# HP Storage Essentials SRM Report Optimizer

**Software Version: 6.3**

## Creating Reports in a Complex Environment

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# Contents

# 1 Creating Reports in a Complex Environment

This chapter contains the following topics:



HP Storage Essentials can manage very complex enterprise SAN environments encompassing thousands of devices. These devices can include hosts, storage arrays, backup systems, SAN switches from many different vendors, and a variety of software products. In such an environment, the HP Storage Essentials database is represented in a SRM Report Optimizer universe that contains over 4,200 objects with approximately 300 classes. The complexity of the HP Storage Essentials database and the SRM Report Optimizer universe can be challenging when you are attempting to create new reports; for example, it may not be clear which objects need to be included when creating a report to obtain the desired report results.

This document provides the general background information and specific task instructions that will help you successfully create realistic reports in a complex HP Storage Essentials environment.

This document describes how to select the correct objects and classes to be included in a report, and avoid common problems in selecting objects. It also describes how to select the correct context to be used when the report is run.

## Selecting Objects for a Report

This section contains the following topics:

# General Concepts: Selecting Objects

Follow the guidelines in this section when creating reports.

## Independent Classes

**Report Objects** – Asset, Chargeback, Discovery details, and Tape Library are independent classes. They do not interact with any other class, and the queries involving these classes cannot be combined with other classes. For example, you cannot combine objects from the Asset class and the Host class.

If you are interested in generating a report that contains independent classes, a different query must be added to the same report. The output can be obtained in the same report on the same page, or on a different tab.

**Global Report Objects** – There are no independent classes in global report objects.

For additional information about independent classes, see Context Types on page 27.

## Class Categories

The names of the classes in the universe are self explanatory and describe what the purpose of each class is. A few classes are repeated with additional text in the class name. The purpose of the class or sub-class is defined by additional text within the class name.

**Report Objects**

**Table 1 Class Categories for Report Objects**

| Category | Description | Example |
|---|---|---|
| Dependency | Use these classes and sub-classes when you are interested in dependency information.<br>For a full description of dependency classes, see Context Descriptions on page 27. | Host > HBA<br>This class lists all of the HBAs for the given host.<br>Host > HBA for Dependency<br>This class lists only the HBAs that are connected to fabric. |

| Category | Description | Example |
|---|---|---|
| Capacity/ Performance Statistics-Latest | Collectors periodically capture every element statistic. The "Latest" class of statistics always contains the most recent values for the object.<br>Use this class if you want to find the most recent value of the object. | Host > Host Capacity Statistics-Latest<br>Host > Host Performance Statistics > CPU performance Statistics-Latest |
| Capacity/ Performance Statistics-Historical | Collectors periodically capture every element statistic. These stats, collected for every interval, are represented in the "Historical" statistics class.<br>Use this class if you are interested in trending or change management. | Host > Host Capacity Statistics-Historical<br>Host > Host Performance Statistics > CPU performance Statistics-Historical |
| Capacity Statistics-Drill | Collectors periodically capture every element statistic. These stats, collected for every interval, are represented in the "Drill" statistics class. Use this class in the reports when you want to drill up or drill down.<br>Use this class if you are interested in the drill functionality of the product. | Host > Host Volumes > Host Volume Capacity Statistics-Drill |

**Global report objects** – There are no separate or duplicate classes for Dependency, Capacity, or Performance Statistics classes as there are for report objects.

For example:

- There are no separate Dependency classes for dependency or connectivity information.

  Example: **Global Host** > **Global HBA** works for both details and dependency information.

- There are no separate Latest, Historical, or Drill classes for Capacity or Performance statistics. Only one Capacity or Performance Statistics class will satisfy all of these requirements.

  Example: **Global Hosts** > **Global Host Volumes** > **Global Host Volume Statistics** only works like the Host Volume Statistics-Latest, Host Volume Statistics-Historical, and Host Volume Statistics-Drill classes in Report Objects.

Issue 1: The Global Host Volume Statistics class in Global Report Objects does not work like the Host Volume Statistics-Latest class in Report Objects.

Solution: Pull any of the objects but Collection Time from the class. All of the statistics with the latest collection time are now provided, and the class works like the Host Volume Statistics-Latest class in Report Objects. There is no need to apply any of the provided filters.

Issue 2: The Global Host Volume Statistics class in Global Report Objects does not work like the Host Volume Statistics-Historical class in Report Objects.

Solution: Pull any of the objects (including Collection Time) from the class. The class now shows all of the historical data and works like theHost Volume Statistics-Historical class in Report Objects. You can apply any of the filters provided in the class.

Isssue 3: The Global Host Volume Statistics class in Global Report Objects does not work like the Host Volume Statistics-Drill class in Report Objects.

Solution: For statistics with the latest collection time, pull any of the objects but Collection Time from the class. All of the statistics with latest collection time are now provided. Activate the drilling option in the report, and it works like the Host Volume Statistics-Drill class in Report Objects.

Another option is to pull any of the objects (including Collection Time) from the class. The class now shows all of the historical data. Apply the Latest Collection Time filter and it returns all of the statistics with latest collection time. Activate the Drilling option in the report, and it works like the Host Volume Statistics-Drill class in Report Objects.

**Repeating objects** – Objects in Report Objects are repeated across classes. Take care when picking objects from the same class. For example, when creating a report containing the **Host** > **HBA** class, use only objects from HBA class. Do not mix objects from the HBA for Dependency class. For a list of these objects, see Summary: Contexts Visible to Report Creators and Users on page 29.

**#MULTIVALUE error** – Occasionally, data values in the report show a #MULTIVALUE error. This is because the column in question has multiple values associated with it. To resolve this issue, the key object that can eliminate multiple values has to be identified and added to the report. It is not necessary to show this value inside the report, but it needs to be added to avoid this error.

For example, if you pick a vendor name from the Host class and Total Capacity in GB from the Host Capacity Statistics-Latest class, when you run the report you will see this error because there can be multiple values (in this case hosts) for a vendor. To resolve this error, pick a unique object. In this case, pick the Host Name object.

> **Note**: In most cases, there will not be any #MULTIVALUE errors in Global Report Objects, since most of the measure objects are automatically aggregated to the next level. You can control this by deselecting the Retrieve Duplicate Rows Data property at **InfoView** > **Edit Query** or by selecting the Avoid Duplicate Row Aggregation property at **InfoView** > **Edit Report**.

For additional information, see Avoiding #MULTIVALUE Errors on page 13.

**Contexts** – When creating a new report, a list of contexts based on the objects to be included in the report is displayed. You must select one context to create the report. Your selection of context resolves the multi-path issue, picks a particular path, and enables the report to run.

After upgrading to version 6.2, you might need to reselect some contexts.

Deselect the option to ”reset contexts on refresh” on the report side, so that the context list will not be prompted each time you run or schedule the report.

For additional information, see Example Use Cases on page 43.

## Avoiding Incompatible Objects

**Note**: All of the classes in the Report Objects section are incompatible with the classes in the Global Report Objects section.

Some classes and sub-classes are independent and should not be used with any other classes or sub-classes. These classes are incompatible, and cannot be combined in a single report. Using these classes in combination with other classes and sub-classes results in error messages indicating “incompatible objects.” The following classes are independent in Report Objects:

- Asset Class
- Chargeback Class
- Configuration Class
- Discovery Details Class
- Tape Library Class

**Note**: There are no independent classes in Global Report Objects.

The following table summarizes class compatibilities in Report Objects. Compatible classes are marked with an X. All unmarked combinations are incompatible.

**Table 2 Class Compatibilities in Report Objects**

| Class Name | Asset | Application | Backup | Chargeback | Configuration | Discovery Details |
|---|---|---|---|---|---|---|
| Asset | X | | | | | |
| Application | | X | | | | |
| Backup | | | X | | | |
| Chargeback | | | | X | | |
| Configuration | | | | | X | |
| Discovery Details | | | | | | X |
| Events | | | | | | |
| Fabric | | X | X | | | |
| File Server | | X | X | | | |
| Host | | X | X | | | |

| Class Name | Asset | Application | Backup | Chargeback | Configuration | Discovery Details |
|---|---|---|---|---|---|---|
| Nas | | X | X | | | |
| Path | | X | X | | | |
| Storage System | | X | X | | | |
| Switch | | X | X | | | |
| Tape Library | | | | | | |

**Table 3 Class Compatibilities in Report Objects (Continued)**

| Class Name | Events | Fabric | File Server | Host | NAS | Path | Storage system | Switch | Tape Library |
|---|---|---|---|---|---|---|---|---|---|
| Asset | | | | | | | | | |
| Application | | X | | X | X | X | X | X | |
| Backup | | X | | X | X | X | X | X | |
| Chargeback | | | | | | | | | |
| Configuration | | | | | | | | | |
| Discovery Details | | | | | | | | | |
| Events | X | | | | | | | | |
| Fabric | | X | X | X | | | X | X | |
| File Server | | X | X | X | X | X | X | X | |
| Host | | X | X | X | X | X | X | X | |
| Nas | | | X | X | X | X | | | |
| Path | | | X | X | X | X | X | X | |
| Storage System | | X | X | X | | X | X | X | |
| Switch | | X | X | X | | X | X | X | |
| Tape Library | | | | | | | | | X |

The following table summarizes class compatibilities in Global Report Objects. Compatible classes are marked with an X. All unmarked combinations are incompatible.

**Table 4 Class Compatibilities in Global Objects**

| Class Name | Global Application | Global Asset Details | Global Fabric | Global Host | Global Storage System | Global Switch | Global Org. Details |
|---|---|---|---|---|---|---|---|
| Global Application | X | X | X | X | X | X | X |
| Global Asset Details | X | X | X | X | X | X | X |
| Global Fabric | X | X | X | X | X | X | X |
| Global Host | X | X | X | X | X | X | X |
| Global Storage System | X | X | X | X | X | X | X |
| Global Switch | X | X | X | X | X | X | X |
| Global Organization Details | X | X | X | X | X | X | X |

## Combining Incompatible Objects in a Report

You can combine incompatible objects in a report by creating separate queries for each type. For example, if you are interested in SAN and NAS capacities in your environment, from Report Objects you can select NAS objects in one query and SAN (storage system) objects in another query, and then run the two queries together. The output can be combined in one report or different tabs of the same report.

# Avoiding #MULTIVALUE Errors

If there are multiple values for an object in a report, the #MULTIVALUE error occurs when the report is run. To avoid this situation, design reports so that each object in the report represents a unique value. In general, for each main class, a report will require a unique object.

If you have created a report containing all required objects, and a #MULTIVALUE error occurs, then include any required objects from the appropriate sub-class.

If there are elements with the same name, serial number, and other properties, assign a custom name to the element.

The following table describes the unique objects for each class in Report Objects.

**Table 5 Required Objects in Report Objects**

| Class Name | Required Object Name |
|---|---|
| Host | Host Name, IP Address, Organization Name |
| Application | Application Name, Host Name, Organization Name |
| Backup | Application Name, Host Name, Organization Name |
| Storage System | Storage System Name, Serial Number, Organization Name |
| NAS | Filer Name, IP Address, Organization Name |
| Switch | Switch Name, Serial Number, Organization Name |
| File Server | File Server Name, Host Name, Organization Name |
| Tape Library | Tape Library Name, Organization Name |
| Host Capacity Statistics-Historical | Host Name, Organization Name, Collection Time, Statistics Type |
| Host Capacity Statistics-Latest | Host Name, Organization Name |
| Host Volume Capacity Statistics-Historical | Host Name, Logical Volume Name, Organization Name, Collection Time, Statistics Type |
| Host Volume Capacity Statistics-Latest | Host Name, Logical Volume Name, Organization Name |
| Host Volume Capacity Statistics-Drill | Host Name, Logical Volume Name, Organization Name, Collection Time, Statistics Type |
| Storage System Capacity Statistics-Historical | Storage System Name, Organization Name, Collection Time, Statistics Type |
| Storage System Capacity Statistics-Latest | Storage System Name, Organization Name |

| Class Name | Required Object Name |
|---|---|
| Storage Pool Capacity Statistics-Historical | Storage System Name, Storage Pool Name, Organization Name, Collection Time, Statistics Type |
| Storage Pool Capacity Statistics-Latest | Storage System Name, Storage Pool Name, Organization Name |
| Exchange Application Capacity-Historical | Application Name, Organization Name, Host Name, Collection Time, Statistics Type, Storage Group Name |
| Exchange Application Capacity-Latest | Application Name, Organization Name, Host Name, Storage Group Name |
| Virtual Application Capacity-Historical | Application Name, Organization Name, Host Name, Collection Time, Statistics Type, Virtual Path |
| Virtual Application Capacity-Latest | Application Name, Organization Name, Host Name, Virtual Path |
| DB Application Physical Capacity-Historical | Application Name, Organization Name, Host Name, Collection Time, Statistics Type, DB Instance Name, DB Physical Name, DB Logical Name |
| DB Application Physical Capacity-Latest | Application Name, Organization Name, Host Name, DB Instance Name, DB Physical Name, DB Logical Name |
| DB Application Instance Capacity-Historical | Application Name, Organization Name, Host Name, Collection Time, Statistics Type, DB Instance Name |
| DB Application Instance Capacity-Latest | Application Name, Organization Name, Host Name, DB Instance Name |
| Switch Capacity Statistics-Historical | Switch Name, Organization Name, Collection Time, Statistics Type |
| Switch Capacity Statistics-Latest | Switch Name, Organization Name |

## Examples: Resolving #MULTIVALUE Errors

The following table provides examples of reports that will generate the #MULTIVALUE error, and how to resolve these situations.

**Table 6 Resolving #MULTIVALUE Errors**

| Use Case | Cause of #MULTIVALUE Error | Resolution |
|---|---|---|
| Create a report to show the latest host capacity statistics. Select all of the following:<br>• Host class > Vendor object<br>• Host Capacity Statistics-Latest class > Total Capacity in GB object | There can be multiple hosts with the same vendor name. | Select a unique object, such as Host Name. |
| Create a report to show total storage capacity. Select all of the following:<br>• Storage System class > Vendor object<br>• Storage System Capacity Statistics-Latest class > Total Raw Capacity in GB object | There can be multiple storage systems with the same vendor name. | Select a unique object, such as Storage System name. |
| Create a report to show total storage capacity. Select all of the following:<br>• Host class > Host Name object<br>• Host Volume Capacity Statistics-Latest class > Total Capacity in GB object | There can be multiple logical volumes on a given host. | Select the Logical Volume Name object from the Host Volumes class. |

| Use Case | Cause of #MULTIVALUE Error | Resolution |
|---|---|---|
| Create a report to show Host Volume capacity. Select all of the following:<br>• Host Volume Capacity Statistics-Historical class > Total in GB object<br>• Host class > Host Name object<br>• Host class > Logical Volume Name object | For historical capacity statistics, there can be multiple values because capacity data was collected at different times. | Select the Collection Time object from the sub-class. |

**Note**: In general, you must include the main objects and all the objects in the sub-classes in the query to avoid #MULTIVALUE errors.

## Using the "XYZ for Dependency" Classes in Report Objects

Some classes from Report Objects, such as HBA, Host Volumes, and Storage System Fiber Channel Ports, have corresponding classes such as HBA for Dependency, Host Volumes for Dependency, and Storage System Fiber Channel Ports for Dependency. Use these guidelines when choosing between Class Name classes and Class Name for Dependency classes:

- Use Class Name for a report containing only objects from one class or sub-classes, or when using Generic and Managed contexts.
- Use Class Name for Dependency when combining objects of different classes. Use this only to find objects used in connectivity or dependency with objects in other classes. Examples include host-dependent storage systems and host-dependent switches.

The following table shows when to use various classes versus their corresponding XYZ for Dependency classes. In this instance, XYZ can be Host Volume Capacity Statistics, Storage System Capacity Statistics, Switch Configuration Statistics, Storage Pool Capacity Statistics, and so on.

**Table 7 XYZ for Dependency Classes in Report Objects**

| Classes | Usage Guidelines |
|---|---|
| • Host Volumes<br>• Host Volumes for Dependency<br>• Host Volume Management | • Use the Host Volumes class only with the Host class and/or its sub-classes, or with Generic and Managed contexts.<br>• Use the Host Volumes for Dependency class with other classes, such as Switch, Storage System, or NAS.<br>• Use the Host Volume Management class when you want to find volume management volumes information. |
| • HBA<br>• HBA for Dependency | • Use the HBA class only with the Host class and/or its sub-classes. The HBA class provides information about all of the HBAs for a given host.<br>• Use the HBA for Dependency class with other classes and sub-classes, such as Switch, Storage System, or NAS. The HBA for Dependency class provides information about HBA connectivity with other devices, but not for all HBAs on a given host. |
| • HBA Ports<br>• HBA Ports for Dependency | • Use the HBA Ports class only with the Host class and/or its sub-classes. The HBA Ports class provide information about all of the HBA ports for a given host.<br>• Use the HBA Ports for Dependency class with other classes and sub-classes, such as Switch, Storage System, or NAS. Use this class to get information about HBA port dependency or connectivity with other devices. This class does not provide all of the HBA ports for a given host. |
| • Storage System Fiber Channel Ports<br>• Storage System Fiber Channel Ports for Dependency | • Use the Storage System Fiber Channel Ports class to find all of the fiber channel ports for a given storage system, Use this class only with the Storage System class and/or its sub-classes, or in combination with Switch class and its sub-classes.<br>• Use the Storage System Fiber Channel Ports for Dependency class to find ports connected to other elements. You must combine this class with the Storage System class (and its sub-classes) and other classes such as the Host or Application class. You cannot combine this class with the Switch class. This class provides only the Fiber channel port dependency or connectivity. For example, it shows the Fiber channel port connected to an HBA port. It does not show all Fiber channel ports for a given storage system. |

## Examples: Using the XYZ for Dependency Classes in Report Objects

The following table provides examples of when to use XYZ for Dependency classes in Report Objects when creating reports.

**Table 8 XYZ for Dependency Classes in Report Objects when Creating Reports**

| To Create This Report | Select All of These Objects |
|---|---|
| Show host logical volumes with their capacity information | • Host > Host Name<br>• Host > Host Volumes > Logical Volume name<br>• Host > Host Volumes > Host Volume Capacity Statistics-Latest > Total in GB<br>• Host > Host Volumes > Host Volume Capacity Statistics-Latest > Used in GB<br>• Host > Host Volumes > Host Volume Capacity Statistics-Latest > Free in GB |
| Show host-dependent storage systems and details | • Storage System > Storage System Name<br>• Host > Host Name<br>• Host > HBA Ports for Dependency > HBA Port Name<br>• Host > Host Volumes for Dependency > Logical Volume Name<br>• Storage System > Storage Volumes > Storage Volume Name<br>• Storage System > Storage System Fiber Channel Ports for Dependency > Port Name |
| Show switch-dependent storage systems and details | • Switch > Switch Details > Switch Name<br>• Switch > Switch Details > Switch Ports > Switch Port Name<br>• Storage System > Storage System Name<br>• Storage System > Vendor<br>• Storage System > Storage System Fiber Channel Ports > Port Name |

## Using the XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects

SRM Report Optimizer provides the most recently calculated capacity statistics and historical capacity statistics.

The following table lists when to use XYZ-Latest, XYZ-Historical, and XYZ-Drill classes in Report Objects.

**Table 9 XYZ-Latest, XYZ-Historical, and XYZ-Drill in Report Objects**

| Class Name | When to Use |
|---|---|
| “XYZ”-Latest | To find the latest point-in-time data or the most current data. |
| “XYZ”-Historical | To find the collection of all data points over a period of time or time series report. |
| “XYZ”-Drill | To drill up or down, or to see an Automatic Summarization of capacities over a period of time. |

## Examples: Using the XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects

The following table provides examples of using the XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects.

**Table 10 XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects**

| Class Name | Examples of Use |
|---|---|
| • Host > Host Volumes > Host Volume Capacity Statistics-Latest<br>• Host > Host Volumes > Host Volume Capacity Statistics-Historical > Total in GB | • Use the Latest class to show the host capacity information calculated at the point-in-time from the most current data.<br>• Use the Historical class to show the historical host capacity information as a collection of all data points over a period of time, or as a time series report. |
| • Host > Host Volumes > Host Volume Capacity Statistics-Latest<br>• Host > Host Volumes > Host Volume Capacity Statistics-Historical<br>• Host > Host Volumes > Host Volume Capacity Statistics-Drill | • Use the Host Volume Capacity Statistics-Latest class when you want the latest host volume capacity information. For example, the latest point-in-time data or the most current data.<br>• Use the Host Volume Capacity Statistics-Historical class when you want historical host volume capacity information. For example, a collection of all data points over a period of time, or a time series report.<br>• Use the Host Volume Capacity Statistics-Drill class s when you want host volume and/or host capacity information. For example, if you want to use drill down/up or Automatic Summarization of capacities. |

| Class Name | Examples of Use |
|---|---|
| • Storage System > Performance Statistics > EVA > EVA Physical Disk Statistics- Latest<br>• Storage System > Performance Statistics > EVA > EVA Physical Disk Statistics-Historical | • Use the EVA Physical Disk Statistics-Latest class when you want the latest EVA physical disk capacity information. For example, if you want the latest point-in-time data or the most current data.<br>• Use the EVA Physical Disk Statistics-Historical class should when you want historical EVA physical disk capacity information. For example, if you want a collection of all data points over a period of time, or a time series report. |

## Using the XYZ Statistics Class in Global Report Objects as XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects

A new feature introduced with version 6.1 enables SRM Report Optimizer to provide the most recently calculated capacity statistics, historical capacity statistics, and drill down functionality in the same class in Global Report Objects. This feature is only applicable to classes under Global Report Objects.

> **Note**: Clusters, virtual machines, and virtual servers are not supported by the global universe. Global reports and any reports based on the global universe are not supported for these elements. The aggregate capacities for hosts are not accurate when these elements are in the the environment.

### Examples: Using the XYZ Statistics class in Global Report Objects as XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects

The following table provides examples of how to use the same XYZ Statistics class in Global Report Objects as XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects.

**Table 11 XYZ Statistics Class in Global Report Objects as XYZ-Latest, XYZ-Historical, and XYZ-Drill Classes in Report Objects**

| Class Name | Type of Data | Examples of Use |
|---|---|---|
| Global Host> Global Host Volumes> Global Host Volume Capacity Statistics | Latest | • Use any of the objects except Collection Time in the query panel. The report will show the host volume capacity information calculated at the point-in-time from the most current data.<br>• It is not necessary to apply any of the conditional filters provided in this scenario. |
| | Historical | • Use any of the objects along with Collection Time in the query. The report will show the historical host volume capacity information as a collection of all data points over a period of time, or as a time series report.<br>• Use the conditional filters to control the retrieved data in this scenario |
| | Drill | • Use any of the measure objects except Collection Time in the query. The report will show the latest host volume capacity information. Activate the drilling option in the report.<br>• It is not necessary to apply any filters.<br>*Or*<br>• Use any measure objects along with Collection Time in the query. The report will show historical host volume capacity information. Apply the Latest Conditional Time filter, which will returns the most current data. Activate the drilling option in the report.<br>• It is not necessary to apply any other filters. |

## Events Class in Report Objects

The following table describes the Events class in Report Objects.

**Table 12 Events Class**

| Events Class | Examples |
|---|---|
| • The Events class provides all events, including: application, host, storage system, switch, fabric, etc. Events is an independent class and cannot be used in combination with any other classes.<br>• The Element Specific Events class provides event information for a specific element only (such as application, backup, file server, NAS, Host, Storage system, Switch, Tape Library, etc.). | • The Application Events class provides event information for applications only.<br>• The Host Events class provides event information for hosts only. |

## Assets Class in Report Objects

The following table describes the Assets class in Report Objects.

**Table 13 Assets Class**

| Assets Class | Examples |
|---|---|
| • The Asset class gives information about all the assets in your environment. The Assets class is an independent class and cannot be used in combination with any other classes.<br>• The Element Specific Assets class gives asset information for a specific element only (such as application, backup, file server, NAS, Host, Storage system, Switch, Tape Library, etc.). | • The Application Assets class gives asset information for applications only.<br>• The Host Assets class gives asset information for hosts only. |

## Hidden Objects and Classes in Report Objects

The following objects and classes are hidden in Report Objects when you upgrade from one SRM Report Optimizer release to another.

### 6.0 to 6.0.1

The following objects and classes are hidden in Report Objects:

- The Cluster Node Members class under Host class is renamed to Cluster Node Details and there are hidden unwanted objects inside this class.
- The Cluster Node Members object under Host class.

### 6.0.1 to 6.1

The following objects and classes are deleted from Report Objects:

- The VM end to end Connectivity class and its objects under Host > Virtual Server Details

- The SCSI Controller Name object under Storage System > Storage Disk Drives

The following objects/classes are hidden in Report Objects:

- The Virtual Member Disk drives class and its object under Virtual Server Details class
- The Storage System Disk Drives class and objects under Storage System > Storage Extents
- The NAS Disk Drives class and objects under NAS > NAS Volumes
- The Capacity object under Backup > Backup Manager Details > Session Summary
- The Storage Tier Classification and Storage Tier Cost per GB objects under all classes except Application and Storage system classes
- The Mapping Version object under the Discovery Details class
- The Collection Time object under File Server > File Server Scanned Volumes > Home Directory Details

# Using Wild-Card Searching with the Filters

Wild-card searching is not possible with the built-in query filters that are available as part of the universe, but when you are creating filters, there are options named Matches Pattern and Different from Pattern that can be used for pattern searching.

For example, if you are creating a filter on Host Name, select the object and then select Matches Pattern or Different from Pattern. The following table provides examples of the Matches Pattern option.

**Table 14 Matches Pattern Option**

| "Matches Pattern" Typed in the Text Field | Possible Output | Comments |
|---|---|---|
| %usa% | • Host.test.usa.com<br>• usa123<br>• Zusa | The output must contain the word "usa." |
| A%1% | • A1.test.usa.com<br>• Ased1<br>• A74188 | The output must start with "A" and include "1" as one of the characters. |

The following table provides examples of the "Different from Pattern" option.

**Table 15 Different from Pattern Option**

| "Different from Pattern" Typed in the Text Field | Possible Output | Comments |
|---|---|---|
| %test% | • Host.usa.com<br>• Te23st123<br>• Host_123<br>• mycomp.usa.com | The output must not contain the word "test." |
| A%1% | • A.test.usa.com<br>• sed1<br>• 74188 | The output must not start with "A" and have "1" as one of the characters. |

# Selecting Context

This section contains the following topics:



## About Contexts

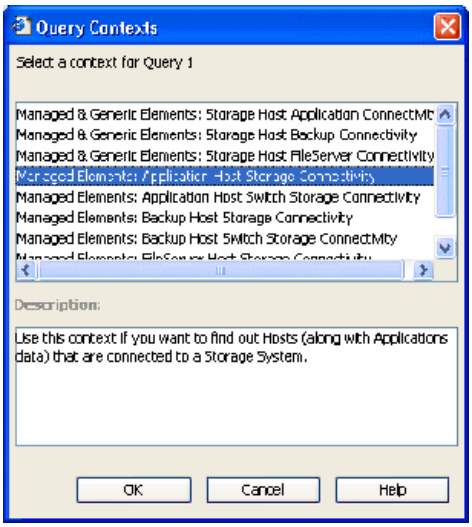
A context shows the relationships among the various objects in the universe.

You are prompted to select a context when creating a new report that contains objects from two or more different classes. For example, application and storage system classes.

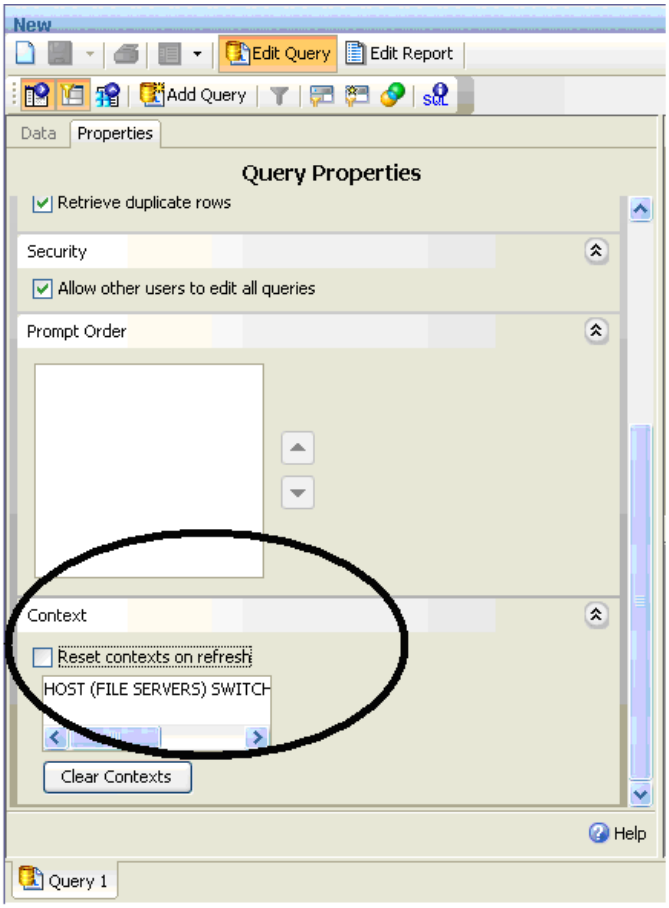
You are prompted to select a context when there are different paths to get the data, which is a normal situation when you create a report containing objects from two or more different type of classes. Your selection of context resolves the multi-path issue and picks a particular path, which allows your report to run.

When creating a new report, the list of possible contexts depends on the objects to be included in the report. You must select one context in order to create the desired report.

The following figure shows an example of the Query Contexts dialog box.




Once the report is designed, you can disable context prompting, so that the pre-selected context will be used automatically whenever the report is run or scheduled. To disable context prompting, deselect the option labeled “Reset contexts on refresh” in the WEBI Query Properties panel.



All Report Pack reports default to a particular context, so you will not be prompted to select a context when running or scheduling a Report Pack report.

## Context Types

The following types of contexts are used with Report Objects:

- **Managed elements**: Elements that are discovered through the management server.
- **Generic elements**: Elements that are not discovered through the management server, but are available when the fabric is discovered.

The following types of contexts are used with Global Report Objects:

- **Global Managed Elements**: Global elements that are not discovered through the management server, but are available when the fabric is discovered.
- **Global Elements**: Indicates both Global Managed Elements and Global Generic Elements.

## Context Descriptions

The following contexts are defined in the universe:

> **Note**: Cluster file servers are only displayed if you select a Managed & Generic Elements context.

- **Managed Elements: Application Host Switch Storage Connectivity** – Use this context if you want to find out the connectivity between (Applications and Hosts) OR (Applications and Switches) OR (Applications and Storage systems) OR (Hosts and Switches) OR (Hosts and Storage systems) OR (Switches and Storage systems) OR (Applications, Hosts, Switches and Storage systems).
- **Managed Elements: Application Host NAS Connectivity** – Use this context if you want to find out the connectivity between (Applications and Hosts) OR (Hosts and NAS) OR (Applications and NAS) OR (Applications, Hosts and NAS).
- **Managed Elements: Application VirtualMachine Switch Storage Connectivity** – Use this context if you want to find out the connectivity between (Applications and Virtual Machines) OR (Applications and Switches) OR (Applications and Storage Systems) OR (Virtual Machines and Switches) OR (Virtual Machines and Storage Systems) OR (Switches and Storage Systems) OR (Applications, Virtual, Machines, Switches and Storage Systems) OR any combinations of these element types.
- **Managed Elements: Backup Host Switch Storage Connectivity** – Use this context if you want to find out the connectivity between (Backup and Hosts) OR (Backup and Switches) OR (Backup and Storage systems) OR (Hosts and Switches) OR (Hosts and Storage systems) OR (Switches and Storage systems) OR (Backup, Hosts, Switches and Storage systems).
- **Managed Elements: Backup Host NAS Connectivity** – Use this context if you want to find out the connectivity between (Backup and Hosts) OR (Hosts and NAS) or (Backup and NAS) OR (Backup, Hosts and NAS).

- **Managed Elements: Backup VirtualMachine Switch Storage Connectivity** – Use this contect if you want to find out the connectivity between (Backup and Virtual Machines) OR (Backup and Switches) OR (Backup and Storage Systems) OR (Virtual Machines and Switches) OR (Virtual Machines and Storage Systems) OR (Switches and Storage Systems) OR (Backup, Virtual, Machines, Switches and Storage Systems) OR any combination of these element types.
- **Managed Elements: FileServer Host Switch Storage Connectivity** – Use this context if you want to find out the connectivity between (File servers and Hosts) OR (File servers and Switches) OR (File servers and Storage systems) OR (Hosts and Switches) OR (Hosts and Storage systems) OR (Switches and Storage systems) OR (File servers, Hosts, Switches and Storage systems).
- **Managed Elements: FileServer Host NAS Connectivity** – Use this context if you want to find out the connectivity between (File servers and Hosts) OR (Hosts and NAS) OR (File servers and NAS) OR (File servers, Hosts and NAS).
- **Managed & Generic Elements: Storage Host Application Connectivity** – Use this context if you want to find out the connectivity between (Storage systems and Hosts) OR (Storage systems and Applications) OR (Hosts and Applications) OR (Storage systems, Hosts and Applications).
- **Managed & Generic Elements: Storage Host Backup Connectivity** – Use this context if you want to find out the connectivity between (Storage systems and Hosts) OR (Storage systems and Backup) OR (Hosts and Backup) OR (Storage systems, Hosts and Backup).
- **Managed & Generic Elements: Storage Host FileServer Connectivity** – Use this context if you want to find out the connectivity between (Storage systems and Hosts) OR (Storage systems and File servers) OR (Hosts and File servers) OR (Storage systems, Hosts and File servers).
- **Managed & Generic Elements: Switch Host Application Connectivity** – Use this context if you want to find out the connectivity between (Switches and Hosts) OR (Switches and Applications) OR (Hosts and Applications) OR (Switches, Hosts and Applications).
- **Managed & Generic Elements: Switch Host Backup Connectivity** – Use this context if you want to find out the connectivity between (Switches and Hosts) OR (Switches and Backup) OR (Hosts and Backup) OR (Switches, Hosts and Backup).
- **Managed & Generic Elements: Switch Host FileServer Connectivity** – Use this context if you want to find out the connectivity between (Switches and Hosts) OR (Switches and File servers) OR (Hosts and File servers) OR (Switches, Hosts and File servers).
- **Managed & Generic Elements: Switch Storage Connectivity** – Use this context if you want to find out the connectivity between (Storage Systems and Switches) OR vice versa.
- **Managed & Generic Elements: Fabric Host Application** – Use this context if you want to find out the Host (along with Application) information related to a Fabric
- **Managed & Generic Elements: Fabric Host Backup** – Use this context if you want to find out the Host (along with Backup) information related to a Fabric.
- **Managed & Generic Elements: Fabric Host FileServer** – Use this context if you want to find out the Host (along with File server) information related to a Fabric.

- **Global Elements: Application Details** – Use this context to find all Application details.
- **Global Elements: Assets and Organization Details** – Use this context to find out Asset Management information across sites and their Organization details.
- **Global Elements: Fabric-Switch Host Application** – Use this context to find the Host (along with Application) information related to a Fabric-Switch.
- **Global Elements: Fabric-Switch Storage System** – Use this context to find the Storage system information related to Fabric-Switch.
- **Global Elements: Host Details** – Use this context to find all Host details.
- **Global Elements: Storage System Details** – Use this context to find all Storage system details.
- **Global Elements: Switch Details** – Use this context to find all Switch details.
- **Global Elements: Application Host Switch Connectivity** – Use this context to find out the connectivity between (Hosts and Applications) OR (Hosts and Switches) OR (Switches and Applications) OR (Applications, Hosts and Switches).
- **Global Elements: Storage System Host Connectivity** – Use this context to find out the connectivity between Storage systems and Hosts OR vice versa.
- **Global Managed Elements: Storage System Host Switch Application Connectivity** – Use this context to find out the connectivity between (Applications and Hosts) OR (Applications and Switches) OR (Applications and Storage systems) OR (Hosts and Switches) OR (Hosts and Storage systems) OR (Switches and Storage systems) OR (Applications, Hosts, Switches and Storage systems).

  **Note**: This does not include the Hosts that are target of LUN Maskings from the Storage systems. This only includes the Hosts associated through the path.

  **Note**: If you use **Global Switch > Switch Name** in this context, it shows the switch that is connected to the host but not the switch that is connected to the storage system. Select **Global Switch > Global Switch Ports > Storage Connected Switch Ports > Switch Name** to find out the switch that is connected to the storage system in this context.
- **Global Elements: Storage System Switch Connectivity** – Use this context to find out the connectivity between (Storage systems and Switches) OR vice versa.
- **Users Roles Organizations** – Use this context to find Security information such as Users, Roles and Organizations.

## Summary: Contexts Visible to Report Creators and Users

The following contexts are visible to users who create and run reports.

**Table 16 Context Summary for Report Objects (Part 1 of 2)**

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **Application** | **Virtual Machines** | **Storage Systems** | **Hosts** | **Switches** |
| Managed Elements: Application Host Switch Storage connectivity | X | | | X | |
| | X | | | | X |
| | X | | X | | |
| | | | | X | X |
| | | | X | X | |
| | | | X | | X |
| | X | | X | X | X |
| Managed Elements: Application Host NAS connectivity | X | | | X | |
| | | | | X | |
| | X | | | | |
| | X | | | X | |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **Application** | **Virtual Machines** | **Storage Systems** | **Hosts** | **Switches** |
| Managed Elements: Application Virtual Machine Switch Storage Connectivity | X | X | | | |
| | X | | | | X |
| | X | | X | | |
| | | X | | | X |
| | | X | X | | |
| | | | X | | X |
| | X | X | X | | X |
| Managed Elements: Backup Virtual Machine Switch Storage Connectivity | | X | | | |
| | | | | | X |
| | | | X | | |
| | | X | | | X |
| | | X | X | | |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **Application** | **Virtual Machines** | **Storage Systems** | **Hosts** | **Switches** |
| | | X | | X | |
| | X | X | | X | |
| Managed Elements: Backup Host Switch Storage Connectivity | | | | X | |
| | | | | | X |
| | | | X | | |
| | | | | X | X |
| | | | X | X | |
| | | | X | | X |
| | | | X | X | X |
| Managed Elements: File Server Host Switch Storage connectivity | | | | X | |
| | | | X | | |
| | | | | | X |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **Application** | **Virtual Machines** | **Storage Systems** | **Hosts** | **Switches** |
| | | | X | X | |
| | | X | X | | |
| | | X | | X | |
| | | X | X | X | |
| Managed and Generic elements: Storage Host Application Connectivity | | | X | X | |
| | X | | X | | |
| | X | | | X | |
| | X | | X | X | |
| Managed and Generic elements: Storage Host Backup connectivity | | | X | X | |
| | | | X | | |
| | | | | X | |
| | | | X | X | |
| Managed and Generic elements: Storage Host File Server connectivity | | | X | X | |
| | | | X | | |
| | | | | X | |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **Application** | **Virtual Machines** | **Storage Systems** | **Hosts** | **Switches** |
| | | X | X | | |
| Managed and Generic elements: Switch Host Application connectivity | | | | X | X |
| | X | | | | X |
| | X | | | X | |
| | X | | | X | X |
| Managed and Generic elements: Switch Host Backup connectivity | | | | X | X |
| | | | | | X |
| | | | | X | |
| | | | | X | X |
| Managed and Generic elements: Switch Host File Server connectivity | | | | X | X |
| | | | | | X |
| | | | | X | |
| | | | | X | X |
| Managed and Generic elements: Switch Storage connectivity | | | X | | X |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **Application** | **Virtual Machines** | **Storage Systems** | **Hosts** | **Switches** |
| Managed and Generic elements: Fabric Host Application | X | | | X | |
| Managed and Generic elements: Fabric Host File Server | | | | X | |
| Managed and Generic elements: Fabric Storage | | | X | | |
| Managed and Generic elements: Fabric Switch | | | | | X |
| Managed and Generic elements: Tape Library | | | | | |

**Table 17 Context Summary for Report Objects (Part 2 of 2)**

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **NAS** | **Backup** | **File Servers** | **Fabrics** | **Tape Libraries** |
| Managed Elements: Application Host Switch Storage connectivity | | | | | |
| | | | | | |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **NAS** | **Backup** | **File Servers** | **Fabrics** | **Tape Libraries** |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Managed Elements: Application Host NAS connectivity | | | | | |
| | X | | | | |
| | X | | | | |
| | X | | | | |
| Managed Elements: Application Virtual Machine Switch Storage Connectivity | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **NAS** | **Backup** | **File Servers** | **Fabrics** | **Tape Libraries** |
| | | | | | |
| Managed Elements: Backup Virtual Machine Switch Storage Connectivity | | X | | | |
| | | X | | | |
| | | X | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | X | | | |
| Managed Elements: Backup Host Switch Storage Connectivity | | X | | | |
| | | X | | | |
| | | X | | | |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **NAS** | **Backup** | **File Servers** | **Fabrics** | **Tape Libraries** |
| | | | | | |
| | | | | | |
| | | | | | |
| Managed Elements: Application Host NAS connectivity | X | | | | |
| Managed Elements: File Server Host Switch Storage connectivity | | | X | | |
| | | | X | | |
| | | | X | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | X | | |
| Managed & Generic elements: Storage Host Application Connectivity | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Managed & Generic elements: Storage Host Backup connectivity | | | | | |
| | | X | | | |
| | | X | | | |
| | | X | | | |
| Managed & Generic elements: Storage Host Application Connectivity | | | | | |
| Managed & Generic elements: Storage Host File Server connectivity | | | | | |
| | | | X | | |
| | | | X | | |

| Context | Shows Connectivity between the Following Objects | | | | |
|---|---|---|---|---|---|
| **Context Name** | **NAS** | **Backup** | **File Servers** | **Fabrics** | **Tape Libraries** |
| | | X | | | |
| Managed & Generic elements: Switch Host Application connectivity | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Managed & Generic elements: Switch Host Backup connectivity | | | | | |
| | | X | | | |
| | | X | | | |
| | | X | | | |
| Managed & Generic elements: Switch Host File Server connectivity | | | | | |
| | | | X | | |
| | | | X | | |
| | | | X | | |
| Managed & Generic elements: Switch Storage connectivity | | | | | |
| Managed & Generic elements: Fabric Host Application | | | X | X | |
| Managed & Generic elements: Fabric Host File Server | | | | | |
| Managed & Generic elements: Fabric Storage | | | | X | |
| Managed & Generic elements: Fabric Switch | | | | X | |
| Managed & Generic elements: Tape Library | | | | | X |

**Table 18 Context Summary for Global Report Objects**

| Context | Shows Connectivity between the Following Objects | | | | | | |
|---|---|---|---|---|---|---|---|
| **Context Name** | **Global Application** | **Global Asset Details** | **Global Fabric** | **Global Hosts** | **Global Storage System** | **Global Switch** | **Organization Details** |
| Managed Elements: Application Details | X | X | | | | | X |
| Global Elements: Assets and Organization Details | | X | | | | | X |
| Global Elements: Host Details | | X | | X | | | X |
| Global Elements: Storage System Details | | X | | | X | | X |
| Global Elements: Switch Details | | X | | | | X | X |
| Global Managed Elements: Application Host Switch Connectivity | X | X (of host) | | X | | | X (of host) |
| | | X (of host) | | X | | X | X (of host) |
| | X | X (of host) | | | | X | X (of host) |
| | X | X (of host) | | X | | X | X (of host) |

| Context | Shows Connectivity between the Following Objects | | | | | | |
|---|---|---|---|---|---|---|---|
| **Context Name** | **Global Application** | **Global Asset Details** | **Global Fabric** | **Global Hosts** | **Global Storage System** | **Global Switch** | **Organization Details** |
| Global Elements: Storage system Host Connectivity | | X (of storage system | | X | X | | X (of storage system |
| Global Elements: Storage system Switch Connectivity | | X (of storage system | | | X | X | X (of storage system |
| Global Managed Elements: Storage system Host Switch Application Connectivity | X | X (of storage system) | | X | | | X (of storage system) |
| | X | X (of storage system) | | | X | | X (of storage system) |
| | X | X (of storage system) | | | | X | X (of storage system) |
| | X | X (of storage system) | | X | X | | X (of storage system) |

| Context | Shows Connectivity between the Following Objects | | | | | | |
|---|---|---|---|---|---|---|---|
| **Context Name** | **Global Application** | **Global Asset Details** | **Global Fabric** | **Global Hosts** | **Global Storage System** | **Global Switch** | **Organization Details** |
| Global Managed Elements: Storage system Host Switch Application Connectivity | X | X (of storage system) | | X | | X | X (of storage system) |
| | | X (of storage system) | | X | X | | X (of storage system) |
| | | X (of storage system) | | X | | X | X (of storage system) |
| | | X (of storage system) | | X | X | X | X (of storage system) |
| | | X (of storage system) | | | X | X | X (of storage system) |
| Global Elements: Fabric-Switch Host Application | X | X (of switch) | X | X | | | X (of switch) |
| | | X (of switch) | X | | | X | X (of switch) |
| | X | X (of switch) | X | X | | X | X (of switch) |
| Global Elements: Fabric-Switch Storage system | | X (of switch) | X | | X | | X (of switch) |
| | | X (of switch) | X | | | X | X (of switch) |
| | | X (of switch) | X | | X | X | X (of switch) |

**Note**: In the previous table, "X (of storage system)" indicates that asset and organization details are provided for the storage system only. For example, assume that you added the objects Host Name, Switch Name, and Storage system. Then from the Global Managed Elements > Storage system Host Switch Application Connectivity context you added the object Asset Name from the Global Asset Details class or the object Organization Name from the Organization Details class. In this case, the report will show the asset or organization details of the storage system only. The same is true of "X (of host)" and "X (of switch)."

# Example Use Cases

The following example use cases illustrate the process of creating new reports. Each use case describes the user goal and the steps to create the desired report. This section focuses on the steps related to selecting the appropriate classes, objects, contexts, and functions to create specific reports. It is not a goal of this document to describe details such as customizing report titles and formatting, or the steps to create a simple report; these topics are documented elsewhere.

All objects in the SRM Report Optimizer universe are contained within two classes. In some cases, an object is contained within a top-level class, and in other cases it is necessary to expand one or more sub-classes within a top-level class to find a specific object.

In describing how to select the classes of objects to be included in a report, this chapter uses the following convention:

```
Class > [Subclass1] > [Subclass2] > … [SubclassN]
```

In this instance:

- Class represents the name of the top-level class, such as Host or Storage System
- [Subclass1], [Subclass2], and [SubclassN] represent the names of one or more subclasses containing the specified object (where applicable). Examples of sub-classes include Host > Host Volumes and Storage System > Storage System Volumes.

## Use Case 1: Allocated, Mounted, and Used Storage

User Goal: Create a report showing:

- Total amount of storage allocated to a specific host
- How much of the allocated storage is mounted
- How much of the mounted volumes is used and free

To create this report, follow these steps:

1. Find the storage allocated to a host by selecting the following objects/filters under Report Objects from the Report Connector universe, and dragging them onto the Results Objects/Query Filters panel.

| Class > Subclass(es) | Object/Filter |
|---|---|
| Host | Host Name |
| Storage System | Storage System Name |
| Storage System > Storage System Volumes | Storage Volume Name |
| Storage System > Storage System Volumes | Volume Size in GB |
| Host | Managed Hosts filter |
| Host | Non-Clustered Hosts filter |

2. Click **Run Query** to run the report and select the proper context. The following contexts are offered when you run the report:
   - Managed & Generic Elements: Storage Host Application Connectivity
   - Managed & Generic Elements: Storage Host Backup Connectivity
   - Managed & Generic Elements: Storage Host FileServer Connectivity
   - Managed Elements: Application Host Switch Storage Connectivity
   - Managed Elements: Backup Host Switch Storage Connectivity
   - Managed Elements: FileServer Host Switch Storage Connectivity

   To select the proper context, you must understand the differences between the two types of contexts:
   - Managed & Generic Elements Contexts include both managed and generic elements in the report. All of these contexts will provide exactly the same data in the report. This type of context will return data from Target LUN mapping.
   - Managed Elements Contexts include only managed elements in the report. All of these three contexts will provide exactly the same data in the report.

   Select a context type based on whether you want to see information about managed and generic elements, or only managed elements.
3. Find data about the mounted, used, and free storage for a host:
   a. Select **Edit Query**.
   b. Click **Add Query** to create another query within this report. You can either accept the default query names (for example Query 1, Query 2), or assign meaningful names to the queries for ease of use.
4. Select the following objects under Report Objects from the Report Connector universe, and drag them onto the Results Objects/Query Filters panel for the second query.

| Class > Subclass(es) | Object |
|---|---|
| Host | Host Name |
| Host > Host Volumes | Logical Volume Name |
| Host > Host Volumes > Host Volume Capacity Statistics-Latest | Total in GB |
| Host > Host Volumes > Host Volume Capacity Statistics-Latest | Used in GB |
| Host > Host Volumes > Host Volume Capacity Statistics-Latest | Free in GB |
| Host | Managed Hosts filter |
| Host | Non-Clustered Hosts filter |

5. Run the report.

   This report displays two separate tables. Depending on your needs, you can select among these options to display the results on a single page, or on different tab pages:

   - Insert a table in a new report (creates two tables in two separate tab pages).
   - Insert a table in the current report (creates two tables in the same tab page).
   - Include the result objects in the document without generating a table.

   These options are only available the first time you run the report. The option you select will be used each time the report is run. It cannot be changed later.

6. Group by Host name in these two tables by selecting the Host name column and clicking **Insert/Remove Break**.
7. In the first table, select the Volume Size in GB column and click **Insert Sum** to add a row to display the total storage allocated to the selected volumes.
8. In the second table, add rows to display the Total in GB, Used in GB and Free in GB, as described above (select each column, and click **Insert Sum** once for each column).

The following figures show an example of an Allocated, Mounted, and Used Storage Report:

**Figure 1 Allocated, Mounted, and Used Storage Report**

| Host Name | Storage System N | Storage Volume N | Volume Size in GB |
|---|---|---|---|
| HP-NAS | eva4k-hyd | HP-NAS\HP-NAS-1 | 200 |
| HP-NAS | | Sum: | 200 |
| QA-BLADE-16 | AMS1000@16.180 | LDEV 09 | 3 |
| | AMS1000@16.180 | LDEV 10 | 2 |
| | AMS1000@16.180 | LDEV 1035 | 1 |
| | AMS1000@16.180 | LDEV 21 | 2 |
| | AMS1000@16.180 | LDEV 22 | 3 |
| | AMS1000@16.180 | LDEV 23 | 3 |
| QA-BLADE-16 | | Sum: | 14 |

| Host Name | Logical Volume Name | Total in GB | Used in GB | Free in GB |
|---|---|---|---|---|
| BACKUP-180 | C: | 14.99 | 5.94 | 9.06 |
| | Y: | 74.56 | 44.21 | 30.35 |
| | Z: | 55 | 54.9 | 0.09 |
| BACKUP-180 | Sum: | 144.55 | 105.04 | 39.5 |
| CMS20 | C: | 68.33 | 27.67 | 40.66 |
| | D: | 68.33 | 31.1 | 37.23 |
| CMS20 | Sum: | 136.66 | 58.78 | 77.88 |

## Use Case 2: Creating a High-Level List of Managed Hosts

User Goal: Create a report showing a high-level list of all managed hosts.

To create this report, follow these steps:

1. To find host information, select the following objects under Report Objects from the SRM Report Optimizer universe, and drag them into the Results Objects/Query Filters panel.

| Class > Subclass(es) | Object/Filter |
|---|---|
| Host | Host Name |
| Host | IP Address |
| Host | DNS Name |
| Host | Model |
| Host | Vendor |
| Host | OS |

| Class > Subclass(es) | Object/Filter |
|---|---|
| Host | OS Version |
| Host | # of Processors |
| Host | Total Physical Memory in MB |
| Host > Host CIM Extension Version | Build Number |
| Host | Managed Hosts filter |
| Host | Non-Cluster Host filter |

2. Click **Run Query** to run the report.
3. To find the HBA count and CIM extension versions, select the following objects under Report Objects from the SRM Report Optimizer universe, and drag them into the Results Objects/Query Filters panel.

| Class > Subclass(es) | Class > Subclass(es) |
|---|---|
| Host > HBA | HBA Name |
| Host > Host CIM Extension Version | Major Version |
| Host > Host CIM Extension Version | Minor Version |
| Host > Host CIM Extension Version | Small Version |

4. Create a variable named “HBA count” using the following formula:

   ```
   =Count([HBA Name]) in ([Host Name])
   ```

5. Drag “HBA count” to report.
6. Insert a new column named CIM Extension Version:
   a. Right-click at the end of the table.
   b. Select **Insert column after** from the Insert submenu.
7. Add the following formula to the CIM Extension Version” column by double-clicking on the column, any entering the following in the edit field:

   ```
   "=If(IsNull([Major Version]) And IsNull([Minor Version]) And
   IsNull([Small Version]);" ";[Major Version]+"."+[Minor
   Version]+"."+[Small Version])"
   ```

8. Run the report.

9. This report may generate a #MULTIVALUE error or double count in the HBA Count field. To avoid this:

   a. Select **Host** > **Host Organization Name** and drag it to the Results Objects panel.

   b. Update “HBA count” with the following formula by double clicking on “HBA count” in the Data tab and entering the following in the edit field:

   ```
   "=Count([HBA Name]) In ([Host Name];[Host Organization Name])"
   ```

10. Run the report.

Here is an example of a Host Summary Report.

| Host Name | IP Address | DNS Name | Model | Vendor | OS | OS Version | Total Processors | Total Physical Memory in MB | HBA Count | CIM Extension Version | Build Number |
|---|---|---|---|---|---|---|---|---|---|---|---|
| conquistador | 16.118.237.117 | conquistador.selab.usa.hp.com | sun4u | SUN | Solaris | Generic_120011-14.5.10 | 2 | 768.00 | 2 | 6.0.1 | 78 |
| crusader | 16.118.237.116 | crusader.selab.usa.hp.com | sun4u | SUN | Solaris | Generic_117171-07.5.9 | 2 | 768.00 | 2 | 6.0.1 | 78 |
| greyflood | 16.118.235.85 | greyflood.selab.usa.hp.com | sun4u | SUN | Solaris | Generic_120011-14.5.10 | 1 | 4,096.00 | 1 | 6.0.1 | 78 |
| HP-NAS | 16.180.170.106 | 16.180.170.106 | ProLiant DL585 G1 | HP | Windows(R) Server 2003 | 5.2.3790 | 2 | 3,927.50 | 1 | 6.0.0 | 285 |
| hpux128hpux | 16.180.170.49 | 16.180.170.49 | 9000/800/rp3440 | HP | HP-UX | B.11.23 U | 2 | 2,046.00 | 1 | 6.0.2 | 54 |
| kenmore | 16.118.236.147 | 16.118.236.147 | sun4u | SUN | Solaris | Generic_117171-07.5.9 | 2 | 512.00 | 2 | 6.0.2 | 50 |
| nashak | 16.118.237.79 | nashak.selab.usa.hp.com | sun4u | SUN | Solaris | Generic_117171-07.5.9 | 2 | 2,048.00 | 3 | 6.0.1 | 78 |
| QA-BLADE-16 | 16.180.169.17 | QA-BLADE-16 | ProLiant BL465c G1 | HP | Windows(R) Server 2003 | 5.2.3790 | 2 | 4,093.63 | 2 | 6.0.2 | 36 |
| RHEL4-U6-X64 | 16.180.170.41 | 16.180.170.41 | x86_64 | HP | LINUX | 2.6.9-67.ELsmp | 2 | 7,972.00 | 2 | 6.0.1 | 78 |
| silverlode | 16.118.235.87 | silverlode.selab.usa.hp.com | sun4u | SUN | Solaris | Generic_120011-14.5.10 | 1 | 4,096.00 | 1 | 6.0.1 | 78 |
| sputnik | 16.118.237.115 | sputnik.selab.usa.hp.com | sun4u | SUN | Solaris | Generic_117171-07.5.9 | 1 | 256.00 | 2 | 6.0.2 | 19 |
| sun12 | 16.180.170.22 | 16.180.170.22 | sun4u | SUN | Solaris | Generic_117350-25.5.8 | 2 | 2,048.00 | 1 | 6.0.2 | 24 |
| sun29 | 16.180.170.29 | 16.180.170.29 | sun4u | SUN | Solaris | Generic_118558-34.5.9 | 6 | 3,584.00 | 4 | 6.0.2 | 38 |
| suni386 | 16.180.170.28 | 16.180.170.28 | i86pc | SUN | Solaris | Generic_120012-14.5.10 | 2 | 3,959.31 | 1 | 6.0.1 | 78 |

**Note**: The Host Summary Report contains additional details not visible in this figure.

## Use Case 3: Application-Specific Utilization for a Managed Application

User Goal: Create a report showing the application specific utilization for a managed application. For example, this report will show table space utilization for a database, or mail store utilization for Microsoft Exchange.

To create this report, follow these steps:

1. To find information about the database applications, select the following objects/filters under Report Objects from the Report Connector universe, and drag them into the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Host | Host Name |
| Host | IP Address |
| Application | Application with Host Name |
| Application > DB Applications > DB Application Physical Capacity-Latest | DB Logical Name |
| Application >DB Applications > DB Application Physical Capacity-Latest | DB Physical Name |

| Class > Subclass(es) | Object/Filter |
|---|---|
| Application > > DB Applications > DB Application Physical Capacity-Latest | Total in GB |
| Application > DB Applications> DB Application Physical Capacity-Latest | Used in GB |
| Application > DB Applications > DB Application Physical Capacity-Latest | Free in GB |
| Application | Select Application with Host Name filter |

2. To find information about the Exchange applications:
   a. Click **Add a combined** query.
   b. Use the default operator “UNION” to combine these two queries.
   c. Remove all the default objects except Host Name, IP Address, and Application with Host Name.
   d. Select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel. You must select these objects in the same order as for the first query.

| Class > Subclass(es) | Object/Filter |
|---|---|
| Application > Exchange Applications > Exchange Application Capacity-Latest | Storage Group Name |
| Application > Exchange Applications > Exchange Application Capacity-Latest | Exchange Filepath |
| Application > Exchange Applications > Exchange Application Capacity-Latest | Total in GB |
| Application > Exchange Applications > Exchange Application Capacity-Latest | Used in GB |
| Application > Exchange Applications > Exchange Application Capacity-Latest | Free in GB |
| Application | Select Application with Host Name filter |

3. To find information about Virtual applications:
   a. Click **Add a combined query**.
   b. Use the default operator “UNION” to combine these three queries.

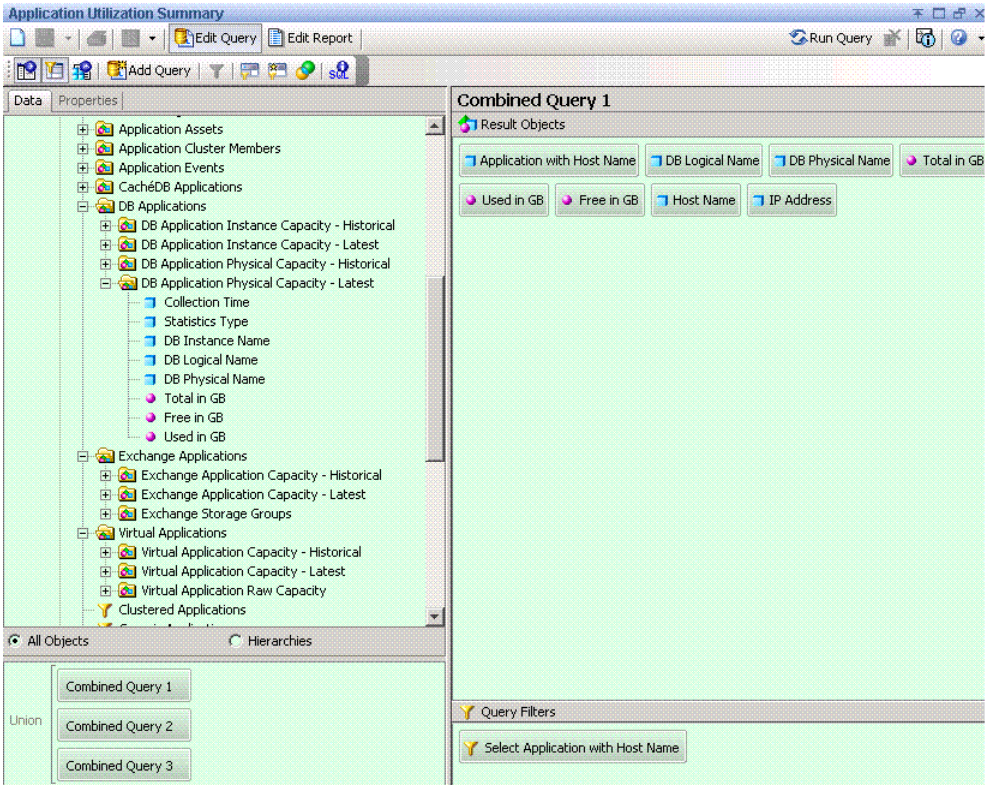
c. Remove all the default objects except Host Name, IP Address, and Application with Host Name.

d. Select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel. You must select the objects in the same order as for the first query.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Application > Virtual Applications > Virtual Application Capacity-Latest | Application Path |
| Application > Virtual Applications > Virtual Application Capacity-Latest | Total in GB |
| Application > Virtual Applications > Virtual Application Capacity-Latest | Used in GB |
| Application > Virtual Applications > Virtual Application Capacity-Latest | Free in GB |
| Application | Select Application with Host Name filter |

e. To have the same number and order of objects in both queries, drag Application > Vendor from the SRM Report Optimizer universe, and insert it into the Results Objects panel, between the Application Path and Total in GB objects.

The combined queries are displayed as follows:




4. Run the report. The following contexts are offered:
   - Managed & Generic Elements: Fabric Host Application
   - Managed & Generic Elements: Storage Host Application Connectivity
   - Managed & Generic Elements: Switch Host Application Connectivity
   - Managed Elements: Application Host NAS Connectivity
   - Managed Elements: Application Host Switch Storage Connectivity
5. Select **Managed Elements: Application Host Switch Storage Connectivity**.
6. Remove unnecessary columns from the report:
   - DB Physical Name.
   - Host Name and IP Address
7. Create the necessary variables using the following formulas.

| Variable Name | Formula |
|---|---|
| V_Total | =Sum([Total in GB]) |
| V_Used | =Sum([Used in GB]) |

| Variable Name | Formula |
|---|---|
| V_Free | =Sum([Free in GB]) |
| % Used | =If ([V_Total]=0;0;[V_Used]/[V_Total]) |
| % Free | =If ([V_Total]=0;0;[V_Free]/[V_Total]) |

   a. Replace content of Total in GB with V_Total.

   b. Replace content of Used in GB with V_Used.

   c. Replace content of Free in GB with V_Free.

   d. Drag % Used and % Free to the end column of the table.

8. Format the report:

   a. Right-click the columns **% Used** and **% Free**.

   b. Select **Format Number** and follow the Number Format dialog box instructions to set these two columns to percentage format.

   c. Drag Application with Host Name to the top of the table to create the section.

9. Create totals for each application:

   a. Highlight the Total in GB column and select **Sum** from the drop-down list of the Insert Sum button.

   b. Highlight the Used in GB column and select **Sum** from the drop-down list of the Insert Sum button.

   c. Highlight the Free in GB column and select **Sum** from the drop-down list of the Insert Sum button.

   d. Select the cell under %Used and enter:

   ```
   "=If(Sum([V_Total])=0;0;Sum([V_Used])/Sum([V_Total]))”
   ```

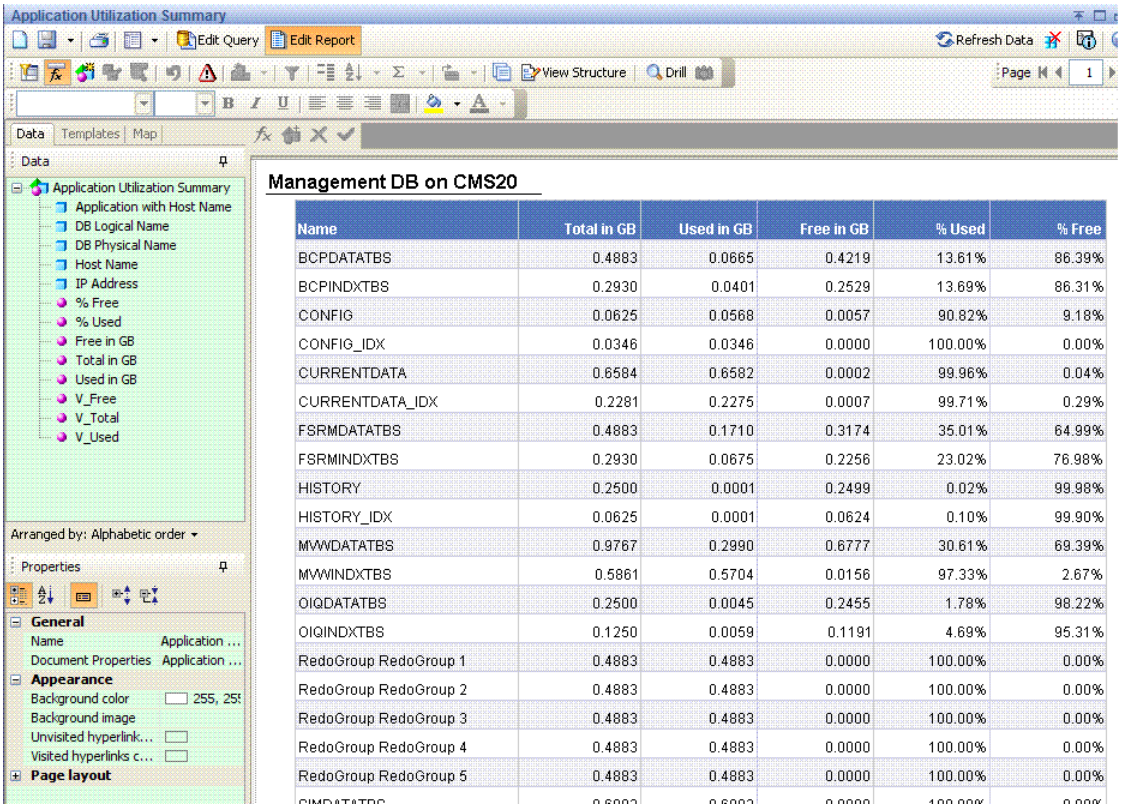
   e. Select the cell under % Free and enter:

   ```
   "=If(Sum([V_Total])=0;0;Sum([V_Free])/Sum([V_Total]))”
   ```

   f. Right-click these two cells and select **Format Number**. Follow the Number Format dialog box instruction to set these two cells to percentage format.

10. Run the report.

Here is an example of an Application Utilization Summary Repor:.




| Name | Total in GB | Used in GB | Free in GB | % Used | % Free |
|---|---|---|---|---|---|
| BCPDATATBS | 0.4883 | 0.0665 | 0.4219 | 13.61% | 86.39% |
| BCPINDXTBS | 0.2930 | 0.0401 | 0.2529 | 13.69% | 86.31% |
| CONFIG | 0.0625 | 0.0568 | 0.0057 | 90.82% | 9.18% |
| CONFIG_IDX | 0.0346 | 0.0346 | 0.0000 | 100.00% | 0.00% |
| CURRENTDATA | 0.6584 | 0.6582 | 0.0002 | 99.96% | 0.04% |
| CURRENTDATA_IDX | 0.2281 | 0.2275 | 0.0007 | 99.71% | 0.29% |
| FSRMDATATBS | 0.4883 | 0.1710 | 0.3174 | 35.01% | 64.99% |
| FSRMINDXTBS | 0.2930 | 0.0675 | 0.2256 | 23.02% | 76.98% |
| HISTORY | 0.2500 | 0.0001 | 0.2499 | 0.02% | 99.98% |
| HISTORY_IDX | 0.0625 | 0.0001 | 0.0624 | 0.10% | 99.90% |
| MVWDATATBS | 0.9767 | 0.2990 | 0.6777 | 30.61% | 69.39% |
| MVWINDXTBS | 0.5861 | 0.5704 | 0.0156 | 97.33% | 2.67% |
| OIQDATATBS | 0.2500 | 0.0045 | 0.2455 | 1.78% | 98.22% |
| OIQINDXTBS | 0.1250 | 0.0059 | 0.1191 | 4.69% | 95.31% |
| RedoGroup RedoGroup 1 | 0.4883 | 0.4883 | 0.0000 | 100.00% | 0.00% |
| RedoGroup RedoGroup 2 | 0.4883 | 0.4883 | 0.0000 | 100.00% | 0.00% |
| RedoGroup RedoGroup 3 | 0.4883 | 0.4883 | 0.0000 | 100.00% | 0.00% |
| RedoGroup RedoGroup 4 | 0.4883 | 0.4883 | 0.0000 | 100.00% | 0.00% |
| RedoGroup RedoGroup 5 | 0.4883 | 0.4883 | 0.0000 | 100.00% | 0.00% |

## Use Case 4: Specified Number of Oldest Files for Each Volume in Each File Server

User Goal: Create a report showing a specified number of the oldest files for each volume in each file server.

To create this report, follow these steps:

1. To find information about file servers, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| File Server | File Server Name |
| File Server > File Server Scanned Volumes | Volume Name |
| File Server > File Server Scanned Volumes > Top N Aged Files | File Name |
| File Server > File Server Scanned Volumes > Top N Aged Files | File Modified |
| File Server > File Server Scanned Volumes > Top N Aged Files | File Created |

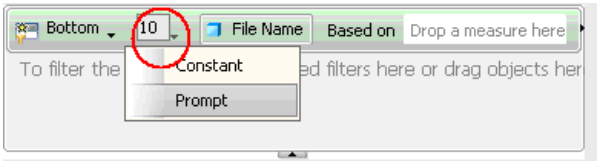
| Class > Subclass(es) | Object/Filter |
|---|---|
| File Server > File Server Scanned Volumes > Top N Aged Files | File Owner Name |
| File Server > File Server Scanned Volumes > Top N Aged Files | File Accessed |
| File Server > File Server Scanned Volumes > Top N Aged Files | File Size in GB |

2. Add database ranking to the query by clicking **Add a database ranking**.

   a. Select **Bottom** from the first drop-down list:


   b. Drag File Name to the “Drop a dimension here” field.

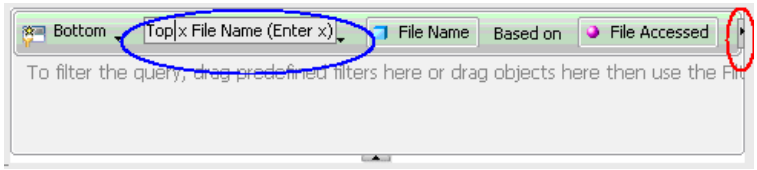
   c. Select **Prompt** from the second drop-down list:




   d. Change "Bottom x File Name (Enter x)" back to "Top x File Name (Enter x)."

   e. Drag File Accessed to the “Drop a measure here” field.

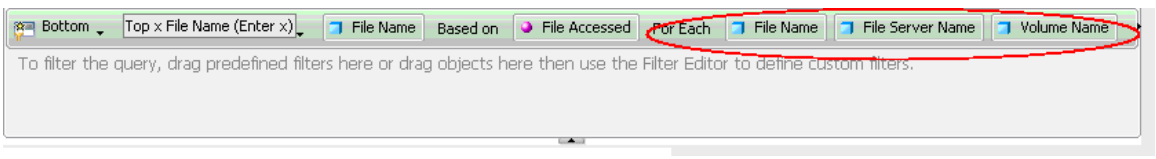
   f. Click the arrow button at the right end of the filter box.




   g. Drag File Name to the “drop a dimension here” field after the For Each label.

   h. Drag File Server Name to “drop a dimension” here” field after For Each label.

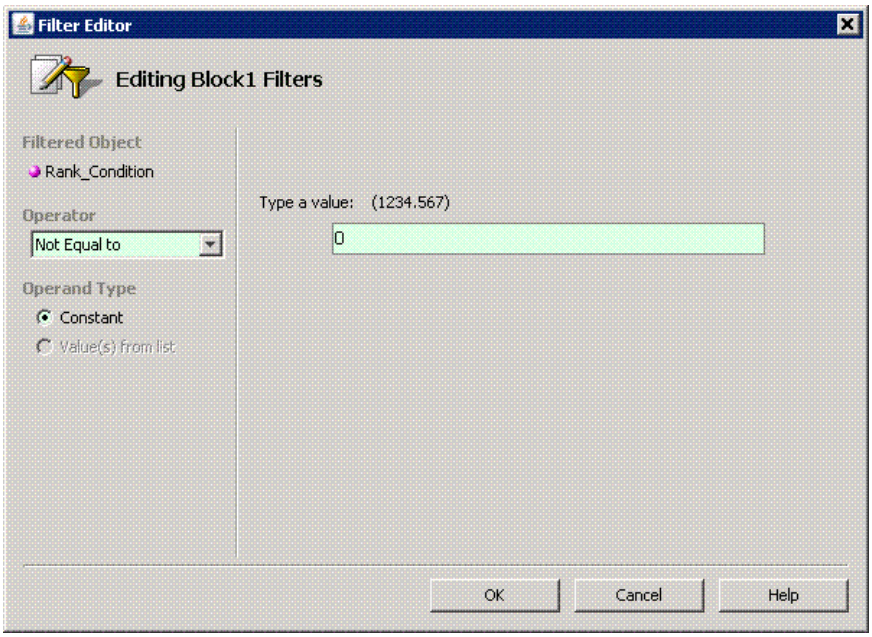
   i. Drag Volume Name to “drop a dimension” here” field after For Each label.




3. Create the necessary variables using the following formulas.

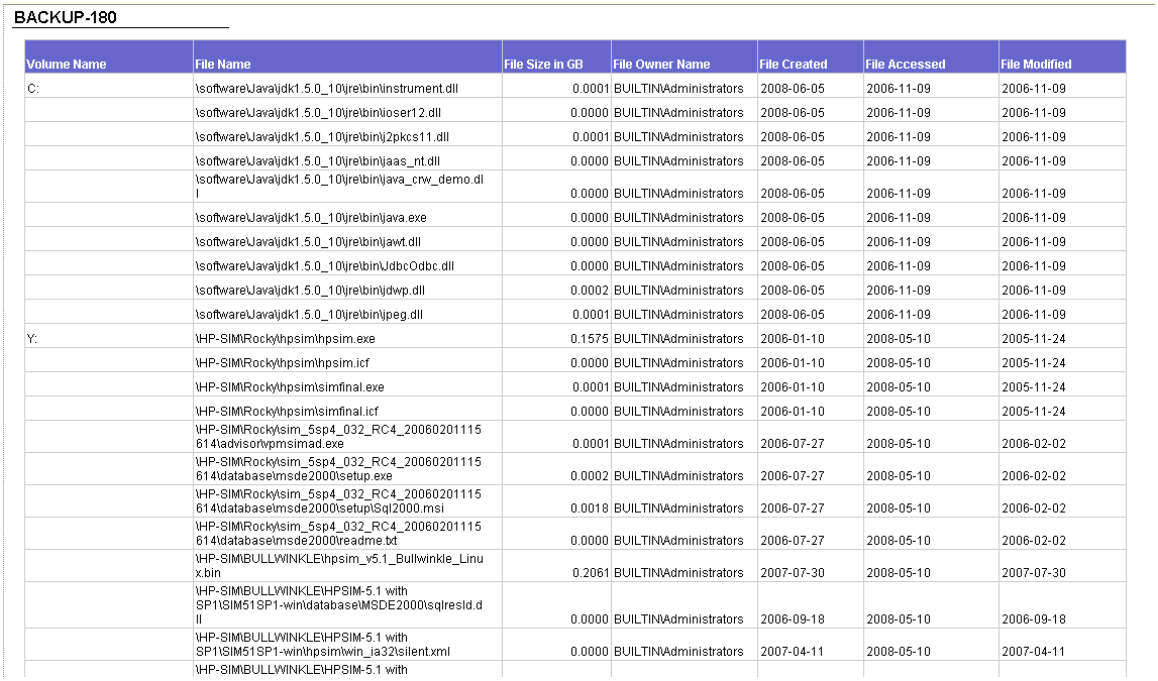
| Variable Name | Formula |
|---|---|
| UsedResponse | =ToNumber(UserResponse("Top x File Name (Enter x)")) |
| File_Rank | =Rank([File Accessed]; ([File Server Name];[Volume Name];[File Name]); ([File Server Name];[Volume Name])) |
| Rank_Condition | =If([File_Rank]<=[UserResponse] ForAll([File Name]) ForEach([Volume Name]);1;0) |

4. Add a “Rank_Condition” report filer to rank the file name based on the file access time:
   a. Click **Show/Hide filter pane**.
   b. Drag the Rank_Condition variable to the Report filter pane.
   c. Select **Not equal to** from the Operator drop-down menu and set the value to 0.




5. Drag File Server Name to the top of the table to create a section.
6. Run the report.

Here is an example of a Top N Aged Files report.



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| Volume Name | File Name | File Size in GB | File Owner Name | File Created | File Accessed | File Modified |
|---|---|---|---|---|---|---|
| C: | \software\Java\jdk1.5.0_10\jre\bin\instrument.dll | 0.0001 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\ioser12.dll | 0.0000 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\j2pkcs11.dll | 0.0001 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\jaas_nt.dll | 0.0000 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\java_crw_demo.dll | 0.0000 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\java.exe | 0.0000 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\jawt.dll | 0.0000 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\JdbcOdbc.dll | 0.0000 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\jdwp.dll | 0.0002 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| | \software\Java\jdk1.5.0_10\jre\bin\jpeg.dll | 0.0001 | BUILTIN\Administrators | 2008-06-05 | 2006-11-09 | 2006-11-09 |
| Y: | \HP-SIM\Rocky\hpsim\hpsim.exe | 0.1575 | BUILTIN\Administrators | 2006-01-10 | 2008-05-10 | 2005-11-24 |
| | \HP-SIM\Rocky\hpsim\hpsim.icf | 0.0000 | BUILTIN\Administrators | 2006-01-10 | 2008-05-10 | 2005-11-24 |
| | \HP-SIM\Rocky\hpsim\simfinal.exe | 0.0001 | BUILTIN\Administrators | 2006-01-10 | 2008-05-10 | 2005-11-24 |
| | \HP-SIM\Rocky\hpsim\simfinal.icf | 0.0000 | BUILTIN\Administrators | 2006-01-10 | 2008-05-10 | 2005-11-24 |
| | \HP-SIM\Rocky\sim_5sp4_032_RC4_20060201115614\advisor\wpmsimad.exe | 0.0001 | BUILTIN\Administrators | 2006-07-27 | 2008-05-10 | 2006-02-02 |
| | \HP-SIM\Rocky\sim_5sp4_032_RC4_20060201115614\database\msde2000\setup.exe | 0.0002 | BUILTIN\Administrators | 2006-07-27 | 2008-05-10 | 2006-02-02 |
| | \HP-SIM\Rocky\sim_5sp4_032_RC4_20060201115614\database\msde2000\setup\Sql2000.msi | 0.0018 | BUILTIN\Administrators | 2006-07-27 | 2008-05-10 | 2006-02-02 |
| | \HP-SIM\Rocky\sim_5sp4_032_RC4_20060201115614\database\msde2000\readme.txt | 0.0000 | BUILTIN\Administrators | 2006-07-27 | 2008-05-10 | 2006-02-02 |
| | \HP-SIM\BULLWINKLE\hpsim_v5.1_Bullwinkle_Linux.bin | 0.2061 | BUILTIN\Administrators | 2007-07-30 | 2008-05-10 | 2007-07-30 |
| | \HP-SIM\BULLWINKLE\HPSIM-5.1 with SP1\SIM51SP1-win\database\MSDE2000\sqlresld.dll | 0.0000 | BUILTIN\Administrators | 2006-09-18 | 2008-05-10 | 2006-09-18 |
| | \HP-SIM\BULLWINKLE\HPSIM-5.1 with SP1\SIM51SP1-win\hpsim\win_ia32\silent.xml | 0.0000 | BUILTIN\Administrators | 2007-04-11 | 2008-05-10 | 2007-04-11 |
| | \HP-SIM\BULLWINKLE\HPSIM-5.1 with | | | | | |

**Note**: This report contains additional details that are not visible in the figure.

## Use Case 5: NAS Information and Details for the Client host and Application

User Goal: Create a report showing NAS information and details for the client host and application.

To create this report, follow these steps:

1. To find information on NAS systems, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| NAS | Filer Name |
| NAS | IP Address |
| NAS | DNS Name |
| NAS | OS |
| NAS | OS Version |
| NAS | Select NAS Hosts filter |

2. Run the report.
3. Click **Add Query** to add another query.

4. To find information on NAS Client Hosts, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

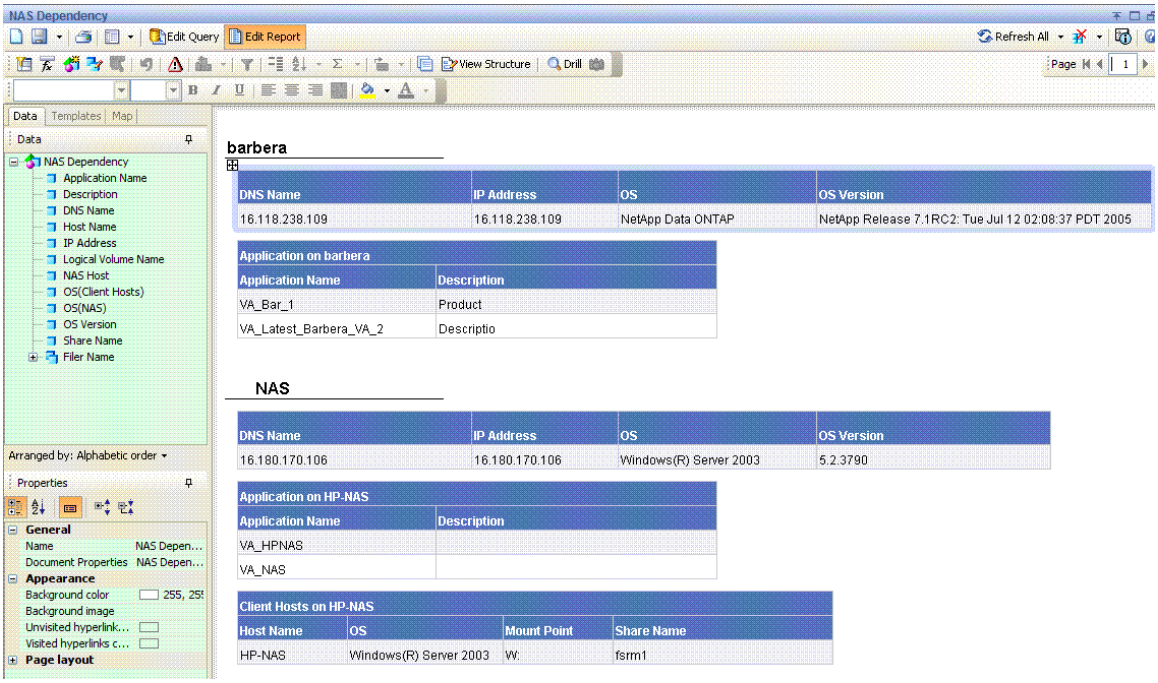
| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| NAS | NAS Host Name |
| NAS | Associated NAS Client Hosts filter |
| Host | Host Name |
| Host | OS |
| Host > Host Volumes for Dependency | Logical Volume Name |
| Host > Host Volumes for Dependency | Share Name |

5. Click **Add Query** to add another query.
6. To find information on the applications, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Application | Application Name |
| Application | Description |
| NAS | Filer Name |
| NAS > NAS Dependent NAS Hosts | NAS Host |
| NAS | NAS Hosts filter |

7. Drag Filer Name from the report to the top of the table to create a section.
8. Run the report.

Here is an example of a NAS Dependency Report.




## Use Case 6: Storage Tier Information, Hosts, and Storage Volumes

User Goal: Create a report showing the storage tier information, hosts, and storage volumes for each storage pool.

To create this report, follow these steps:

1. To find information on Host Storage Volumes, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

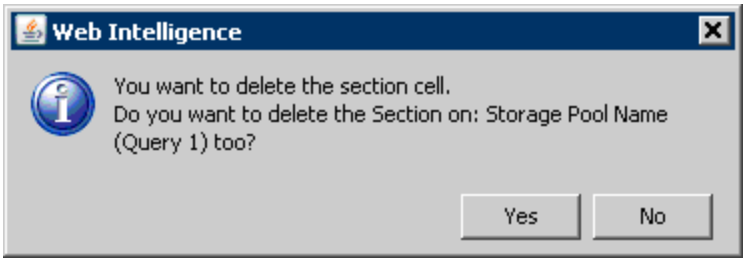
| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Host | Host Name |
| Storage System | Vendor |
| Storage System | Storage System Name |
| Storage System > Storage System Pools | Storage Pool Name |
| Storage System > Storage Tier Information for Chargeback | Tier Name |
| Storage System > Storage System Assets | Storage Tier Classification |
| Host | Managed Hosts filter |
| Storage System | Managed Storage system filter |

2. Click the **Add Query** to add another query.

3. To find information on Storage Tiers, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

| Class > Subclass(es) | Object/Filter |
|---|---|
| Host | Host Name |
| Host > Host Assets | Department Name |
| Storage System | Storage System Name |
| Storage System > Storage System Pools | Storage Pool Name |
| Storage System > Storage System Volumes | Storage Volume Name |
| Storage System > Storage System Volumes | Volume Size in GB |
| Host > HBA for Dependency > HBA Ports for Dependency | Port Name |
| Host > HBA for Dependency > HBA Ports for Dependency | WWN |
| Storage System > Storage Tier Information for Chargeback | Cost per GB |
| Host | Managed Hosts filter |
| Storage System | Managed Storage system filter |

4. Run the report.
5. Create sections for Storage System Name and Storage Pool Name:
   a. Merge dimensions on Storage System Name, Storage Pool Name, and Host Name on these two queries by clicking the **Merge Dimensions** and following the screen instructions.
   b. Create a section with Storage System Name.
   c. Create a section with Storage Pool Name which is nested in the Storage System Name section.
   d. Right-click the “Storage pool name” section, and click **Remove** in the sub-menu to remove the section name only. The following message is displayed:



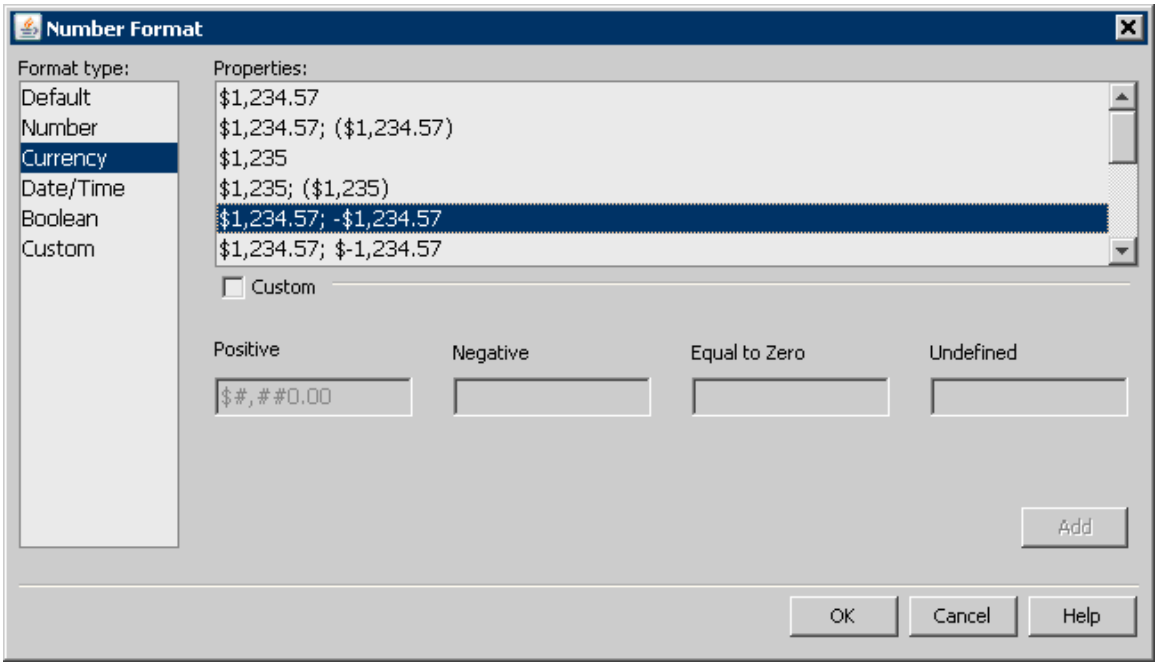

   e. Click **No** to delete the section cell (but not the section).

f. Similarly, right-click on the “Storage system name” section, and click **Remove** in the sub-menu to remove the section name only.

6. Run the report.
7. Calculate the total cost as follows:
   a. Double-click the Cost per GB column and enter:

      ```
      "=Ceil([Volume Size in GB]*[Cost per GB])"2
      ```

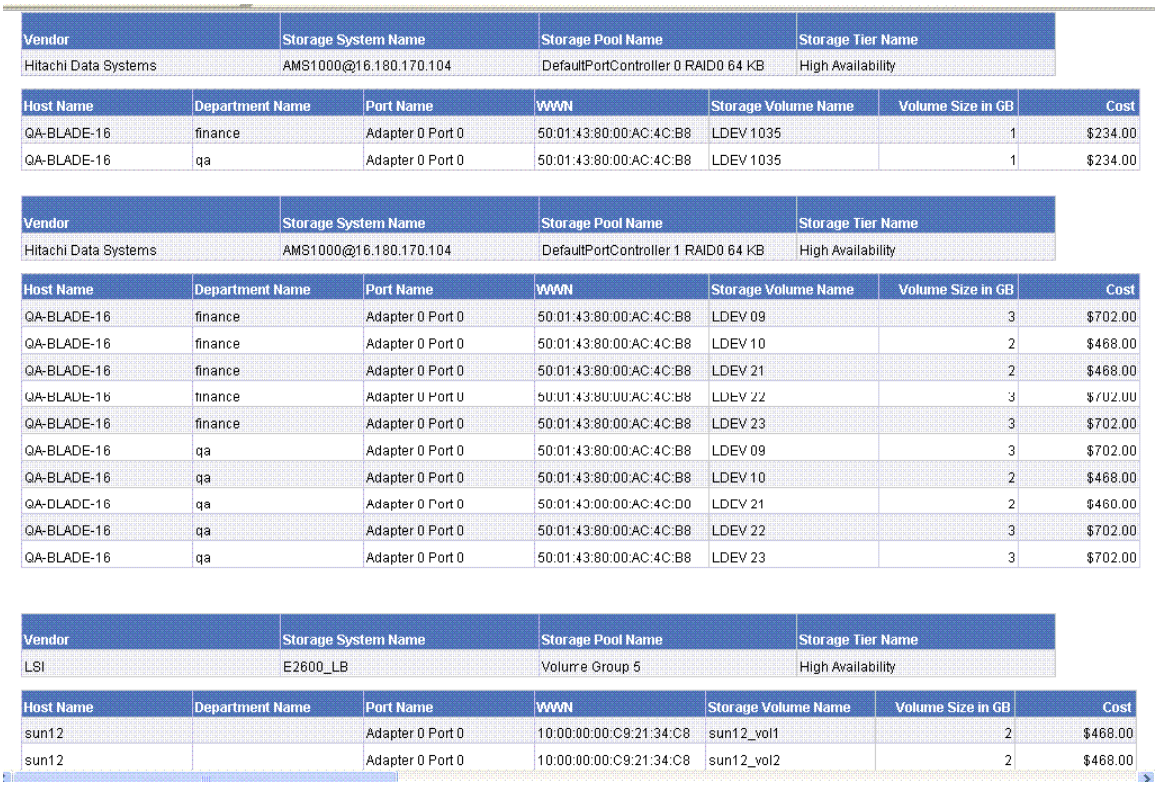
   b. Right-click on the Cost per GB column, and select **Format Number**.
   c. Select **Currency** in the Number Format dialog box and follow the screen to select the correct currency format.




   d. Rename Cost per GB to Cost.

8. Run the report.

Here is an example of an Array-based Chargeback Report:



| Vendor | Storage System Name | Storage Pool Name | Storage Tier Name |
|---|---|---|---|
| Hitachi Data Systems | AMS1000@16.180.170.104 | DefaultPortController 0 RAID0 64 KB | High Availability |

| Host Name | Department Name | Port Name | WWN | Storage Volume Name | Volume Size in GB | Cost |
|---|---|---|---|---|---|---|
| QA-BLADE-16 | finance | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 1035 | 1 | $234.00 |
| QA-BLADE-16 | qa | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 1035 | 1 | $234.00 |

| Vendor | Storage System Name | Storage Pool Name | Storage Tier Name |
|---|---|---|---|
| Hitachi Data Systems | AMS1000@16.180.170.104 | DefaultPortController 1 RAID0 64 KB | High Availability |

| Host Name | Department Name | Port Name | WWN | Storage Volume Name | Volume Size in GB | Cost |
|---|---|---|---|---|---|---|
| QA-BLADE-16 | finance | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 09 | 3 | $702.00 |
| QA-BLADE-16 | finance | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 10 | 2 | $468.00 |
| QA-BLADE-16 | finance | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 21 | 2 | $468.00 |
| QA-BLADE-16 | finance | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 22 | 3 | $702.00 |
| QA-BLADE-16 | finance | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 23 | 3 | $702.00 |
| QA-BLADE-16 | qa | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 09 | 3 | $702.00 |
| QA-BLADE-16 | qa | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 10 | 2 | $468.00 |
| QA-BLADE-16 | qa | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:D0 | LDEV 21 | 2 | $468.00 |
| QA-BLADE-16 | qa | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 22 | 3 | $702.00 |
| QA-BLADE-16 | qa | Adapter 0 Port 0 | 50:01:43:80:00:AC:4C:B8 | LDEV 23 | 3 | $702.00 |

| Vendor | Storage System Name | Storage Pool Name | Storage Tier Name |
|---|---|---|---|
| LSI | E2600_LB | Volume Group 5 | High Availability |

| Host Name | Department Name | Port Name | WWN | Storage Volume Name | Volume Size in GB | Cost |
|---|---|---|---|---|---|---|
| sun12 | | Adapter 0 Port 0 | 10:00:00:00:C9:21:34:C8 | sun12_vol1 | 2 | $468.00 |
| sun12 | | Adapter 0 Port 0 | 10:00:00:00:C9:21:34:C8 | sun12_vol2 | 2 | $468.00 |

**Note**: This report contains additional details that are not visible in the figure.

## Use Case 7: Media Utilization Trends Over a Specified Period

User Goal: Create a report showing media utilization trends over a specified time period.

To create this report, follow these steps:

1. To find media information, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

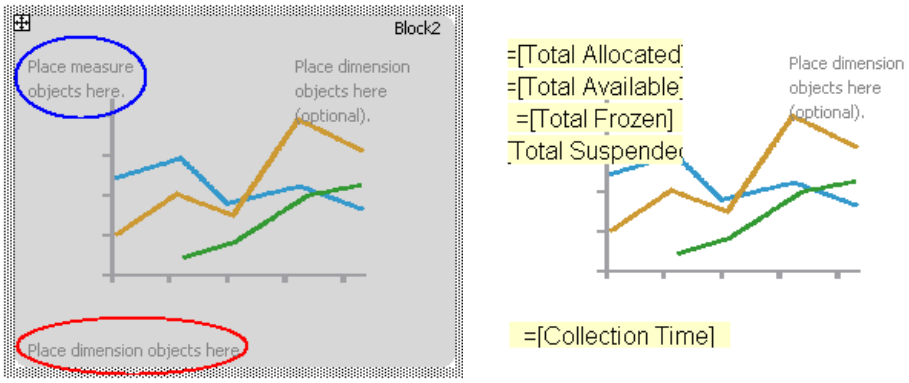
| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Backup > Backup Manager Details | Backup Manager Name |
| Backup > Backup Manager Details > Media Server Details | Media Server Name |
| Backup > Backup Manager Details > Resource Summary Statistics-Historical | Collection Time |
| Backup > Backup Manager Details > Resource Summary Statistics-Historical | Total Available Media |
| Backup > Backup Manager Details > Resource Summary Statistics-Historical | Total Allocated Media |

| Class > Subclass(es) | Object/Filter |
|---|---|
| Backup > Backup Manager Details > Resource Summary Statistics-Historical | Total Frozen Media |
| Backup > Backup Manager Details > Resource Summary Statistics-Historical | Total Suspended Media |
| Backup > Backup Manager Details | Select Backup Manager filter |
| Backup > Media Server Details | Select Media Server Name filter |
| Backup > Backup Manager Details > Resource Summary Statistics-Historical | Schedule Time Period filter |

2. Create the necessary variables using the following formulas.

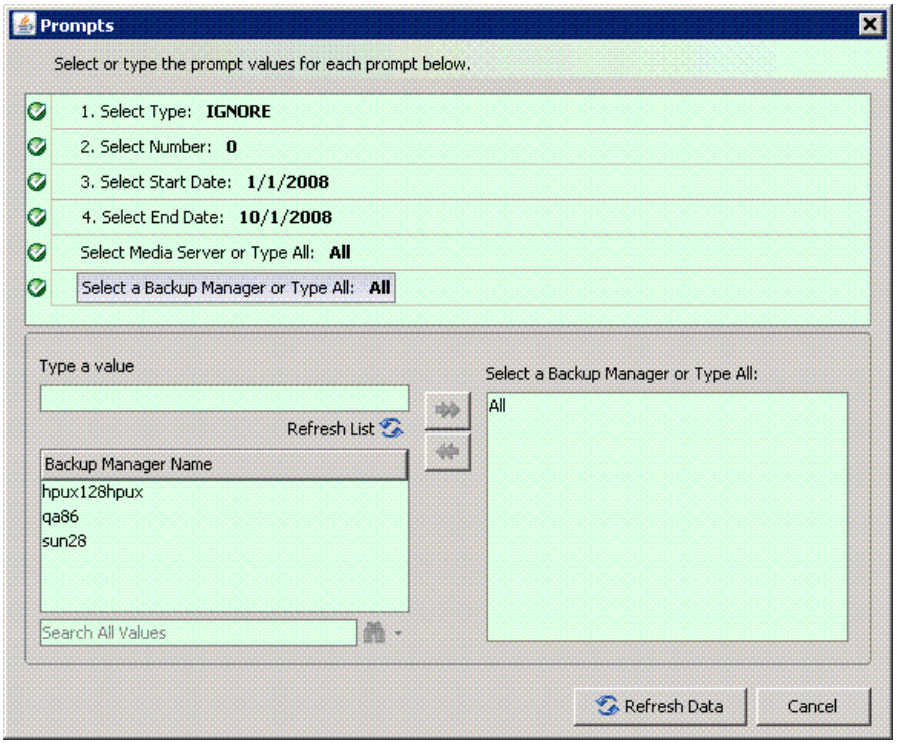
| Variable Name | Formula |
|---|---|
| Total Allocated | =Sum([Total Allocated Media]) |
| Total Available | =Sum([Total Available Media]) |
| Total Frozen | =Sum([Total Frozen Media]) |
| Total Suspended | =Sum([Total Suspended Media]) |

3. Replace the content of these variables
    a. Replace content of Total Allocated Media with Total Allocated.
    b. Replace content of Total Available Media with Total Available.
    c. Replace content of Total Frozen Media with Total Frozen.
    d. Replace content of Total Suspended Media with Total Suspended.
4. Create a line graph.
    a. Select a line graph from the Templates tab, and drag it to the Results Objects panel.
    b. Drag Collection Time to “Place dimension objects here” in the line graph.
    c. Drag Total Allocated, Total Available, Total Frozen, and Total Suspended to “Place measure objects here.”

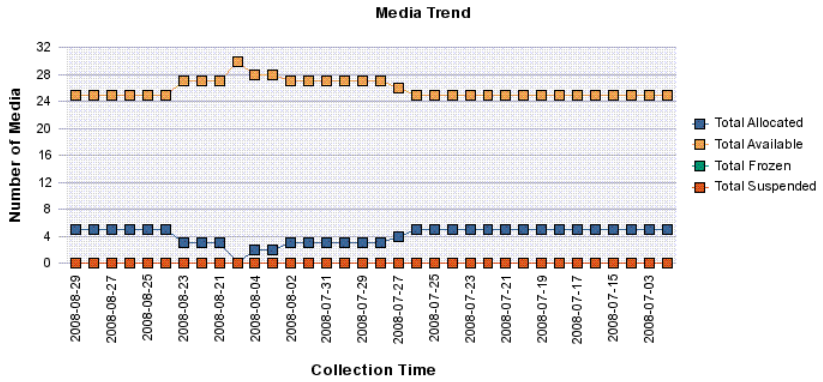



d. Uncheck the box “3D Look” under Properties > Display.

5. Run the report. When prompted, select the following fields:




Here is an example of a Media Trend-Media Summary Report:




| Collection Time | Total Media | Total Available Media | Total Allocated Media | Total Frozen Media | Total Suspended Media |
|---|---|---|---|---|---|
| 2008-08-29 | 30 | 25 | 5 | 0 | 0 |
| 2008-08-28 | 30 | 25 | 5 | 0 | 0 |
| 2008-08-27 | 30 | 25 | 5 | 0 | 0 |
| 2008-08-26 | 30 | 25 | 5 | 0 | 0 |
| 2008-08-25 | 30 | 25 | 5 | 0 | 0 |
| 2008-08-24 | 30 | 25 | 5 | 0 | 0 |
| 2008-08-23 | 30 | 27 | 3 | 0 | 0 |
| 2008-08-22 | 30 | 27 | 3 | 0 | 0 |
| 2008-08-21 | 30 | 27 | 3 | 0 | 0 |
| 2008-08-20 | 30 | 30 | 0 | 0 | 0 |

## Use Case 8: All Managed Hosts without Cluster Hosts and Cluster Member Hosts

User Goal: Create a report showing the high-level list of all managed hosts without cluster hosts and cluster member hosts.

To create this report, follow these steps:

1. To find media information, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

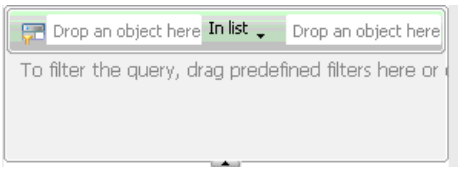
| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Host | Host Name |
| Host | Description |
| Host | Vendor |
| Host | OS |
| Host | OS Version |
| Host | Managed Hosts filter |

2. Run the report.

3. Filter out the cluster host and cluster member hosts as follows:

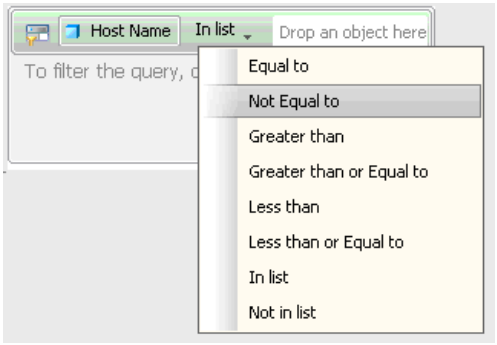
   a. Drag the Non-Cluster Host filter from the Host class onto the query filter panel.

   b. Click **Add a Sub-query**. The sub-query dialog box is displayed:




   c. Drag Host Name to the first “Drop an object here” field in the sub-query.

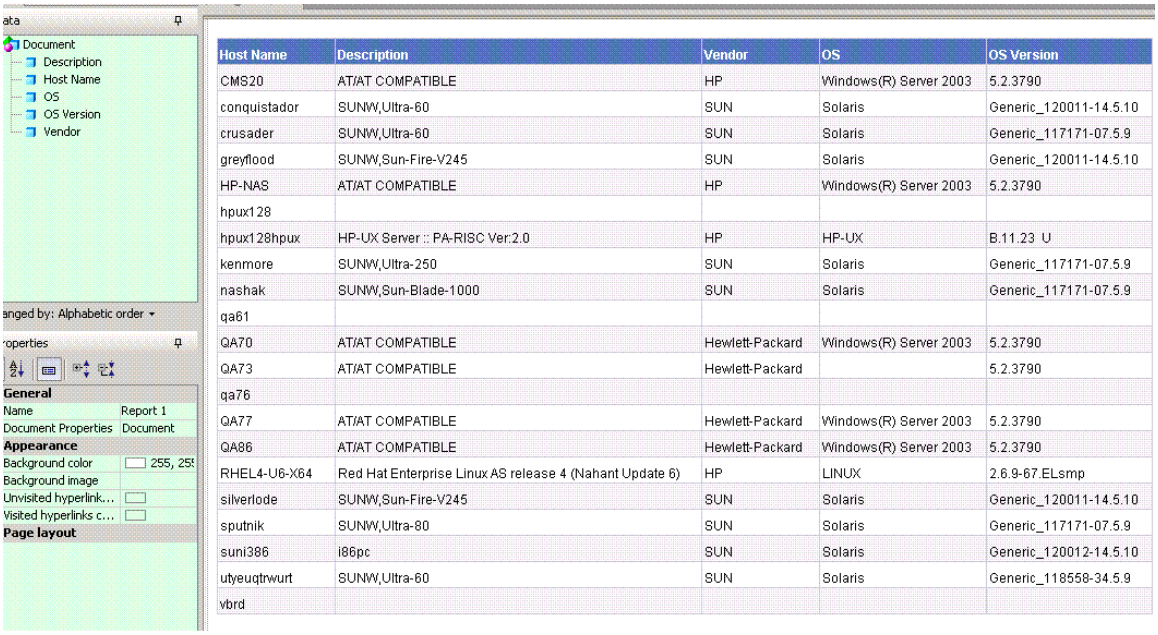
   d. Select **Not Equal to** from the drop-down list in the sub-query:




   e. Drag Member Host Name from the Host > Host Cluster Details > Cluster Node Members class, and drop it into the second drop box in the sub-query.

4. Run the report.

Here is an example of a hosts report without clusters and cluster nodes:




| Host Name | Description | Vendor | OS | OS Version |
|---|---|---|---|---|
| CMS20 | AT/AT COMPATIBLE | HP | Windows(R) Server 2003 | 5.2.3790 |
| conquistador | SUNW,Ultra-60 | SUN | Solaris | Generic_120011-14.5.10 |
| crusader | SUNW,Ultra-60 | SUN | Solaris | Generic_117171-07.5.9 |
| greyflood | SUNW,Sun-Fire-V245 | SUN | Solaris | Generic_120011-14.5.10 |
| HP-NAS | AT/AT COMPATIBLE | HP | Windows(R) Server 2003 | 5.2.3790 |
| hpux128 | | | | |
| hpux128hpux | HP-UX Server :: PA-RISC Ver:2.0 | HP | HP-UX | B.11.23 U |
| kenmore | SUNW,Ultra-250 | SUN | Solaris | Generic_117171-07.5.9 |
| nashak | SUNW,Sun-Blade-1000 | SUN | Solaris | Generic_117171-07.5.9 |
| qa61 | | | | |
| QA70 | AT/AT COMPATIBLE | Hewlett-Packard | Windows(R) Server 2003 | 5.2.3790 |
| QA73 | AT/AT COMPATIBLE | Hewlett-Packard | | 5.2.3790 |
| qa76 | | | | |
| QA77 | AT/AT COMPATIBLE | Hewlett-Packard | Windows(R) Server 2003 | 5.2.3790 |
| QA86 | AT/AT COMPATIBLE | Hewlett-Packard | Windows(R) Server 2003 | 5.2.3790 |
| RHEL4-U6-X64 | Red Hat Enterprise Linux AS release 4 (Nahant Update 6) | HP | LINUX | 2.6.9-67.ELsmp |
| silverlode | SUNW,Sun-Fire-V245 | SUN | Solaris | Generic_120011-14.5.10 |
| sputnik | SUNW,Ultra-80 | SUN | Solaris | Generic_117171-07.5.9 |
| suni386 | i86pc | SUN | Solaris | Generic_120012-14.5.10 |
| utyeuqtrwurt | SUNW,Ultra-60 | SUN | Solaris | Generic_118558-34.5.9 |
| vbrd | | | | |

## Use Case 9: Host Capacity with Drill-Down to Host Volumes

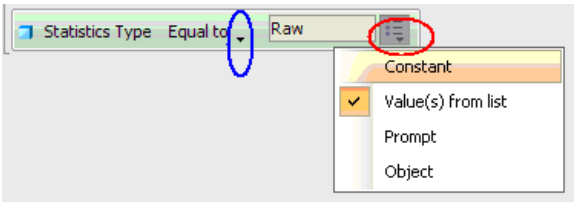
User Goal: Create a report showing host capacity for each host, and providing the ability to drill-do.wn to each host volume.

To create this report, follow these steps:

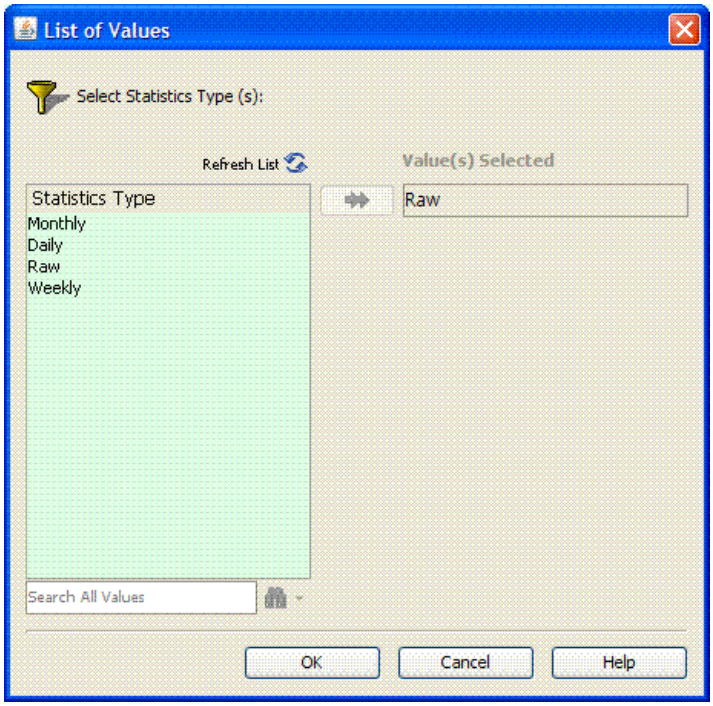
1. To find host capacity information, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Host | Host Name |
| Host | IP Address |
| Host > Host Volumes > Host Volume Capacity Statistics-Historical | Statistics type |
| Host > Host Volumes > Host Volume Capacity Statistics-Historical | Total in GB |
| Host > Host Volumes > Host Volume Capacity Statistics-Historical | Used in GB |
| Host > Host Volumes > Host Volume Capacity Statistics-Historical | Free in GB |
| Host | Managed Hosts filter |
| Host > Host Volumes > Host Volume Capacity Statistics-Historical | Latest Collection time filter |

2. Drag the Host > Host Volumes > Host Volume Capacity Statistics-Historical > Statistics type to the Query Filters panel.
3. Select **Equal to** from the drop-down list.
4. Select **Value(s) from list** from the drop-down list:




5. Select **Raw** from Statistics Type in the List of Values dialog box:




6. Create variables.

| Variable Name | Formula |
|---|---|
| Used space in GB | =Sum([Used in GB]) |
| Free space in GB | =Sum([Free in GB]) |

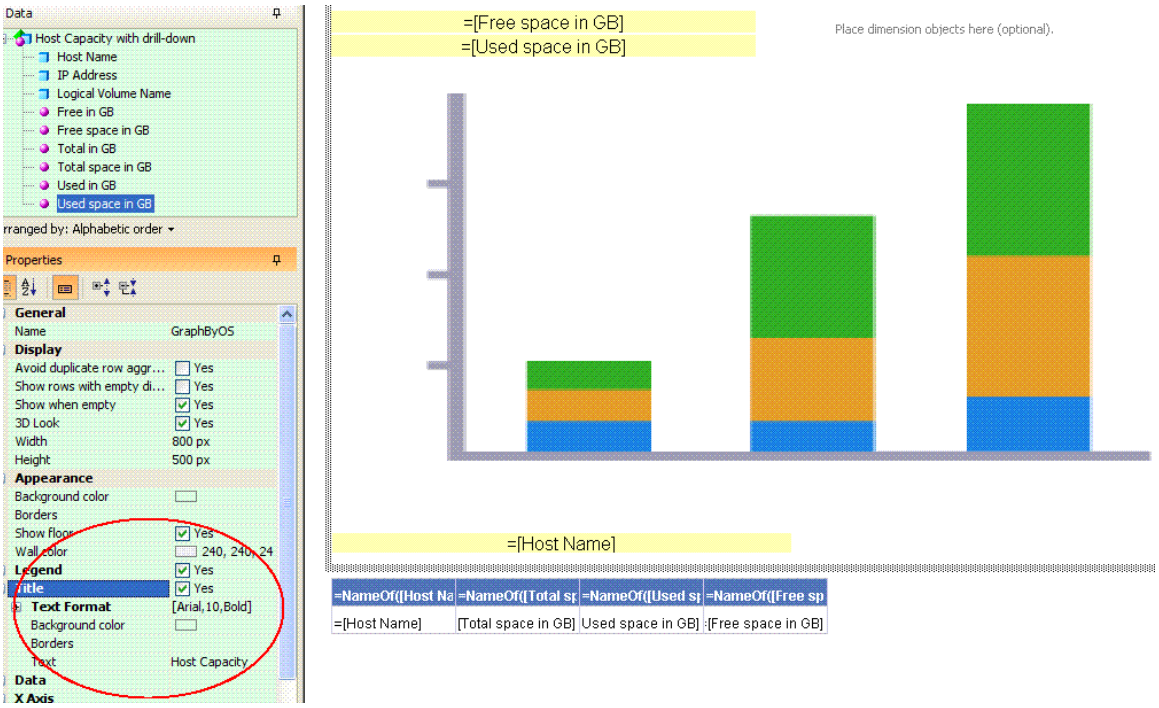
7. Run the report.
8. Create a bar chart:
   a. Select **Vertical Grouped bar chart** from the Templates tab.

b. Drag Free space in GB and Used space in GB to “Drop measure objects here” in the graph.

c. Drag Host Name to “drop Dimension objects here” in the graph.

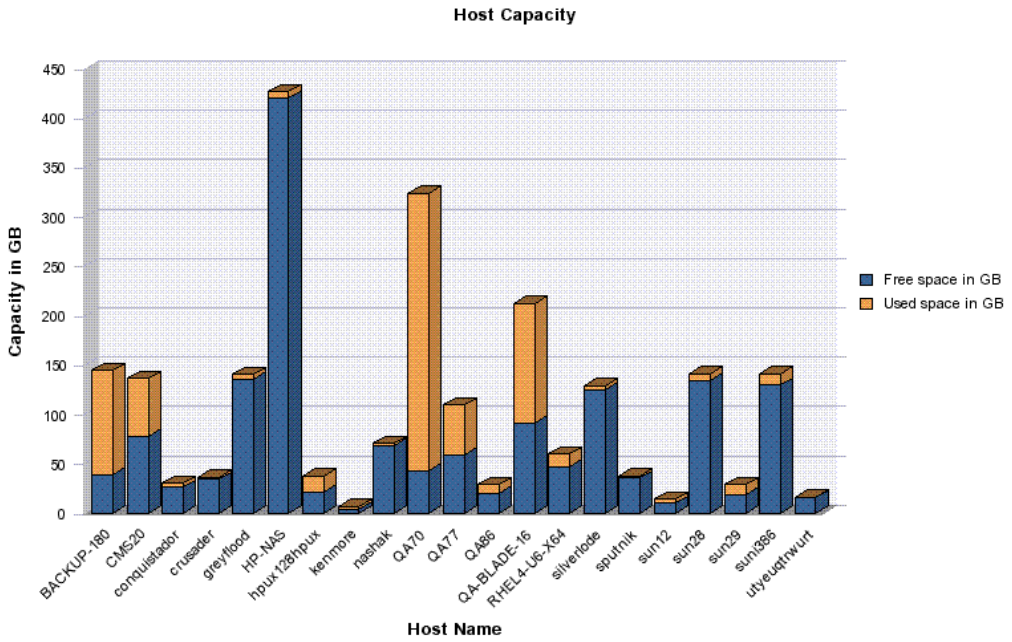
d. Enter “Host capacity” in Title > Text under the Properties page in Edit Report.

e. Check the Legend box under the Properties page in Edit Report.




9. Run the report.

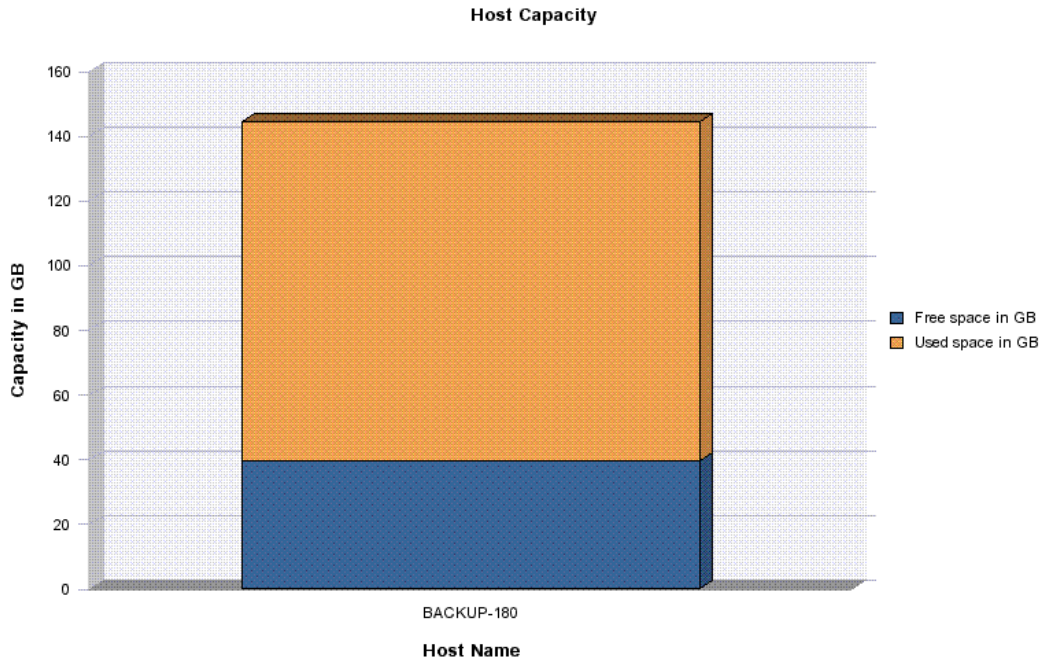
The following figure shows a Host Capacity Report before drill-down to the host logical volume.




| Host Name | Total space in GB | Used space in GB | Free space in GB |
|---|---|---|---|
| BACKUP-180 | 144.55 | 105.04 | 39.5 |
| CMS20 | 136.66 | 58.75 | 77.91 |
| conquistador | 30.69 | 4.22 | 26.46 |
| crusader | 36.76 | 1.99 | 34.76 |

10. To drill down to the details for a host volume, click the **Drill** in “Edit Report.”
11. Click one of the host names to show the host logical volumes for the selected host, along with the total, used, and free for each volume.

The following figure shows a Host Capacity Report with drill-down to host logical volumes.




| Logical Volume Name | Total space in GB | Used space in GB | Free space in GB |
|---|---|---|---|
| C: | 14.99 | 5.94 | 9.06 |
| Y: | 74.56 | 44.21 | 30.35 |
| Z: | 55 | 54.9 | 0.09 |

## Use Case 10: Top N EVA Performance

User Goal: Create a report showing performance statistics for the top HP EVA arrays.

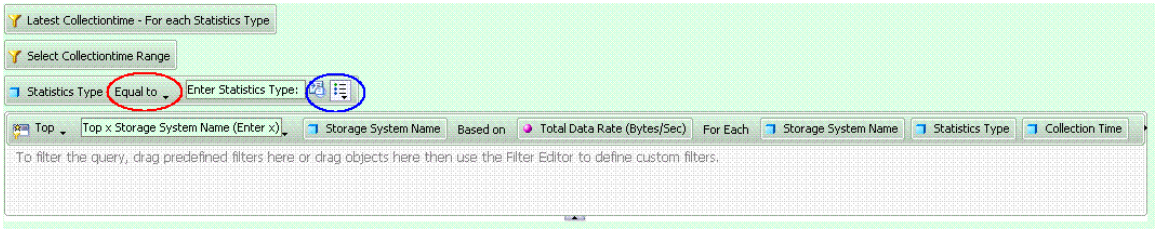
To create this report, follow these steps:

1. To find EVA storage system statistics, select the following objects/filters under Report Objects from the SRM Report Optimizer universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Storage System > Performance Statistics > EVA > EVA Storage System Statistics-Historical | Collection Time |
| Storage System > Performance Statistics > EVA > EVA Storage System Statistics-Historical | Statistics Type |
| Storage System > Performance Statistics > EVA > EVA Storage System Statistics-Historical | Total Data Rate (bytes/sec) |
| Storage System > Performance Statistics > EVA > EVA Storage System Statistics-Historical | Total I/O rate (req/sec) |

| Class > Subclass(es) | Object/Filter |
|---|---|
| Storage System | Storage System Name |
| Storage System > Performance Statistics > EVA > EVA Storage System Statistics-Historical | Latest Collection Time Per Statistics Type Per Day filter |
| Storage System > Performance Statistics > EVA > EVA Storage System Statistics-Historical | Select Collection Time Range filter |
| Storage System > Performance Statistics > EVA > EVA Storage System Statistics-Historical | Select Statistics Type filter |

2. Drag Storage System > Performance Statistics EVA > EVA Storage System Statistics-Historical >Statistics Type to the Query Filter panel,
   a. Select **Equal to** from the first drop-down list.
   b. Select **Prompt** from the second drop-down list.
3. Create a ranking prompt to allow users to enter the value:
   a. Click **Add a database Ranking**.
   b. Drag Storage System Name from the Storage System class to the “Drop a dimension here” field.
   c. Select **Prompt** from the first drop-down list.
   d. Drag Total Data Rate (Bytes/Sec) to the “Drop a measure here” field.
   e. Click the arrow at the end of the query filter frame.
   f. Drag Storage System Name, Statistics Type, and Collection Time to the “Drop a dimension here” field.

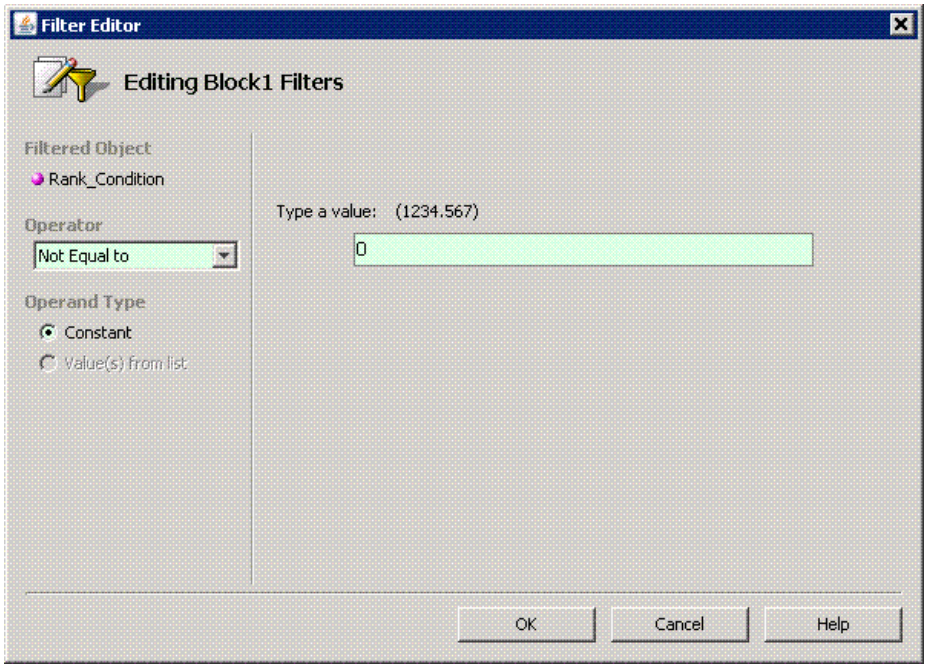



4. Create the necessary variables using the following formulas.

| Variable Name | Formula |
|---|---|
| UserResponse | =ToNumber(UserResponse("Top x Storage System Name (Enter x)")) |

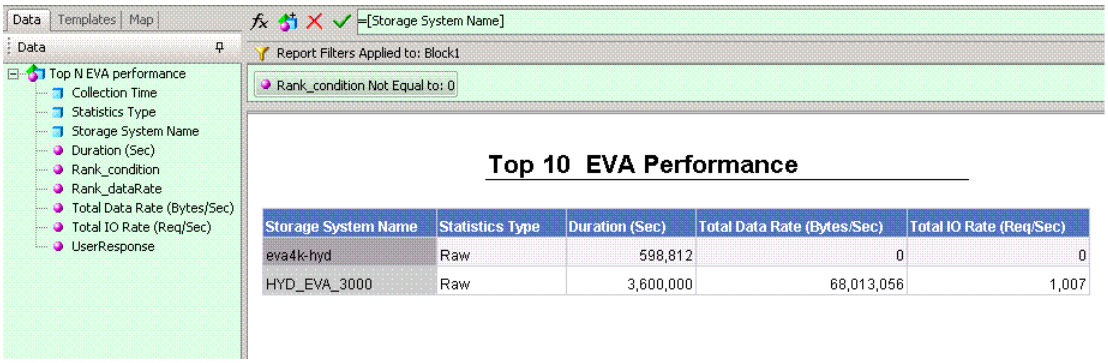
| Variable Name | Formula |
|---|---|
| Rank_ dataRate | Rank([Total Data Rate (Bytes/Sec)];([Storage System Name];[Statistics Type]);([Statistics Type])) |
| Rank_ Condition | If([Rank_dataRate]<=[UserResponse] ForAll([Storage System Name]) ;1;0) |

5. Create a ranking condition in the report:
   a. Click **Show/Hide Filter pane**.
   b. Drag the Rank_Condition variable to the Report Filters panel.
   c. Select **Not equal to** from the "Operator" drop-down list and set its value to 0 in the "Type a value" text field.




6. Run the report.

The following figure shows a Top N EVA Performance Report.




## Use Case 11: Global End to End Connectivity

To create this report. follow these steps:

1. Select the following objects/filters under Global Report Objects from the Report Connector universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Global Host | Site Name, Host Name, OS |
| Global Host > Global HBA | HBA Name |
| Global Host > Global HBA > Global HBA Ports | HBA Port Name, Connected Switch Name, Connected Switch Port |
| Global Host > Global HBA > Host Volumes | Logical Volume Name |
| Global Storage System | Storage System Name |
| Global Storage System > Global Storage System Fiber Channel Ports | FC Port Name, Connected Switch Port |
| Global Storage System > Global Storage System Pools | Storage Pool Name |
| Global Storage System > Global Storage System Volumes | Storage Volume Name, Volume Size in GB |
| Global Storage System > Global Storage Volumes > Global Storage Volume Ports | Lun in Hex |
| Global Host | Select Managed Host, Select Site Name |

2. Click **Run Query** to run the report.
3. Select the Global Elements > Storage System Host Connectivity context.

## Use Case 12: Hosts Connected through Switch and LUN Masking with Allocated External Storage Capacity

Allocated capacity is equal to the size of all of the storage volumes.

To create this report, follow these steps:

1. To get details for all of the discovered hosts, select the following objects/filters under Global Report Objects from the Report Connector universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Global Host | Site Name, Host Name |
| Global Storage System | Storage System Name |
| Global Storage System > Global Storage System Volumes | Storage Volume Name, Volume size in GB |

2. Click **Run Query** to run the report.
3. Select the Storage System Host Switch Connectivity context.
4. Return to Edit Query mode, and click **Add Query**.
5. To get information about hosts that are using LUN masking, select the following objects/filters under Global Report Objects from the Report Connector universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Global Host | Site Name, Host Name |
| Global Storage System | Storage System Name |
| Global Storage System > Global Storage System Volumes | Storage Volume Name, Volume size in GB |

6. Click **Run Query** to run the report.
7. Select the Storage System Host Connectivity context.
8. When the pop-up window displays, select **Insert in Current Report**.
9. Format the report:
    a. In the left-hand pane, select the objects to merge the dimension in both of the queries.
    b. Drag all of the merged objects to the right-hand pane to see the report data.

## Use Case 13: All Storage Capacity and Allocated to Host Capacity

To create this report, follow these steps:

1. Select the following objects/filters under Global Report Objects from the Report Connector universe, and drag them onto the Results Objects/Query Filters panel.

| **Class > Subclass(es)** | **Object/Filter** |
|---|---|
| Global Storage System | Site Name, Storage System Name |
| Global Storage System > Global Storage System Capacity Statistics | Total Size in GB |
| Global Host | Host Name |
| Global Host > Global Host Volumes | Logical Volume Name |
| Global Host > Global Host Volumes > Global Host Volume Capacity Statistics | Total in GB, Used in GB |

2. Click **Run Query** to run the report.
3. Select the Storage System Host Switch Connectivity context.
4. Add the following filter: Global Storage System > Select Site Name.
5. Format the report by removing the columns in the report and adding only the following:
   - Site Name
   - Storage System
   - Total Size in GB
   - Total in GB
   - Used in GB

By removing the Logical Volume and Host Name columns, all of the capacities are automatically merged to show capacity at the storage system level.

# Troubleshooting

## Date in Report Footers

The date displayed in the footer of the reports is the date the report was last saved, rather than the date of the last refresh.

## Asset Class Filter in Global Report Objects

When viewing a global asset details report, if you specify a site name and apply the asset class filter, the query output will include the same asset class from other sites.

## Port Name Object

When creating a report, if the port name object in the Global Storage System class is selected along with another object from the same class, the Query Context dialog box is displayed.

## Using the Same Object Multiple Times in a Query

It is not possible to get results for the same object in a query multiple times.

To display the same object more than once, you must modify the object in the report or create a combined query.

## Filtering NULL Data for Host Volumes

The Host Volumes and Global Host Volumes classes contain an object called Model Type. This object refers to whether a Logical Volume Name is a File System or a Logical Disk.

When the Model Type is Logical Disk, the Logical Volume Name is NULL. You can use the Model Type object to filter out NULL data.

## Empty Graphs when There is Only One Data Point

SRM Report Optimizer does not show data in graphs when there is only one data point.