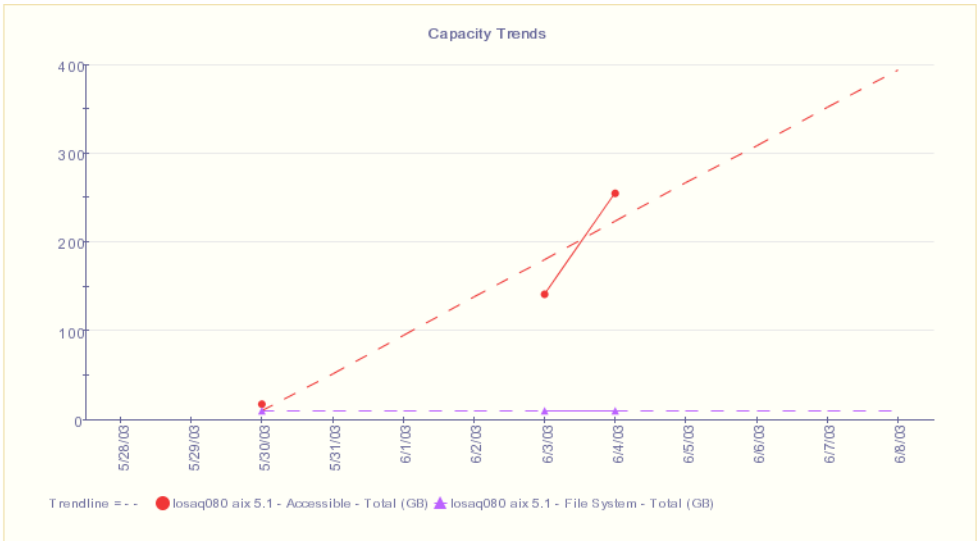


Figure 5-11 Trendlines

This chapter describes how you can change configuration properties in order to customize your StorageScope server application.

- ◆ Changing the Name of the Repository6-2
- ◆ Limiting Data Extracted from the Repository.....6-2
- ◆ Changing the Location of the XML Archives6-4
- ◆ Customizing the List of Files Available for Download6-4
- ◆ Localizing the StorageScope UI6-5
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- ◆ Creating a Custom Hyperlink.....6-13

Changing the Name of the Repository

The ControlCenter Repository is typically installed with the name **RAMBDB**. However, if this is not the case, you can change the name. The property that specifies the name of the Repository is in the `stsapplication.properties` file.

To change the name of the Repository:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore it.

By default, the `stsapplication.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:
`services.DatabaseService.urlname=<repository_name>`
5. Enter the correct `<repository_name>`.
6. Save and close the file.
7. Start the StorageScope service.

Limiting Data Extracted from the Repository

When you filter the data that appears in a custom report layout, you are only limiting the data that has already been extracted from the Repository from appearing in a report.

However, you can also limit the amount of data that is extracted from the Repository when reports are run by adding standard SQL **where** clauses into the `stsapplication.properties` file.

This feature is especially useful when you want to shorten the amount of time that it takes to run reports that contain large amounts of data.

Some important things to remember when you add where clauses to the `stsapplication.properties` file:

- ◆ Any number of reports may be restricted by a where clause, but each report may have only one where clause associated with it.
- ◆ Commas inside the where clause must be escaped with a backslash (\,).
- ◆ Refer to the *EMC ControlCenter StorageScope API* document for view names and key names.

To limit data extracted from the Repository:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore it.

By default, the `stsapplication.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Add the following entry to the file:

```
services.XMLDataManagementService.viewRestrictProperty.<View_Name>=<Where_Clause>
```

5. In `<View_Name>`, enter the view name for the report that contains the data you want restricted.
6. In `<Where_Clause>`, enter the key name for the specific column that contains the data that you want to be restricted and how you want the data to be restricted.

Example

To limit the data extracted for the **Arrays** report (**STS_ARRAY_LIST**) to arrays with more than 500 GB (>500) of total configured usable storage (**ST_CONFIG_SUM**), add the following where clause:

```
services.XMLDataManagementService.viewRestrictProperty.STS_ARRAY_LIST=where ST_CONFIG_SUM>500
```

7. Save and close the file.
8. Start the StorageScope service.
9. Run reports.

Changing the Location of the XML Archives

By default, the XML files that are created when reports run are archived in a directory called `xmlrepository`. You can change the location of this archive in the `stsapplication.properties` file.

To change the location of the report archive:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore it.

By default, the `stsapplication.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Find the following property:

```
services.XMLDataManagementService.xmldatahome  
=<xmlrepository>
```

5. Enter the new location in `<xmlrepository>`.

The value can be an absolute or relative path to the directory `<Install_Root>\StorageScope`.

6. Save and close the file.
7. Start the StorageScope service.

Customizing the List of Files Available for Download

The **System and Log File Access** page on the StorageScope UI allows you to download system, log, and properties files. This option is particularly useful if you need to download to:

- ◆ Send to Customer Support in order to troubleshoot StorageScope
- ◆ To change a configuration property in one of the files

The `adminlogging.properties` file contains a list of the files that appear on the page. You can add or remove files from the list of files available for download.

This procedure does not require you to restart the StorageScope service. After you change and save the `adminlogging.properties` file, the change is recognized and updated by the StorageScope server within 60 seconds.

To customize the file access list:

1. Make a backup copy of the `adminlogging.properties` file in case you need to restore it.

By default, the `adminlogging.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Open the `adminlogging.properties` file with a text editor such as Notepad or WordPad.
3. Add the name of the file with its relative path from the StorageScope installation root directory in the following format:

```
logutil.logtoinclude=<filename>
```

Example

```
logutil.logtoinclude=config\stsapplication.properties
```

The order in which the file names are specified in the `adminlogging.properties` file is the order in which they will appear on the System and Log File Access page.

4. Close and save the file.

Localizing the StorageScope UI

StorageScope supports localizing the UI by translating the text that is displayed into any of the ISO-supported languages. Each StorageScope server installation supports only one language at a time. The default configuration is **US English**.

The files you will be working with are located in subdirectories under the `<Install_Root>\StorageScope` directory.

To localize the StorageScope UI:

- Step 1* Stop the StorageScope service.

- Step 2* Back up the following files to a secure location in case you need to restore any of them.
- ◆ `\config\stsapplication.properties`
 - ◆ `\config\STSApplicationResources_en.properties`
Contains text for such things as copyright notices, and error and informational messages that are displayed
 - ◆ `\config\STSReportResources_en.properties`
Contains column headers, tooltips, and report titles
 - ◆ `\config\UserReportResources_en.properties`
Dynamically updated with the names of custom report layouts as you create them
 - ◆ `\WebApps\sts\WEB-INF\struts-config.xml`

- Step 3* In the `stsapplication.properties` file, modify the following two properties with the appropriate ISO Codes for language and country. The default language is **en** (English) and the default country is **US** (United States).

- ◆ `services.LocalizationService.language=<language code>`
- ◆ `services.LocalizationService.country=<country code>`

ISO Language Codes are lowercase two-letter codes as defined by ISO-639.
ISO Country Codes are uppercase two-letter codes as defined by ISO-3166.

- Example* In this example, the language is French and the country is France.

```
services.LocalizationService.language=fr
services.LocalizationService.country=fr
```

- Step 4* Open each of the following files, translate the text in the following into the desired language (in the example, French), and then save the file. Note that you do not need to rename the files with language code until the next step in the procedure.

- ◆ `STSApplicationResources_en.properties`
- ◆ `STSReportResources_en.properties`

You do not need to translate the `UserReportResources_en.properties` file. After you complete this localization procedure and start the StorageScope service again, the names of any custom report layouts that you create will be automatically entered into this file in the selected language.

Step 5 To ensure support for any non-ASCII characters that the language may require, you must convert all three properties files (see Step 4) to the proper encoding format.

1. In WordPad, open each file, and then save it as a **Unicode Text Document**.

You **MUST** use WordPad in order to save the files in the proper format.

2. Run the JDK utility **native2ascii** (located at `<Install_Root>\Repository\jdk\bin\`) on each file to convert it to Java Unicode encoding. Use the following command format:

```
native2ascii -encoding UTF-16 <input filename> <output filename>
```



CAUTION

The name of the output files must be exactly the same (except for the language code) as the names of the original properties files.

Example

```
native2ascii -encoding UTF-16
STSApplicationResources_en.properties
STSApplicationResources_fr.properties

native2ascii -encoding UTF-16
STSReportResources_en.properties
STSReportResources_fr.properties

native2ascii -encoding UTF-16
UserReportResources_en.properties
UserReportResources_fr.properties
```

Step 6 In the `struts-config.xml` file, modify the following property:

```
<message-resources parameter="STSApplicationResources_en"/>
```

Replace the default **en** with the two-character ISO Code for the language into which the properties files were translated (in the example, **fr** for French).

Step 7 Start the StorageScope service.

Changing Logging Properties

The StorageScope application logs (`STS_Application.logx`) contain informational and error messages that have been logged by StorageScope.

The current application log is named `STS_Application.log`. Logging messages accumulate in this file until the file reaches a user-defined maximum size. It is then renamed `STS_Application.log.1`, and the numeric suffixes of any previously archived logs are also incremented by one up to a user-defined maximum number of logs (7 by default).

By default, the threshold for logged messages is INFO, which means all INFO messages and messages of a higher priority are logged. Priority levels in increasing priority are DEBUG (verbose detail on all system activity), INFO, WARN, ERROR, and FATAL.

This procedure does not require you to restart the StorageScope service. After you change any logging properties and save the `log4j.properties` file, the changes are recognized and updated by the StorageScope server within 60 seconds.

To change logging properties:

1. Make a backup copy of the `log4j.properties` file in case you need to restore it.

By default, the file is located in
`<Install_Root>\StorageScope\config.`

2. Open the `log4j.properties` file with a text editor such as Notepad or WordPad.
3. Locate and then change the appropriate logging property.

Maximum log size

In the following property, change the maximum size of each application log. The default is 5120 kilobytes (5 MB).

```
log4j.appender.STSAppender.MaxFileSize=<filesize_in_KB>
```

Maximum number of archived logs

In the following property, change the number of application logs that are archived at any one time. The default is 7.

```
log4j.appender.STSAppender.MaxBackupIndex=<no_of_logs>
```

Minimum priority level of messages logged

In the following properties, specify the minimum priority level of messages that are logged. The default is INFO.

```
log4j.rootCategory=<threshold>, STSAppender
```

```
log4j.appender.STSAppender.Threshold=<threshold>
```

The priority level **MUST** be the same in both properties.

4. Save and then close the file.

Bypassing Login

When you successfully log in to ControlCenter, you are automatically logged in to StorageScope as well. However, if you launch StorageScope directly from your browser, you must explicitly log in to StorageScope with a valid Username and Password.

Your StorageScope Username and Password is the same one you use to log in to ControlCenter Console and the Web Console.

You can configure StorageScope so that users do not have to log in when they access StorageScope through their browser. Instead, they are automatically logged in when they enter the URL of the StorageScope server.



CAUTION

If you allow users to bypass logging in, they will be logged in with administrator permissions.

To configure StorageScope to bypass logging in through a browser:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore it.

By default, the `stsapplication.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Add the following property to the file:

```
services.SecurityService.bypasslogin=true
```

The property must be set to **true**. If the value is set to false, logging in will be required.

5. Close and save the file.
6. Start the StorageScope service.

Changing Report Display Properties

You can change the format in which reports and numeric values are displayed. You can also customize the way a report appears when it is exported to PDF.

To customize report format properties:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore it.

By default, the `stsapplication.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. In the file, locate and then edit the appropriate property.

Maximum number of rows on a page

In the following property, specify the maximum number of report rows you want to appear on a single report page. The default is 50 rows.

```
services.ReportService.maxRowsInPage=<max_rows>
```

The number of rows that can be displayed on a page with a graph depends on the type of graph, the time interval being graphed, and the number of metrics being graphed. If a graph is displayed on the page, StorageScope calculates the number of rows (up to the set maximum) that can also be displayed. See Chapter 5, *Creating Graphs* for more information.

Numeric precision

In the following property, specify the number of decimal places to which numeric values are rounded up, and then displayed. The default is two decimal places (for example, 1, 896.38).

```
services.ReportService.numberPrecision=<decimal_places>
```

Maximum number of columns on a page in PDF

In the following property, specify the number of columns you want to appear on each page of a report exported into a PDF document. The default value is eight.

If the report layout contains more than the maximum number of columns specified, the first increment of columns are exported into one PDF table and the remaining columns wrap to a second PDF table. The first column in the report is repeated in each PDF table that is created so that the context of the report is preserved throughout.

```
services.ReportService.maxPDFCols=<number_of_columns>
```

5. Close and save the file.
6. Start the StorageScope service.

Changing Time-outs and Intervals

StorageScope allows you to customize various time-outs and intervals to meet the specifics needs of your everyday working environment.

To change a default time-out or interval:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore it.

By default, the `stsapplication.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. In the file, locate and then edit the appropriate time-out or interval property.

Inactive session time-out

In the following property, specify the number of minutes that a StorageScope session can be inactive before it times out. When this interval expires, you must log in to StorageScope again. The default is 30 minutes.

```
services.SecurityService.sessionTimeout=<minutes>
```

Set this value to -1 if you want the session to never time out. 0 is not a valid value and is ignored.

Report run time-out

In the following property, specify the number of seconds that an individual report is allowed to run before it is aborted. The default is 3600 seconds (1 hour).

```
services.XMLDataManagementService.singleReportTimeoutSeconds=<seconds>
```

Report query interval

In the following property, specify how often (in seconds) you want StorageScope to check if reports are scheduled to run. The default is every 900 seconds (15 minutes).

```
services.XMLDataManagementService.watchdogInterval
=<seconds>
```

Even if reports are scheduled to run at 2 p.m., if the watchdog does not wake up until 2:10 p.m., then reports will not run until 2:10 p.m. Set a shorter interval to ensure that reports run closer to scheduled times.

Maintenance logging interval

In the following property, specify the interval (in seconds) at which maintenance information is logged. Maintenance information includes information such as what tasks are running and how much memory is in use. The default is every 900 seconds (15 minutes).

```
services.SchedulingService.maintenanceInterval=<seconds>
```

5. Close and save the properties file.
6. Start the StorageScope service.

Creating a Custom Hyperlink

If you also use a third-party reporting tool to generate reports as well as StorageScope, you can create a link on the StorageScope home page that allows you to navigate to the site where those reports reside. For example, you could create a link such as the following on the StorageScope home page.

Custom Report(s)



To create a hyperlink on the StorageScope home page to another site:

1. Make a backup copy of the `stsapplication.properties` file in case you need to restore it.

By default, the `stsapplication.properties` file is in the `<Install_Root>\StorageScope\config` directory.

2. Stop the StorageScope service.
3. Open the `stsapplication.properties` file with a text editor such as Notepad or WordPad.
4. Locate the following two properties and uncomment them.

```
#ui.externalPageLink.URL=http://<url>
```

```
#ui.externalPageLink.Title=<link_title>
```

5. Replace `<url>` with the URL of the site to which you want the link to take you (for example, `www.emc.com`).
6. Replace `<link_title>` with the hyperlink text that you want to appear on the StorageScope home page (for example, Other Reports).
7. Close and save the properties file.
8. Start the StorageScope service.

Configuring SSL for StorageScope

The Secure Sockets Layer (SSL), a commonly used protocol for managing data security on the Internet, is included with the Microsoft Internet Explorer and Netscape browsers and the Tomcat Web server, which is used to manage StorageScope. SSL uses sockets to pass data between client and server programs, and verifies the transmitted data with a public-and-private key encryption system from RSA, which also includes the use of a digital certificate.

You can configure SSL to protect the data transmitted to and from the StorageScope using the following procedure:

1. Log on with the proper authority.
2. Stop services for the StorageScope.
3. Generate a keystore certificate.
4. Enable SSL Communications.
5. Disable non-SSL Communications (Optional).
6. Restart services for the StorageScope.

7. Publicize the URL of the secure StorageScope.

Log On with the Proper Authority

Ensure that you are logged on to the StorageScope host with an account that is a member of the local Administrators group running the Windows operating system.

Stop Services for StorageScope

If it is not already stopped, stop the services that control StorageScope, as follows:

1. From the **Start** menu, select **Settings, Control Panel, Administrative Tools, Services**.
2. In the Services window, ensure that the Status of the EMC ControlCenter StorageScope service is stopped. If necessary, right-click the service name and select **Stop**.

Generate a Keystore Certificate

To implement SSL, a StorageScope server must have a keystore certificate for each IP address that accepts secure connections. You can use a selfsigned certificate generated by your installation and optionally verify the certificate using a certificate authority (a third-party organization that issues digital certificates).

Do the following to generate a self-signed certificate:

1. In a command window on the StorageScope Server host, change to the following directory:

```
<ECC_INSTALL_ROOT>\tools\JRE\Nt\1.4.2\bin
```

2. Enter the following command:

```
keytool -genkey -alias tomcat -keyalg RSA -keystore  
<path_to_keystore_file>
```

For the, *path_to_keystore_file* use the full path of appserver directory under the StorageScope directory of the ControlCenter installation, i.e.,

```
<ECC_INSTALL_ROOT>\StorageScope\appserver
```

Important: The default expiration for a self-signed certificate is 90 days. EMC recommends that you specify a longer time period for expiration. For example, to specify 350 day expiration, specify the following on the keytool command: `-validity 350`

Note: To change the default path and filename for .keystore, specify the -add parameter in the keytool command.

After executing the above command, you will first be prompted for a keystore password.

3. Enter the default password used by Tomcat (which is casesensitive): `changeit`.

The program prompts for your first and last name.

4. Instead of entering your first and last name, enter the network name of the StorageScope Server host.

The program prompts for information about your organizational unit.

5. Enter information about your organizational unit, organization, city or locality, state or province, and two-letter country code. Press **Enter** after answering each question.

The program displays a summary of the entered information and prompts you to indicate if it is correct.

6. Enter **yes** to indicate the information is correct, or **no** (the default) to make changes.
7. Enter the key password for Tomcat (which is case sensitive), or press **Enter** to make it the same as the default password (`changeit`) specified in step 3 above.

The program creates the following file:

```
<ECC_INSTALL_ROOT>\StorageScope\appserver\.keystore
```

8. Optionally enter the following command to create a Certificate Signing Request (CSR), which allows you to obtain a certificate from the Certificate Authority of your choice:

```
keytool -certreq -keyalg RSA -alias tomcat -file  
certreq.csr -keystore <your_keystore_filename>
```

The program creates a file encoded in PEM format, called `certreq.csr`.

9. Optionally submit `certreq.csr` to a Certificate Authority. The following are some possible Certificate Authorities:

- Verisign:
<http://www.verisign.com/support/install/intermediate.html>
- Trustcenter:
<http://www.trustcenter.de/certservices/cacerts/en/en.htm#server>
- Thawte:
<http://www.thawte.com/certs/trustmap.html>

The Certificate Authority will return to you a chain certificate.

10. Optionally (if you performed step 9) enter the following command to import the chain certificate into your keystore.

```
keytool -import -alias root -keystore
<your_keystore_filename> -trustcacerts -file
<filename_of_the_chain_certificate>
```

Enable SSL Communications

To enable SSL communications, uncomment a section in the server configuration file on the StorageScope Server host, as follows.

1. Open the following file in a text editor:

```
<ECC_INSTALL_ROOT>\StorageScope\appserver\conf\server.xml
```

2. In `server.xml`, remove the XML comment characters shown in bold below.

```
<!-- Define an SSL HTTP/1.1 Connector on port 8443 -->
<!--
<Connector
  className="org.apache.catalina.connector.http.HttpConnector"
    port="8443" minProcessors="5" maxProcessors="75"
    enableLookups="true"
    acceptCount="10" debug="0" scheme="https"
    secure="true">
  <Factory className="org.apache.catalina.net.SSLServerSocketFactory"
    clientAuth="false" protocol="TLS"/>
</Connector>
-->
```

3. Add a new attribute "keystoreFile" to the Factory attribute of the SSL connector with the relative path of the keystore file as below:

```
<Connector
  className="org.apache.catalina.connector.http.HttpConnector"

  port="8443" minProcessors="5" maxProcessors="75"

  enableLookups="true"

  acceptCount="10" debug="0" scheme="https"
  secure="true">

  <Factory
    className="org.apache.catalina.net.SSLServerSocketFactory"

    keystoreFile=".\\.keystore" clientAuth="false"
    protocol="TLS"/>

  </Connector>
```

4. Save `server.xml`, but leave it open for editing-the next step entails further edits to `server.xml`.

Note: If the port 8443 is already in use by other application, user can use any other free port on the system

Disable Non-SSL Communications (Optional)

To optionally disable non-SSL communications, comment out a section in the server configuration file on the StorageScope Server host, as follows:

1. If not already editing this file, open it in a text editor.


```
<ECC_INSTALL_ROOT>\StorageScope\appserver\conf\server.xml
```
2. Comment out (add the characters `<!--` and `-->` as shown in bold below) the section of `server.xml` that defines a non-SSL connection as shown below.


```
<!-- Define a non-SSL HTTP/1.1 Connector on port 8080
-->

<!--

<Connector
  className="org.apache.catalina.connector.http.HttpConnector"

  port="8080" minProcessors="5" maxProcessors="75"

  enableLookups="true" redirectPort="8443"
```

```
acceptCount="10" debug="0"  
connectionTimeout="60000"/><!-- Define a non-SSL Coyote  
HTTP/1.1 Connector on port 7070->
```

```
-->
```

3. Save `server.xml` and exit the file.

Restart Services for StorageScope

Restart the StorageScope service on the StorageScope Server host, as follows:

1. From the **Start** menu, select **Settings, Control Panel, Administrative Tools**, and then **Services**.
2. In the Services window, right-click the **EMC ControlCenter StorageScope service** and select **Start**.

Publicize the URL of the Secure StorageScope

Inform users about the URL of the StorageScope.

```
https://<ECCStorageScopeServer-OR-IPAddress>:8443/sts
```


Troubleshooting Tips

This chapter provides troubleshooting tips for StorageScope. Also check Chapter 8, *Frequently Asked Questions*, for additional troubleshooting procedures.

- ◆ Starting StorageScope.....7-2
- ◆ Logging In to StorageScope.....7-5
- ◆ Working with Reports7-7
- ◆ StorageScope Configuration.....7-14

Starting StorageScope

The following sections address some of the problems you may encounter while starting StorageScope.

StorageScope Fails to Start

Problem/Cause If StorageScope fails to start, use the following procedures to try to isolate and correct the problem.

See page 8-4 for a list of indications that StorageScope failed to start and possible reasons why.

Solution First, check the StorageScope application log file (`STS_Application.log`) for one of the fatal error messages described in the section *Configuration File is Lost or Corrupted*. Depending on the content of the error message, use the appropriate procedure to try to recover from the problem.

By default, application log files are located in the directory:
`<Install_Root>\StorageScope\logs`

Configuration File is Lost or Corrupted

Problem If your StorageScope configuration file is lost or corrupted, use the following procedures to try to isolate and correct the problem.

Solution 1. Check if there is a fatal error message similar to the following:

`<FATAL message type> Application will now shut down the JVM.`

or

`<FATAL message type> A fatal condition occurred during startup sequence. StorageScope could not start and will now shut down its JVM.`

2. Access the following file:

`<Install_Root>\StorageScope\WebApps\sts\WEB-INF\web.xml`

3. Find the following servlet element:

```
- <servlet>
  <servlet-name>stsservlet</servlet-name>
  <servlet-class>com.emc.sts.system.control.
    STSServlet</servlet-class>
  - <init-param>
    <param-name>config</param-name>
    <param-value>stsapplication.properties
  </param-value>
</init-param>
  <load-on-startup>1</load-on-startup>
</servlet>
```

- a. Verify that <servlet-name> has an <init-param> element.
 - b. Verify that the <param-name> element has the value config.
 - c. Verify that the <param-value> element has the value stsapplication.properties.
4. In \config, check if the stsapplication.properties.template file exists.

If the File Exists

If the configuration file exists:

1. Stop the StorageScope service.
2. Start the StorageScope service. This forces StorageScope to regenerate the stsapplication.properties file.

If the File Does Not Exist

If the configuration file does *not* exist:

1. Back up the XML Repository directory to a different directory for later migration. See page 8-12 for procedures and guidelines for copying report files.
2. Stop the StorageScope service.

3. Uninstall StorageScope:
 - a. From the **Start** menu, select **Settings, Control Panel**.
 - b. Open **Add/Remove Programs**.
 - c. Select **EMC ControlCenter 5.2 Uninstall**.
 - d. Click **Change/Remove** to launch the InstallShield Wizard.
 - e. Select **StorageScope** in the list of **Available Components** and add it to the **Selected Components** list.
 - f. Click **Next** to uninstall StorageScope.
4. Reinstall StorageScope.
5. Copy the contents of the backup XML Repository to the new XML Repository. By default, the location is:

```
<Install_Root>\StorageScope\xmlrepository
```
6. Start the StorageScope service.

Logging In to StorageScope

The following sections address some of the problems you may encounter when logging in to StorageScope.

Error When Logging In

Problem You get the following error message after you first install ControlCenter and StorageScope, and then attempt to log in to StorageScope:

Login failed. If the problem persists, have your administrator check the application log file. (ServiceSecurityservice failed to initialize: Failure getting authentication server.)

Cause/Solution There are several reasons why you may not be able to log in to StorageScope. Try the following:

- ◆ Since StorageScope uses the ControlCenter security service to authenticate user logins, this may occur because ControlCenter has not yet established this service. To resolve this problem, always wait at least 30 seconds after launching ControlCenter before you start StorageScope.
- ◆ Make sure the host name of the ControlCenter Server has been entered correctly. Check the following property in the `stsapplication.properties` file:

```
services.SecurityService.ECCServerHostname=<hostname>
```

- ◆ Try launching StorageScope from the Console.

Cannot Access StorageScope with Browser

Problem You try to access StorageScope with your browser, but you get a message that the URL cannot be found.

Cause/Solution To access StorageScope by using your browser, enter one of the following sites:

`http://<storagescope_host_name>:<storagescope_port_number>`

or

`http://<storagescope_host_name>:<storagescope_port_number>/sts`

Where:

- *storagescope_host_name* is the name of the host on which StorageScope is installed.
- *storagescope_port_number* is the number of the port on the StorageScope host through which you communicate with StorageScope. The default port number is **8080**.

Cannot Access Reports from ControlCenter

Problem When you select a managed object (or objects) in the Console and right-click, the menu does not contain a StorageScope reports option. In addition, a Reports option does not appear anywhere in the Console menu bar.

Cause/Solution If the StorageScope Reports option is not available in the Console, it most likely means that StorageScope is not installed. By default, StorageScope is installed in *<Install_Root>\StorageScope*. If that folder does not exist, StorageScope is not installed.

Working with Reports

The following sections address some of the problems you may encounter when working with StorageScope reports.

Cannot Export Report to XML

Problem You are using Netscape as your browser. You try to export a report in XML format. A new window opens, but the window is empty.

Cause/Solution Because Netscape cannot display XML, you will not see the XML report content in the new window. However, if you choose the option to view the source for the window, you will see the XML content. This XML content can then be saved to a file for use.

Cannot Display or Create Graphs of a Report

Problem On rare occasions, attempts fail to graph StorageScope report data. Although reports are available for display, an error message is displayed when you try to display or create a graph. This problem is rare and cannot be manually reproduced.

Cause/Solution To solve this problem, restart the StorageScope service.

No Data Found Message

Problem You create a custom report layout and set up several data filters. However, when you try to display the custom report, you see a no data found message.

Causes In most cases, you get this message because the custom report target (for example, all array devices on a specific array allocated to a specific host) does not match the filtering criteria you have specified. Some reasons for this are:

1. Your filtering criteria is too narrow. The filtering criteria that you specify is cumulative and the target must match all criteria. The more filters you create, the less likely that any targets that match the criteria will be found.

2. You made an error when you entered a filter operator or value so that no data matches that operator/value. For example, you may specify that the target must equal 1234 when you meant that it must contain 1234.
3. User-defined object names in the Console tree sometimes contain multiple, consecutive spaces that are not easily detected by the naked eye. When a browser encounters these multiple, consecutive spaces, it condenses the string of spaces to a single space. So if you copy a user-defined object name that contains multiple, consecutive spaces from the Console tree and then paste it in the filter value field, those spaces are condensed into a single space. In this case, StorageScope looks for a filter value that does not exist in ControlCenter and no data is found.

- Solutions*
1. Specify fewer filters and a broader range of possible filter values.
 2. Double-check your filter operators and values.

Exporting Large Reports in Internet Explorer

Problem You are using Internet Explorer as your browser. You try to export a large report (for example, more than 50000 records) in XML format. The XML file loads very slowly and you get a message that you are running out of virtual memory.

Cause/Solution This is an Internet Explorer limitation when caching large files. To work around this problem, save the file to disk before displaying the data in XML format. Do the following:

1. Display the report you want to export.
2. Position the cursor over the **Export** icon.
3. Right-click on **XML**.
4. Select **Save Target As** and save the file to disk.

Cannot Read Some Characters Exported to CSV

Problem You export a report to CSV format and choose to open it (rather than save it). An Excel window opens with the exported data, but any non-alphanumeric characters are replaced with alternative characters.

*Cause/Solution***Microsoft Excel for Office XP and UTF-8 Characters**

Microsoft Excel for Office XP does not support UTF-8 encoded Unicode characters.

To solve this problem, do the following:

1. After the file is opened, **Save** the report.
2. Open it in Notepad, and then **Save As** Unicode (USC-2).
3. Open it in Excel. The report displays characters correctly.

Microsoft Excel 2002 and Inconsistent Formula Messages

When you open a StorageScope report that has been exported into Excel 2002, some cells may display an Inconsistent Formula error marker.

This problem only occurs in Excel 2002, and not in older versions of Excel. Since StorageScope does not use Excel formulas, the exported data is correct, and you can ignore these messages.

To turn off Inconsistent Formula error markers:

- ◆ Access the **Tools** menu from your Excel spreadsheet.
- ◆ Select **Options**, and then the **Error Checking** tab.
- ◆ Click the **Inconsistent formula in region** checkbox.

Incompatible Locale and Language Settings

If the locale (location) setting on your computer differs from the language version of the operating system, your exported CSV report may misalign characters and display numbers incorrectly. You may see this distortion, for example, if the English language version of Windows is installed on your computer, and you changed the locale setting to Spanish or French.

To solve this problem, make sure your locale (location) setting is the same as the language version of your operating system.

As an alternative solution, you can:

1. Save the exported report as a text (.txt) file.
2. Open the saved text report in Excel.
3. When prompted, select **Delimited** by commas to display text correctly.

Cannot Save Report Exported to CSV

Problem You export a report to CSV format and choose to open it (rather than save it). An Excel window opens with the exported data, but you get an error when you try to save the file.

Cause/Solution When Excel opens the file, it names the file `report [x]` by default (for example, `report [1]`). However, square brackets ([]) are illegal characters in Excel filenames, so when you try to save the file with that name, you get an error message and cannot save the file.

To solve this problem, do one of the following:

- ◆ After the file is opened, either **Save** or **Save As** the file with a name that does not contain illegal Excel filename characters.
- ◆ Instead of opening the file, save it to disk with a filename that does not contain illegal Excel filename characters. Then, you can open the file in Excel.

Out of Memory Error When Printing Reports

Problem You receive an out-of-memory error when you select the Print All option to print a very large report.

Cause/Solution Try increasing the report page size (`services.ReportService.maxRowsInPage=<number_of_rows>`) in the `stsapplication.properties` file, and then print each page individually. Depending on the size of the report, try increasing the page size to 500 rows per page.

Custom Layout Popup Window Does Not Appear

Problem You select to create a new custom layout for a report, but the **Create Custom Layout** dialog box does not appear. When you try to edit or delete an existing custom layout, you encounter the same problem.

Cause/Solution Since StorageScope is designed to be launched in a browser (for example, Internet Explorer or Netscape), this may occur if you launch StorageScope from a non-browser application such as Windows Explorer. EMC highly recommends that you not use other Windows applications to launch and operate StorageScope.

Inconsistent Symbols on Graphs

Problem Symbols in the graph legend occasionally differ from the symbols actually used to plot metrics in the graph. For example, in the graph legend, the symbol for total files system capacity for Windows hosts is + (blue plus sign). However, the graph displays the symbol as a - (blue minus sign).

Cause/Solution Although the symbols may differ, the color of the line is the same in the graph as it is in the legend.

Cannot Save a Custom Report Layout

Problem You try to save a new custom layout for a report, but you get an error message on the **Create Custom Layout** dialog box.

Cause/Solution The solution you use depends on the error message you see:

- ◆ A failure occurred adding the custom layout definition.

When you create a new custom layout and save it, the layout is written to several files in your StorageScope home directory. If you do not have write access to these files, you will get this message. Make sure the following files are writable:

```
<installdir>\config\UserReportResources_en.properties  
<installdir>\config\report\UserRelatedFamily.xml  
<installdir>\config\report\UserReportDef.xml
```

- ◆ The requested name is already used. Please specify a new name:
<report name>

A custom layout name must be unique for the specific report. That is, you cannot have two custom layouts for the All Arrays report named **allarrays**. However, custom layout names are case-sensitive. So, you could have a custom layout named **AllArrays** and **allArrays** for the same report. Specify a new and unique name for the layout.

Automatic Logout When Selecting a Linked Report

Problem You are automatically logged out of StorageScope, when you select any hyperlink. This condition occurs both when you launch StorageScope from the ControlCenter Console and when you access StorageScope directly using Internet Explorer.

Cause This problem occurs when you have Microsoft security patch MS01-055 for its Internet Explorer browser Versions 5.5 and 6 (or another patch containing this security fix) installed.

This Microsoft patch prevents servers with improper name syntax from setting cookies. Domains that use cookies must use only alphanumeric characters ("- " or ".") in the domain name and the server name. Internet Explorer blocks cookies from a server if the server name contains other characters, such as an underscore ("_"). Web applications rely on cookies to function and cannot maintain a session between requests if cookies cannot be set on the client.

Therefore, if a host or virtual host contains a non-alphanumeric character such as "_", you are automatically logged out when you select a linked StorageScope report.

For more information about this Microsoft issue, refer to these sites:

<http://www.microsoft.com/technet/treeview/default.asp?url=/technet/security/bulletin/MS01-055.asp>

Solution To solve this problem, use the Internet Protocol address in the StorageScope URL instead of the cluster or server name. In a cluster environment, you need to know the IP address of both nodes.

If the cluster fails over, you cannot launch StorageScope reports from the Console

Host Chargeback Report Fails

Problem The Host Chargeback report fails.

Cause/Solution The report may have failed because you ran reports while managed objects were being added to groups in ControlCenter.

If the report fails, an exception is logged to the Report History page. Look for STS_HOSTOBJECTS_BY_GROUP in a Host Chargeback report in the Table/Stored Procedure Name column with a status of Fail.

- ◆ Run the reports again after you finish adding objects. In the future, avoid running reports while you are adding managed objects to groups.

StorageScope Configuration

The following sections address some of the problems you may encounter with your StorageScope configuration.

Losing Changes to Application Properties File

Problem You are losing changes you made to your `stsapplication.properties` file.

Cause/Solution During operation of StorageScope, the application will occasionally need to save certain parameters to this file. When this happens, the values that were read in at StorageScope startup will be reapplied over any manual changes that were made while StorageScope was running. To avoid this, EMC recommends shutting down the StorageScope service while making any manual changes to the `stsapplication.properties` file.

No Reports Menu Option on Console

Problem You select an object (or objects) in the Console tree panel and right-click, but **StorageScope Reports** does not appear in the menu options. In addition, **StorageScope Reports** does not appear in the Console menu bar when ECC Administration is selected in the task bar.

Cause/Solution If the StorageScope Reports option is not available in the Console, it most likely means that StorageScope is not installed. By default, StorageScope is installed in the `StorageScope` folder in the ControlCenter root installation directory:

```
<Install_Root>\StorageScope\
```

If the `StorageScope` directory does not exist, StorageScope is not installed.

To correct this problem:

1. Install StorageScope and add its license in the Console.
2. Restart the Console.

Report Unavailable Message

Problem You see a Report Unavailable message when you try to display a report.

Causes StorageScope has no report data to display. Possible causes are:

1. The Repository was only recently installed and reports have not yet run or are still running.
2. StorageScope is not pointing to the correct Repository host server and reports cannot run.
3. StorageScope is pointing to an incompatible version of the Repository and reports cannot run.

StorageScope must point to the correct ControlCenter Repository in order to access StorageScope reports. This ControlCenter Repository must be the same ControlCenter Repository used by the ControlCenter Server that communicates with the Console. In addition, the Repository schema must be compatible with the version of StorageScope that you are running.

Solutions Check the status of the Repository:

1. In StorageScope, check the status of the ControlCenter Repository.
 - a. Click the **Administration** tab.
 - b. Select **Site Management** to access the Site Management page.
2. Check the **Site Status** field. Depending on the site status, use one of the following solutions.
 - Site Status — Available
Reports are still running or have not yet run.
Check report status on the Retention and Scheduling page.
 - If report status shows that reports are running, wait until they complete.
 - If report status indicates that there are no reports in the Repository, wait for reports to run (reports should start to run in about 15 minutes) or run reports manually.
You can check if reports are running on the Retention and Scheduling page.

- Site Status — Unavailable

An error may have been made entering the IP Address, host name, or the database port number when StorageScope was installed.

- a. On the Site Management page, click the site name. The Edit Site Management page appears.
- b. Try re-entering the information (IP address or host name and database port number).
- c. Test the site connection. The site status should change to Available.
- d. Save any changes.
- e. Wait for reports to run (reports should start to run in about 15 minutes) or run reports manually.

You can check if reports are running on the Retention and Scheduling page.

- Site Status — Incompatible

The Repository to which StorageScope is pointing is incompatible with the version of StorageScope you are running.

- a. On the Edit Site Management page, modify the IP address or name of the Repository host.
- b. Test the site connection. The site status should change to Available.
- c. Save any changes.
- d. Wait for reports to run (reports should start to run in about 15 minutes) or run reports manually.

You can check if reports are running on the Retention and Scheduling page.

Wrong StorageScope Server Port Number

- Problem/Causes* Your StorageScope server port number is incorrect. Possible causes are:
- ◆ During installation, you entered an incorrect StorageScope port number, which effects the port number that StorageScope Server uses.
 - ◆ The ControlCenter Console has an incorrect definition for the StorageScope port number, which prevents access to StorageScope from the ControlCenter Console.

Solutions The solution you use depends on the cause of the problem.

Incorrect Port Number Entered during StorageScope Installation

If you entered an incorrect StorageScope server port number during installation, you can change the port number as follows:

1. Edit the following file:

```
<ControlCenter_installdir>\StorageScope\appserver\conf\server.xml
```

2. Find the section you need to change by searching for the port number you want to change.
3. Change the port attribute in the following XML element to the new port number.

```
<!-- Define a non-SSL HTTP/1.1 Connector on port 8080 -->
<Connector className="org.apache.catalina.connector.http.HttpConnector"
port="8080" minProcessors="5" maxProcessors="75"
enableLookups="true" redirectPort="8443"
acceptCount="10" debug="0" connectionTimeout="60000"/>
```

If you want to change the Tomcat shutdown port, search for and change the port attribute `<Server port="8005" shutdown="SHUTDOWN" debug="0">`.

4. Stop and then start the StorageScope service.

You must stop and then start the StorageScope service for the changes to take effect. EMC highly recommends that you stop the StorageScope service, make the change, and then start StorageScope.

Incorrect StorageScope Port Number Defined in the Console

If you are unable to access StorageScope from the ControlCenter Console because an incorrect StorageScope server port number is defined, you can change the port number as follows:

1. Stop the StorageScope service.
2. Uninstall StorageScope.
 - a. From the **Start** menu, select **Settings, Control Panel**.
 - b. Open **Add/Remove Programs**.
 - c. Select **EMC ControlCenter 5.2 Uninstall**.
 - d. Click **Change/Remove** to launch the InstallShield Wizard.
 - e. Select **StorageScope** in the list of **Available Components** and add it to the **Selected Components** list.
 - f. Click **Next** to uninstall StorageScope.
3. Reinstall StorageScope with the correct port number.
4. Start the StorageScope service.

Wrong Primary Network Server Name Entered

Problem You entered an incorrect name for the primary StorageScope network server name during installation.

- Cause/Solution*
1. Back up the XML Repository directory to a different directory for later migration. See page 8-12 for procedures and guidelines for copying report files.
 2. Stop the StorageScope service.
 3. Uninstall StorageScope.
 - a. From the **Start** menu, select **Settings, Control Panel**.
 - b. Open **Add/Remove Programs**.
 - c. Select **EMC ControlCenter 5.2 Uninstall**.
 - d. Click **Change/Remove** to launch the InstallShield Wizard.
 - e. Select **StorageScope** in the list of **Available Components** and add it to the **Selected Components** list.
 - f. Click **Next** to uninstall StorageScope.
 4. Reinstall StorageScope with the correct primary StorageScope network server name.
 5. Copy the contents of the backup XML Repository directory to the new XML Repository directory. By default, the location is:
`<Install_Root>\StorageScope\xmlrepository`
 6. Start the StorageScope service.

Frequently Asked Questions

This chapter addresses some frequently asked questions about StorageScope.

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General

Q. Which ControlCenter agents do I need to install for StorageScope reports?

Agents are processes that run on hosts and manage your storage environment. Which agents you install determines not only the kind of data collected and reported on in StorageScope reports, but also the completeness and accuracy of that data. Agents and their data collection policies (DCPs) are managed in ControlCenter.

Q. Can multiple StorageScope servers access a single Repository?

There are no checks to prevent you from running more than one instance of the StorageScope server against a single Repository. However, EMC does not recommend that you do because you may get data inconsistencies caused by simultaneous report execution attempts. For example, you may see missing group data in reports.

If you do run multiple StorageScope servers against a single Repository, accesses the most recently installed StorageScope server when you request reports.

For example, suppose you install StorageScope on host A and later on host B. They both point to the same Repository. When you request a report or launch StorageScope from ControlCenter, the URL in the browser window that opens is host B.

Q. Under what conditions might the StorageScope service fail to start?

Important If the StorageScope service fails to start, see Chapter 7, *Troubleshooting Tips*.

The StorageScope service may fail to start under the following conditions:

- ◆ The StorageScope configuration file template (`stsapplication.properties.template`) has been corrupted or cannot be found.
- ◆ The StorageScope configuration file (`stsapplication.properties`) does not exist.
- ◆ The StorageScope sites file (`sites.properties`) is missing or corrupted.

By default, these files are located in the directory
<Install_Root>\StorageScope\config

Q. How can I tell that the StorageScope service failed to start?*Important*

If StorageScope fails to start, see Chapter 7, *Troubleshooting Tips*.

The following conditions are some indicators that the StorageScope service failed to start:

- ◆ You start the StorageScope service in the Windows Services window and try to access StorageScope from your browser, but you get a Page not found error message.
- ◆ You start the StorageScope service but after refreshing or reopening the Windows Services window, you see that the status of the StorageScope service is Stopped.
- ◆ The Windows Application Log (available through Event Viewer) contains an EMC® ControlCenter StorageScope error message similar to the following:

```
The Java Virtual Machine has exited with a code of -1,  
the service is being stopped.
```

Start, stop, and fatal service events for StorageScope are also logged to the Windows Application Log.

Q. What is the stsapplication.properties.template file?

The `stsapplication.properties.template` file is created when you install StorageScope. It is then populated with data entered during StorageScope installation.

When you start StorageScope, it copies the template file to a file named `stsapplication.properties` (without the `.template` extension). This new file is updated whenever certain properties (for example, the report scheduling policy) are modified.

If `stsapplication.properties` is lost or deleted, StorageScope uses the template file to initialize a new one.

If `stsapplication.properties` becomes corrupted, you can delete it so that StorageScope uses the template file to create a new one.

Logging In to StorageScope

Q. Why do I have to log in when I access StorageScope through my browser, but not when I access StorageScope from the Console?

When you enter your ControlCenter username and password and successfully log in to ControlCenter, you are also automatically logged in to StorageScope with the StorageScope permissions assigned to you.

By default, all ControlCenter users have at least StorageScope user permissions. StorageScope administrator permissions must be explicitly assigned to a user by the ControlCenter administrator.

When you launch StorageScope from your browser, you have not yet established yourself as an authorized StorageScope user, so the Login web page appears and you must log in unless bypass login has been enabled. See the next FAQ for information about bypassing login.

When you log in to StorageScope through your browser, use your ControlCenter username and password.

Q. Is there any way to bypass login?

In the event that the ControlCenter Server or ControlCenter Repository is not accessible (due to network problems for example), users will not be able to use normal login procedures to access StorageScope. In this case, you may want to allow users to access StorageScope directly through a browser without logging in.

To allow users to bypass login, the StorageScope administrator can add a property to the `stsapplication.properties` file. When this property is added users are automatically logged in to StorageScope with administrator permissions. If the user's session times out, a new session is created. If bypass login is enabled, the user does not have to log off either. In fact, the Logoff link does not appear in the StorageScope navigation bar.



CAUTION

If you allow users to bypass login, they will be accessing StorageScope as administrators, and will be able to perform all StorageScope operations, including modifying report schedule and retention policies.

To configure StorageScope so that users do not need to log in:

1. Stop the StorageScope service.
2. Add the following property to `stsapplication.properties`:

```
services.SecurityService.bypasslogin=true
```

Important

You must set the value to **true** in order to bypass login. If the value is set to **false**, normal login procedures are enforced.

3. Start the StorageScope service.

Q. What do I need to do to launch StorageScope from a ControlCenter Console running on a UNIX host?

In order to launch StorageScope from a ControlCenter Console running on a UNIX host, you must use a supported version of Netscape as your browser and the path to that version of Netscape must be in your `$PATH` environment variable.

See the *EMC ControlCenter 5.2 Support Matrix* on the Powerlink™ website for supported models and versions.

Q. Why is my browser displaying a message that JavaScript is required?

The StorageScope application requires JavaScript to function. However, when Internet Explorer security is set to high, JavaScript is not allowed. To access StorageScope, make sure your IE security level is set to Medium at most.

Modifying the StorageScope Configuration

Q. What do I need to do when the location of my ControlCenter Repository changes?

If the ControlCenter Repository to which StorageScope is pointing is moved to another location:

1. Access the **Site Management** page on the **Administration** tab.
2. Modify the IP address, host name, or database port of the Repository.
3. Validate by testing the site connection, and then save any changes.

Q. What do I need to do when the location of the ControlCenter Server changes?

If the ControlCenter Server is moved to another location:

Important

Before you uninstall ControlCenter and its other applications, including StorageScope, back up the XML Repository directory to a different directory. See page 8-12 for procedures and guidelines for moving the XML Repository.

1. Stop the StorageScope service.
2. Modify the following property in the `stsapplication.properties` file with the new location (`<hostname>`):

`services.SecurityService.ECCServerHostname=<hostname>`
3. Start the StorageScope service.

Running Reports

Q. Does StorageScope automatically run reports each time I start it up?

StorageScope only runs reports automatically the first time you start the service after installation. After that, reports are run at their regularly scheduled time. By default, reports are run every day at 4 a.m. local time (when there is minimal ControlCenter Repository activity scheduled). You can modify this default time on the Scheduling and Retention Web page. Reports are also run when you click the **Run Reports Now** button.

You must be a StorageScope administrator to modify report scheduling and to run real-time reports.

Q. What does StorageScope do when reports are run?

Each time reports are run, StorageScope does the following:

1. While reports are running, StorageScope places each XML report file in the directory:

```
<Install_Root>\StorageScope\xmlrepository\site0\working
```

If you look at the *working* directory, you can see each report added to the directory as it completes running.

2. After reports have finished running, StorageScope zips the reports to an archive file named `xmlreports` appended with the date and time the reports were run (for example, `xmlreports-20020822-042643.zip`).

The date and time appended to the filename is Greenwich Mean Time (GMT), not local server time.

3. StorageScope creates a directory named `xmloutput-YYYYMMDD` (for example, `xmloutput-20020822`) and places all report zip files created on the day specified by `YYYYMMDD` in that directory.

The date and time appended to the directory name is GMT, not local server time.

4. If Multisite is enabled, StorageScope retrieves copies of remote reports and copies them to local site folders. For more information about Multisite reporting, see *How Data Is Retrieved* on page 2-4.

Q. I just rebooted the Repository and started StorageScope. However, all reports display a Title Unavailable message and the Administration page does not show that reports are running. Why?

If you just rebooted the Repository, it may be that it is not yet available to populate the reports. Or, StorageScope may be pointing to a version of the ControlCenter Repository schema with which it is not compatible.

You cannot run reports unless StorageScope is connected to an available and compatible version of the ControlCenter Repository. However, you can still display historical reports already stored in the `xmlrepository` directory.

If StorageScope cannot connect to ControlCenter Repository for any reason, messages are logged to the `STS_Application.log` file. The default location of this file is:

```
<Install_Root>\StorageScope\logs
```

To check if this is the case, you can do one of the following:

- ◆ Access the **Site Management** page on the **Administration** tab to check the current site status.
- ◆ Look in this log file for a message or messages similar to the following:

```
<ERROR> Initialization:Unexpected exception while
      obtaining database service: at
      org.apache.catalina.startup.Bootstrap.main(Bootstrap
      p.java:243
```

```
com.emc.sts.systemservices.database.DatabaseException
: STSDatabaseService: database connection
information could not be obtained, verify the
database configuration properties.
```

In this case, either:

- ◆ Wait 16 minutes for the next report run attempt and check the reports again.
- ◆ Run reports manually from the Retention and Scheduling page on the Administration tab.

Q. What happens if StorageScope shuts down while reports are running?

If StorageScope shuts down while scheduled reports are running, the report run is aborted. When StorageScope starts up again, the report run is restarted. All data from the aborted first run is lost and is replaced with data from the second run.

Q. What happens if a single report fails?

If a query for a single report fails, StorageScope immediately retries the query once (and only once).

Retrying the query allows StorageScope to handle any intermittent network problems or other nonfatal errors.

If the second query fails as well, that report will not be available and the error will be logged on the Report History Web page.

If the single report failure was due to an intermittent network problem, retrying the report allows StorageScope to work around the problem. However, if the failure was due to a severe database connectivity issue, the time-out is twice what is specified in the `stsapplication.properties` file (the original time-out plus the retry time-out).

To change this time-out setting (the default is one hour), see *Changing Time-outs and Intervals* on page 6-12.

Q. What happens if a database query is especially long during a report run?

If a database query is especially long during a report run, a single report failure can occur. See the previous FAQ, *What happens if a single report fails?*

Maximizing Performance

Q. How are StorageScope report queries optimized?

ControlCenter provides a job called Analyze Tables that analyzes the Repository tables for information (for example, the number of records) that optimizes database queries such as StorageScope report queries.

After the Repository is installed, it is rebooted as part of the installation process.

Automatically

Analyze Tables automatically runs on the following schedule:

- ◆ The job automatically runs every day at 11 p.m. (Repository server local time).
- ◆ After the first month, it runs once a week on Sundays at 11 p.m. (Repository server local time).

Manually

You can also run Analyze Tables manually as needed. To run the job, execute the following batch process:

```
%ORACLE_HOME%\admin\ramb_scripts\ramb_analyze_table.bat
```

Q. Reports seem to be running slowly. Is there anything I can do to improve performance?

Reports may appear to run slowly if a large number of objects need to be discovered in order to generate the reports. In this case, it is recommended that you run Analyze Tables before you start running reports. A good threshold for a large discovery is a 10 percent increase or change in the number of records for an object in the database tables (for example, a 10 percent increase in the number of array device records).

Important

Running StorageScope reports when Analyze Tables is running may cause reports to run slowly or even hang because all required database statistics have not yet been gathered. So when you choose to run reports now, StorageScope checks to see if Analyze Tables is running. If it is running, you get a message that reports cannot be run now. In this case, try to run the reports at a later time.

Q. How can I tell when Analyze Tables last ran?

Each time StorageScope starts or reports run, an INFO message is logged to the STS_Application.log file. To see when the Analyze Tables job last ran, check this file. Look for messages similar to the following:

```
2003-07-18 04:12:54,296 <INFO>  
Initialization:Repository at site 0 last analyzed at  
2003-07-17 23:00:53.0 repository host local time.
```

```
2003-07-18 04:12:55,296 <INFO>  
XMLService:Repository at site 0 last analyzed at  
2003-07-17 23:00:53.0 repository host local time.
```

If AnalyzeTables has never analyzed the Repository, so StorageScope finds no previous information, you may find a similar message:

```
2003-07-18 04:12:54,234 <INFO> Database:Repository  
at site 0 last analyzed time is not returned.
```

If AnalyzeTables is unable to access the Repository information, you may find a similar message:

```
2003-07-18 04:12:54,234 <ERROR> Database:Could not  
obtain last analyzed time from site 0 repository.
```

Copying and Moving Report Files

Q. What StorageScope report files can I copy from one location to another?

You can copy any report files from one location to another as long as you preserve the parent directories under which the files reside. The following example of an XML Repository directory structure uses the default StorageScope file naming conventions.

```
xmlrepository
    site0
        working
            xmloutput-20020822
                xmlreports-20020822-205032.zip
                xmlreports-20020822-221313.zip
            xmloutput-20020823
                xmlreports-20020823-005211.zip
                xmlreports-20020823-023727.zip
                xmlreports-20020823-063720.zip
```

Q. How do I move my XML Repository directory from one location to another?

You can move your XML Repository directory from:

- ◆ One location to a different location on the same StorageScope server.
- ◆ One StorageScope server to another StorageScope server.

You may want to move your XML Repository directory if the current StorageScope server host is experiencing problems and you have installed StorageScope on a new host. The StorageScope server on the new host will recognize the migrated files when you request a report.

Moving the XML Repository Directory to a New Location on the Same Host

To move the XML Repository directory to a new location on the same host:

1. Back up the XML Repository directory.
2. Copy the XML Repository directory to the new location.
3. Stop the StorageScope service.
4. Modify the following property in the `stsapplication.properties` file with the new location:

```
services.XMLDataManagementService.xmldatahome=<xmlrepository>
```

The `services.XMLDataManagementService.xmldatahome` property allows absolute and relative paths.

5. Start the StorageScope service.

Moving the XML Repository Directory to Another StorageScope Server

To move the XML Repository directory to another StorageScope server:

1. Stop the StorageScope service on the new host.
2. Make sure you are copying the XML Repository directory to the correct directory on the new host. Check the value of `<xmlrepository>` in the following property in the `stsapplication.properties` file on the new host.

```
services.XMLDataManagementService.xmldatahome=<xmlrepository>
```

3. Back up the XML Repository directory.
4. Copy the entire XML Repository directory to the XML Repository directory on the new host.
5. Start the StorageScope service on the new host.

Q. How do I move my custom StorageScope reports from one location to another?

When you create a new custom layout and save it, the layout is written to several files in your StorageScope home directory. To move your custom StorageScope report layouts to another location:

1. Stop the StorageScope service on the new host.
2. Back up the following files to a secure location:

The StorageScope directory under the ControlCenter root installation directory (ECC\StorageScope, for example) is the default location of the files that you need for localization.

```
\config\report\UserChartDef.xml
\config\report\UserRelatedFamily.xml
\config\report\UserReportDef.xml
\config\UserReportResources_en.properties
```

3. Copy these files to the new location.

Make sure these files are writable.

4. Start the StorageScope service on the new host.

Getting Log Information

Q. What information is logged and where is it logged when I start the StorageScope service?

Every time you start the StorageScope service, it logs information about:

- ◆ Itself (the StorageScope application)
- ◆ The host on which it is installed
- ◆ The ControlCenter Server
- ◆ The ControlCenter Repository to which it is pointing

This information is logged to the StorageScope application log files in the form of INFO messages (usually with the prefix *ServiceManager*, *Initialization*, or *Database*).

Specific information that is logged includes:

- ◆ The version, build, and build date of the installed StorageScope application.
- ◆ The name and IP address of the host on which StorageScope is installed.
- ◆ The version of Java you are running.
- ◆ The name of the host on which the ControlCenter Repository is installed and the current date and time on the Repository host.
- ◆ The version and build date of the ControlCenter Repository schema.
- ◆ The name or IP address of the host on which the ControlCenter Server is installed.

Q. Where does StorageScope log information?

StorageScope logs information in a variety of log files that you can use to get information about and troubleshoot problems with StorageScope.

Application Log

Default Location <Install_Root>\StorageScope\logs

File name STS_Application.log

<i>Description</i>	Shows messages logged by StorageScope.
<i>Use</i>	◆ Get information about StorageScope activity such as initializing StorageScope and authorizing users ◆ Track report generation and isolate specific report run failures ◆ Troubleshoot long running or missing reports ◆ Troubleshoot StorageScope startup problems ◆ Troubleshoot problems such as failing to connect to ControlCenter Repository

Application Server Logs

<i>Default Location</i>	<Install_Root>\StorageScope\appserver\logs
<i>File names</i>	<hostname>_access_log.YYYY-MM-DD <hostname>_log.YYYY-MM-DD
<i>Description/Use</i>	Application server access logs show all requests to the StorageScope Web server. Use to track which reports are most requested and to troubleshoot problems accessing the StorageScope Web server. Application server logs show exceptions that were not handled by StorageScope. Use to troubleshoot problems such as configuration errors (for example, missing Java jar files).

System Logs

<i>Default Location</i>	<Install_Root>\StorageScope\logs
<i>File names</i>	STS_SystemOut.log STS_SystemErr.log
<i>Description/Use</i>	The System Out log shows messages written to system.out (for example, Tomcat startup messages). The System Error log shows exceptional errors written to system.err that were not caught and logged to the STS_Application.log (for example, a TCP port is already in use).

StorageScope uses version 6.1 of JCChart for generating graphs. In general, the version 6.1 is compliant with JDK 1.4.1 which is used to develop StorageScope. However, when starting the StorageScope service, multiple warnings similar to the following may be logged to the STS_SystemErr.log.

```
WARNING: Duplicate name in Manifest: Depends-On  
Dec 2, 2003 9:38:44 AM java.util.jar.Attributes read
```

These are informational warnings and can be ignored

Q. Why do I see multiple copies of the application log?

The StorageScope application logs (`STS_Application.logx`) contain informational and error messages that have been logged by StorageScope.

The current application log is named `STS_Application.log`. Logging messages accumulate in this file until it reaches a maximum size. By default, the maximum size of any application log is 5120 kilobytes (5 MB), but you can change this maximum.

When the current application log reaches the maximum allowable size, StorageScope:

- ◆ Increments the numeric suffixes of any previously archived logs by one up to a user-defined maximum number of logs (7 by default).
- ◆ Renames the current log file to `STS_Application.log.1`.

See *Changing Logging Properties* on page 6-8 for instructions to change the maximum size of each application log and how many application logs are archived at any one time.

Q. Can I limit the level of detail I see in StorageScope logs?

Yes. Priority levels of logging messages in order of increasing priority are:

- ◆ DEBUG (verbose detail on all system activity)
- ◆ INFO
- ◆ ERROR
- ◆ WARN

By default, the threshold for logged messages is INFO, which means all INFO messages and messages of a higher priority are logged. You can change the minimum priority level of messages that are logged to the application logs. For example, you may only want error (ERROR) and warning (WARN) messages logged. See *Changing Logging Properties* on page 6-8 for the instruction to change the minimum priority of logged messages.

Dates and Times

Q. When I start StorageScope, what date and time will I see?

Each time you start a new StorageScope session (that is, log into StorageScope), StorageScope establishes an in-session date and time. The default in-session date and time is the last date and time for which reports are available. If no reports are available (for example, if this is a new StorageScope installation and reports have not yet been run), no in-session date or time is set until reports are run for the first time, and then you can select a date.

StorageScope maintains this in-session date and time throughout your session unless you select a different report date and/or time. The new date and/or time that you select becomes the in-session date and time until you change it again.

Q. How do I know what the current in-session date and time is?

The calendar on the Reports home page shows you the current in-session date. The current in-session date is highlighted with a blue background. The current in-session date is also displayed in the Report Date field on each report page. The current in-session time is displayed in the Time drop-down list box on each report page.

Q. What do the hyperlinked dates on the calendar mean?

A hyperlinked date (for example, [26](#)) means that reports are available for that date.

Q. How does StorageScope calculate the dates and times that are displayed?

Report dates and times are displayed in terms of local time. StorageScope takes the GMT time stamp on the report and applies the time zone offset set on the local machine to convert GMT into local time. When you launch reports directly in your browser, the browser supplies StorageScope with the time zone offset setting on the browser's local machine. When you launch reports from the ControlCenter Console, the time zone offset is based on the setting for the local machine on which the Console is installed.

The only exception to this local time rule is the Report History page where dates and times are displayed in GMT, not local time.

Q. What happens to report times if my local time changes?

It is important to note that when you select a report to display, StorageScope dynamically calculates the local time at which the report was run. This means that, in those locations that observe seasonal time changes, reports that are run prior to a time change and subsequently displayed after a time change will display a time relative to the current time zone offset and not the offset at the time the report was run.

For example, suppose that reports are run at 4:00 a.m. local time at a location that observes daylight savings changes. After the time change, those reports will display a time one hour earlier or later than the original 4:00 a.m. report time.

Q. Why are my report times off by an hour or two?

One possible reason is that you are using Netscape as your browser. It has been noted that Netscape may not accurately determine your local time zone offset value and does not always accurately account for seasonal time changes. If you see that report times are not what you expect them to be and you are using Netscape as your browser, try using Internet Explorer instead.

Q. What happens if the date on my local machine gets set incorrectly?

StorageScope only displays dates up to the date currently set on the StorageScope server host. If the time on that host is set incorrectly (for example, to a future date), reports run on that date will not be available if the date is set back to the correct date. For example, if the date on the StorageScope server host is set to 1-DEC-2002 and reports are run, and then the date is set back to 1-AUG-2002, only reports up to and including 1-AUG-2002 will be available.

EMC recommends that you delete these future reports or move them to a directory other than the XML Repository directory, as their time stamps are not accurate.

Report Scheduling and Retention

Report Scheduling

Q. Why do reports sometimes not run exactly when they are scheduled?

StorageScope has a built-in interval that regulates how often it checks to see if it is time to run reports. This value defaults to 900 seconds (15 minutes), which means that reports may not actually be run for up to 15 minutes after the scheduled time.

If StorageScope finds that reports have been run since the scheduled time, it determines that reports do not need to be run. For example:

- ◆ Reports are scheduled to be run at 4:00 a.m.
- ◆ At 4:05 a.m., you run reports.
- ◆ At 4:15 a.m., StorageScope checks to see if reports need to be run, and since they were run at 4:05 a.m., does not run them again.

Report Retention

Q. Does the retention policy affect all files?

The retention policy only affects the XML archive (.zip) files in the XML Repository directory. Any other files placed in that directory and the *working* directory, which is used to hold report files during a report run, are not affected by the retention policy.

Q. How is the retention policy enforced?

The retention policy offers three options:

- ◆ Keep all reports indefinitely (the default).
- ◆ Keep reports until the total size of all stored reports exceeds a specified number of megabytes (MB).
- ◆ Keep reports for no longer than a specified number of months.

Retention by Size

When you choose to keep/delete reports based on aggregate size, not all files are deleted when the retention policy is enforced. When StorageScope scans the XML archive files, the file that causes the XML Repository directory to grow past the specified maximum size is not deleted. Therefore, no matter what maximum size you specify, the XML Repository directory will always contain one file.

Retention by Age

A date-based retention policy is enforced based on the time currently set on the StorageScope server host. Be aware that if you modify the date/time on the StorageScope server host while StorageScope is running, the retention policy may be enforced as a result and report files may be deleted prematurely.

Q. How often is the retention policy enforced?

The retention policy set on the Report Retention and Scheduling Web page is enforced:

- ◆ After every report run.
- ◆ Whenever the retention or scheduling policy is modified.

Viewing Reports

Q. Why do I have a blank column in a report?

There are many reasons why a column may be blank in a report. Some things to check are:

- ◆ Are the agents required for the specific report installed?
- ◆ Are the agents installed correctly?
- ◆ Is the information in this column supported by the agent that is installed?

Q. Why is the chart missing when I generate a legacy report with a chart?

Viewing a legacy report that contains a custom layout that included a graph with removed or renamed columns, displays the following red message in the chart area, instead of displaying a chart:

`A failure occurred generating chart.`

You can delete the custom layout and create a new one.

Q. Why do I sometimes get partial information about a host or storage array?

Some agents only collect partial information about hosts and arrays. For example:

- ◆ The Storage Agent for NAS, Fiber Channel Connectivity Agent, and Symmetrix SDM Agent only collect partial information for Symmetrix arrays.
- ◆ The host agents and Common Mapping Agent can retrieve information about storage arrays to which the host has devices mapped and the mapped devices. However, they do not collect array port information.

Q. How are gigabytes (GB) and terabytes (TB) calculated in StorageScope?

StorageScope uses the following conversion factor:

$$1 \text{ TB} = 1024 \text{ GB} = 1024 * 1024 \text{ MB}$$

Q. Why can't I see the Run Reports Now button on the Administration Web pages?

Only one set of reports may be run at a time. To prevent more than one user running reports at the same time, or a user running reports during the scheduled report runtime, the **Run Reports Now** button does not appear while reports are running. However, you do see the current report status. For example:

Report Status: Initializing

Status Reports are initializing...

Report Status: Running

Status Running, started on Apr 29, 2003 at 9:15 AM

Further, you do not see the **Run Reports Now** button if reporting is disabled on the **Site Management** page.

Q. How can I provide a specific point-in-time snapshot of a report (for example, a snapshot of last Friday's All Hosts report) to a non-technical (business) user?

You can save the report as PDF or HTML, and then send it to any user. To do so:

1. Display the report you want to display.
2. Select the report layout.

If you want to print the graph associated with the selected layout (if applicable), make sure graphing is turned on.

3. Click the **Print** icon.
4. Select one of the following options:

PDF – This Page
PDF – All Pages
HTML – This Page

A new browser window opens with the report content that you can print or e-mail.

5. In the PDF report window, select the **Save** icon to save the report as file type .pdf.

In the HTML report window, select **File, Save As**. Save the report as file type .htm.

6. Use e-mail to send the PDF or HTML report.

Q. Why is the text distorted in some report tables?

When viewing reports in a non-maximized browser window, text in the report table may wrap or appear distorted. To clear distortion and optimize the report view, maximize your browser window. If you are using Netscape as your browser, you should also refresh the page by pressing the **F5** key. For example, an Arrays By Group report may

display the icon in a non-adjacent cell until you maximize and refresh the screen to correct the display.

Q. Why is some text distorted in my Excel table?

When viewing a report that you exported and opened in CSV format, distorted text in the Excel table may replace any non-alphanumeric characters.

Microsoft Excel for Office XP and UTF-8 characters

Microsoft Excel for Office XP does not support UTF-8 encoded Unicode characters.

To clear distortion, do the following:

1. After the file is opened in Excel, **Save** the report.
2. Open it in Notepad, and then **Save As** Unicode (USC-2).
3. Open it in Excel again. The report displays characters correctly.

Incompatible Locale and Language Settings

If the locale (location) setting on your computer differs from the language version of the operating system, your exported CSV report may misalign characters and display numbers incorrectly. You may see this distortion, for example, if the English language version of Windows is installed on your computer, and you changed the locale setting to Spanish or French.

To solve this problem, make sure your locale (location) setting is the same as the language version of your operating system.

As an alternative solution, you can:

1. Save the exported report as a text (.txt) file.
2. Open the saved text report in Excel.
3. When prompted, select **Delimited** by commas to display text correctly.

Q. Why are the legends distorted in my PDF preview?

When viewing a report that you exported to PDF, the print preview that appears in the browser may contain blurred or pixilated legends that are difficult to read. However, the report will print clearly on paper.

Q. Why is my report exported to more than one PDF table?

By default, PDF format allows a maximum of eight columns in a PDF exported table. If the report layout contains more than eight columns, the first eight columns are exported to one PDF table, and the remaining columns wrap to a second PDF table. The first column in the report is repeated in each additional PDF table that is created so that the context of the report is preserved throughout.

Your StorageScope administrator can change the default value of eight columns in the StorageScope application properties file.

If your report layout has more than eight columns, make sure that the report layout provides the context you want for the report. In a host report, for example, the first column may be the host name. If the report wraps to a second PDF table, then the host name is carried over to the first column of the second PDF table to preserve the context of the remaining columns. To change the column that appears first and repeats, you can create a custom report layout.

Trendlines

Q. What is a trendline?

StorageScope allows you to display report metrics as trendlines. A trendline for a metric represents the trend of the historical data over time and uses that historical data to project into the future. One trendline is associated with each metric that you select to graph.

StorageScope employs the Simple Linear Regression Model to model and predict the trendline. The approach is similar to the one that is used by Microsoft Excel for linear regression and forecasting.

Q. How are trendline co-ordinates calculated?

Co-ordinates for a trendline are calculated from the data that is available for the selected time interval using the Simple Linear Regression Model.

Missing values are not considered in calculations.

For plotting the graph into the future, the co-ordinates of the trendline are then calculated for an additional period equal to half the selected time interval.

Q. How do I display trendlines?

Select the **Show trendlines** option on the **Graph** tab when you create a custom graph for a custom report layout.

Because trendlines do not apply to the current report date, the Show trendlines option appears only when you select a multirate time interval for the graph.

Trendlines are displayed as follows:

- ◆ One trendline is associated with each metric that you select to graph. If you do not want to see a trendline for a specific metric, deselect that metric in the graph layout.
- ◆ A trendline for a metric is shown in the same color as the historical data for the metric, but without symbols and as a dashed line. The graph legend indicates if there are trendlines for the graph, but each individual trendline is not represented in the legend.

- ◆ Since trendlines represent the trend of historical data, if the data does not change or vary with time, the trendline data points are superimposed on the existing data.
- ◆ A linear trendline has either a positive slope or a negative slope. A trendline with positive slope indicates an increase in metric demand over time. Similarly, a trendline with negative slope indicates a decrease in metric demand over time.
- ◆ The period of the trendline is based on the selected report date. To change the trendline period, select a new report date.
- ◆ Trendlines will never go below 0 (zero). If the slope of a line indicates that the line would go below 0 for the selected time interval, the trendline will bottom out at 0 and continue at 0 to the end of the projection period.
- ◆ When a new managed object (for example, a host) is discovered or added to ControlCenter, the agent for that object typically does not collect data on the *first day*. This means that the first day's data point for the object will be 0 (zero) and 0 will be used to calculate the trendline.

Backup Reports

Q. What does "no entity found" mean in the Configuration Item column?

If you see "no entity was found (227)" in the **Configuration Item Name** column for a VERITAS NetBackup server host, it means that although the NetBackup software and the Backup Agent for NetBackup have both been installed on the backup server host, the backup software has not been configured.

A configuration item is also known as a Policy Domain, Group, Policy, or Schedule Template depending on the type of backup software.

Q. In the Backup reports, what do the terms configuration item and data set mean?

Configuration item and data set are general terms used in StorageScope to take the place of multiple vendor-specific terms. Table 8-1 provides the vendor-specific equivalents of those general terms.

Table 8-1 Vendor Equivalents for Backup Report Terms

StorageScope	Tivoli Storage Manager	Legato NetWorker	VERITAS NetBackup	EMC Data Manager
Configuration Item	Policy Domain	Group	Policy	Work Item
Data Set	File Space	Save Set	Included File	Item in File Specification for Work Item

Array Reports

Q. Which agents should I install to get complete information about an array?

To get accurate data about an array (that is, data about the array itself), the array must first be discovered by the storage agent for that array.

Array information related to device allocation may be incorrect if the fabric is not discovered. Not only should the Fibre Channel Connectivity (FCC) agent be installed and running, but you should also use it to discover the fabric.

However, even with both the storage agent and FCC agent installed, you will not get host data about SCSI connected hosts or hosts to which an HDS array is connected by a direct Fibre connection. In this case, in order to get host data about the storage used, the appropriate host agent must be installed and running on the host.

In addition to the other requirements for obtaining array data, the Symmetrix SDM agent is required in order to get Symmetrix LUN masking data and port WWNs.

Q. Why is the System Resource Capacity for IBM ESS StorageWorks blank?

All Array reports show System Resource Capacity as blank because the storage agent does not support System Resource for StorageWorks.

Q. Why do I see only the Array Name and Array ID for some devices in the All Devices layout of the Device Allocation report?

The All Devices layout shows all array devices in the infrastructure. Select the **Allocated only** layout to see only allocated array devices and whether or not they are allocated to hosts. Select **Accessible only** layout to see only array devices that are accessible to hosts and whether or not they are allocated.

Q. Why are there extra characters in the name of a storage pool when I export the Storage Pool report to CSV format?

If the name of the storage pool contains certain non-alphanumeric characters (such as @#\$%^&*()+|) and you export the Storage Pool report to CSV format, Excel inserts extra non-alphanumeric characters in front of the storage pool name. You cannot change the name in Excel, but you can still work with and save the report.

Q. Why aren't CLARiiON devices reported in the Array Ports to Devices report?

For a device to be accessible by a host (and be reported in the Ports to Devices report) the device must be specifically mapped to an array port. Since CLARiiON Storage Groups can be accessed from any port on the CLARiiON array, StorageScope does not report on CLARiiON devices in the Ports to Devices report.

Host Reports

Q. Are hosts that are manually created in the ControlCenter Console displayed in StorageScope?

All hosts are displayed, even those hosts created in the Console. If an HBA is mapped to the host when the host is created, Array Allocated information for that host is displayed.

Q. Why do I see some rows in the Host Devices report with no host device name?

In some cases, StorageScope may report an array device as accessible to a host although no associated host device is reported. In addition, the capacity of the array device is counted as host allocated capacity. Possible causes are:

- ◆ The array device is LUN masked to the host, but the host has not yet discovered it. If this is the cause, the associated host device will appear in the Host reports when the host discovers the array device.
- ◆ The address of the array device is invalid.
- ◆ The array device is not ready, that is the Status of the device on the ControlCenter Console is Not Ready.

Q. The host shows zero capacity allocated even though it has capacity allocated on the array. Why?

If the array is not fully discovered, the capacity displayed may be zero. Some array information is collected by non-array agents, but for proper capacity reporting, the array agents should be used.

Q. Why does my Tru64 host show no total host accessible capacity, but does show host used accessible capacity?

Since the Common Mapping Agent does not report the size of internal disks, if the host has only internal disks then Host – Accessible – Total will be zero (0). However, Host – Accessible – Used can be calculated from the file system size.

Q. Why is the domain name for some hosts populated by random alphanumeric characters?

Domain information cannot be obtained on some Windows hosts. In this case, the MAC address of the NIC card is used to ensure uniqueness and is displayed in the Domain Name column.

Q. What file systems are reported on the Host File Systems report?

The Host File Systems report provides a list of and details about local file systems on Windows and UNIX hosts. Network-attached and remotely mounted file systems are reported in the NAS File Server File Systems report.

Q. What does (Deleted) in the File System column mean?

If the filesystem has been unmounted or deleted, (Deleted) appears after the name of the file system.

If you delete a filesystem from a host, the filesystem persists and is displayed with (Deleted) in parenthesis next to the filesystem name, on the Console as well as in StorageScope in filesystem reports. The filesystem size appears only in StorageScope reports, but it is no longer added to the Filesystem Totals on host, group, or chargeback reports. This applies to UNIX unmounted systems as well.

Q. When I total the individual sizes of file systems on the Configuration report for Host X, I get a slightly different value than the one shown in the File System Total column on the Hosts report. Why?

The values on the Host Configuration report are rounded to the precision specified in the `stsapplication.properties` file (the default is two decimal places). If you add these sizes, the total reflects this rounding.

In the case of the File System Total on the Hosts report, the sizes of the individual file systems are first totaled, and then rounded.

Q. Why is the number of PowerPath devices zero?

Although the Common Mapping Agent collects some types of host information, StorageScope needs the host agent installed and running on the host in order to collect and report information about PowerPath® devices. A Host report shows no Symmetrix PowerPath devices if a host agent is not installed and running on the host.

Q. Why is the geometry for a shared array device reported differently for the different hosts that share the array?

An array device that is shared by hosts with different operating systems may display different values for the number of cylinders, tracks per cylinder, and number of sectors because the specific host operating system's BIOS interprets the geometry of that array device in a way that best suits its usage by that host.

Q. Why do I see no (0) array capacity reported for an array in the Host reports?

Array capacity is reported only for those array devices discovered by a storage agent. For a newly discovered host connected to an unknown array, it is common to see 0 (zero) GB of array capacity until the array is discovered.

Q. Why are the array-related capacity totals for a group or subgroup in a tree table report sometimes less than the sum of the capacity values for the individual hosts or host devices in the group or subgroup?

The totals for a group or subgroup may be less than the sum of the totals for the hosts or host devices in the group if any hosts or host devices share an array since the capacity for a host or host device is only counted once.

Q. Why don't I have as much free volume group capacity as I think I should?

Normally, the amount of free volume group capacity is calculated by subtracting the total amount of logical volume capacity from the total capacity of the volume group. The formula is:

$$(\text{Volume Group} - \text{Total}) - (\text{Logical Volume} - \text{Total}) = (\text{Volume Group} - \text{Free})$$

However, if the volume group was created using PowerPath Volume Manager (PPVM), a certain amount of that volume group's capacity is reserved for metadata. In this case, the amount of free volume group capacity reported in StorageScope may be less than what you think it should be since StorageScope does not report the metadata capacity.

Database Reports

Q. Why is the number of schemas zero for many databases?

The number of schemas is collected for Oracle databases only. For all other database types, the number of schemas is displayed as zero.

Q. In the database reports, on what database structures does StorageScope report?

For Oracle databases, StorageScope reports on schemas, tablespaces, and files. For SQL Server, Sybase, Informix, and DB2 databases, StorageScope reports on databases and files.

It is important to note that in the database reports, the values reported in the columns labeled Tablespace are not equivalent for all database types. In those columns, the value refers to Oracle tablespaces, but for all other database types, the value refers to databases. For example, in the # *Tablespaces* column, the number of Oracle tablespaces is reported. The value in that column for an SQL Server database would be the number of databases.

Table 8-2 illustrates the various database structures.

Those structures reported by StorageScope appear in **bold**.

Table 8-2 Database Structures Reported by StorageScope

Oracle	SQL Server	Sybase	Informix	DB2
Schema	Database	Database	Database	Database
Tablespace	File Group		DB Space	Tablespace
File	File	File	File	File

NAS Reports

Q. What is the NAS File Server Name?

For a Celerra® Network Server, the File Server Name is the IP address of the Control Station. For a NetApp, the File Server Name is the serial number of the file server.

Q. What file systems are reported on the NAS File Servers File Systems report?

Network-attached/remotely mounted file systems are reported in the NAS File Systems report. Details about local file systems on Windows and UNIX hosts are reported on the Host File Systems report.

Q. What do the Array Name and Array Device Name refer to on the Storage Devices view of a NAS File Server Configuration report?

For NAS file servers that are connected to storage arrays, the Array Name is the name of the array to which the file server is connected. The Array Device is the device on the array to which the file system is mapped.

In the case of a Celerra Network Server, these are the names of the Symmetrix array and the array device. Since NetApp file servers are connected to JBOD storage, these columns will be blank.

Q. Why do I see more file systems when I run `server df` on my Celerra than I see reported in StorageScope?

StorageScope does not report on Celerra root file systems so the number of NAS file systems for a Data Mover will not include the root fs file system.

Switch Reports

Q. What does the Fiber Channel Connectivity Agent do?

The Fibre Channel Connectivity Agent (FCC) discovers connectivity elements, such as switches, fabrics, and zones. In order to collect this type of information, the following agents must be installed:

- ◆ Master Agent, Host Agent, and FCC Agent for all array types.
- ◆ For Symmetrix arrays, the Symmetrix SDM Agent must also be installed.

Q. Does StorageScope report all HBAs connected to switch ports?

In the Switch reports, StorageScope only reports those HBAs that have been fully discovered by a host agent or HBAs that were entered when a host was manually created in the ControlCenter Console. If a host HBA is connected to a switch port, but the host has not yet been discovered, the HBA is considered unknown.

In this case, the WWN of the HBA is shown in the Connected Port WWN column, but the HBA ports are counted in the *# Ports to Unknown Objects* column rather than the *# of Ports to HBAs* column.

MVS Reporting

Q. How are SMS groups treated in StorageScope reports?

StorageScope treats SMS groups in the way it treats volume groups. Information about SMS groups is reported wherever volume group information is reported.

Product revision and description information is not reported for MVS devices.

Q. Why is my MVS host showing some host devices as internal/JBOD capacity?

An MVS host expects all host devices to be array-based. In order to get array-based device information, the appropriate storage agent must first discover the array. If the array is not discovered, the MVS host will incorrectly report its host devices as internal/JBOD. In addition, information about the array such as the array name and serial number is also not reported.

Another case in which MVS host devices are reported as internal/JBOD is if the MVS host is connected to a Symmetrix and Symcall blocking is turned on for mapped array devices so that array device information cannot be obtained.

Tree Tables

Q. Which reports are tree table reports?

Tree table reports show you how ControlCenter managed objects have been grouped in ControlCenter for reporting purposes. The By Group reports are tree table reports. The Host Chargeback report is also a tree table report, but slightly different from the other tree reports in that the groups in the tree table can include unlike objects (for example, databases, volume groups, and file systems).

Q. What data is graphed for a tree table report?

A graph of a tree table report always contains the aggregate data for an entire group or subgroup, rather than data for the individual objects that make up the groups.

Q. Why do I see the Graph icon when no graph is available for a subgroup?

Since a graph for a tree table report depicts the aggregate data for each group or subgroup rather than data for the individual objects that make up each group, you can only create a custom graph for a group or subgroup that contains other subgroups.

The graph icon, however, appears next to the Layout box if a custom graph has been created for any group or subgroup in the tree table report. This means that if you create a custom report layout for a subgroup that does not contain any other subgroups, you may see the graph icon even if no graph is available for that specific subgroup.

Q. What options are available for tree table reports?

Print This Page

The only Print option available for tree table reports is **This Page**. The tree in a tree table report is always fully expanded in the print document.

If you have a report with many groups that contain many objects, it may take some time for the print document to render.

Basic (for Export) Layout

You can export tree table reports in much the same way that you export other reports to CSV or XML formats. As when you print a tree table report, the tree is always fully expanded in the export document.

Because tree table reports contain data for groups of objects and individual objects, a special **Basic (for Export)** layout is provided. This export layout contains three additional columns that provide information about the hierarchical structure of the report and the relationships between the groups and objects in the report. These three columns are:

- ◆ **Object Type** — Identifies whether the report row represents a group or subgroup (Group) or an object (Host, StorageArray, NASFileSystem, and so on)
- ◆ **Group Path** — Complete path to the group or managed object through all its parent groups
- ◆ **# Subgroups** — Number of subgroups in the group

Although you can export any tree table report layout and can create custom report layouts for export, EMC highly recommends that you include these three columns in the layout to maintain the hierarchical structure of the report and the relationships between groups and objects.

If you export a report that was generated with a StorageScope version prior to 5.2, the Object Type and Group Path columns will be empty.

Custom Report Layouts and Graphs

Q. Can all reports be graphed?

No. Some reports cannot be graphed. Either the report contains no metrics or the metrics are not appropriate to graph in the context of this report. If a report cannot be graphed, you will see a message to that effect on the **Graph** tab on the **Create Custom Layout** wizard.

Q. Why are the labels on my graphs truncated?

Long character string labels (for example, host names or array IDs) on the axis of a graph can distort the graph. To minimize this effect, long strings are truncated to 12 characters.

Q. Why do some graphs take longer to appear than others?

StorageScope is designed to optimize the graphing process in that it only searches a report data file until it finds the appropriate data to populate the graph. For example, if a data file has 1000 rows but the needed data elements are found in the first 100 rows, the search ends and the graph is rendered and displayed. Some factors that may impact the process include:

- ◆ The size of the report
- ◆ The length of the selected time interval
- ◆ Changing the predefined sort order of the report

See Chapter 5, *Creating Graphs*, for additional information about graphs.

Q. Why does it take so long for the Create Custom Layout dialog box to appear?

Due to the processing and compilation required, it is normal for the Create Custom layout dialog box to take from 30 to 45 seconds to appear the first time you access it after a new StorageScope installation or a StorageScope restart. However, subsequent accesses are quite fast (approximately 1 to 2 seconds).

Q. Why can't I display or create graphs of a report?

On rare occasions, attempts to graph StorageScope reports data fail. Although reports are available for display, StorageScope displays an error message when you try to display or create a graph. To solve this problem, restart the StorageScope service.

How do I find out what the custom field names represent for a report?

Use the Custom Field Legend report to find out the values of custom fields. For example, suppose you want to find out what the custom field names represent for the Array Devices report. Using the Array Custom Field Legend report, find the name of the report in the legend, then find the custom field name (for example IP Address) for the report column (for example Array Devices Custom Field 1). Note that the Combined Custom Field Legend report shows the custom field values for all managed objects.

StorageScope API

For detailed information about the StorageScope API, see the *EMC ControlCenter 5.2 SP4 StorageScope API* document (P/N 300-002-261).

Q. What is the StorageScope API?

The StorageScope API provides access to information collected and stored by the ControlCenter infrastructure. The StorageScope API provides access to the database from anywhere in the ControlCenter distributed infrastructure; the XML files are located on the StorageScope host.

The API provides access to:

- ◆ StorageScope-generated XML files that contain historical snapshots of the data in the ControlCenter Repository.
- ◆ StorageScope-defined database views that contain current data from SQL queries of the ControlCenter Repository.

Important

Although EMC tries to maintain the stability and consistency of the XML file formats and database views from software release to release, changes may occur in the future.

Q. How and where do I install the StorageScope API?

You install the StorageScope API from the EMC ControlCenter installation CDs.

Requirements

The requirements for using the StorageScope API depend on whether you want to access:

- ◆ Both the database views *and* the XML report files, or
- ◆ Only the databases views.

Accessing Both Database Views and XML Files

If you want to access both database views and XML files using the API, you must:

1. Install the StorageScope 5.2 software, which requires a valid StorageScope license.
2. Install the StorageScope 5.2 API software on the same host as the ControlCenter Repository.

When you *install* the StorageScope API from the installation CDs, you are not actually installing anything, but rather activating or enabling the database views. If you are not logged on to the Repository host, you will not see the StorageScope API in the list of components to install.

3. Start the StorageScope service.
4. Run reports to generate the XML files.

Accessing Database Views Only

If you want to access only database views using the API, you must:

1. Install the StorageScope 5.2 API software on the same host as the ControlCenter Repository.

When you *install* the StorageScope API from the installation CDs, you are not actually installing anything, but rather activating or enabling the database views. If you are not logged on to the Repository host, you will not see the StorageScope API in the list of components to install.

2. Set up your database access method. Refer to *EMC ControlCenter 5.2 StorageScope API* (P/N 300-000-495).

Security

Q. How does StorageScope authenticate a request for access to StorageScope?

When a user requests access to StorageScope from the ControlCenter Console (the Console), ControlCenter passes a request for user authentication to the StorageScope server (the server). This request contains a parameter named `eccid`. This parameter consists of the following four components:

username | user role | time stamp | host name

While the server is running, it keeps a list of all `eccid` parameters passed in requests from the Console. Each `eccid` is kept for at least 7 days. Whenever a new Console request is made, the server checks the list of `eccid` parameters. An `eccid` is removed from the list at the first Console request containing that `eccid` made after the `eccid` is 7 days old. Also, whenever the server is restarted, the cached `eccids` are lost.

The default `eccid` expiration property (7 days) can be changed by the StorageScope administrator.

The StorageScope server performs several checks on this parameter before it authenticates the user and executes the request. The following summarizes the StorageScope authentication process.

1. The StorageScope server first checks to make sure the `eccid` is not a duplicate, that is, not currently in the list of `eccid` parameters cached by StorageScope. If the `eccid` has the same value as an `eccid` in the list cached by StorageScope, the request is denied. This check (along with the time-stamp check in step 3) prevents a user from using a StorageScope URL cached in a browser to illegally gain access.
2. If the `eccid` is not a duplicate, it is unobfuscated and parsed for the four components that make up the `eccid`. In order to be considered valid, the `eccid` must contain all four components.
3. If all components are present, the server proceeds to validate each component:
 - a. The username is validated first. The username must be the name of a valid user in the HostUser Repository table. If the username is not found, the server denies the request.

- b. The user role is then validated. The user role must be one of the two valid StorageScope user roles: StorageScope User or StorageScope Admin. If the user role is not valid, the request is denied.

The user role is also used after the user is logged into StorageScope to check if the user is authorized to perform specific tasks within StorageScope.

- c. The time stamp is validated next. The time stamp passed in the Console request is the system time (in GMT) of the Console host at the time the request was made. This time is compared to the StorageScope server time (in GMT). The difference between the times must be less than 48 hours or the request is denied. This check in conjunction with the duplicate `eccid` check prevents a user from using a cached StorageScope URL to illegally access StorageScope while the server is running.

If you set the `eccid` expiration property to 2 days or less, then an `eccid` may be reused within the 48-hour window because the time stamp on the request may be greater than the expiration property. For example, if the difference between the time stamp on the request and the StorageScope server is 32 hours but the `eccid` expires after 24 hours, StorageScope will remove the `eccid` from the list of *duplicate eccids* when it receives the Console request.

- d. The last validation is the host name. Each Console request is directed to a specific StorageScope server. The host name of the StorageScope server embedded in the `eccid` must be the same as the host name of the StorageScope server processing the request. This check prevents a user from trying to gain access to StorageScope by substituting a different StorageScope server host name in a cached URL.

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