Sun StorageTek™ Business Analytics Management Console User's Guide

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Chapter One – Getting Started

Overview

This chapter describes how you get started using the Sun StorageTek Business Analytics web-based Management Console. **Note**: With the acquisition of StorageTek, Sun Microsystems has re-branded and re-named Global Storage Manager (GSM) as Sun StorageTek Business Analytics, a member of the Enterprise Storage Manager portfolio of software solutions. The functionality of Business Analytics is identical to GSM, only the name has changed.

The reports shown in this manual are for discussion purposes only — your company's reports will portray actual data, and will thus be somewhat different.

Logging In

To log in to the Sun StorageTek Business Analytics Management Console, you'll need your user name and password. If you do not have a valid user name and password, contact your system administrator. Proceed as follows:

1. Launch your web browser.
2. Enter the URL that your system administrator supplies to reach the Sun StorageTek Business Analytics Management Console Home Page.
3. The Sun StorageTek Business Analytics Management Console login window appears, similar to the one shown in Figure 1.

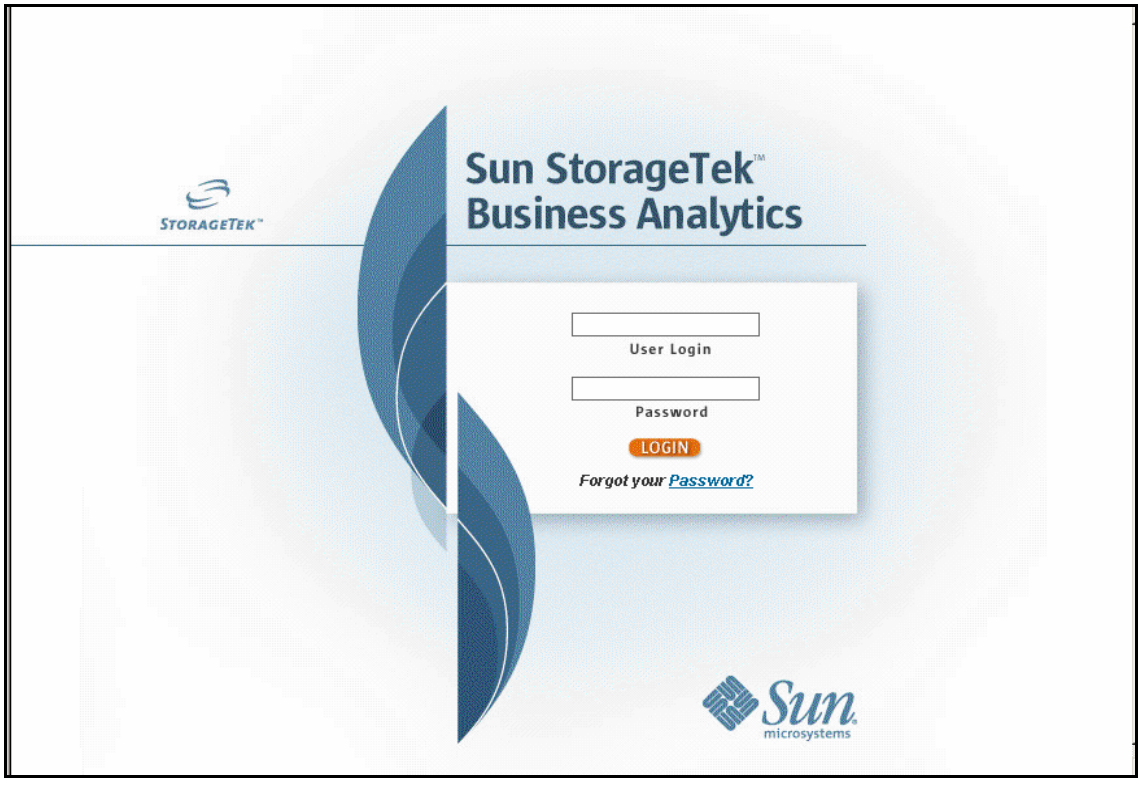


Figure 1 - Management Console Login Window

4. Type your **USER LOGIN** and **PASSWORD** in the corresponding fields, and click **Login**. Your company's Management Console Home Page appears.

Reset Password

If you forget your password, you may reset it as follows:

1. Click **Password** on the Login screen to access the Forget Your Password? window, as shown in Figure 2.

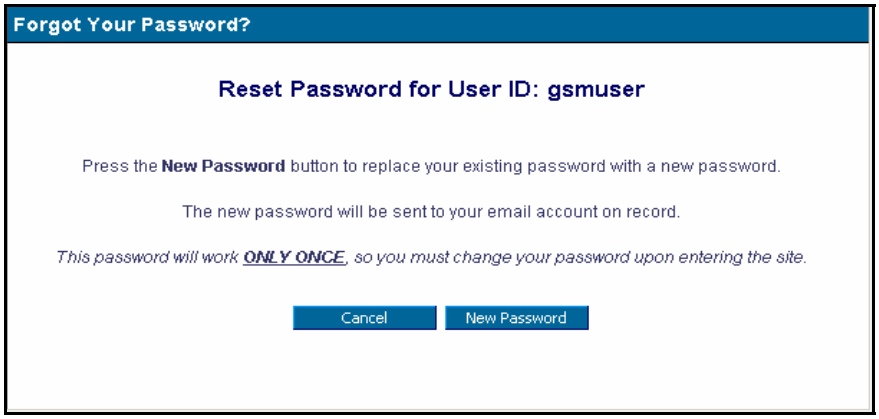


Figure 2 - Reset Password

2. Click the **New Password** button.

   The new password is sent to your e-mail account and will only work once. You must change your password and record it for subsequent Management Console sessions.

Home Page

The Sun StorageTek Business Analytics Management Console Home Page appears after you successfully log in to the application. Sun StorageTek Business Analytics provides a customizable Home Page (or personalized dashboards). A sample Management Console Home Page is shown below.

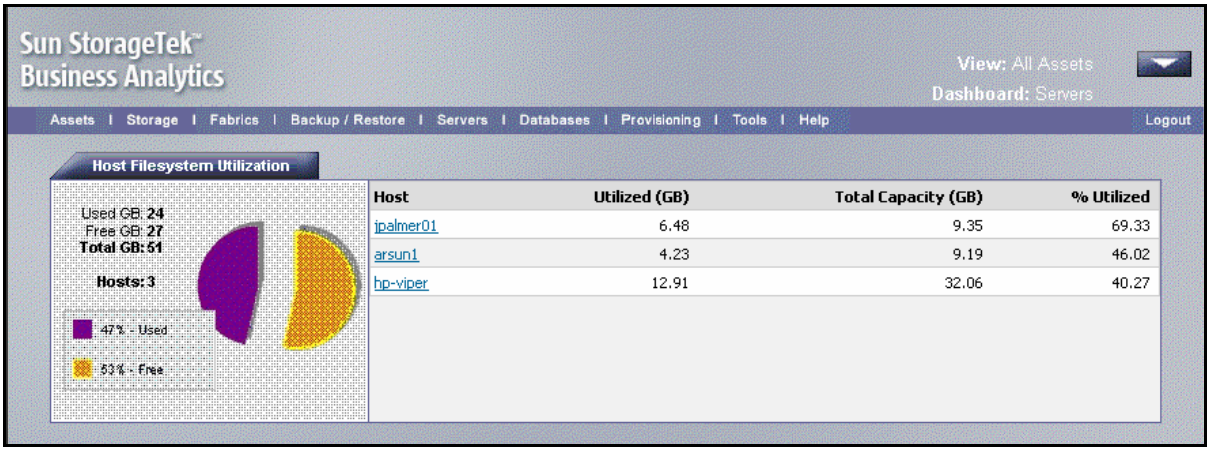


Figure 3 - Sample Manager Console Home Page

DASHBOARDS

The Management Console supports personalized dashboards that you create using the Dashboard Administration menus. Each dashboard contains one or more panes that together represent a customized home page.

By selecting **Tools-> Change Dashboard** you can choose any available dashboard as your current dashboard, as shown in Figure 4.

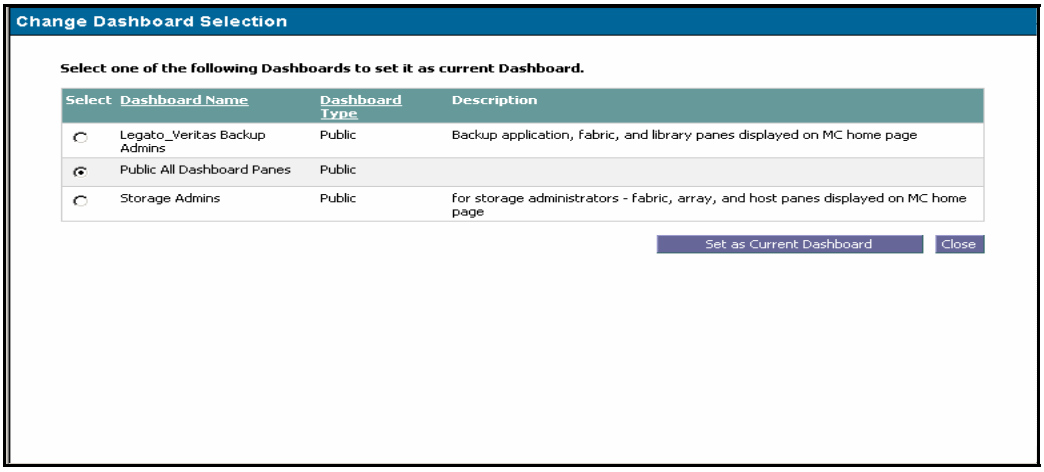


Figure 4 - Change Dashboard

Proceed as follows:

1. Use the radio button to choose the desired dashboard in the table.
2. Click Set as Current dashboard. The following pop up dialog is displayed.

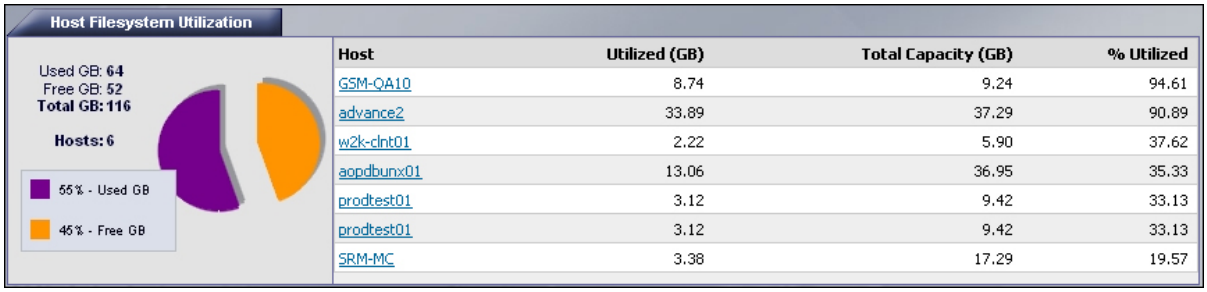
Figure 5 - Default dashboard has been changed

3. Click **OK**. Your browser window will be refreshed and the selected dashboard will appear on your Management Console Home Page.

DASHBOARD PANES

The dashboard panes provide high-level information on a specific asset or application, as described below.

Host Filesystem Utilization – This pane allows you to quickly identify hosts with the least amount of available storage capacity for file systems. Refer Figure 6.



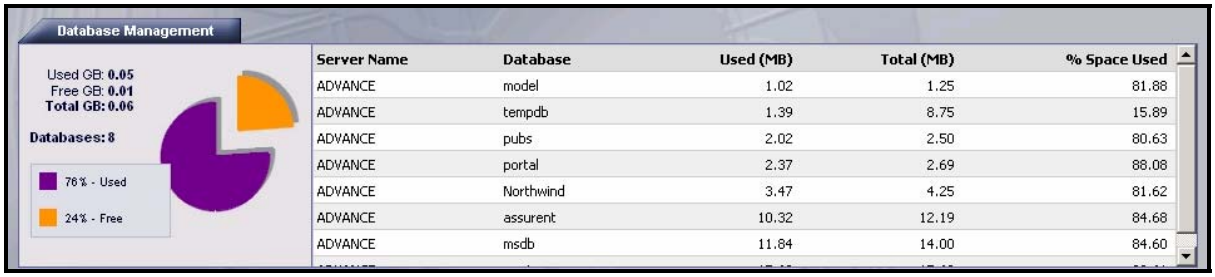
Host	Utilized (GB)	Total Capacity (GB)	% Utilized
GSM-QA10	8.74	9.24	94.61
advance2	33.89	37.29	90.89
w2k-clnt01	2.22	5.90	37.62
aopdbunx01	13.06	36.95	35.33
prodtest01	3.12	9.42	33.13
prodtest01	3.12	9.42	33.13
SRM-MC	3.38	17.29	19.57

Figure 6 - Host Filesystem Utilization

As seen in the figure 6, the pie chart shows disk utilization for the top ten hosts. Holding the mouse over the pie chart displays the "Host Data Utilized for <Company Name or View> since dd/mm/yyyy GMT." text message. The pie chart and table are presented based on data collected for the current date.

The table presents the same information, but in tabular form. To obtain other host-related information, use the **Servers** pull-down menu and click the report you wish to view.

Database Management – This pane summarizes how your databases are consuming storage. Refer Figure 7.



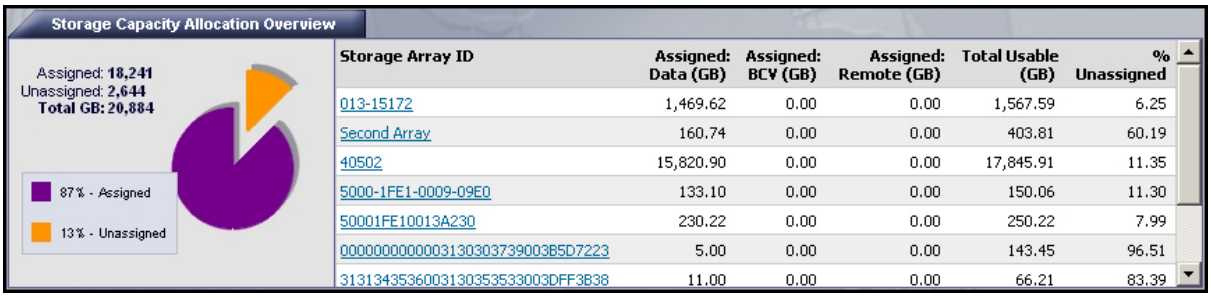
Server Name	Database	Used (MB)	Total (MB)	% Space Used
ADVANCE	model	1.02	1.25	81.88
ADVANCE	tempdb	1.39	8.75	15.89
ADVANCE	pubs	2.02	2.50	80.63
ADVANCE	portal	2.37	2.69	88.08
ADVANCE	Northwind	3.47	4.25	81.62
ADVANCE	assurent	10.32	12.19	84.68
ADVANCE	msdb	11.84	14.00	84.60

Figure 7 - Database Management

The pie chart shows the storage utilization for the specified number of databases or instances. Holding the mouse over the pie chart displays the "Database Configuration Information for <Company Name> between dd/mm/yyyy and dd/mm/yyyy" text message. This dashboard presents data collected over the past thirty days.

To the right of the pie chart, the database server, database, and consumed storage are displayed in a tabular format. When more detailed information is needed, use the **Database** pull-down menu and click the Database Configuration/Capacity report.

Storage Capacity Allocation Overview – This pane shows storage that has been allocated to SAN-connected host servers. Refer Figure 8.



Storage Array ID	Assigned: Data (GB)	Assigned: BCV (GB)	Assigned: Remote (GB)	Total Usable (GB)	% Unassigned
013-15172	1,469.62	0.00	0.00	1,567.59	6.25
Second Array	160.74	0.00	0.00	403.81	60.19
40502	15,820.90	0.00	0.00	17,845.91	11.35
5000-1FE1-0009-09E0	133.10	0.00	0.00	150.06	11.30
50001FE10013A230	230.22	0.00	0.00	250.22	7.99
0000000000003130303739003B5D7223	5.00	0.00	0.00	143.45	96.51
3131343536003130353533003DFF3B38	11.00	0.00	0.00	66.21	83.39

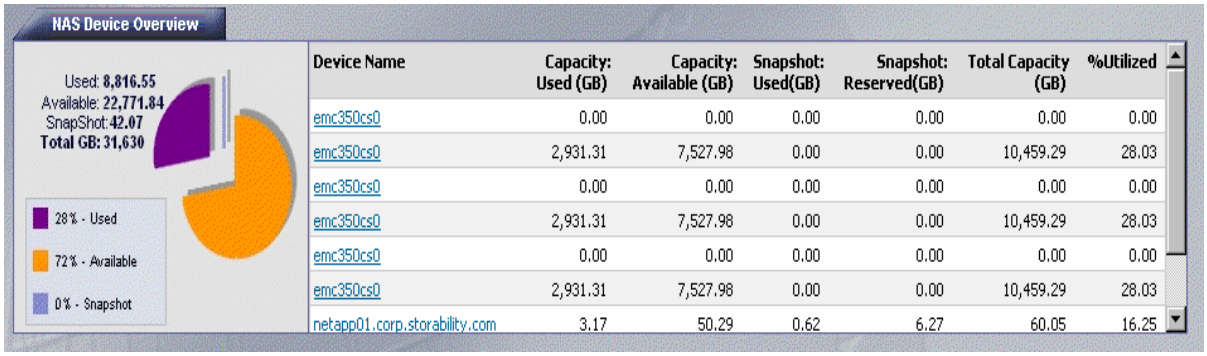
Figure 8 - Storage Capacity Allocation Overview

The pie chart displays the percentage of total capacity assigned, the percentage of overall capacity available, and the percentage assigned to local copies (BCVs). Clicking on the pie chart displays the Storage Allocation Overview report. This report provides the information displayed in the dashboard as well as the following items:

- Definitions of terminology
- Export button

The table provides essentially the same data but also shows the percentage of storage assigned to remote copies. The **Storage Array ID** column is a report link that displays the Detailed Array Configuration report. The Asset Management report also provides access to displaying the Detailed Array Configuration report.

NAS Device Overview – This pane shows summary-level information on the utilization of storage resources on NAS devices. See Figure 9.



Device Name	Capacity: Used (GB)	Capacity: Available (GB)	Snapshot: Used(GB)	Snapshot: Reserved(GB)	Total Capacity (GB)	%Utilized
emc350cs0	0.00	0.00	0.00	0.00	0.00	0.00
emc350cs0	2,931.31	7,527.98	0.00	0.00	10,459.29	28.03
emc350cs0	0.00	0.00	0.00	0.00	0.00	0.00
emc350cs0	2,931.31	7,527.98	0.00	0.00	10,459.29	28.03
emc350cs0	0.00	0.00	0.00	0.00	0.00	0.00
emc350cs0	2,931.31	7,527.98	0.00	0.00	10,459.29	28.03
netapp01.corp.storability.com	3.17	50.29	0.62	6.27	60.05	16.25

Figure 9 - NAS Device Overview

The table contains the following columns:

- Device Name
- Capacity Used (GB)
- Capacity Available (GB)
- Snapshot Used (GB)
- Snapshot Reserved (GB)
- Total Capacity (GB)
- % Utilized [Capacity Used + Total Snapshot / Total Capacity]

A snapshot is a read-only copy of an entire file system, as of the time the snapshot was created. Both EMC Celerra and Network Appliance use a copy-on-write technique to create snapshots very quickly without consuming any disk space. Only as blocks in the active file system are modified and written to new locations on disk does the snapshot begin to consume extra space. Snapshot refers to the percentage of the overall file system space that has been reserved to store changed file system blocks.

The total Capacity is calculated as [Capacity Used + Capacity Available + Snapshot]. The % Utilized is calculated as [Capacity Used + Total Snapshot / Total Capacity]. The Total Snapshot variable refers usually to the Snapshot Reserved, but it could be the Snapshot Used if the Snapshot Used exceeds the Snapshot Reserved.

The pie chart shows the summary level NAS filesystem utilization for the current view. Holding the mouse over the pie chart displays the "Detailed nas data for <current_view> on <current_date> text message. Clicking on the pie chart displays the NAS Filesystem

Utilization report. Clicking on the NAS device name link in the table displays the Detailed NAS Configuration report.

Backup Status Summary – This pane allows you to quickly identify unsuccessful backups for the listed NetBackup or Legato backup clients in the last twenty-four hours. The pie chart displays backup summary information on the backup client success rate for the backup infrastructure. Hold the mouse over the chart to display the start date for the data that appears in the chart. The possible statuses are described as follows:

- **Successful** – Backup application returned a successful completion code.
- **Failed** – Backup application returned a failure completion code.
- **Partial** – Backup application returned a completion code other than successful/failure.

To the right of the pie chart is a table that lists more detail for the failed backup events represented in the pie chart. The table shows the failed backup client, the master server, and the client status.

The Backup Client Name report link displays the Detail Backup/Restore Job Logs for Client report.

Tape Library Overview – This pane shows to what extent your tape library resources are being utilized. The pie chart displays the number of free cells, active cells, and total cells in the environment's tape libraries. The percentage of free cells versus active cells appears above the pie chart

The table displays the data used to create the pie chart. This includes the library name, library type, the number of active cells, the number of free cells, the total number of cells, and the percentage utilized.

Clicking on an area in the pie chart displays the Library Asset View report. Clicking the **Library Name** link displays the Library Configuration View. Both reports are subsequently described in the **Tape Libraries** section of this manual.

Fabric Switch Utilization – This pane summarizes the utilization of your fabric switches. The pie chart displays the number of free ports and the number of used ports for the fabrics monitored by the Fabric Agent(s). Clicking on the pie chart displays the Fabric Configuration report.

The table displays the data used to create the pie chart, including the fabric name, switch name, used ports, total ports, and percentage of total ports utilized for the fabric switches. By default, the Fabric Name is the WWN of the principal switch. However, the Fabric Name field may display the alias name of a principal switch. The **Fabric Name** link displays the Detailed Fabric View report; the **Switch Name** link displays the Detailed Switch View report.

TSM Summary Report – This pane allows you to quickly identify the status of TSM backup events. The pie chart summarizes backup events by successful, failed, and missed percentage over the past twenty-four hours for all the TSM servers in the site.

The table displays the data used to create the pie chart. This includes the TSM server name, the aggregate number of successful events, missed events and failures.

NAS Filesystem Overview – This pane displays summary information on utilization of NAS file systems over the past twenty-four hours. The pie chart summarizes NAS file system utilization by storage used, available, used for snapshots, and total storage utilized (GB). The table contains the following fields:

- Filesystem Name
- Capacity Used (GB)
- Capacity Available (GB)
- Snapshot Used (GB)
- Snapshot Reserved (GB)
- Total Capacity (GB) [Capacity Used + Capacity Available + Snapshot]
- %Utilized [Capacity Used / Total Capacity]

The pane is sorted through the %Utilized column in descending order.

Clicking the pie chart displays the NAS Filesystem Overview that shows the NAS file system utilization in a tabular format. Clicking the Filesystem Name link in the pane displays the NAS Filesystem Details report for the selected NAS file system.

DASHBOARD ADMINISTRATION

A dashboard is a set of panes on the Sun StorageTek Business Analytics Management Console Home Page. Dashboard Administration allows the user to view existing dashboards, set their current dashboard, as well as add, modify, or remove dashboards.

CHANGE DASHBOARD

Change Dashboard allows you to choose your customized Management Console home page.

Note: After a current dashboard is selected, it persists between Management Console login sessions until that dashboard is changed. The **Manage Dashboards** menus allow you to create, modify, and delete dashboards that can be selected as the current dashboard (or customized Home Page).

Proceed as follows:

1. Log in to the Management Console.

2. Select **Dashboard Administration** -> **Change Dashboard** from the **Tools** pull-down menu. The **Change Dashboard Selection** window appears.

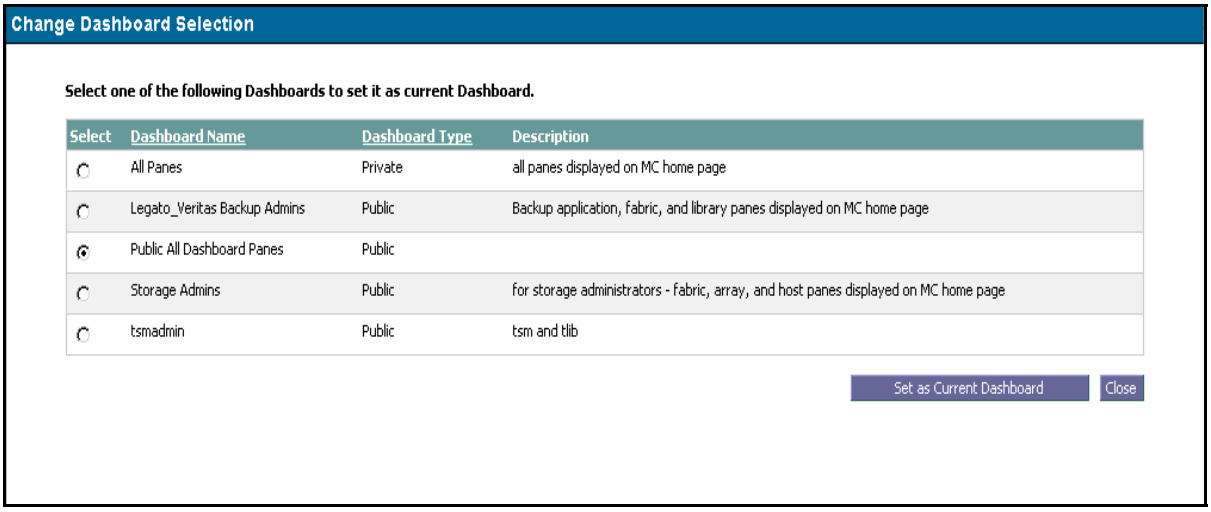


Figure 10 - Change Dashboard Selection

3. Change Dashboard Selection contains a table with radio boxes under the Select heading allowing you to select a dashboard as well as the Dashboard Name, Dashboard Type (private or public), and Description fields. The window also contains the **Set as Current Dashboard** and **Close** buttons. Clicking **Close** will close this window.

4. To set the current dashboard, proceed as follows:

    a. Use the radio box under the **Select** heading to choose the desired dashboard.

    b. Click the **Set as Current Dashboard** button. The "Default Dashboard has been changed. Click the **OK** button to close this window and refresh the Home Page" dialog appears.

    c. Click **OK** and the customized Home Page will appear.

VIEWS

A view is a collection of assets and reports. Sun StorageTek Business Analytics report security is controlled by what view is assigned to the user. A Sun StorageTek Business Analytics report is what is generated when you select a menu item, such as Connection Exception or Capacity Allocation, in the Management Console application.

Users are assigned one or multiple views. Some general characteristics are described as follows:

- There are two view types: Asset View and Composite View.
- An Asset View is assigned any number of monitored assets, such as servers, arrays, switches, NAS devices, NAS filesystems, databases, and tape libraries.
- An asset can be added to multiple views.
- A site is also considered an asset, and it provides visualization of all the resources (arrays, fabrics, servers, etc.) collected by the Local Managers assigned to that site.
- A Composite View is comprised of one or more Asset views.

In simple terms, report security is essentially controlled through your view.

After you successfully log in to the Management Console, you can access and view Sun StorageTek Business Analytics reports based on:

- The installed Sun StorageTek Business Analytics products (storage, fabrics, backup, database) that the administrator has enabled
- Your assigned views

The **View** tab appears at the top right section of the Home Page. By clicking the down arrow tab that is shown below, you can choose a current view from a displayed list of available views. The name of the current view appears to the left of the tab.

Figure 11 - View Tab

Introducing Sun StorageTek Business Analytics Reports

The Management Console's Home Page contains a set of pull-down menus that provide the primary means to view Sun StorageTek Business Analytics reports.

Assets

The **Assets** pull-down menu allows you to access and view the following reports:

- **Asset Management** - Provides a high-level view of all your assets, including host servers, switches, tape libraries, and storage arrays by location and over a user-defined period of time.
- **Tabular Device Reports** – View related information (e.g., file systems, databases, backup, storage allocation, billing, and more) for a selected asset (e.g., host).
- **Configuration Change -** Details the changes in the configuration of a host, switch, array, NAS device, or tape library over a user-defined period of time.
- **Charting Wizards –** Easily produce charts based on user-specified data extraction specifications.

Storage

The **Storage** pull-down menu allows you to access and view the following reports:

- **Array Trending and Forecasting** - Analyze historical consumption for an array, site, or the entire enterprise by using the **Trending** option. Use the **Forecasting** option when budgeting for storage purchases and to more accurately time purchases to match your needs.
- **Capacity Allocation** – Determine how much storage each server in your organization is consuming summarized by view or site. Use this report to assist in tasks like charge back billing and storage provisioning.
- **Storage Discrepancy Report** – Identifies storage that appears to be allocated but, in reality, may not be usable.
- **Connection Exception -** Identify possible configuration errors by viewing: (a) array front-end director ports without corresponding switch connections and (b) host

adapter ports without corresponding switch connections. Use this report to assist in end-to-end configuration management.

- **Array Performance –** View front-end controller, cache, and disk controller performance reports that can be used to identify performance bottlenecks and determine the most effective upgrade options for an array.
- **Allocation Forecast** – Analyze storage allocation to host servers over a year summarized by site or view.
- **Storage Allocation** – View the historical allocation of storage summarized by array vendor, or RAID type.
- **NAS Filesystem Utilization –** Analyze filesystem utilization over the past four weeks summarized by enterprise, site, or server.
- **NAS Filesystem Trending –** View used capacity, available capacity, unassigned capacity, and capacity used for snapshots over the past four weeks summarized by enterprise, site, or server.
- **NAS Quotas -** Determine how many Quotas are allocated per filesystem. It also allows determining the Hard/Soft Quotas per filesystem which can be sorted by user/group/directory.
- **Reporting Wizards –** Access the Volume Configuration Wizard and the Array Configuration Wizard used to create ad-hoc storage-related reports.

FABRICS

The **Fabrics** pull-down menu allows you to access and view the following reports:

- **Fabric Trending and Forecasting** - Determine how many switch ports have been consumed in your organization. Use the **Trending** option to analyze historical consumption for a file-system, server, site, or the entire enterprise.

  Use the **Forecasting** option allows to project future switch port requirements based upon past usage and planned projects. Use this report when budgeting for switch purchases, and to more accurately time purchases to match your needs
- **Fabric Performance –** Analyze fabric switch performance on a port-by-port basis by viewing error and port or fabric busy statistics as well as average transmitted and received frames/bytes per second.
- **Storage Network Topology –** The Storage Network Topology report provides a graphical view of the storage environment. It requires that the supported Java Runtime Environment (JRE) is installed on our computer.
- **Fabric Configuration** - View a high-level fabric summary report as well as use the capability to obtain detailed reports on fabrics and connected hosts or storage arrays.

BACKUP/RESTORE

The **Backup/Restore** pull-down menu allows you to access and view the following reports. Refer to Chapter 5 for specific information which reports are valid for the different backup applications.

- **Job Report Wizard** –Create custom reports using the Sun StorageTek Business Analytics backup job tables.
- **Media Report Wizard** – Create custom reports using the media information stored in the Sun StorageTek Business Analytics database.
- **Backup Success Wizard** - Create custom daily performance reports related to backup report metrics that you specify.

- **Backup Exceptions** – Identify all hosts, file systems, and databases that are not part of an active backup job.
- **Media Trending** - Plan sufficient tape library media based on tape library utilization over a specified time interval.
- **Backup Schedules** – View the types of backups scheduled for a seven-day period as of the current date.
- **Meta Database Capacity** – Analyze the backup catalog disk utilization over a user-defined time interval.
- **Real Time Events** – Allows the backup administrator to quickly determine which backup jobs are failing. This report requires the Semantec Veritas SNMP Extension optional package.
- **Backup Exposure** – Shows the hosts that are not associated with any Backup clients, and any Backup clients that are not associated with any Host agent.
- **TSM Daily Administration** – For Tivoli Storage Manager, provides an expedient way to view the overall health of all TSM servers at a site.
- **TSM Event Summary** – For Tivoli Storage Manager, view the Scheduled Event Completion Summary in a pie chart and tabular format that shows the percentage of events completed, failed, and missed over a specified time interval.
- **Library Asset View** – View utilization of your tape library resources summarized by site or individual library.
- **Global Status View** – Verify the status of the library, drives, and CAP.
- **Library Statistics View** – View the number of initializations, exchange rate, the percentage of target reads that were successful, and the number of retries for any tape library in your backup infrastructure.
- **Tape Drive Allocation** – Tracks the amount of time tapes are located in each drive and when tape drives are not being used.
- **Backup Media Search** - Locate tape media by entering a tape label as a search string, entering a backup client as a search string, or by entering a backup server as a search string.

SERVERS

The **Servers** pull-down menu allows you to access and view the following reports:

- **HBA Configuration** - View the vendor, model, WWN, IP address, node name and driver revision level of each Host Bus Adapter (HBA) or view this information summarized by site.
- **OS Type** – View the operating system of each server, and the percentage of operating system types by site. At the level of the individual server, determine the operating system name and release level, the IP address, the kernel patch level, and the node name.
- **Server Trending and Forecasting** - Determine file-system utilization patterns for your organization summarized for sites.
- **Filesystem Utilization** – Gain insight into the distribution of files and their relative sizes across the various file systems.
- **Filesystem Consumers** – Identify the amount of storage capacity used by particular host Users/Groups.
- **Filesystem Age** - Determine obsolete files, summarized by percent accessed, modified, or created, which are candidates for deletion on a selected host server.
- **File-Level Wizard** – Use to interactively generate and save customized reports that include specific file names and paths.
- **Filesystem Wizard** – Create custom reports using the host file system table.
- **Server Wizard** – Create custom reports using the host configuration tables.
- **HBA Wizard** – Create custom reports using the Host Bus Adapter (HBA) table.

- **Disks Wizard** – Create custom reports using the host physical and logical storage configuration information in the host tables.

DATABASES

The **Databases** pull-down menu allows you to access and view the Database **Capacity/Configuration** report. This report provides details on the database servers, databases, and the databases utilization of physical storage resources

PROVISIONING

The **Provisioning** pull-down menu allows you to access:

- **Storage Provisioning Wizard** – Locate available storage for allocation to a server.
- **Storage Reservations –** Manage the storage provisioning reservations in the system.
- **Provisioning Summary Report –** View all storage reserved for a selected host over a user-specified date range.

SUN STORAGETEK BUSINESS ANALYTICS REPORT ITEMS

Figure 12 – Report Items identifies the items in a Sun StorageTek Business Analytics report screen.

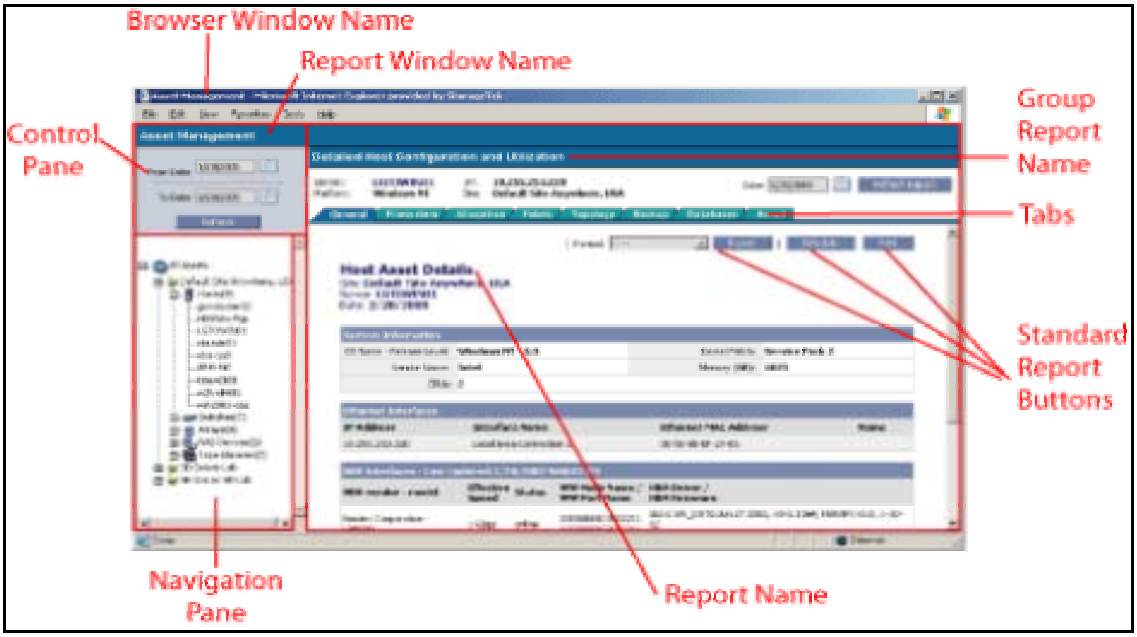


Figure 12 - Report Items

Sun StorageTek Business Analytics reports can be divided into several frames:

- **Navigation Pane** – Is the left frame that allows you to navigate through the reporting options, such as to display a view-level, site-level, or device-level report.
- **Report Pane** – Displays the report data in the frame to the right of the navigation frame.

Tabular Device Reports

In some instances, the administrator may want to examine all the related information about a particular device, such as a host server, fabric switch, NAS server, or storage array. Under Asset Management, you can access the tabular device reports that are designed to address this requirement.

Each tabular device report provides a default tab **General** that displays general information about the device. In addition, these reports provide a series of tabs to allow the administration to access report information about specific properties of the device (asset, configuration, performance, trending, etc.) as appropriate for the device family, The Detailed Array Configuration report (Figure 13 – Tabular Device Reports) represents one of the tabular device reports Sun StorageTek Business Analytics provides.

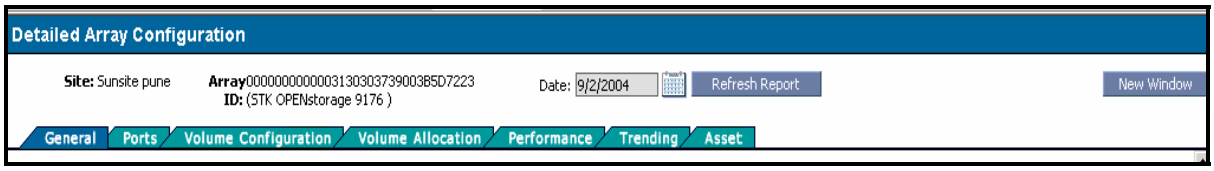


Figure 13 - Tabular Device Reports

The **New Window** button allows the administrator to display information from several device tabs (e.g., ports and performance for an array) in their own window. Asset information is defined using the **User-Defined Fields** menus under Database Administration selection from the **Tools** pull-down menu.

Calendar

Sun StorageTek Business Analytics enables generating reports like "display the number of successful backup jobs over the previous day". The **Calendar** icon provides an easy way you can select a specific start date and end date for the reporting interval. After you set the date range, you click **Generate Report** and a report appears for the time interval that you selected.

Export Data

Sun StorageTek Business Analytics reports provide an **Export** button that provides you the option to transfer the data collected and used by Sun StorageTek Business Analytics, to other applications (e.g., Excel) in the user's computing environment.

The exported data formats are listed as follows:

- ASCII text
- XML
- Excel tab-delimited

The Storage Network Topology diagram can be exported to an XML format that is compatible with Visio 2003 or higher. This functionality is explained in the subsequent section on the Storage Network Topology report.

Report Scheduling

Sun StorageTek Business Analytics reports include a **Schedule** button to allow you to schedule a report. A scheduled report consists of a schedule for the distribution of an e-mail containing the report URL.

Note: For ad-hoc reports you generate using the reporting wizards, you must save the report before you can specify it to be scheduled using Report Scheduling.

Proceed as follows.

1. Click the **Schedule** button on a report and the Report Scheduling window appears. The name of the report appears in the non-modifiable Report Name field.

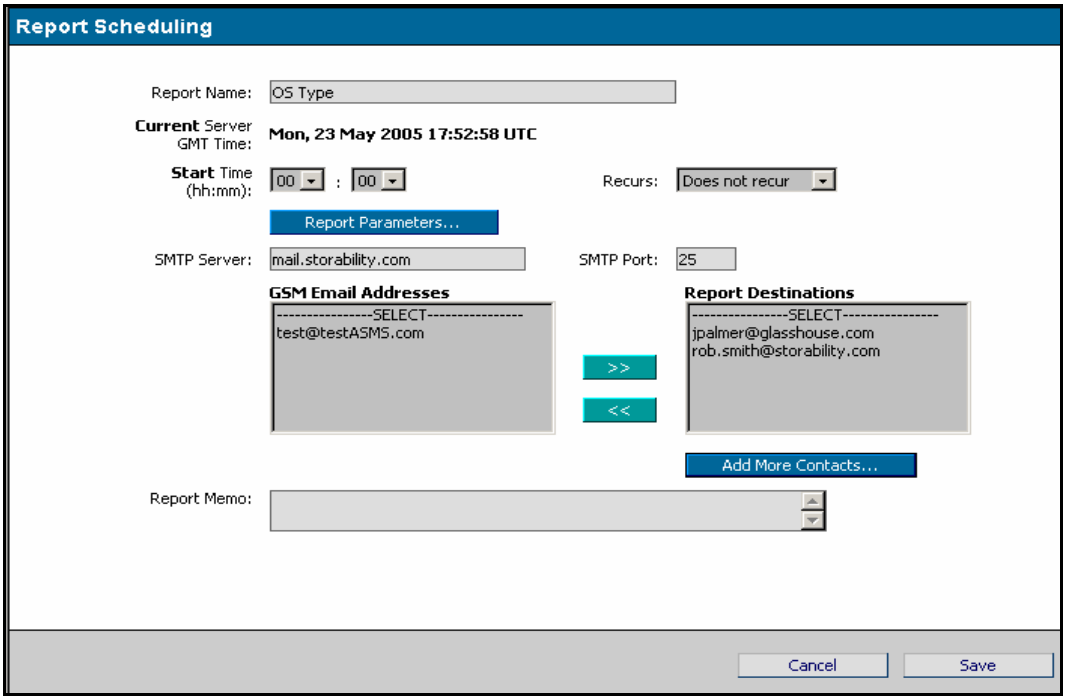


Figure 14 - Report Scheduling

The report fields are described as follows:

- **Report Name** – Non-modifiable report name.
- **Current Server GMT Time** - Current time in GMT on the Management Console server.
- **Start Time** - Pull-down menus to set the start time (hh:mm) for the scheduled report. Select the time in GMT format; 24-hour time.
- **Report Parameters** - Allows you to determine how any report date parameters behave when they are scheduled. You must set these parameters before you save the scheduled report.

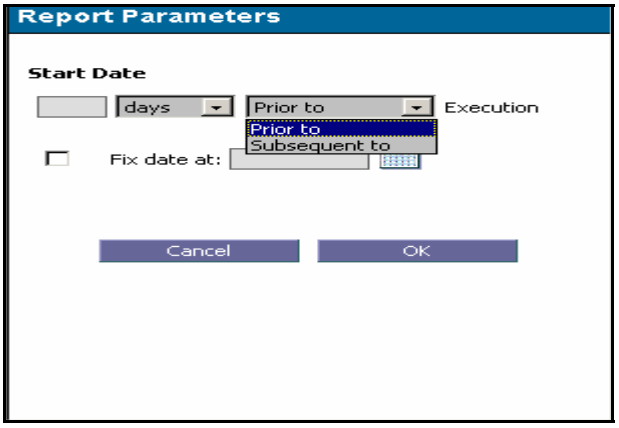


Figure 15 - Report Parameters

- **Start Date** – Type the number of days prior to or subsequent to the report schedule to be observed for the scheduled report or use the "Fix date at" parameter, described below.
- **Fix date at** – Put a check in the checkbox and use the **Calendar** icon to set a fixed date.

- **Recurs –** Use this list box to set its recurrence as does not reoccur, reoccurs weekly, every two weeks, or monthly.
- **SMTP Server –** Specify the IP address of the SMTP server.
- **SMTP Port –** Specify the TCP Port Number for SMTP; the default port number is 25.
- **GSM Email Addresses** – Select the email address of a Sun StorageTek Business Analytics user and click >> to add that user to the report destinations.
- **Add More Contacts** – Click to open a dialogue that allows you to enter the email address of an additional email recipient.

  Enter the SMTP email recipient and click **OK**.

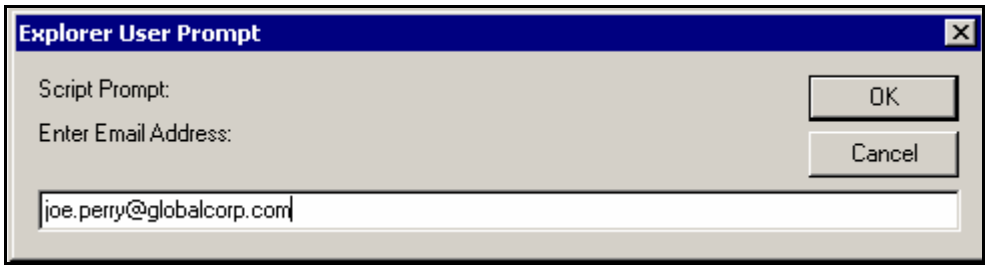


Figure 16 - Add More Contacts

- **Report Memo** – Type descriptive text concerning the scheduled report.
- **Add Contacts** - Allows you to enter the email address of a recipient who is not a Sun StorageTek Business Analytics user.

2. To save the scheduled report, click **Save** on the Report Scheduling window. A confirmation dialogue is displayed.

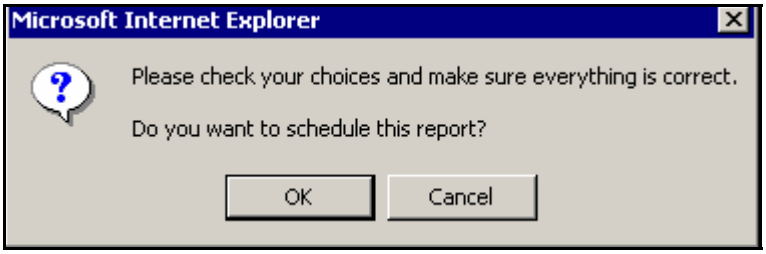


Figure 17 - Scheduled Report Confirmation

3. Click **OK** to confirm or **Cancel** to cancel.
4. If you click **OK**, the Report Scheduling Completed window is displayed.
5. Click **Close**.

Print

Sun StorageTek Business Analytics reports provide a **Print** button that allows you to print a displayed report on a local or network-attached printer.

Closing Report Window

To close a report window, simply click on the **X** selection in the upper right hand corner of the report window or click the **Close** button, where applicable.

Logout

The **Logout** link allows you to close the present user session with the Management Console. Clicking **Logout** will exit the Management Console, changing the browser to the Logout screen.

Figure 18 - Logout Screen

Click **Login** to return to the Management Console login screen. Click **Close Browser** to close the browser session.

Chapter Two - Assets

This chapter describes the different reports available through the Management Console's **Assets** pull down menu.

Asset Management

The Asset Management report allows you to view both summary and detailed level information on your host servers, fabric switches, arrays, NAS devices, and tape libraries.

1. From the Management Console Home Page, select **Assets**.
2. Use the **Calendar** function to set the desired start date and end date for data extraction or accept the default range of the past four weeks.

   999

   Figure 19 - Asset Management

3. For a selected site. You can expand it in the navigation pane to view the hosts, switches, arrays, NAS Devices, and tape libraries comprising its assets.

The following sections describe site-level information you can display in the right frame of the Asset Management report.

Host Listing

Host Listing shows the host name, IP address, Operating System, version, release level, CPU manufacturer, CPU model, and number of CPUs for all host servers. Click the **Hosts** icon in the left frame to display this host information in the right frame.

Switch Listing

Switch Listing displays the Switch WWN, the associated Fabric WWN, the alias, and the vendor. Click the **Switches** icon in the left frame to display the switch information in the right frame.

Storage Array Listing

Storage Array Listing displays the Array ID, maker, name, model, cache, physical disk, and any optional, user-defined asset fields. Click the **Array** icon in the left frame to display the agent collected and user-defined array information in the right frame.

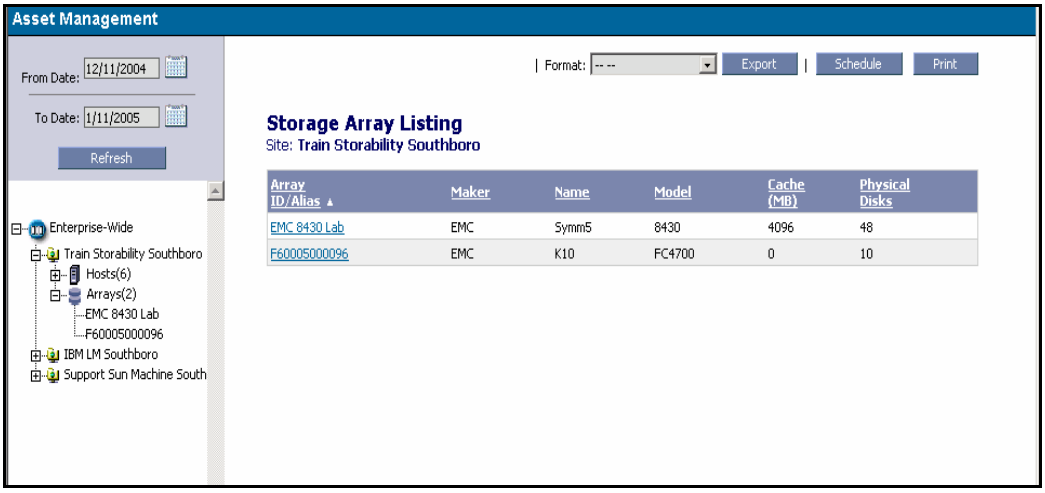


Figure 20 - Storage Array Listing

NAS Detail

NAS Detail displays the System Name, System ID, Product, Mode, and Maker fields. Click the **NAS** icon in the navigation pane to display the NAS detail information in the right frame. Clicking the **System Name** link displays the Detailed NAS Configuration report.

Tape Library Utilization

Tape Library Utilization displays the Library Name, Library Type, Active Cells, Free Cells, Total Cells, and Percent Utilized fields. Click the **Tape Libraries** icon in the navigation pane to display the high-level library utilization information in the right frame.

Asset Management - Tabular Device Reports

Asset Management provides access to the tabular device reports. Each tabular device report has a header frame that includes:

- Site name
- Device name
- Current report date
- Calendar icon and Refresh button to refresh the report data
- New Window button to initiate a second instance of the report window in a new browser and, thereby, allow to compare reports on different tabs

The following sections describe the tabular device reports you can access from the Asset Management report. If you select a tab and there is no data available in the database to produce the report, the report will display this status (e.g., "No Information Available").

Detailed Host Configuration and Utilization

Clicking on a particular host server in the Asset Management navigation pane displays the Detailed Host Configuration and Utilization report. The top section identifies the server name, platform (e.g., Windows NT), IP address, and site for the host.

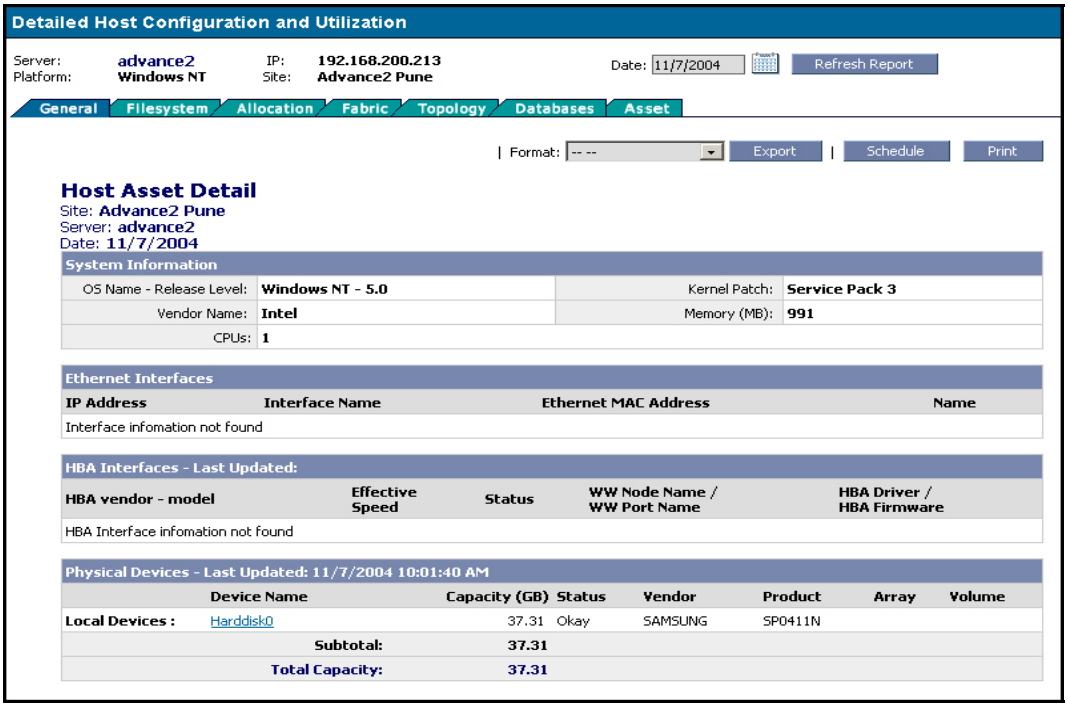


Figure 21 - Detailed Host Configuration and Utilization

The following table appears below this general information:

- **System** –OS name/release level, vendor name (e.g., Intel), number of CPUs, kernel patch, and amount of memory.
- **Ethernet Interfaces** –IP address, IP name, Media Access Layer (MAC) address, MAC name.
- **HBA Interfaces** – HBA vendor, model, World Wide Node Name, World Wide Port Name, HBA driver revision, HBA firmware revision.
- **Physical Devices** - Device name, capacity (GB), status, vendor, product, array and volume (if SAN attached).

The tabular device reports are described as follows:

- **Filesystem** – View aggregate filesystem utilization information that includes the number of filesystems, total size (MB), used space (MB), and percentage of space utilized. At the filesystem-level, the filesystem name, type (e.g., NTFS), total and used size, and percentage of space utilized are shown. Filesystem Name is a link to the Filesystem Details report if the SRM Agents have been installed. This page also links to the Volume Allocation report if the volume is provided over the SAN.
- **Allocation** – View the Volume Allocation summary report for the host.
- **Fabric** – View HBA interface and switch port information showing how the host connects through the SAN to its storage.
- **Topology** – Shows graphical depiction of the host's connection(s) to the SAN, if SAN-connected.
- **Backup** – Displays the Job Details report for this backup client, if applicable.
- **Databases –** Displays the Database Server Details, Databases, Table Spaces/Device Details, and Filesystem Dependencies tables.

- **Database Server Details** identifies the instance Name, type, version, port, and number of databases.
- **Databases** shows the instance name, database name, owner name, devices used for table spaces. It also provides counts for tables, indices, and users. The top five instances (by rows count) are also identified.
- **Table Spaces/Device Details** identifies the instance name, table space device name, type (e.g., datafile), physical name (e.g., e:\Program Files\Microsoft SQL Server\MSSQL$ADVANCE2_CS\data\model.mdf), percentage of space available, total space, and used space.
- **File System Dependencies** – Identifies filesystem dependencies for the database instance by instance name, database name, filesystem name, filesystem maximum size (MB), and filesystem used size (MB).

- **Asset –** Displays the Host Detail report with asset data for the host, if defined.

DETAILED SWITCH CONFIGURATION

Clicking on a particular switch in the Asset Management navigation pane displays the Detailed Switch Configuration – Detailed Switch Report. The **General** tab header identifies the Site, Switch Id, Switch Vendor, Switch Model, and the date of the last update.

The Switch Detail table shows the Switch Name, Switch WWN, Fabric WWN, Vendor, Domain ID, Switch Model, Management IP Address, software version, status, total number of ports, number of ISL ports, number of offline ports, and the number of connected nodes.

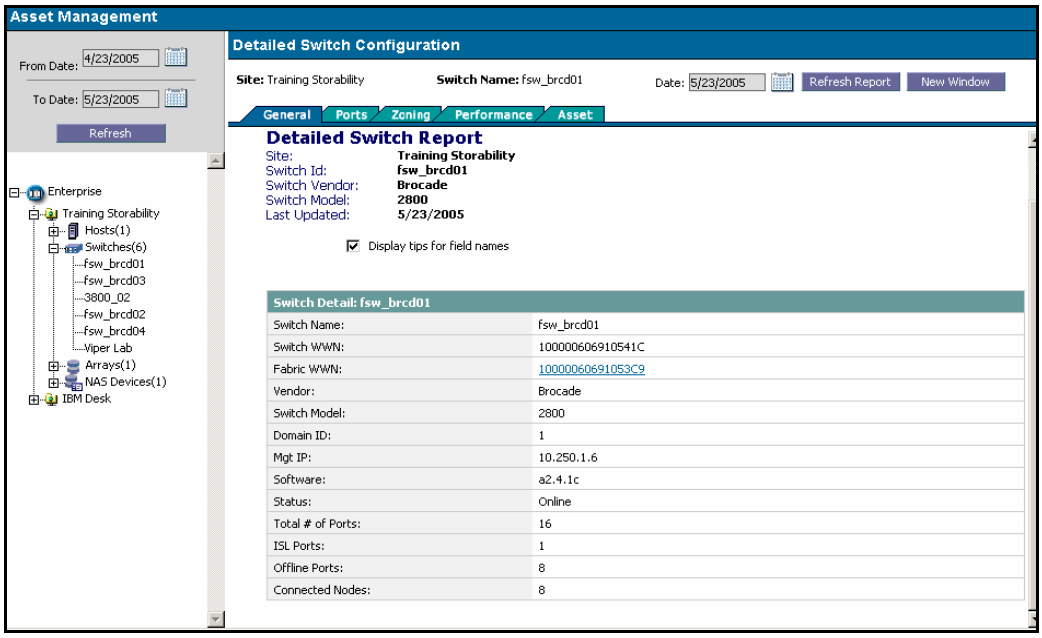


Figure 22 - Detailed Switch Configuration – Detailed Switch Report

The additional tabular device reports are briefly described as follows:

- **Ports** - Provides information about the ports in the switch and connections to other devices or switches as applicable. For each switch port, a table displays the Port Number, Port WWN, Status, Zone Alias, Attached Device Name, and Attached Device WWPN.

- **Zoning** – Displays the Fabric Configuration report that provides information about the current zoning configuration including aliases, active configuration, and nodes attached to the fabric. The following reports can be accessed:
    - Clicking the **Active Zone set** icon displays the zone name and members of each zone in the active zone set.
    - Clicking the **Defined Zone Sets** icon displays the zone members and alias information.
    - **Defined Zones** allows you to select a zone and displays its fabric name, fabric WWN, its zone sets, and member list.
    - **Defined Aliases** enables you to view the Fabric Alias, Fabric WWN, Mgt. IP address, the number of aliases defined, and the alias name memberlist.
    - **Member Switches** – Provides a convenient link to the Detailed Switch View report for a selected switch.
    - **Attached Nodes** – Divides attached nodes into several categories: Arrays, Interswitch Links, and Others. Clicking on an **Array**/Interswitch Link/Other (device type) displays the Detailed Node Connection View report. Its Physical Connection Summary table identifies the Local Port, its WWNN/WWPN, the name of the fabric to which the local port is connected, its attached switch, the switch port, as well as alias and zone information.
- **Performance** – Displays the Fabric Performance report for the specified switch.
- **Asset** – Displays user-defined asset information for the selected switch.

Detailed Array Configuration

Clicking on a particular array in the Asset Management navigation pane displays the Detailed Array Configuration report. The **General** window displays the Site, Array ID, and Date fields. Summary-level information includes the software version, Cache Size, number of Front End Controllers, number of Back End Controllers, and the number of Front End Ports.

The Physical Disks table shows the number of disks, the raw capacity (GB) per disk, the number of data/parity disks, and the number of hot spares. The Configured Volumes table provides information regarding the use of the logical volumes.

You can select any of the tabs:

- **Ports** – Displays information about the front-end ports in the array and their connections to switches, when applicable.
- **Volume Configuration** – Displays information about the configuration of volumes in the array. Choose one of the following filter options: Allocated Volumes, Unallocated Volumes as well as one of the following display options, Front-End Controllers, or Physical Disks, before you click **Generate Report** to generate the report.
- **Volume Allocation** – Before the report is generated, select one of the following report filters (radio buttons): Show All Volumes (default selection), Show Only Assigned Volumes, Show Only Unassigned Volumes, Show Only Unassigned, Mapped Volumes, Show Only Unmapped Volumes. Also select whether or not to display volume details (check box). Finally, select one of the following display options (radio buttons): by Host, by Volume, or by Port before you click **Generate Report** to generate the report.

- **Performance** – Provides a consolidated launch point to access any available performance report for the specific array. Select the report range (Start Date/End Date) and the type of performance report, Disk Controller I/O, Front End Controller, Daily Cache-Hits, or Hourly Cache-Hits before you click **Generate Report** to generate the report, as shown in Figure 16.

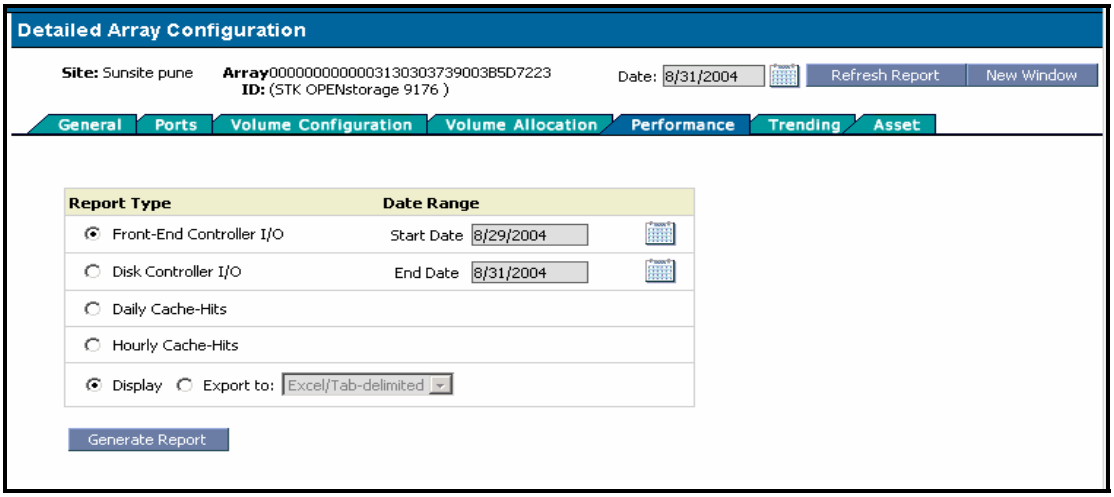


Figure 23 - Detailed Array Configuration - Performance Report Filters

- **Trending** – Provides a consolidated launch point to access any available trending reports for the specific array.
- **Asset** – Displays user-defined asset information for the selected array.

ASSET MANAGEMENT –DETAILED NAS CONFIGURATION

Clicking on a particular NAS server displays the Detailed NAS Configuration report.

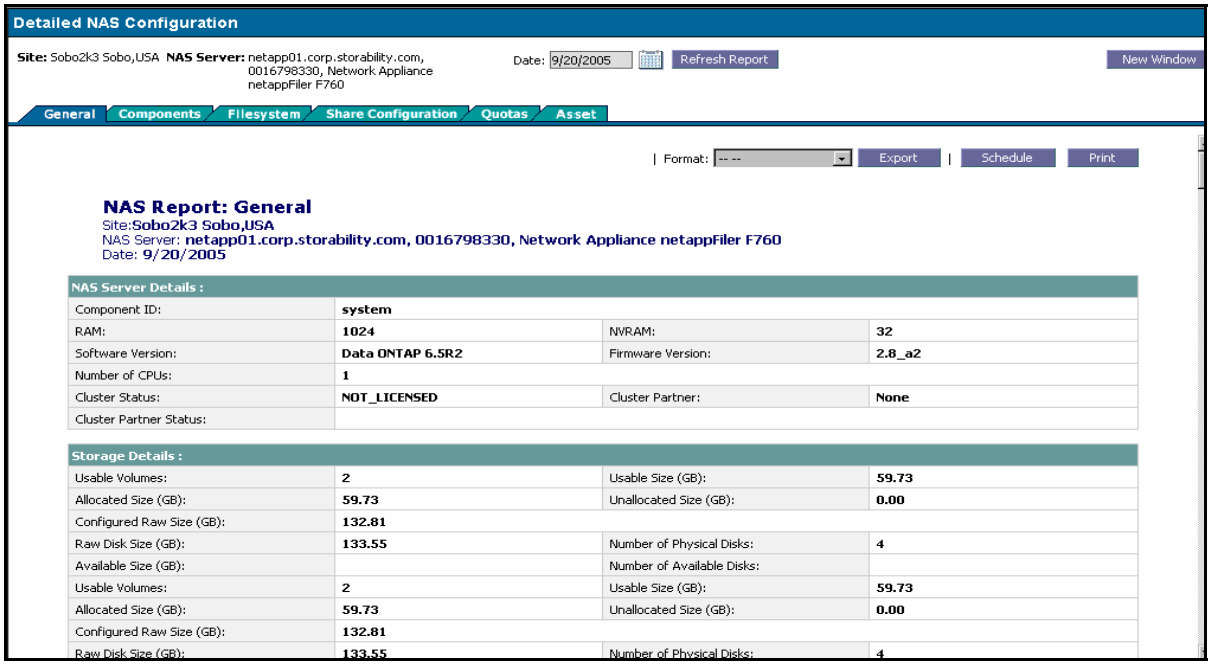


Figure 24 - Detailed NAS Configuration

The **General** tab displays NAS Configuration information and a summary of the NAS server options. The report window mainly consists of three tables:

- NAS Server Details
- Storage Details
- Option Details

The **NAS Server Details** table provides the following information:

- Component ID
- RAM
- NVRAM
- Software Version
- Firmware Version
- Number of CPUs
- Cluster Partner
- Cluster Status
- Cluster Partner Status

The **Storage Details** table contains the following information:

- Usable Volumes
- Usable Size (GB)
- Allocated Size (GB)
- Unallocated Size (GB)
- Configured Raw Size (GB)
- Raw Disk Size (GB)
- Number of Physical Disks
- Hot spare Size (GB)
- Number of Hot spare Disks

The **Option Details** table should contains two sections showing the following details:

- Licensing
  - Option Name
  - Option Value

- Configuration
  - Option Name
  - Option Value

You can select any of the following tabs:

- **Components** - Displays data for any components added to the NAS server. If the server is a Network Appliance filer, there are no additional component details to display. If the server is a Celerra File Server, components of type 'Data Mover' are displayed on this tab. In addition, this report displays the Component ID, name, type, speed (Mb/sec), IP Address, and operational status of both host facing and storage facing interfaces. If the interface type is "softwareloopback(24)", the information is not displayed in the Host facing table.

- **Filesystem** – Provides summary-level information on all filesystems on the server as well as detailed information on each file system. The summary-level details include the number of file systems, total capacity, capacity used (GB), capacity available (GB), snapshot used (GB), snapshot reserved (GB), total snapshot (GB), and % utilized. The filesystem details table shows the filesystem name, type (e.g. wafl), total capacity, capacity used (GB), capacity available (GB), snapshot used (GB), snapshot reserved (GB), and total snapshot for each filesystem on the server.

  Clicking the **Logical Volume Configuration** link displays the NAS Logical Volume Report window. Reports are available at the logical volume, file system, and physical disk levels for the specified NAS server (e.g., netapp01). By using the scroll bars, you can quickly determine how storage capacity is allocated for file systems accessed by clients and snapshots that facilitate backups. This information is provided from a logical volume and physical disk perspective.
- **Share Configuration** - Allows you to view the NAS Share Configuration report. It identifies the Share Name, Share Type, Share Path, Filesystem Name, and Options. The path and access options details can be useful when troubleshooting why a network client cannot mount a file system.
- **Quotas** – Allows you to generate the NAS Report: Quotas Details report sorted by user, group, or directory. The window that allows you to set the filter and display be options contains a table of definitions (e.g., Hard Quota) and options (e.g., sort by directory) to help you choose your desired settings.

  The NAS Report: Quotas Details report contains a table for each filesystem that identifies the Quota ID, Quota Target (e.g., user), Tree (qtree name), Quota Specifier, Quota Used(GB), Hard Limit(GB), % Hard Utilized. The heading above each table shows the File system ID, Total Capacity (GB), and Capacity Available (GB).
- **Asset** - Displays user-defined asset information for the selected NAS device.

Asset Management – Detailed Library Configuration

Clicking on a particular library device in the Asset Management navigation pane displays the Detailed Library Configuration report for that tape library. The report identifies the selected library by displaying the Site, Library Name, and Library Vendor/Model details. It also shows the high-level utilization of the library by displaying the number of free cells, active cells, and total cells in both a pie chart and table.

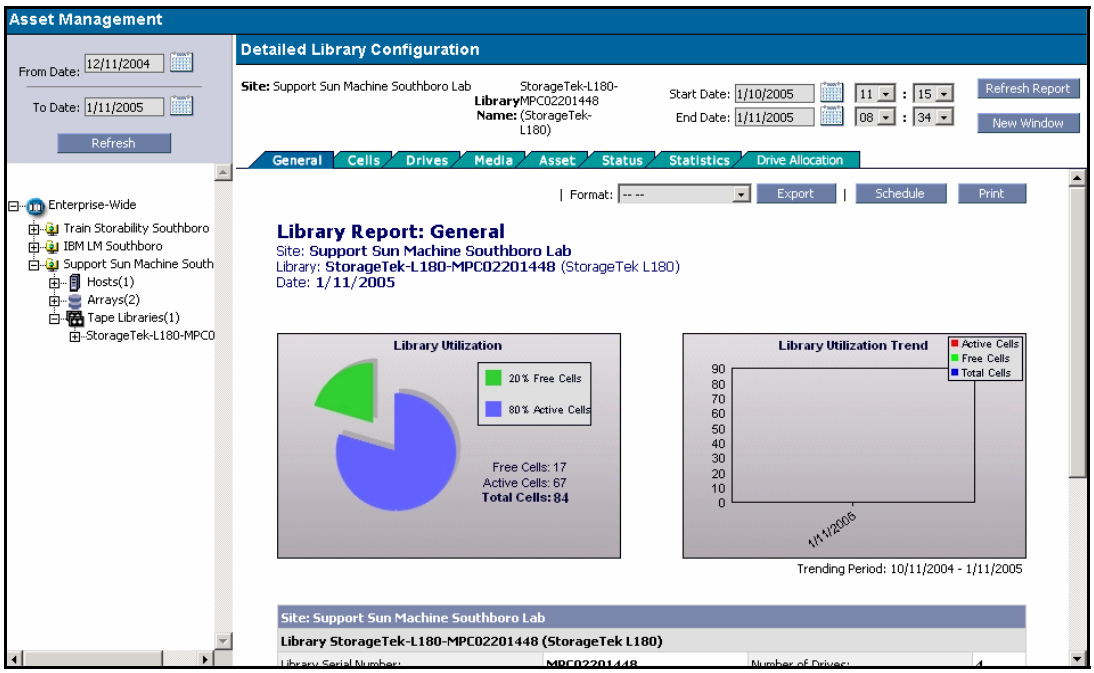


Figure 25 - Detailed Library Configuration

You can select any of the tabs:

- **Cells** – Shows the cells in the library and what tapes are located in individual cells.
- **Drives** – Displays Drive ID, vendor, model, as well as summarized time allocated, time free, time offline, time degraded, and time unknown for that drive.
- **Media –** Shows media details that include volume id, bar code, media type (and correlates it with any information available via the Sun StorageTek Business Analytics backup agents).
- **Assets–** Displays user-defined asset information, if applicable.
- **Status** – Provides general health information on the library and serves as the entry point to view event information related to any failures.
- **Statistics** - Displays statistics that include the number of initializations, exchange rate per hour and total number, the percentage of target reads that were successful, and the number of retries. **Note**: This report is blank if the tape library is monitored by the ACSLS Agent.
- **Drive Allocation** – Displays the drive status summary (allocated, free, degraded, unknown, and offline) by hour over the past 24-hours.

Configuration Change Report

The Configuration Change report displays any configuration changes that have occurred for an asset over a specified time interval. Host servers, Arrays, Switches, NAS devices, and Tape Libraries comprise the assets. Since the administrator typically examines what has changed since a device stopped working properly, this report can serve as the first step in troubleshooting many routine problems.

In the Configuration Change report, data is shown in the range of the user specified dates, as it is done in other Sun StorageTek Business Analytics reports. The default start

and end date range is the past seven days. The changes are grouped by date/time and are presented in reverse historical order (most recent changes first).

ARRAY

The Array report displays the following types of configuration changes:

- Software version
- Cache Size
- Controllers
- Front-end Controllers
- Back-end Controllers
- Front-end Ports
- Physical Disks
- Hot Spares

HOST

The Host report displays the following types of configuration changes:

- IP Address
- Kernel Patch
- OS Name/Release Level
- Memory
- CPUs
- Filesystem count

SWITCH

The Switches report displays the following types of configuration changes:

- Switch Name
- Switch WWN
- Domain ID
- Management IP
- Firmware

The Switches report contains the "Analyze Port Configuration" link. Clicking this link opens a separate report that shows ports with changes in:

- Port WWN
- Zone Alias
- Attached Device Name
- Attached WWN

NAS

The NAS report shows the following types of configuration changes:

- RAM
- NVRAM
- Software Version
- Firmware Version
- Cluster Status
- Cluster Partner
- Usable Volumes
- Number of Physical Disks
- Number of Hot Spare Disks
- Number of logical volumes
- Filesystem count

LIBRARY

The Library report shows the following types of configuration changes:

- Library Name
- Firmware Version
- Number of Drives
- Number of Pass-Thru Ports
- CAP Cells

The Libraries report includes the "Analyze Drive Configuration" link. Clicking this link displays a separate report that shows drives with changes in:

- Model
- Vendor
- Serial Number
- Firmware Revision
- WWPN
- Interface Address

Proceed as follows:

1. From the Management Console Home Page, select **Assets**.
2. Select **Configuration Change** and the Configuration Change Report main window appears.
3. Enter a start and end date in the Control Pane located in the upper left section of the report.
4. Use the navigation pane on the left to navigate to and select an asset. The tables on the right will detail the changes in that asset's configuration. The top table describes the "Changed" details for the asset over the specified start and end date range.
   The bottom table identifies the "Not Changed" configuration attributes during the specified start and end date range.

   If no configuration changes have occurred for the selected device over that time range, the "No configuration change details found within selected dates. Please select different range." message is displayed.

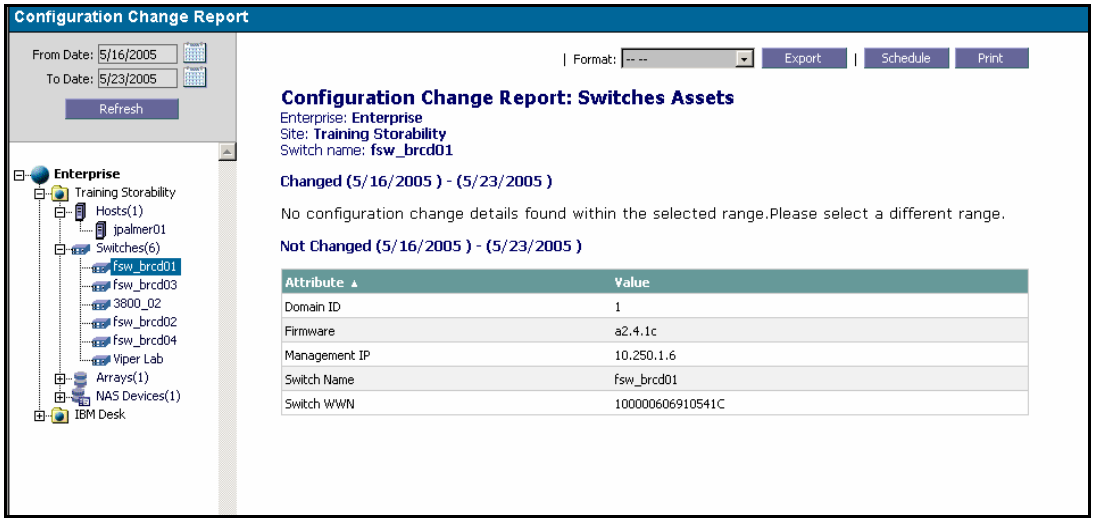


Figure 26 - Sample Configuration Change Report - Switch

The following sample Configuration Change Report shows that the host server's IP address changed during the date range specified, but all other configuration data did not change.

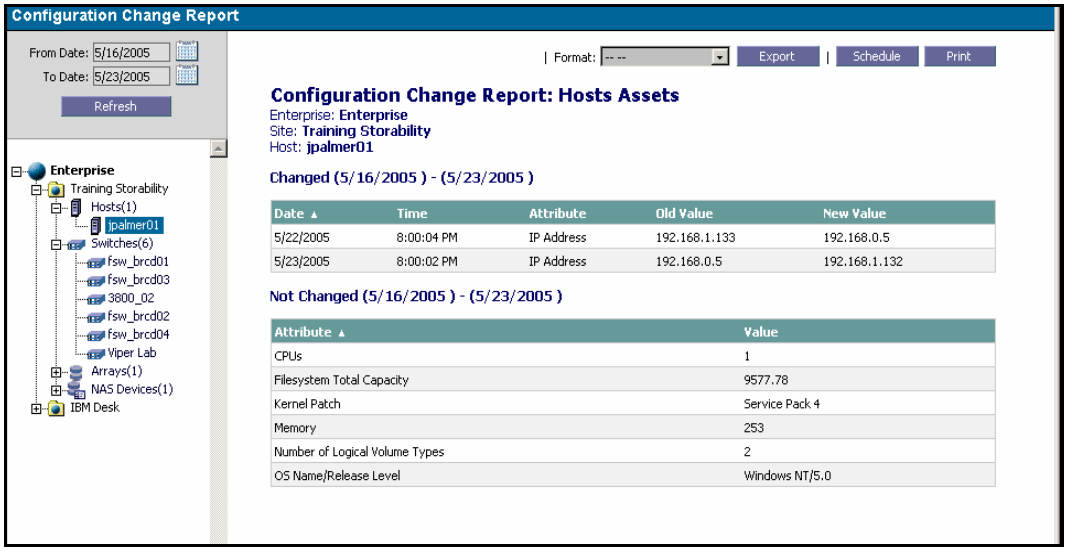


Figure 27 - Sample Configuration Change Report - Host

CHARTING WIZARDS

The Charting Wizards help you to create customized charts based on data stored in the Sun StorageTek Business Analytics database. The following chart types are supported:

- Bar Chart
- Pie Chart
- Line Chart

Charting Wizards allows you to create and save new charts, edit existing charts, or generate a saved chart. A limited number of chart types can be generated. You can select one "metric" or Y-axis for each chart. The Host Statistics Agent must be installed, running, and collecting performance statistics on a Solaris or AIX server to use the Host Performance Chart Wizard.

The reports are based only on data in your current view.

CREATE CHART USING CHARTING WIZARD

1. Select **Assets->Charting Wizards**. The Select a Charting Wizard window is displayed, similar to the one shown in the following figure.

   It contains a table listing the available charting wizards and their selection box. If existing charts have been saved to the database, they are indented in the listing and are associated with an **Edit** and **Display** link.

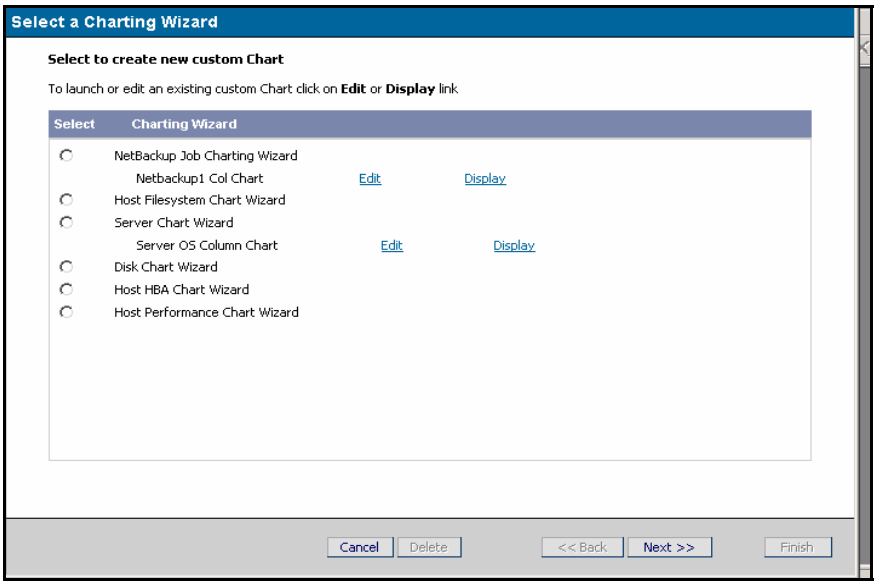


Figure 28 - Select a Charting Wizard

2. Click on the selection box to choose the desired charting wizard and click **Next>>.** This example shows how to create a pie chart using the **Host Filesystem Charting Wizard**. With the exception of different data sets, all charting wizards are utilized similar to this example.
3. The **Select Statistics for <charting wizard>** window is displayed. You can choose one statistic per chart.

   Choose the type of statistics you want to use for the chart. As displayed, the selected field will be used for pie chart division or will act as Y-Axis scale for line and column charts. This example uses Total Capacity (MB).

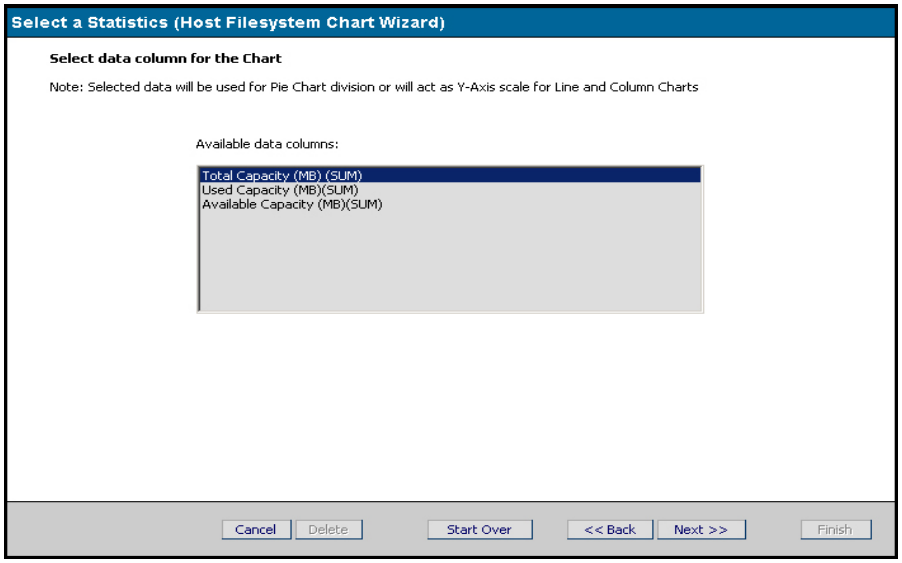


Figure 29 - Select Statistics (Host Filesystem Chart Wizard)

4. Click **Next>>** and the Select Report columns for <charting wizard> window is displayed. Choose the columns you want to use for the chart in the Columns Available table and click Add> or click Add All>> to add all the columns to the chart.

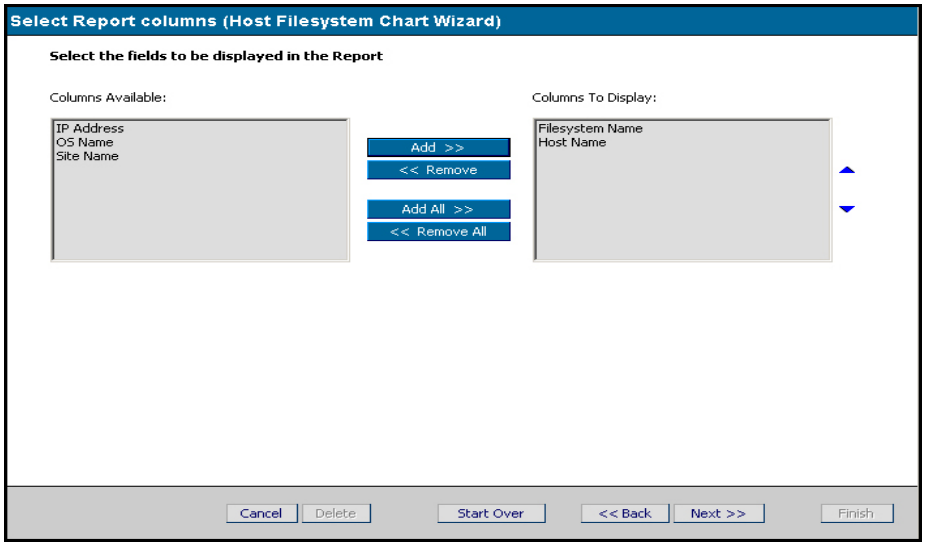


Figure 30 - Select Report Columns (Host Filesystem Chart Wizard)

5. Click **Next>>** and the **Select Report Filters for <charting wizard>** window is displayed. Use the list boxes, such as field and arithmetic operator, as well as the input boxes (e.g., value) to set the selection criteria for the SQL query that will be used to extract the data for the chart. Without specifying any selection criteria, your chart may not be as legible and useful as you need.

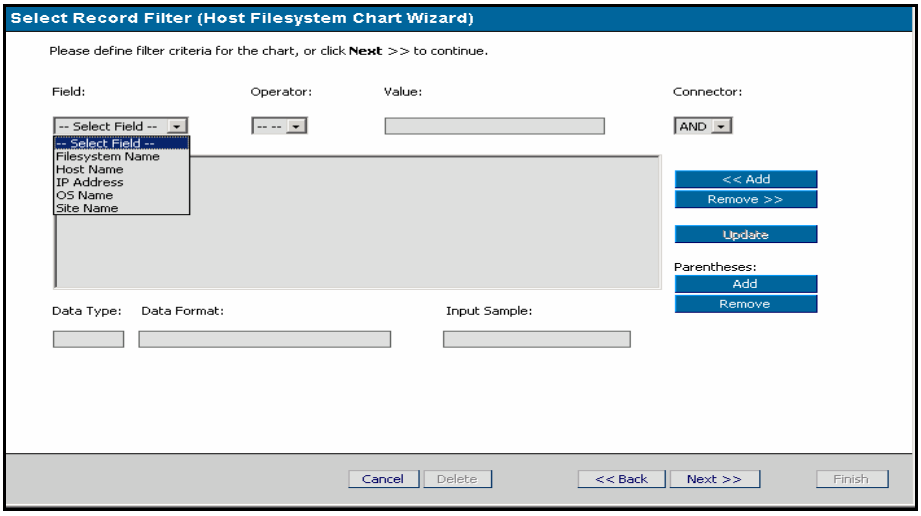


Figure 31 - Select Report Filters (Host Filesystem Chart Wizard)

The **Select Field** variables depend on the charting wizard. The **Operator** drop-down list box contains a list of operators that are valid for the chosen field. The relationship between the fields and the operators is described in the table below.

Data Type	Valid Operators
Numeric	=, <>, >, >=, <, <=, IN
Date	=, <>, >, >=, <, <=, IN
String	Equal To, Like, In
List	IN
Boolean	=, <>, IN

Table 1 - Data Types and Valid Operators

6. Click **Next>>** and the Select Type of Chart <chart wizard name> window appears. Enter the title of the chart in the **Chart Title** input box. Use the radio button to select a chart type: line chart, column chart, or pie chart. A graphical depiction of each chart type appears beside its radio selection box.

   Optionally, set the **Max. Chart Legend Count:** parameter to a desired value and, thereby, restricting the number of legends that will appear in the report. This can enhance the readability of the report.

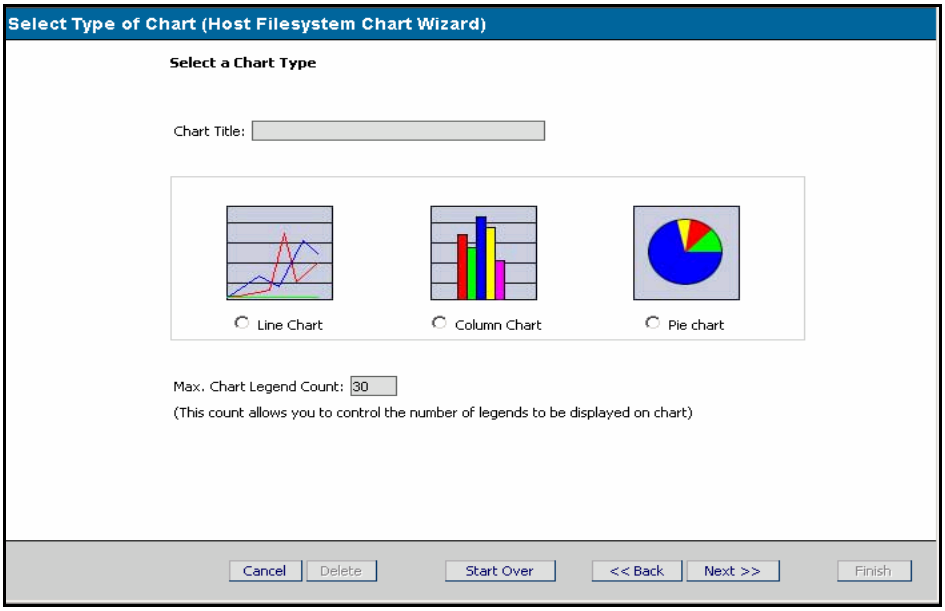


Figure 32 - Select Chart Type

7. Click **Next>>** and the chart is generated and displayed. Beneath the chart, the data set used to create it appears in tabular format.

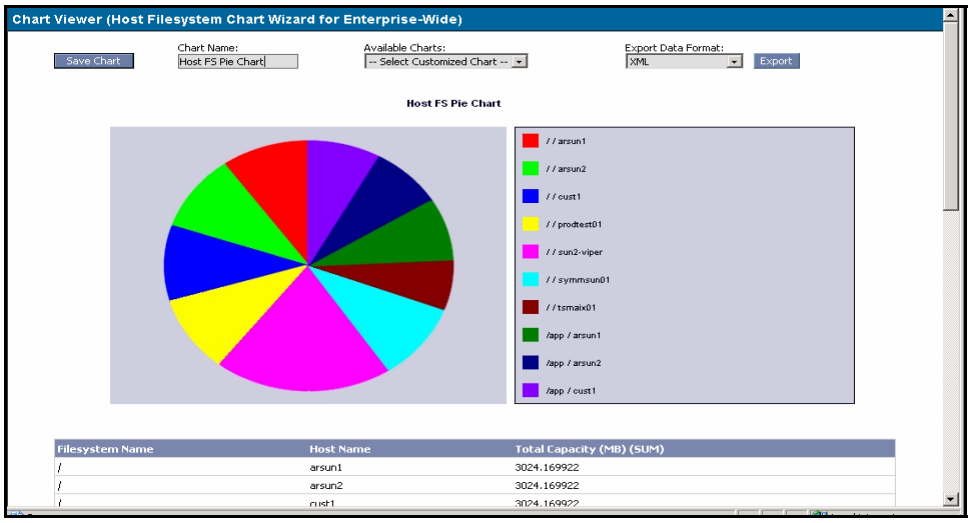


Figure 33 - Sample Chart: Using Charting Wizards

8. Optionally type a chart name and click **Save** to save the chart into the database. You can then use the Edit or Display link on the Select a Charting Wizard window to modify or view the chart, respectively.

VIEW/EDIT CHART USING CHARTING WIZARD

1. Select **Assets->Charting Wizards**. The Select a Charting Wizard window is displayed.
2. Select the desired action:
   a. **Edit** – Click the **Edit** link next to the chart name. The Select Statistics window appears. After you optionally change the statistics selection, use the **Next>>** button to cycle through all the windows used to change columns (fields) and report selection criteria.

b. **Display** – Click the **Display** link to view the chart.

Chapter Three - Storage

This chapter describes the different reports available through the Management Console's **Storage** pull down menu.

Array Trending and Forecasting

The Array Trending and Forecasting report allows you to determine how much storage is being consumed on each array in your organization. For a specified date range, you can see the Total GB, Used GB, Free GB, and percent utilized. The report is available at the view, site, and array levels.

You can set the following options:

- **Trending** - The Trending option allows you to analyze historical consumption for an array, site, or the entire enterprise. This option only looks at past consumption.
- **Raw vs. Usable Storage** - Selecting Raw calculates consumption based on the total storage consumed on the array, including RAID and other protection overhead. Selecting Usable calculates consumption based on the Usable space presented to the servers.
- **Forecasting** - The Forecasting option allows you to project future storage requirements based upon past usage and planned projects. Use this report when budgeting for storage purchases, and to more accurately time purchases to match your needs.
- **Forecast Period** - Enter how far into the future you would like the report to forecast.
- **Targeted Maximum Consumption** - If you wish to maintain a reserve of storage, indicate the amount as a percentage of your total. In other words, if you wish to manage your storage to 90% maximum usage (and maintain a 10% reserve), enter 90% into this field. The report will indicate the date when you can anticipate consuming your targeted amount of storage based on historical usage.

1. From the Management Console Home Page, select **Storage**.
2. Select **Array Trending and Forecasting** and the Array Trending and Forecasting report main window appears.
3. In the upper left section of the report, use the radio button to specify whether to generate a trending report only or to generate a trending and forecasting report.
4. Specify a forecasting period (if applicable) of 3 months, 6 months, 1 year, or 3 years.
5. Specify the targeted consumption.
6. Enter a start and end date.
7. Click on an Enterprise View in the navigation pane to generate the Storage Trending: Enterprise Report, a Site to generate a site-level report, or expand a Site and click on a desired array to generate an array-specific report.

   The report shows the storage consumption using a line chart and tabular data. For a forecasting report, the date on which the user-selected maximum consumption will be reached is displayed. The table identifies the Date, Total GB, Used GB, Free GB, and percentage utilized. A sample Storage Forecasting: Array Report is shown below.

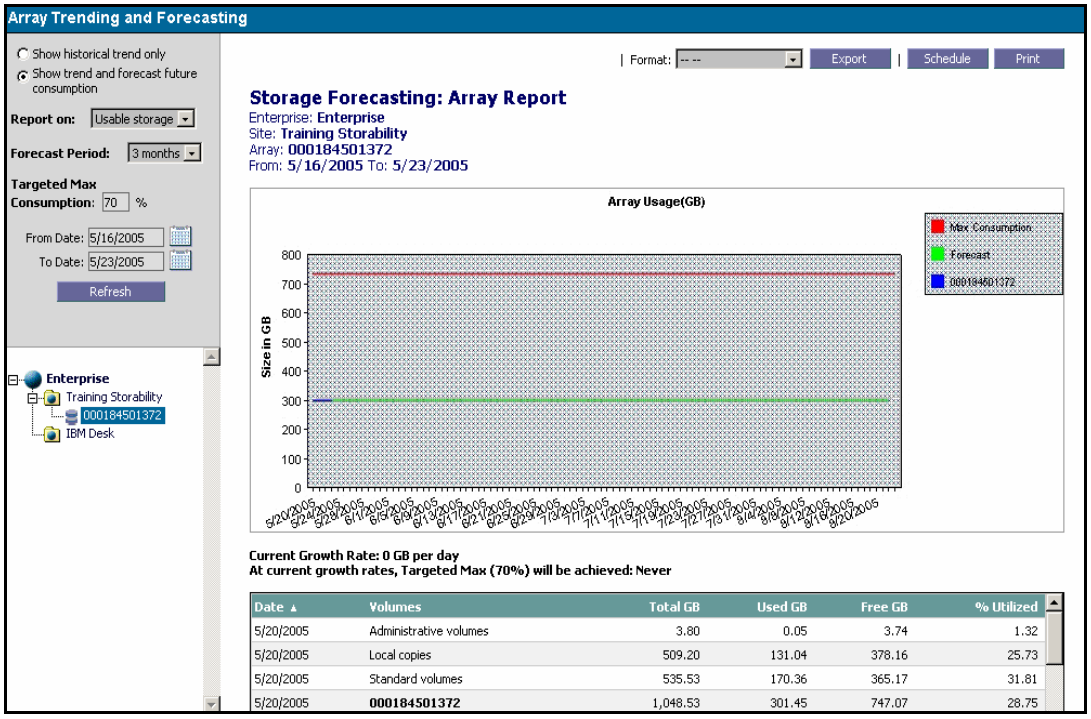


Figure 34 – Storage Forecasting: Array Report

CAPACITY ALLOCATION

The Capacity Allocation report allows you to determine how much storage is being consumed by each server in your organization

You can set the following options before you generate the report:

- **Show only those volumes allocated directly to the server** - This option reports only volumes that are allocated from the array directly to the server. This primarily includes standard data volumes that are visible to that server.
- **Show all associated volumes** - This option reports the volumes above, plus the local and remote mirror copies associated with each standard volume assigned to the server. For example, if a data volume has a BCV that is allocated to the backup server; this option will report that storage as being consumed by the application server that owns the standard volume. This is useful when determining the "true" owner of the volume for charge-back purposes.
- **Report Usable Storage** - Reports the amount of storage visible to the server, ignoring RAID or other data protection overhead.
- **Report Raw Storage**: Reports the amount of raw storage required on the array to provide the volumes to the server. This includes RAID or other data protection overhead.
- **Report Shared Volumes for All Servers** - By default, volumes that are allocated to more than one server (e.g. a cluster) will only be reported for one server. This prevents shared volumes from being counted multiple times. Selecting this option will report that volume to every server that can access it.

  Note: This may cause the total amount of storage allocated to exceed the amount of storage that exists.

When you generate a report, you can click on any header to set the report sort order.

1. From the Management Console Home Page, select **Storage**.
2. Select **Capacity Allocation** and the Capacity Allocation report main window appears.
3. In the Control Pane located in the upper left section of the report, use the radio button to specify whether to sort by Site or by Server.
4. Use the radio button to specify whether to report volumes allocated directly to the server or also report associated volumes (including local and remote copies).
5. Beside the "Report Shared Volumes for All Servers" heading, click the checkbox to put a check mark (enable) or remove the check mark (disable) for this report option.
6. Beside the "Report On:" heading, use the pull-down list box to report on usable storage or raw storage.
7. Click on a site in the menu control tree to generate a site-level report, or expand a site and click on a desired host server to generate a host-specific, storage allocation report.

At the view level, this report displays the site name, view name, host name, total number of volumes allocated to the host, total amount of allocated storage (GB), number of local copies and amount of storage (GB), number of standard volumes and amount of storage (GB), number of local copies and amount of storage (GB), number of remote copies and amount of storage (GB). Be aware that not all Sun StorageTek Business Analytics Array Agents populates tables with information on local and/or remote copies.

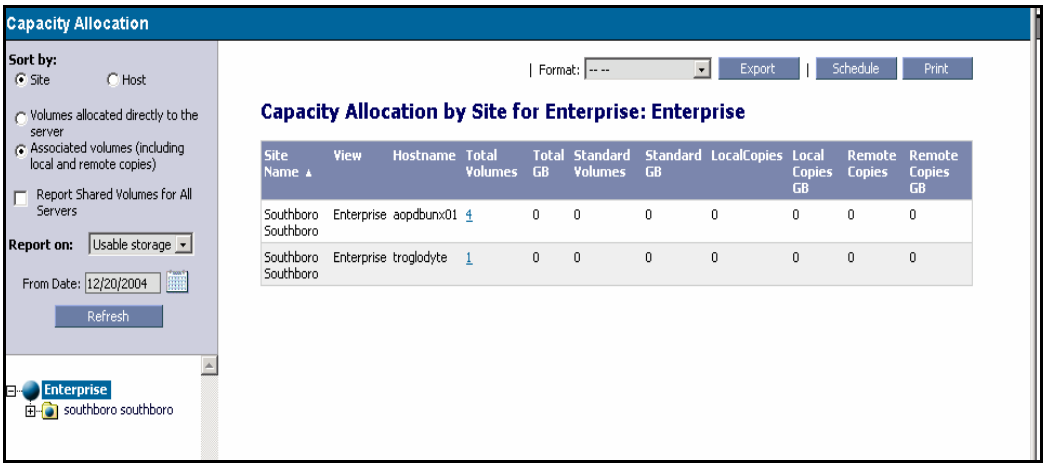


Figure 35 - Capacity Allocation by Site – View Level

At the site or server level, the report displays the Hostname, Total Volumes, Total GB, Standard Volumes, Standard GB, number of Local Copies, Local Copies (GB), number of Remote Copies, and Remote Copies (GB).

Clicking on the **Total Volumes** link displays the Array ID, Volume ID, Raw Size (MB), and Usable Size (MB) associated with each allocated volume.

Storage Discrepancy Report

The Storage Discrepancy Report menu selection provides access to the Storage Discrepancy Report and the Storage Discrepancy Details Report.

Using Storage Discrepancy Report

Proceed as follows:

1. Select **Storage Discrepancy Report** from the **Storage** pull-down menu. The Storage Discrepancy Report appears. The report displays all storage discrepancies for all hosts present at the site and enterprise level.
2. When the report is first opened, no data is displayed. The following descriptive text appears in the report pane:

   "The Storage Discrepancy Report identifies storage that appears to be allocated but in reality may not be usable. This storage can typically be reclaimed for other uses."

   The Control Pane section displays a single Date control (no date ranges) with the Application Date (by default) and a Refresh button. It also provides an integer input box, labeled "Show discrepancies greater than <<input box>> GB". The default value in this box is 1. This can be used to account for rounding differences (e.g., storage volumes are reported in MBs while the Host Agent reports sizes in blocks).

   The Navigation Pane of the report displays the enterprise and sites hierarchy determined by the current view.

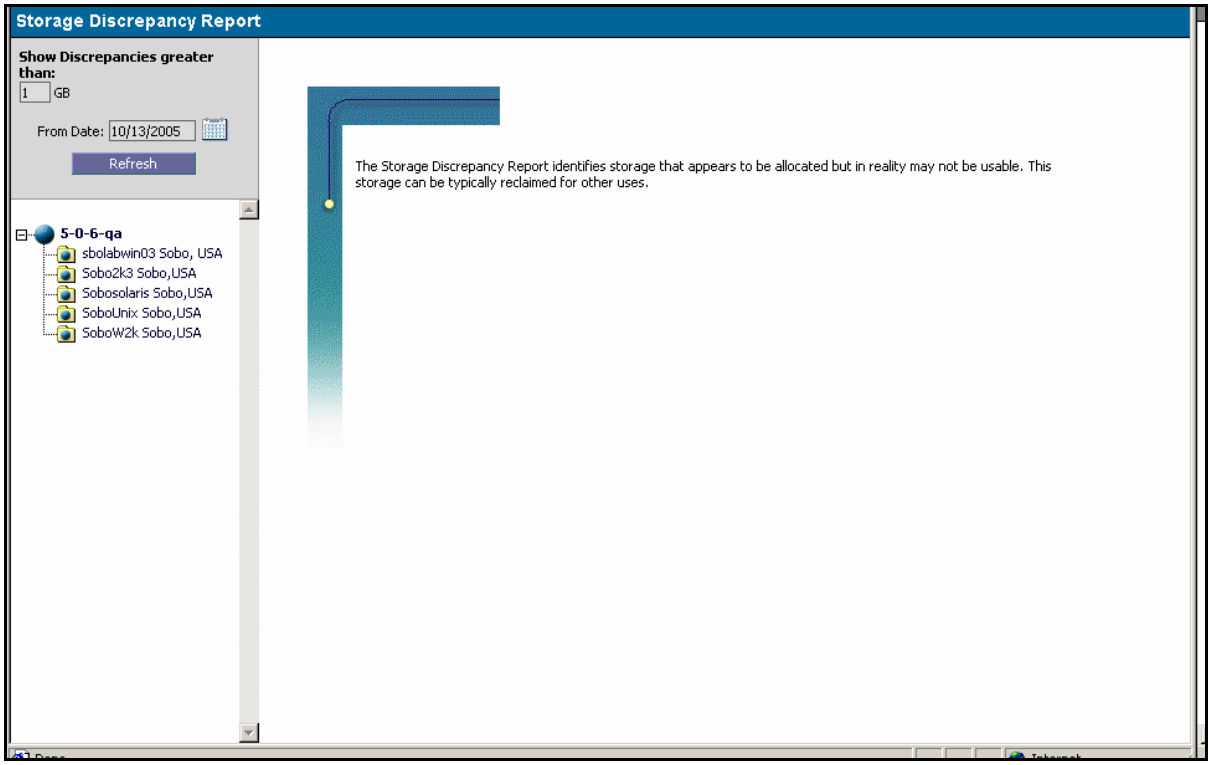


Figure 36 - Storage Discrepancy Report

3. Select a site or entire enterprise view in the navigation pane to generate the report. A sample report for a selected site follows.

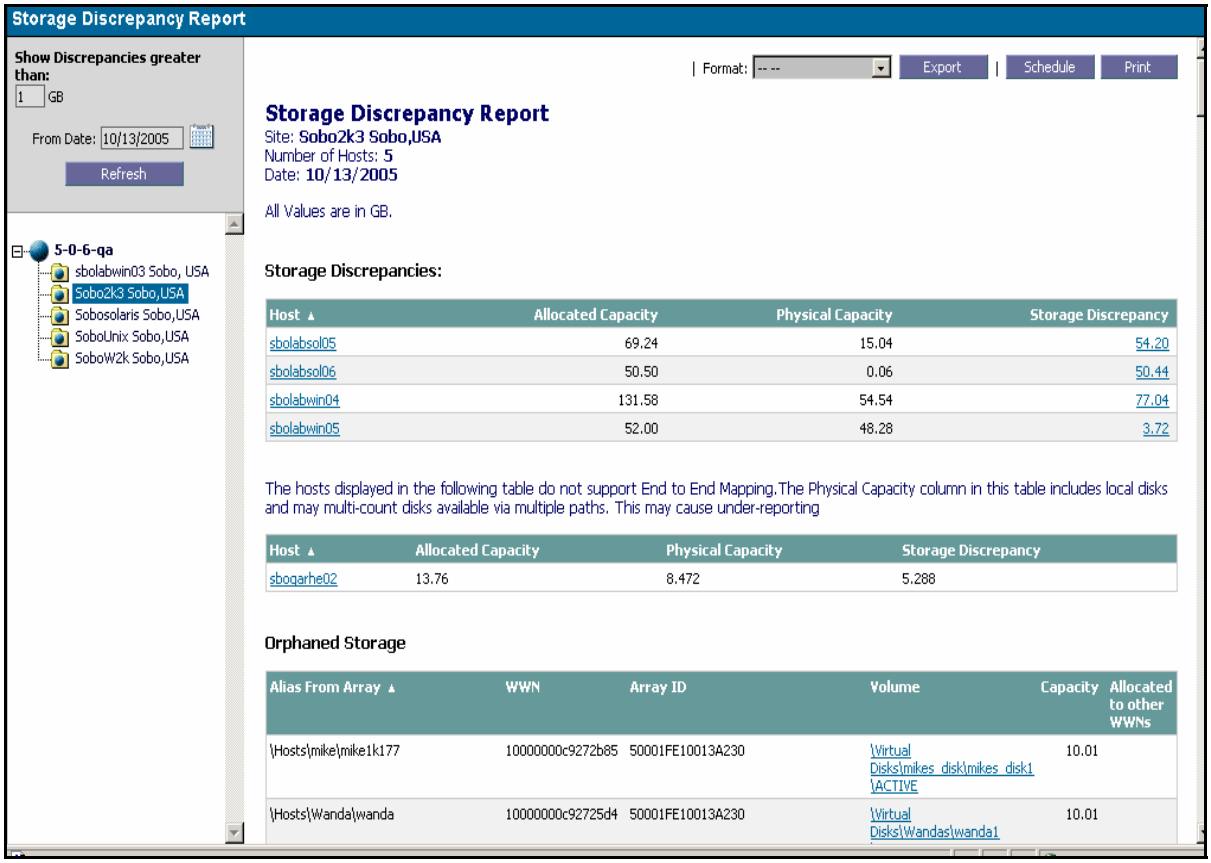


Figure 37 - Storage Discrepancy Report - Site Level

4. The Storage Discrepancy Report contains the following sections:

- The **Storage Discrepancies** table contains the following fields:

  Note: Storage discrepancies occur when storage is allocated (masked) to a particular server in the array's volume security database, but the server cannot see the storage due to a configuration problem. For example, the volume may be mapped to a port that is not in any of the servers' zones.

  - **Host Name** – The host name of the server. Clicking the **Host Name** link displays the Detailed Host Configuration and Utilization report for the selected host server.
  - **Allocated Capacity** (GB) – The total of all volumes allocated to the server. This reflects all the arrays in the view that have allocated storage to the host.
  - **Physical Capacity** (GB) – The total of all allocated remote devices. These are also displayed when the Detailed Host Configuration and Utilization's General tab is displayed for the particular host server.
  - **Storage Discrepancy** – The difference of Allocated Capacity – Physical Capacity.

  The report provides the following tool tips for the column names:

  Allocated Capacity – Total amount of storage allocated from all arrays.

  Physical Capacity – Amount of array storage visible on server.

  Storage Discrepancy – Amount of allocated capacity not visible on server.

- The **Orphaned Storage** table contains the following fields:

  Note: Orphaned storage occurs when storage is masked to a WWN or alias which does not exist in the environment.

- **Alias from Array** – The alias name (which may be a text string or a WWN) from the LUN Security database on the array.
- **WWN** – The WWN listed in the LUN Security database.
- **Volume** – the Volume ID.
- **Capacity** – The usable size of the volume from the array.
- **Allocated to Other WWNs** – This check box contains a check if other allocation records exist for the volume. Otherwise, no check appears.

  Be aware that volumes which are allocated to other WWNs may have invalid/outdated allocation records which should be removed. If the storage is not allocated to any other WWN, then it is either truly orphaned and can be reclaimed, or the WWN is outside of Sun StorageTek Business Analytics management.

The report provides the following tool tips for the column names:

- **Alias from Array** – Alias name defined in array security database.
- **WWN** – WWN the volume is masked to.
- **Volume** – Volume ID on the array.
- **Capacity** – Usable size of the volume.
- **Allocated to Other WWNs** – Indicates whether the volume is also allocated to additional hosts.

- The "Show discrepancies…" check box allows you to account for minor differences in the way that arrays and servers report volume sizes (e.g., bytes vs. blocks). You can also use this value to limit your search to large discrepancies.

STORAGE DISCREPANCY DETAILS REPORT

The Storage Discrepancy Details report uses the End-to-End Mapping information to separate the volumes that have been allocated to this server into two groups:

- Volumes that can be correlated to a physical device on the server (Volumes in Use)
- Volumes that cannot be correlated to a physical device on the server (Discrepancies).

  Important Note: The ability to differentiate between local and networked devices on the host requires a Host Agent that supports End-to-End Mapping (see the latest *Sun StorageTek Business Analytics Support Matrix* for details). For this reason, hosts that lack this support (including those running 3.x Host Agents) are suppressed from this report.

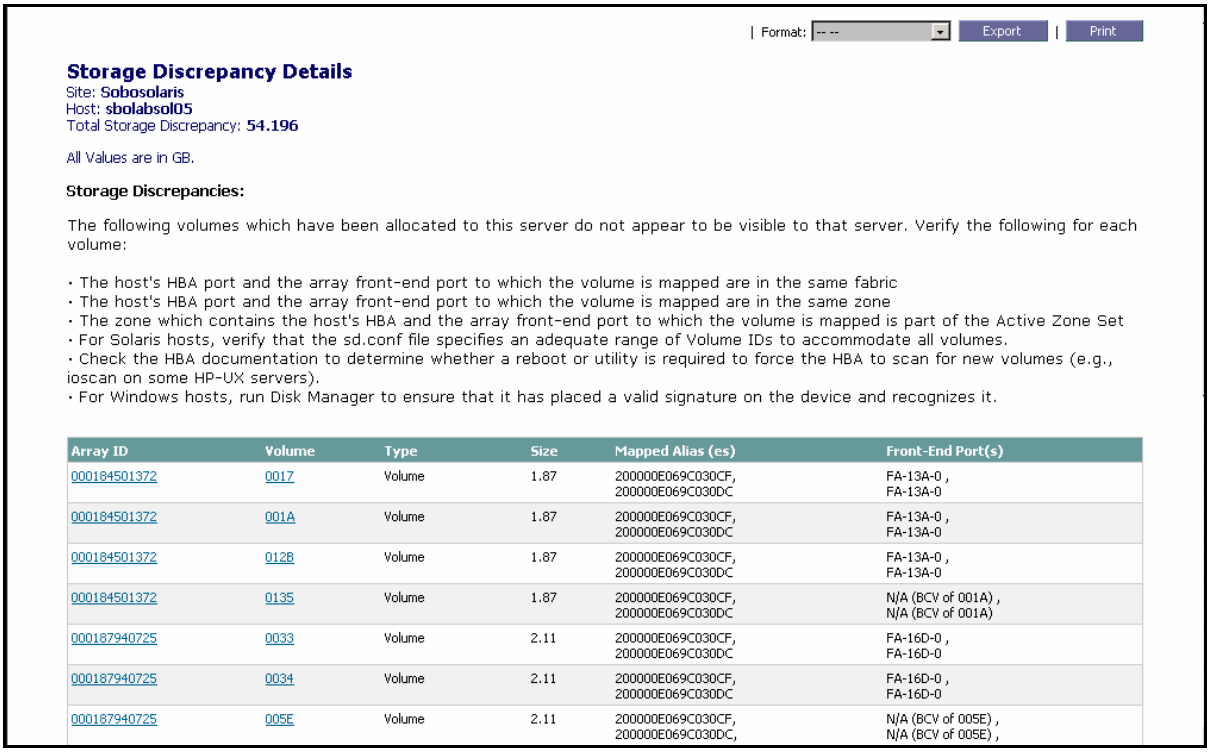
The report is displayed by clicking the **Storage Discrepancy Details** hyperlink in the Storage Discrepancy Report.

The **Discrepancies** section contains the following text to recommend steps to address discrepancies:

"The following volumes which have been allocated to this server do not appear to be visible to that server. Verify the following for each volume:

- The host's HBA port and the array front-end port to which the volume is mapped are in the same fabric
- The host's HBA port and the array front-end port to which the volume is mapped are in the same zone
- The zone which contains the host's HBA and the array front-end port to which the volume is mapped is part of the Active Zone Set

- For Solaris hosts, verify that the sd.conf file specifies an adequate range of Volume IDs to accommodate all volumes.
- Check the HBA documentation to determine whether a reboot or utility is required to force the HBA to scan for new volumes (e.g., ioscan on some HP-UX servers).
- For Windows hosts, run Disk Manager to ensure that it has placed a valid signature on the device and recognizes it."



| Format: -- -- Export | Print

Storage Discrepancy Details
Site: **Sobosolaris**
Host: **sbolabsol05**
Total Storage Discrepancy: **54.196**

All Values are in GB.

Storage Discrepancies:

The following volumes which have been allocated to this server do not appear to be visible to that server. Verify the following for each volume:

- The host's HBA port and the array front-end port to which the volume is mapped are in the same fabric
- The host's HBA port and the array front-end port to which the volume is mapped are in the same zone
- The zone which contains the host's HBA and the array front-end port to which the volume is mapped is part of the Active Zone Set
- For Solaris hosts, verify that the sd.conf file specifies an adequate range of Volume IDs to accommodate all volumes.
- Check the HBA documentation to determine whether a reboot or utility is required to force the HBA to scan for new volumes (e.g., ioscan on some HP-UX servers).
- For Windows hosts, run Disk Manager to ensure that it has placed a valid signature on the device and recognizes it.

Array ID	Volume	Type	Size	Mapped Alias (es)	Front-End Port(s)
000184501372	0017	Volume	1.87	200000E069C030CF, 200000E069C030DC	FA-13A-0 , FA-13A-0
000184501372	001A	Volume	1.87	200000E069C030CF, 200000E069C030DC	FA-13A-0 , FA-13A-0
000184501372	012B	Volume	1.87	200000E069C030CF, 200000E069C030DC	FA-13A-0 , FA-13A-0
000184501372	0135	Volume	1.87	200000E069C030CF, 200000E069C030DC	N/A (BCV of 001A) , N/A (BCV of 001A)
000187940725	0033	Volume	2.11	200000E069C030CF, 200000E069C030DC	FA-16D-0 , FA-16D-0
000187940725	0034	Volume	2.11	200000E069C030CF, 200000E069C030DC	FA-16D-0 , FA-16D-0
000187940725	005E	Volume	2.11	200000E069C030CF, 200000E069C030DC,	N/A (BCV of 005E) , N/A (BCV of 005E) ,

Figure 38 - Storage Discrepancy Details

This text is followed by a table with the following columns:

- **Array ID** – The array ID of the array that is providing this volume to the server. This is the array alias if one exists or the array id number if no alias exists. Clicking the Array ID link displays the Array Configuration Report for that array.
- **Volume** – The volume ID of the volume on the array. Clicking the Volume ID link displays the Volume Details report for that volume.
- **Type** – The volume type, as displayed on the Volume Configuration tab of the array reports (e.g., Admin (GK), Volume, BCV, etc.).
- **Size** – The size, in Usable GB, of the volume
- **Mapped Alias(es)** – The alias(es) to which the volume has been masked in the array's volume security database. This may consist of a text string or a WWN.
- **Front-End Port(s)** – The array front-end port(s) that the volume has been mapped to. If the volume has not been mapped to a port, display "Unmapped". Clicking the Front End Port link displays the Array Configuration report for that volume.

The **Volumes in Use** section consists of a table with the following columns:

- **Host Device Name** – The name of the physical device as seen by the server. On a Solaris host, this will use c#d#t# terminology (e.g., c2d1t0). On a Windows host, this may appear as Harddisk1 or use other terminology.
- **Capacity** – The capacity in GB of the physical device as seen by the server.
- **Vendor** – The vendor of the device as reported by the server. This will typically reflect the array manufacturer.

- **Product** – The product name of the device as reported by the server. This will typically reflect the array type (e.g., Symmetrix).
- **Array ID** – The array ID of the array that is providing this volume to the server. This is the array alias if one exists, or the array id number if no alias exists.
- **Volume** – The volume ID of the volume on the array.

Connection Exception

This report provides two levels of detail on how storage resources are being utilized, showing ports not attached to any fabric switch in the SAN. This report can help the administrator to quickly identify possible configuration errors.

The default reporting date is the current date, but it can be reset using the **Calendar** function in conjunction with the **Refresh Report** button at the top section of the report.

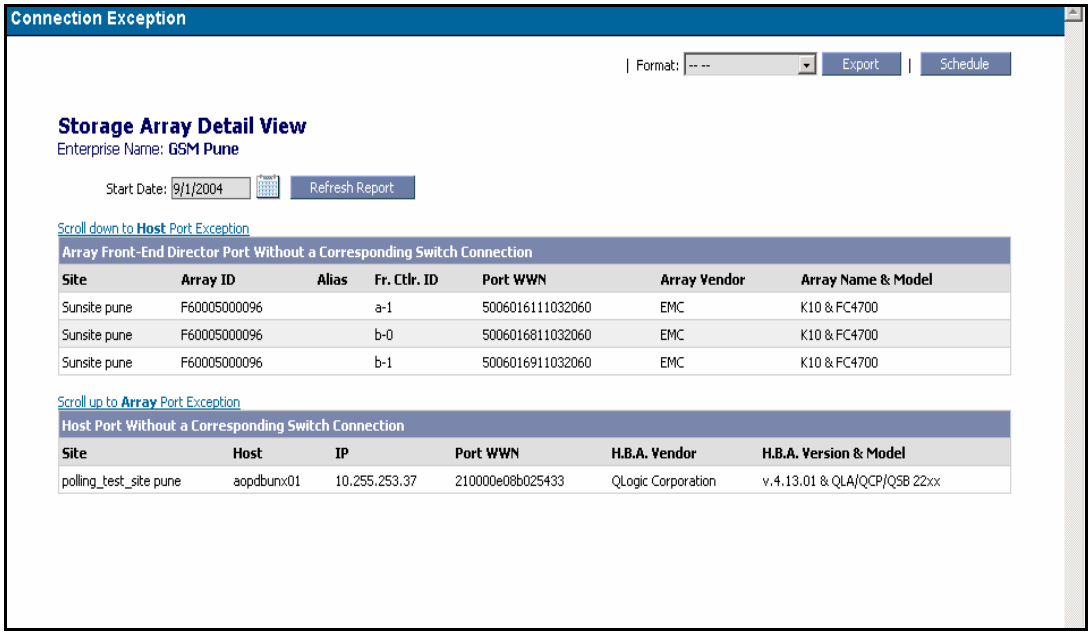


Figure 39 - Connection Exception

The top portion of the report shows array front end controller ports without a connection to a switch. The report fields include the Site, Array ID, Alias, Front End Controller ID, Port WWN, Array Vendor, and Array Name and Model.

The lower portion shows Host Bus Adapters in host servers without switch connections. The report fields show the Site, Host, IP Address, Port WWN, HBA Vendor, and HBA Version and Model.

Array Performance

Array Performance provides access to the following different views of array performance:

- **Hourly Cache Performance report** - Shows total cache hits and misses, plus a graph of total cache I/O per second.
- **Front-End Controller I/O report** - Shows the average I/O per second for a given array. Note that performance is shown per controller, not per port on the controller.
- **Disk Controller I/O report** - Shows the average back-end controller I/O per second for a given array.

These reports can be used to identify performance bottlenecks and determine the most effective upgrade options for an array. Be aware that some Array Agents do not collect performance data; contact your Sun representative for additional details.

1. From the Management Console Home Page, select **Storage**.
2. Select **Array Performance** and the Array Performance: Front End Controller IO report main window appears by default.
3. In the upper left section of the report, use the radio button to specify the desired array performance view.
4. Set the start and end dates for the report.

The reports for the different performance views are described as follows:

- **Front End Controller IO** – The view is available only for an array. The header identifies the Enterprise (view), the site, the array ID, and the report date/time interval. The chart depicts the average I/O rate by time of day where performance is shown per controller, not per port on the controller. Using the "Show by Week", "Use a fixed-scale Y axis with min. and max.", and **Refresh Chart** options, you can modify the chart's appearance.

  The table shows the performance data by Front End Port Address, Hour of Day, and Average IO. You can click on any header in the table to re-specify the sort order.

- **Disk Controller IO** – The view is available for a site or an array.

- **Hourly Cache IO** – The view is available only for an array. The header identifies the Enterprise (view), the site, the array ID, and the report date/time interval. The graph provides a consolidated view of average hits and misses (in percentage) over the selected period. The table shows the performance data by Collection Time, Average Cache Hits, and Average Cache Misses.

ALLOCATION FORECAST

The Allocation Forecast report enables the administrator to:

- View the previous year end storage allocation
- View how storage was allocated for the year-to-date
- View the forecasted storage capacity rate and allocation (GB)

The report is available at the enterprise view and site levels. It only displays data for a site or sites that are assigned to a view.

1. From the Management Console Home Page, select **Storage**.
2. Select **Allocation Forecast** and the Allocation Forecast main window is displayed.
3. In the control pane located in the upper left section of the report, use the list boxes to select the month and year to start extracting records for the report.

4. Click the enterprise view to generate the report at this level, or expand the menu control tree and click a desired site to generate the report at the site level.

The report provides the following information:

- Server name
- Previous year end allocation (based on selected start date)
- Growth rate percentage for year-to-date
- Expected year end storage allocation (GB)
- Forecasted growth rate
- Forecasted storage allocation (GB)
- Monthly breakdown of allocated storage over the reporting period

The **Reporting Administration->Maintain Allocation Forecasting Report** menu under **Tools** allows the administrator to populate the tables used for allocation forecasting

STORAGE ALLOCATION

Storage Allocation shows the increase or decrease in storage allocated to host servers filtered by:

- Storage Vendor
- RAID Configuration

TRENDING BY VENDOR

1. Select **Storage->Storage Allocation->Trending by Vendor** from the home page. The Storage Allocation by Vendor parameters box appears.

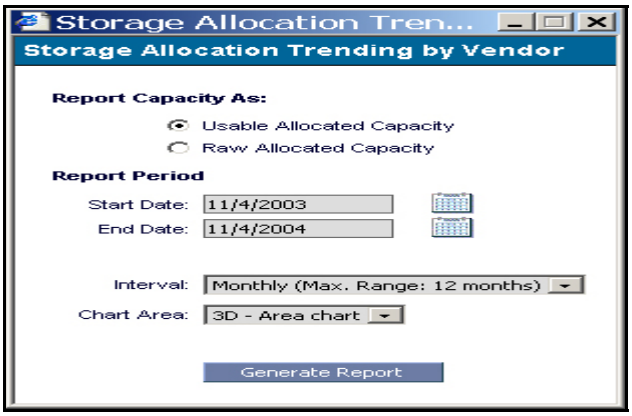


Figure 40 - Storage Allocation Trending by Vendor

2. Use the radio button to specify reporting allocation by usable allocated capacity or by raw allocated capacity.
3. Use the Calendar function to specify the start date and end date for data extraction.
4. Use the Interval list box the interval: daily, weekly, monthly, annual, daily, or two dates.
5. Specify the chart type: Area chart or Histogram.

6. Click **Generate Report**.

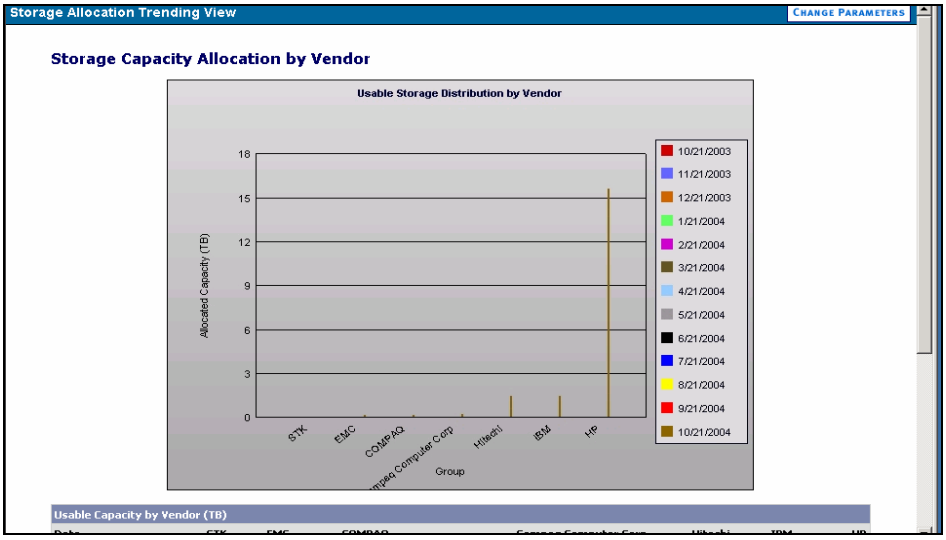


Figure 41 - Storage Capacity Allocation by Vendor

The report displays the data using the specified chart type. Beneath the chart, the data that was used to produce the chart appears in a table. To display charts in 3D as well as 2D graph modes, the Anonymous permission setting under Directory Security in the Internet Manager Services panel must be turned off.

TRENDING BY RAID CONFIGURATION

1. Select **Storage->Storage Allocation->Trending by RAID Configuration** from the home page. The Storage Allocation by RAID Configuration parameters box appears.
2. Use the radio button to specify reporting allocation by usable allocated capacity or by raw allocated capacity.
3. Use the Calendar function to specify the start date and end date for data extraction.
4. Use the Interval list box the interval: daily, weekly, monthly, annual, daily, or two dates.
5. Specify the chart type: Area chart or Histogram.
6. Click **Generate Report**.

NAS FILESYSTEM UTILIZATION

The NAS Filesystem Utilization summary report shows the filesystem usage for the specified reporting date (default is current date) in graphical and tabular report formats. The information consists of "Shared" and "Not Shared" capacity based on total capacity (GB), used capacity, available capacity, and capacity used for snapshots. A snapshot is a point-in-time copy of a production file system that is typically used for backups.

The report is organized at the enterprise view, site, and server levels. It shows the following information:

- Total Capacity (GB)
- Capacity Used (GB)
- Capacity Available (GB)
- Snapshot Used (GB)

- Snapshot Reserved
- Total Snapshot (GB)

The file system details are grouped on Shared and Not Shared type separately, and include the following details

- Total Capacity (GB)
- Capacity Used (GB)
- Capacity Available (GB)
- Snapshot Used (GB)
- Snapshot Reserved
- Total Snapshot (GB)

Both the Shared and Not Shared File system types have individual totals. A sample filesystem utilization report at the site level follows.

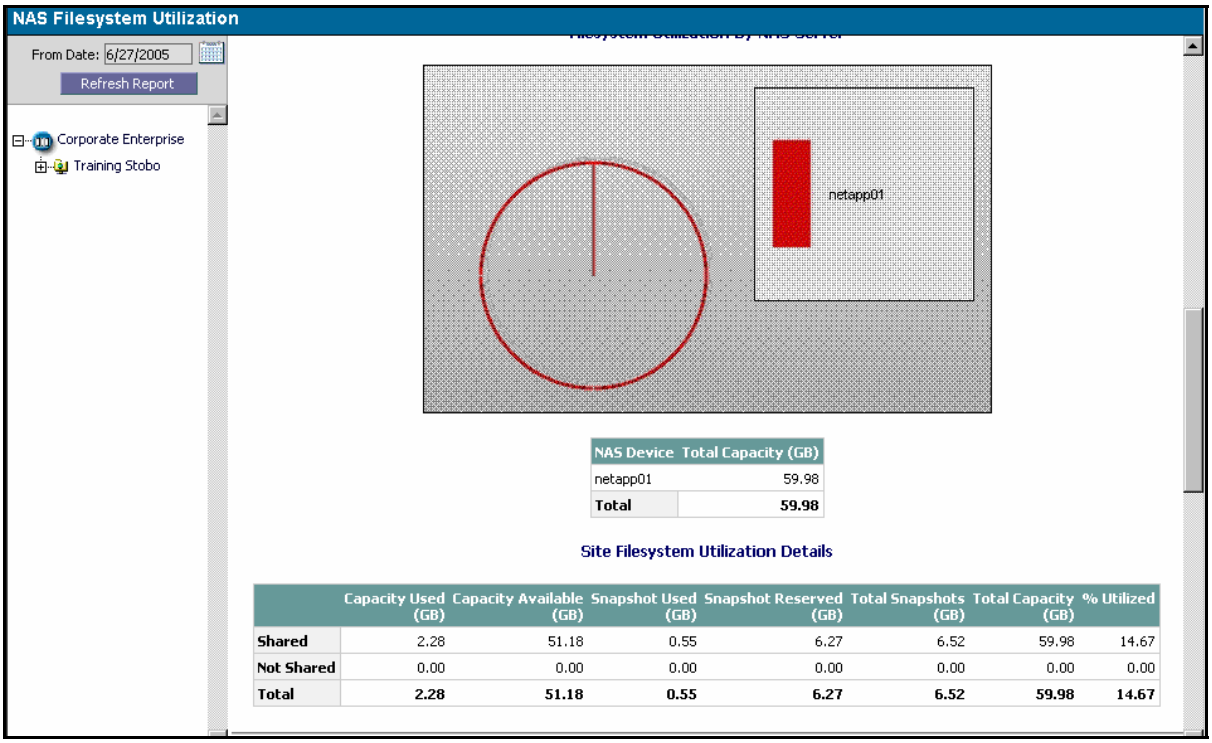
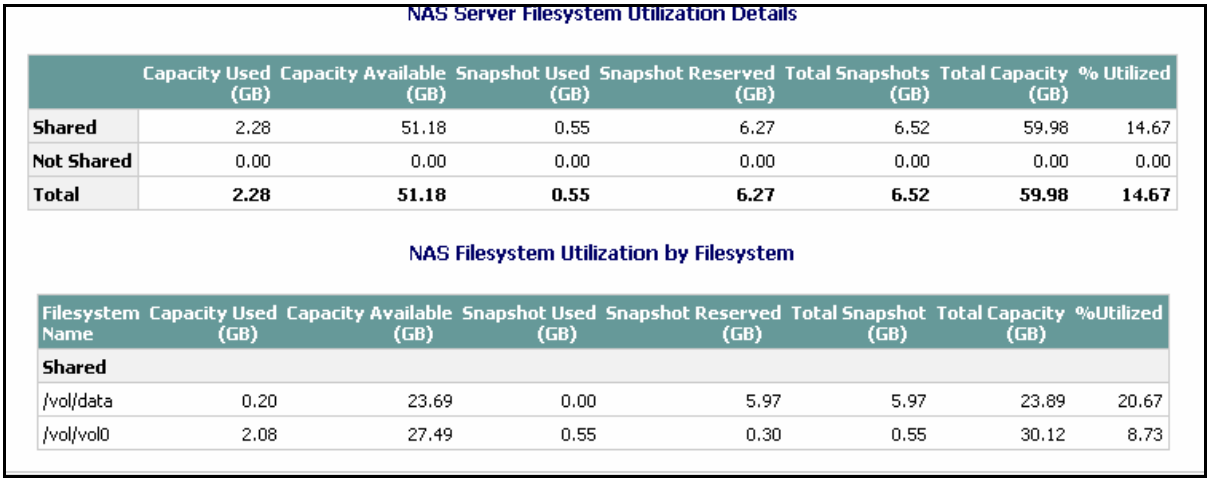


Figure 42 - NAS Filesystem utilization - Site

At the NAS server level, the file system details table shows the file system name for each reported file system.



NAS Server Filesystem Utilization Details

	Capacity Used (GB)	Capacity Available (GB)	Snapshot Used (GB)	Snapshot Reserved (GB)	Total Snapshots (GB)	Total Capacity (GB)	% Utilized
Shared	2.28	51.18	0.55	6.27	6.52	59.98	14.67
Not Shared	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**2.28**	**51.18**	**0.55**	**6.27**	**6.52**	**59.98**	**14.67**

NAS Filesystem Utilization by Filesystem

Filesystem Name	Capacity Used (GB)	Capacity Available (GB)	Snapshot Used (GB)	Snapshot Reserved (GB)	Total Snapshot (GB)	Total Capacity (GB)	%Utilized
Shared							
/vol/data	0.20	23.69	0.00	5.97	5.97	23.89	20.67
/vol/vol0	2.08	27.49	0.55	0.30	0.55	30.12	8.73

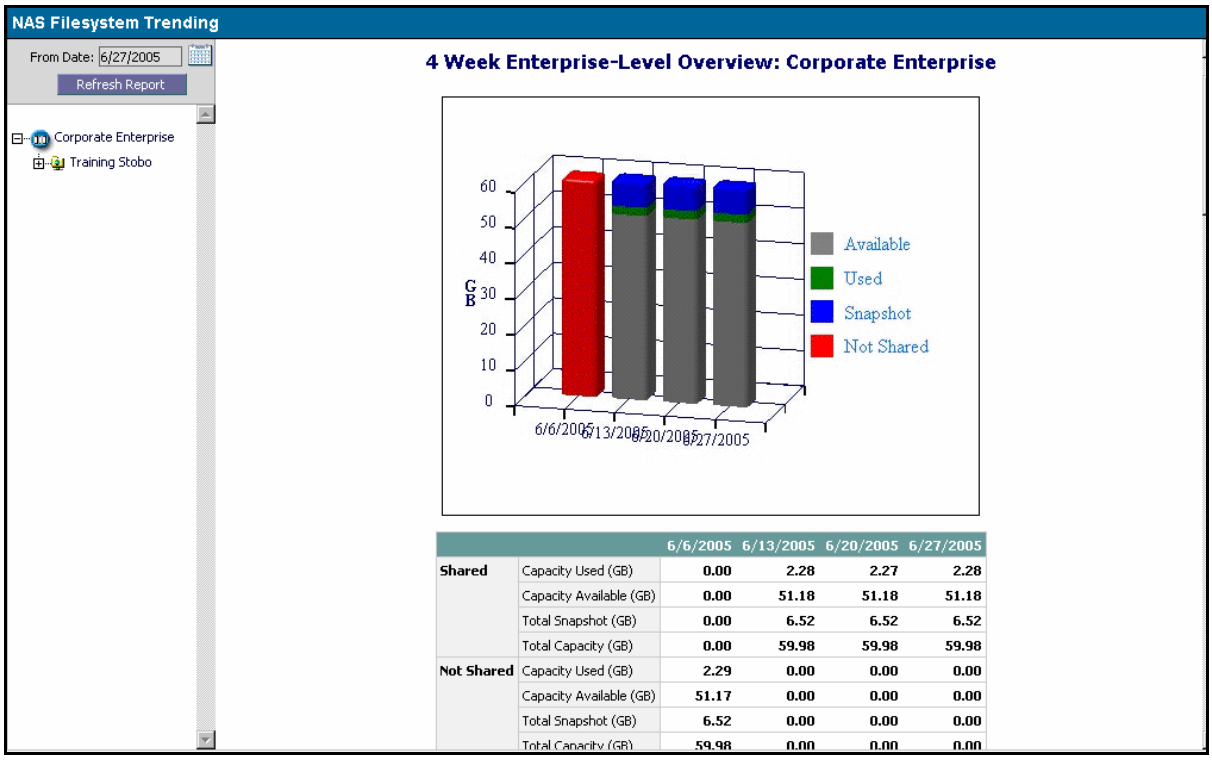
Figure 43 - NAS Server Filesystem Details

NAS FILESYSTEM TRENDING

The NAS Filesystem Trending report shows the increase or decrease in capacity usage, beginning at the date of the report and going back four weeks. The filesystem trending information is displayed in both bar graph and tabular format.

This report is available at the enterprise, site, and NAS server levels. The file system details are grouped on Shared and Not Shared type separately, and include the following details

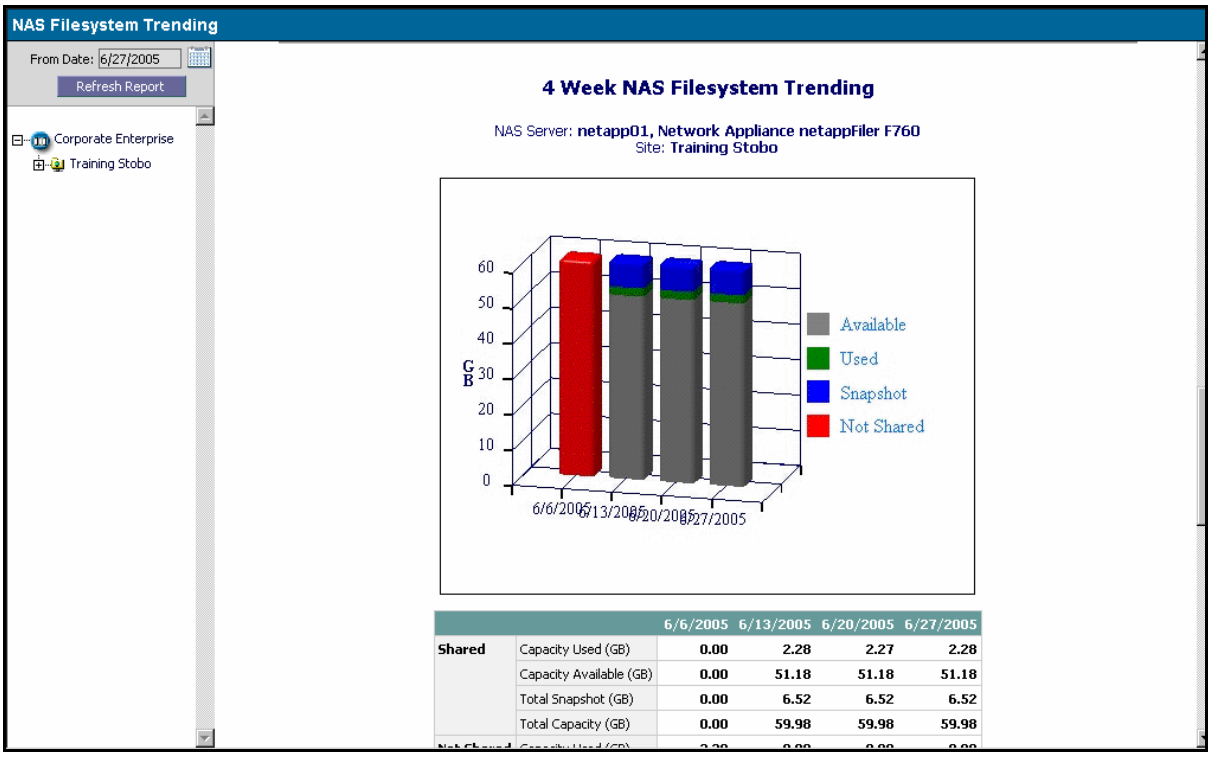
- Capacity Used (GB)
- Capacity Available (GB)
- Total Snapshot (GB)
- Total Capacity (GB)



		6/6/2005	6/13/2005	6/20/2005	6/27/2005
Shared	Capacity Used (GB)	**0.00**	**2.28**	**2.27**	**2.28**
	Capacity Available (GB)	**0.00**	**51.18**	**51.18**	**51.18**
	Total Snapshot (GB)	**0.00**	**6.52**	**6.52**	**6.52**
	Total Capacity (GB)	**0.00**	**59.98**	**59.98**	**59.98**
Not Shared	Capacity Used (GB)	**2.29**	**0.00**	**0.00**	**0.00**
	Capacity Available (GB)	**51.17**	**0.00**	**0.00**	**0.00**
	Total Snapshot (GB)	**6.52**	**0.00**	**0.00**	**0.00**
	Total Capacity (GB)	**59.98**	**0.00**	**0.00**	**0.00**

Figure 44 - 4 Week Enterprise-Level Overview: Enterprise

At the site level, you can obtain filesystem trending information both in bar graph and tabular format for all NAS servers at that particular site. In addition, you can obtain this information for a specified NAS server (device), as shown below.



		6/6/2005	6/13/2005	6/20/2005	6/27/2005
Shared	Capacity Used (GB)	**0.00**	**2.28**	**2.27**	**2.28**
	Capacity Available (GB)	**0.00**	**51.18**	**51.18**	**51.18**
	Total Snapshot (GB)	**0.00**	**6.52**	**6.52**	**6.52**
	Total Capacity (GB)	**0.00**	**59.98**	**59.98**	**59.98**

Figure 45 - NAS Filesystem Trending – Server Level

The server-level report also provides storage allocation for each filesystem on the NAS server. Sample filesystem reports for two filesystems on a Network Appliance filer is shown below.

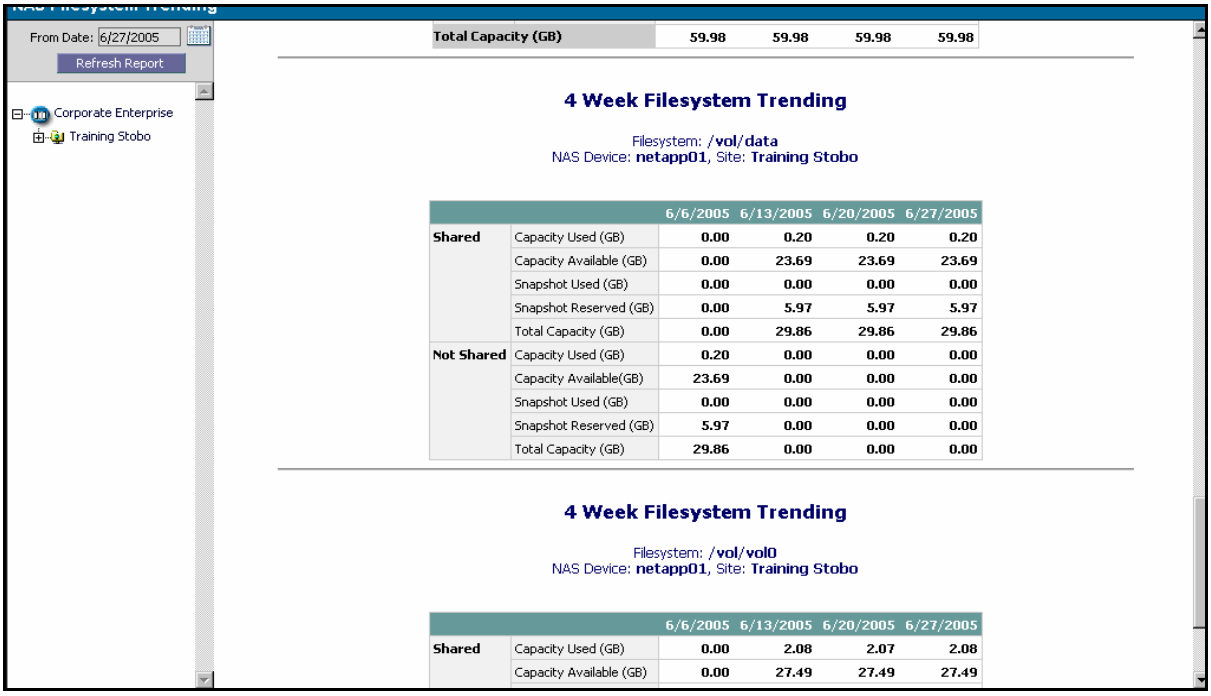


Figure 46 - 4 Week Filesystem Trending

NAS Quota Details

Selecting NAS Quotas on the Storage pull down menu allows you to generate the NAS Quota Details report. The NAS Quota Details report allows you to determine how many Quotas are allocated per filesystem. It also allows to determine the Hard/Soft Quotas per filesystem which can be sorted by user/group/directory. Currently, NAS quota reporting is supported for file systems on Network Appliance filers only.

When you select NAS Quotas, the NAS Quota Details report pane briefly describes the purpose of the report and its parameters.

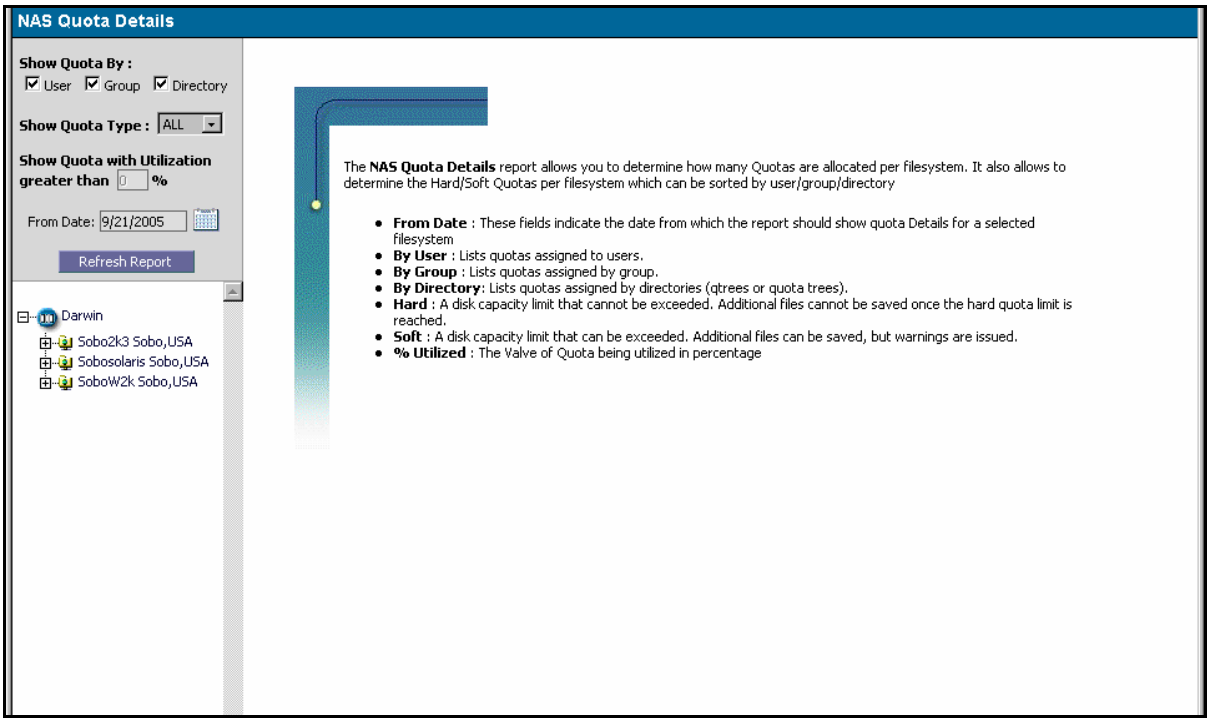


Figure 47 - NAS Quota Details

The control pane allows you to:

- Use the check boxes to set the desired sort order (i.e., by user, group, and/or directory).
- Set report filter to all quotas, hard quotas, or soft quotas.
- Set the start date for the data extraction.

The navigation pane shows you sites and NAS devices as allowed by your current view. Click the plus sign beside a desired NetApp filer to view its file systems, Click on the icon in the navigation pane of the file system to display the NAS Quota Details report in the report pane.

When you generate a report, a column chart is displayed in the top portion of the report pane. The chart shows quota utilization for the quota targets. Quota targets can be users, groups or qtrees. User and group quotas are applied on a per-volume or per-qtree basis. A qtree is a logically defined file system that can exist as a special

subdirectory of the root directory within either a traditional volume or a flexible volume. For NetApp devices, you can have a maximum of 4,995 qtrees on any volume.

Beneath the column chart, the quota utilization details for the file system are displayed in a table. The table heading shows the File system ID, the Total Capacity (GB), and the Capacity Available (GB) for that file system. For each quota, the table provides the following information:

- Quota ID
- Quota Target
- Tree (qtree name)
- Quota Specifier
- Quota Used(GB)
- Soft Limit(GB)
- % Soft Utilized
- Hard Limit(GB)
- % Hard Utilized

Reporting Wizards (Storage)

The Reporting Wizards menu selection under the Storage pull down menu provides access to:

- Volume Configuration Wizard
- Array Configuration Wizard

Note: Sun StorageTek Business Analytics incorporates a database extract, transformation, and load process for the tables in the array domain. The Storage Wizard functionality is based on the transformed data warehouse tables. Your Database Administrator can manually run the gsr_xtrt_proc_etl stored procedure to have the database extract, transformation, and load process run in the background at a desired time.

Volume Configuration Wizard

The Volume Configuration Wizard allows you to create reports about the volumes and their characteristics (mapped ports, physical spindles, etc.), along with the allocation of those volumes to hosts. Sample reports you might create using this wizard include:

- **Assigned Volumes with Copies** - Create a tabular list of all the volumes and their associated local and remote copies.
- **Fan-Out Report** - Show how many different hosts are accessing storage through each front-end port on the array. Compare to your Array manufacturer's "best practice" guidelines on fan-out ratios to optimize performance.
- **Chargeback Reporting** - If your organization charges different rates for different tiers of storage, you may wish to create an extract of the volumes and their RAID types by the host to which they are allocated.
- **Disaster Recovery Relationships** - For all volumes with a remote copy, display the server, array, volume, remote mirror, remote volume, and any hosts at the remote site to which that volume is allocated.

Proceed as follows.

1. Select **Storage->Reporting Wizards ->Volume Configuration Wizard** from the home page. The Step 1 of 4: Storage Volume Wizard window is displayed. You can choose to:
   - Use the **Available Reports** pull down list box to display a selected saved custom report.

- Click **Cancel** to cancel.
- Click **Delete** to delete a saved report you selected from the **Available Reports** pull down list box
- Click **Next** to proceed with creating a new custom report.
- View/change the report security for new report.

2. After you click **Next**, the Step 2 of 4: Storage Volume Wizard - Choose Columns window appears. All columns that can be selected are shown in the left-hand box. The following notes apply to this window:

- Column names must be moved to right-hand box using Add >> and Add All>> buttons to be displayed in the report.
- The default maximum number of rows to be displayed is set to 300. This can be changed for each time a report is executed, but the value cannot be saved.
- In the **Columns to Display** box, select a Column Name and press one of the blue arrows to move it up or down in the list. This is the order in which fields will display (left to right) in the resulting report.
- Exclude duplicate records is the default value.

The columns are included in one (or common to several) storage array tables in the Sun StorageTek Business Analytics database.

Column Name	Description
Array ID	Array identifier collected from the array (not alias defined using the Tools menu Alias functionality)
Array Manufacturer	Manufacturer
Array Model	Model
Disk id 1-4	Unique storage unit ID 1-4
Disk Size	Size
Front End Controller Count	Count of Front End Controllers
Front Controller WWN	World Wide Name (WWN) of front end controller
Front Port WWN	WWN of Front End Controller Port
Host Allocated	Node WWN
Host HBA Port	Host HBA Port WWN
Remote/Local Copy Status	Split, Synchronized, Active
Remote/Local Copy Type	BCV, Snapshot
Remote/Local Copy Target Volume	Remote/Local Copy volume ID
Site Name	Site name
Volume Allocation Status	Remote copy status
Volume ID	Volume Identifier
Volume Meta Head ID	Virtual Head metaLUN lun number
Volume Meta Status	Current state (e.g., ENABLED)
Volume Misc	Miscellaneous
Volume Size Raw (MB)	Volume Raw Size
Volume Usable Size (MB)	Volume Usable Size
Column Name	**Description**
Volume Type	Standard volumes, local copies, administrative volumes, etc.
Volume to Front Port Mapping Status	Mapped/not mapped

Table 2 - Volume Configuration Wizard Columns

3. Add the columns and click **Next**. The Step 3 of 4: Volume Configuration Wizard – Select Filters window is displayed. The following notes apply to this window:
   - You select the Field and Operator, then enter a Value
   - To enter a relative date, syntax is "Today-n" where n represents a number of days.
   - The last AND is ignored in the query
   - You can select two or more filters from the large box in the center and select Add to group them with parentheses. The Remove button reverses this grouping.
4. Enter any optional query filter criteria and click **Next**. The Step 4 of 4: Volume Configuration and Allocation – Select Sorting window is displayed. The following notes apply to this window:
   - The right column on this screen determines sort order.
   - If you do not specify a sort key, the results will be unsorted.
   - If you specify a sort key but not a sort option, the results will be sorted in ascending order.

5. Specify the sort order and click **Next** to display the custom report. The following notes apply to this window.

   - To save a report, enter a report name and then press the **Save Report** button.
   - The Available Reports list box allows you to select and run a previously saved wizard report
   - To export data, first select an export format and then select the **Export** button.

ARRAY CONFIGURATION WIZARD

The Array Configuration Wizard allows you to create summary reports about all the arrays in your environment. It does not provide volume-level information. Sample reports you may create using this wizard include:

- Array Users - Show which hosts are using each array in the system. An administrator might use this as a rudimentary impact analysis report, so they can determine which users would be impacted by taking a given array off-line.
- Lease Expiration – Create a list of arrays whose lease expiration occurs in the next 90 days, for example.

Proceed as follows.

1. Select **Storage->Reporting Wizards ->Array Configuration Wizard** from the home page. The Step 1 of 4: Storage Configuration Wizard window is displayed. You can choose to:
   - Use the **Available Reports** pull down list box to display a selected saved custom report.
   - Click **Cancel** to cancel.
   - Click **Delete** to delete a saved report you selected from the **Available Reports** pull down list box
   - Click **Next** to proceed with creating a new custom report.
   - View/change the report security for a new report.
2. After you click **Next**, the Step 2 of 4: Storage Configuration Wizard - Choose Columns window appears. All columns that can be selected are shown in the left-hand box. The following notes apply to this window:
   - Column names must be moved to right-hand box using Add >> and Add All>> buttons to be displayed in the report.

- The default maximum number of rows to be displayed is set to 300. This can be changed for each time a report is executed, but the value cannot be saved.
- In the **Columns to Display** box, select a Column Name and press one of the blue arrows to move it up or down in the list. This is the order in which fields will display (left to right) in the resulting report.
- Exclude duplicate records are default.

The columns are identified in the table that follows.

Column Name	Description
Array Cache	Cache size
Array Disk Count	Total disks
Array Firmware	Firmware version
Array ID	Array identifier collected from the array (not alias defined using the Tools menu Alias functionality)
Array Manufacturer	Manufacturer
Array Model	Model
Array Name	Name of array collected from the array
Back Controller Count	Number of back end controllers
Count of Configured Disk	Sum of data/parity disks
Count of Free Disk	Sum of available disks
Count of Hot Spare Disk	Sum of Hot Spare disks
Disk id 1-3	Unique storage unit ID 1-3
Front End Count	Number of Front End Controllers
Number of Admin Volumes	Number of administrative volumes
Number of Allocated Admin Volumes	Number of administrative volumes allocated to hosts
Number of Allocated Local Copy Volumes	Number of local copy volumes allocated to hosts
Number of Allocated Standard Volumes	Number of standard volumes allocated to hosts
Number of Unallocated Admin Volumes	Number of administrative volumes not allocated to hosts
Number of Unallocated Local Copy Volumes	Number of local copy volumes not allocated to hosts
Number of Unallocated Standard Volumes	Number of standard volumes not allocated to hosts
Column Name	**Description**
Number of Unassigned Volumes	Count of unassigned volumes
Total Volumes	Total number of volumes
Site Name	Site name
Total Allocated Admin	Sum of assigned usable administrative volumes

Capacity	
Total Allocated Local Copy Capacity	Sum of assigned usable local copy volumes
Total Allocated Standard Capacity	Sum of assigned usable standard volumes
Total Configured Admin Capacity	Sum of configured raw administrative volumes
Total Configured Capacity	Sum of configured raw capacity
Total Configured Local Copy Capacity	Sum of assigned usable local copy volumes
Total Configured Standard Capacity	Sum of configured raw standard volumes
Total Disk Capacity Raw	Sum of raw capacity (GB)
Total Hot Spare Capacity	Sum of hot spare capacity
Total Unallocated Admin Capacity	Sum of unallocated administrative volumes
Total Unallocated Local Copy Capacity	Sum of unallocated local copy volumes
Total Unallocated Standard Capacity	Sum of unallocated standard volumes
Total Unallocated Capacity	Sum of unallocated capacity for all volume types
Total Usable Admin Capacity	Sum of usable administrative volumes
Total Usable Local Copy Capacity	Sum of usable local copy volumes
Total Usable Standard Capacity	Sum of usable standard volumes
Total Usable Capacity	Sum of usable capacity for all volume types

Table 3 - Array Configuration Wizard Columns

3. Add the columns and click **Next**. The Step 3 of 4: Array Configuration Wizard – Select Filters window is displayed. The following notes apply to this window:
   - You select the Field and Operator, then enter a Value
   - To enter a relative date, syntax is "Today-n" where n represents a number of days.
   - The last AND is ignored in the query
   - You can select two or more filters from the large box in the center and select Add to group them with parentheses. The Remove button reverses this grouping.
4. Enter any optional query filter criteria and click **Next**. The Step 4 of 4: Volume Configuration and Allocation – Select Sorting window is displayed. The following notes apply to this window:
   - The right column on this screen determines sort order.
   - If you do not specify a sort key, the results will be unsorted.
   - If you specify a sort key but not a sort option, the results will be sorted in ascending order.

5. Specify the sort order and click **Next** to display the custom report. The following notes apply to this window.

- To save a report, enter a report name and then press the **Save Report** button.
- The Available Reports list box allows you to select and run a previously saved wizard report
- To export data, first select an export format and then select the **Export** button.

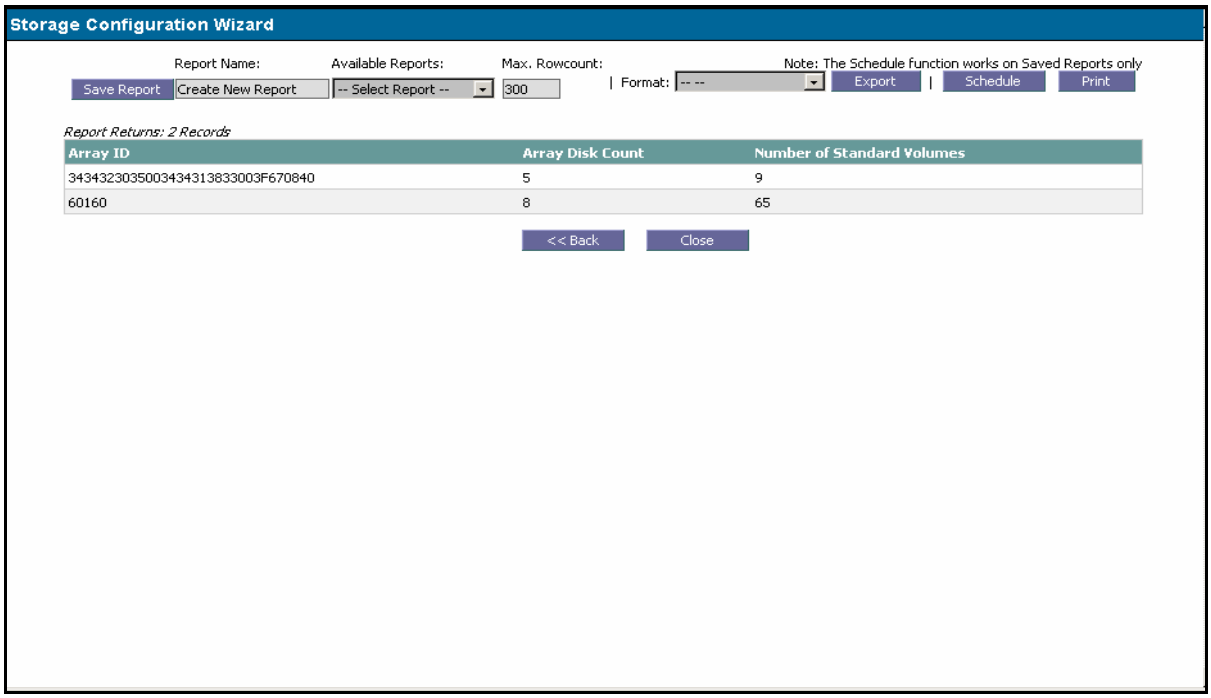


Figure 48 - Sample Array Configuration Wizard

Chapter Four - Fabrics

This chapter describes the different reports available through the Sun StorageTek Business Analytics Management Console's **Fabrics** pull down menu.

Fabric Trending and Forecasting

The Fabric Trending and Forecasting report allows you to determine how many switch ports have been consumed in your organization. This information can be summarized for the site, fabric, or switch.

You can set the following options:

- **Trending** - The Trending option only looks at past consumption.
- **Forecasting** - The Forecasting option allows you to project future switch port requirements based upon past usage and planned projects. Use this report when budgeting for switch purchases, and to more accurately time purchases to match your needs.
- **Date Range** - These fields indicate the date range that the report should use to calculate the forecast. If the range is less than a month long, the report will use a value from the end of each day to calculate the forecast. If the range is between 1 and 6 months, the report will use a value from the end of each week to calculate the forecast. If the range is longer than 6 months, the report will use a value from the end of each month to calculate the forecast.
- **Forecast Period** - Enter how far into the future you would like the report to forecast.
- **Targeted Maximum Consumption** - If you wish to maintain a reserve of ports, indicate the amount as a percentage of your total. In other words, if you wish to manage your switches to 90% maximum usage (and maintain a 10% reserve), then enter 90% into this field. The report will indicate the date when you can anticipate consuming your targeted amount of ports based on historical usage.

1. From the Management Console Home Page, select **Fabrics**.
2. Select **Fabric Trending and Forecasting** and the Fabric Trending and Forecasting main window is displayed.
3. In the upper left section of the report, use the radio button to specify generating the trending or forecasting report.
4. Beside the "Forecast Period:" heading, use the pull-down list box to choose a 3-months, 6-months, 1 year, or 3 years report period.
5. Beside the "Targeted Max Consumption:" input box, select the maximum consumption percentage (or accept the default value of 100%).
6. Set the start and end dates.
7. Click on the site, fabric, or switch in the navigation pane to generate the report for the respective item (e.g., site).

For an enterprise or site, the report shows the report date, number of port changes, number of ports available and unavailable, and the total number of ports.

For a selected fabric or switch, the report header displays the enterprise, site, and fabric or switch WWN. The report data is displayed in a graph at the top section and in a table beneath the graph.

In the graph, the maximum consumption is indicated using a red line and the device-specific usage information is drawn using a green line.

A sample fabric trending report is shown below.

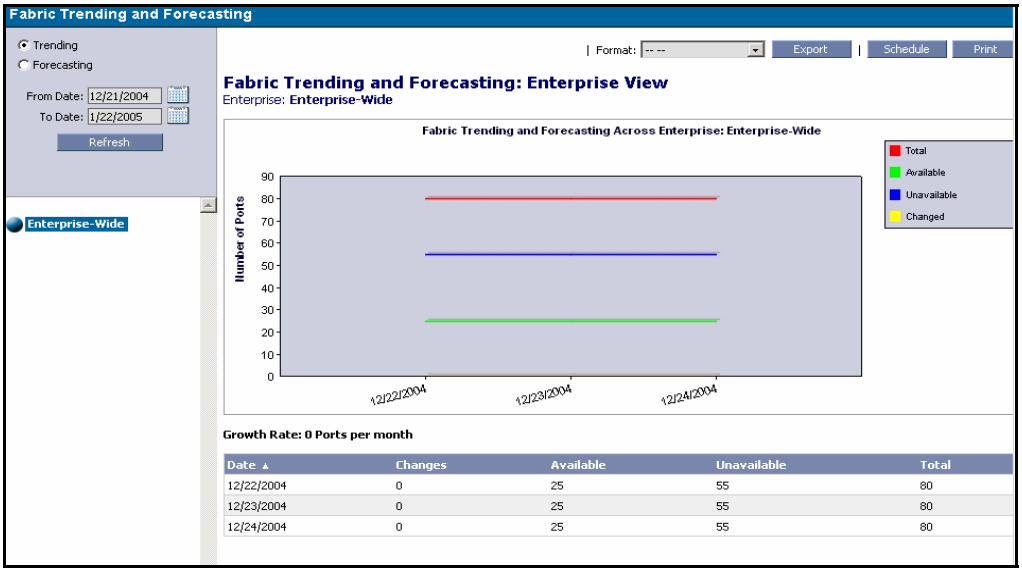


Figure 49 - Fabric Trending and Forecasting

Fabric Performance

The Fabric Performance report displays port performance data. Before you generate a fabric performance report, you specify the following options:

- **Charting Options** - Allow you to generate graphs based on the selected values:
  - Reads / Received
  - Sends /Transmitted
  - Errors
  - Busy
  - Peak Received
  - Peak Transmitted

- **Date Range** - Allows you to filter the report data based on Start Date and Time (Hours: Minutes) and End Date and Time (Hours: Minutes).

For the array, host, and tape library reports, performance is shown only for ports connected to the fabric.

1. From the Management Console Home Page, select **Fabrics**.
2. Select **Fabric Performance** and the Fabric Performance main window is displayed.
3. In the upper left section of the report, put a check in each **Charting Option** checkbox to be used in the report.
4. In the "Units on X-axis" input box, optionally specify the number of units on the x-axis, where n specifies the number of hours. These values will be independent of the graph data points.
5. Set the start date and time and the end date and time for the report.

6. By expanding the items in the navigation pane, click the device for which you want to generate a fabric performance report.

FABRIC/FABRIC SWITCH

The Ports in Fabric report is generated by your clicking the fabric in the navigation pane. A sample report for a fabric appears below.

Figure 50 – Ports in Fabric – Line Graphs

The top section of the report identifies the current view (Enterprise-Wide), the site name, the fabric WWN and name, and the date range. A separate line graph appears for each performance metric selected. These are depicted from the fabric switch perspective.

Beneath the graphs, the Asset Performance Summary and Ports Performance Summary tables are displayed.

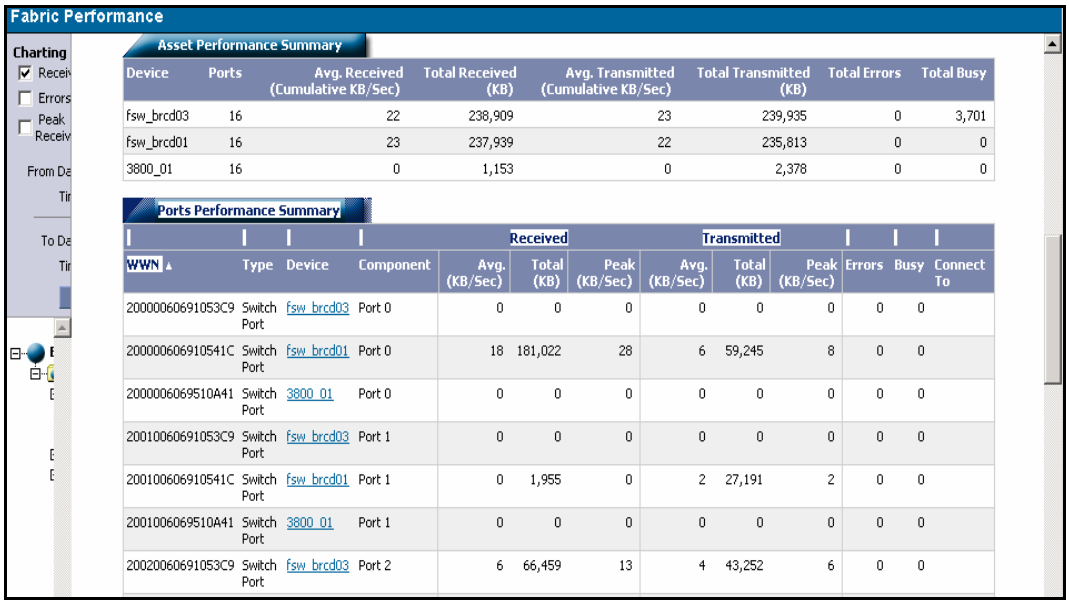


Figure 51 – Ports in Fabric - Tables

The Asset Performance Summary table shows the specified performance statistics per fabric switch. The Ports Performance Summary table drills down to show performance

statistics for the individual fabric switch ports. Clicking the Device report link displays the Detailed Switch Report, similar to the one that appears below.

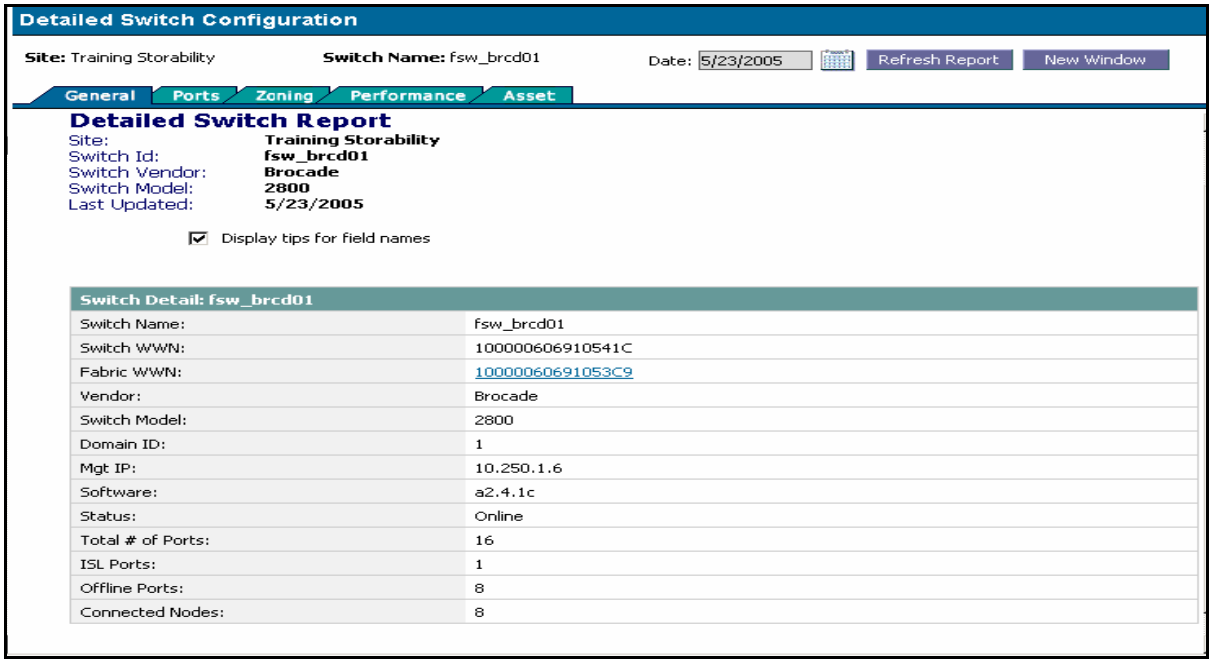


Figure 52 - Detailed Switch Report

The Ports in Switch report is generated by clicking a particular switch in the navigation pane. The report displays performance metrics for the selected fabric switch in line graphs and tabular format. Again, the line graphs depict performance from the fabric switch perspective.

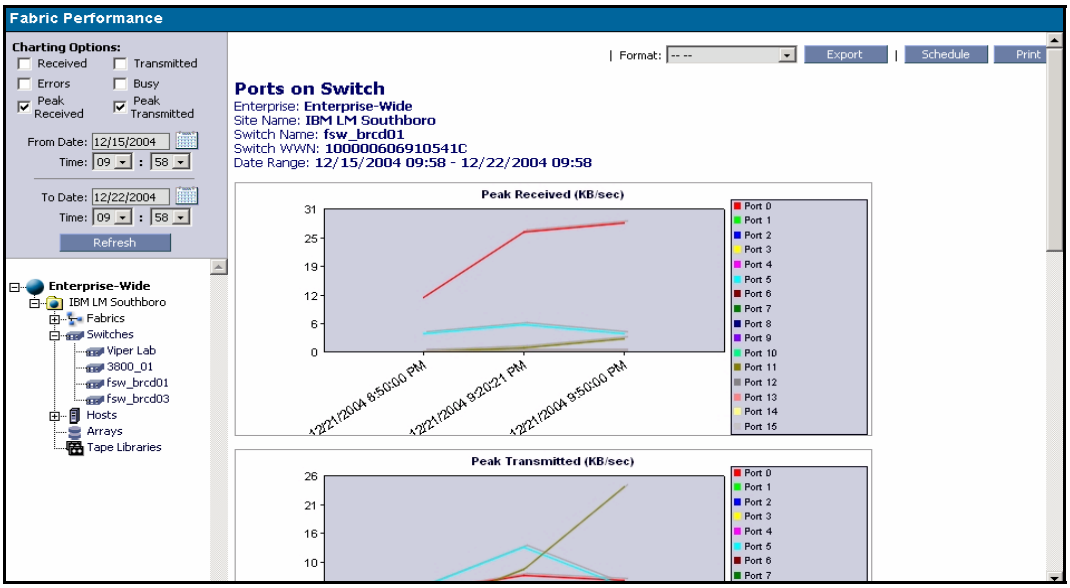


Figure 53 - Ports on Switch – Line Graphs

Hosts

You can generate a Host Connections report for all hosts in a site or for a particular host that you select in the navigation pane. The report displays performance in both line graphs and tabular format. The line graphs depict the performance metrics from the fabric switch perspective.

The Asset Performance Summary table identifies the host name, number of fabric port connections, and individual performance metrics, such as average KB/sec transmitted and received. Clicking the Device link displays the Detailed Host Configuration and Utilization report for the selected host server.

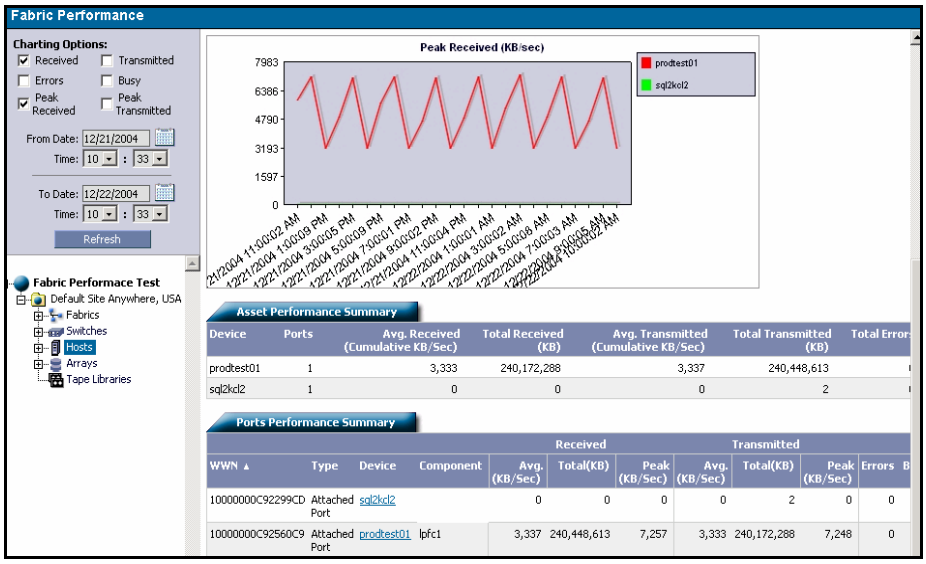


Figure 54 - Host Connections: Site Level

The Ports Performance Summary table shows the WWN of the fabric switch port, its type, the host attached to the port, its HBA, and the fabric port performance metrics.

ARRAYS

You can generate the Arrays Connections report for all arrays in the site or for an array selected in the navigation pane. The report displays performance in both line graphs and tabular format. The line graphs depict the performance metrics from the fabric switch perspective. A sample array-level report is shown below.

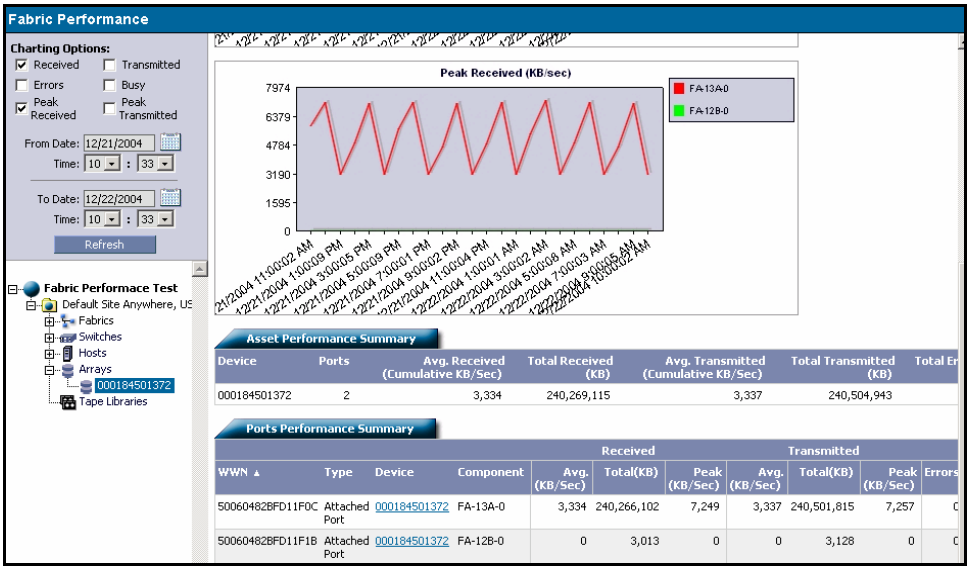


Figure 55 – Array Connections - Array-Level

The Asset Performance table shows the array ID, number of fabric port connections, and the performance metrics. The Port Performance Summary identifies the array port WWN, type, component, and performance metrics.

TAPE LIBRARIES

You can generate the Tape Library Connections report for a tape library selected in the navigation pane. The report displays performance in both line graphs and tabular format. The line graphs depict the performance metrics from the fabric switch perspective.

STORAGE NETWORK TOPOLOGY

The Storage Network Topology report provides a graphical depiction of the storage environment as collected by Sun StorageTek Business Analytics. To display the Storage Network Topology report, the supported version of the Sun Java Runtime Environment (JRE) software must be installed on your computer. If it is not installed on your computer, you will be prompted whether you want to install it from the Sun download site.

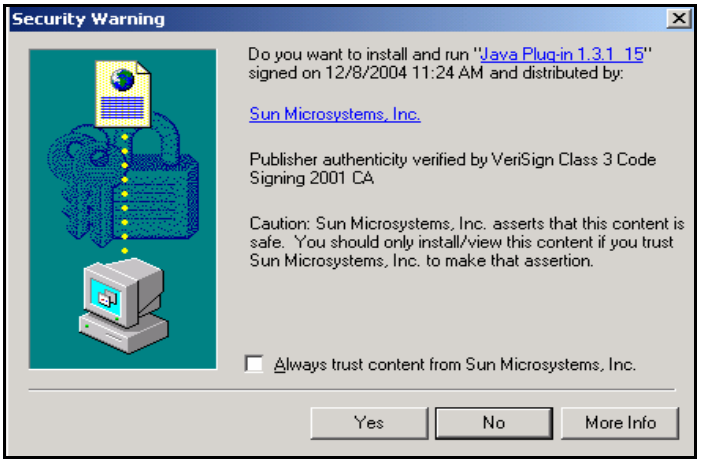


Figure 56 - Java Download Dialog

To install the required JRE, click **Yes** and follow the Wizard prompts to extract and install the software on your computer.

If you are running JRE v. 1.4, the tool tip information is not displayed. With JRE v. 1.5, the report may not work properly.

The top section of the navigation pane contains a Site View radio box and the Date input field that allows you to refresh the date. The sites in your current view can be displayed by expanding the Site heading. The main report window allows you to view an entire site, network elements under a particular fabric, or only network elements connected to a particular switch.

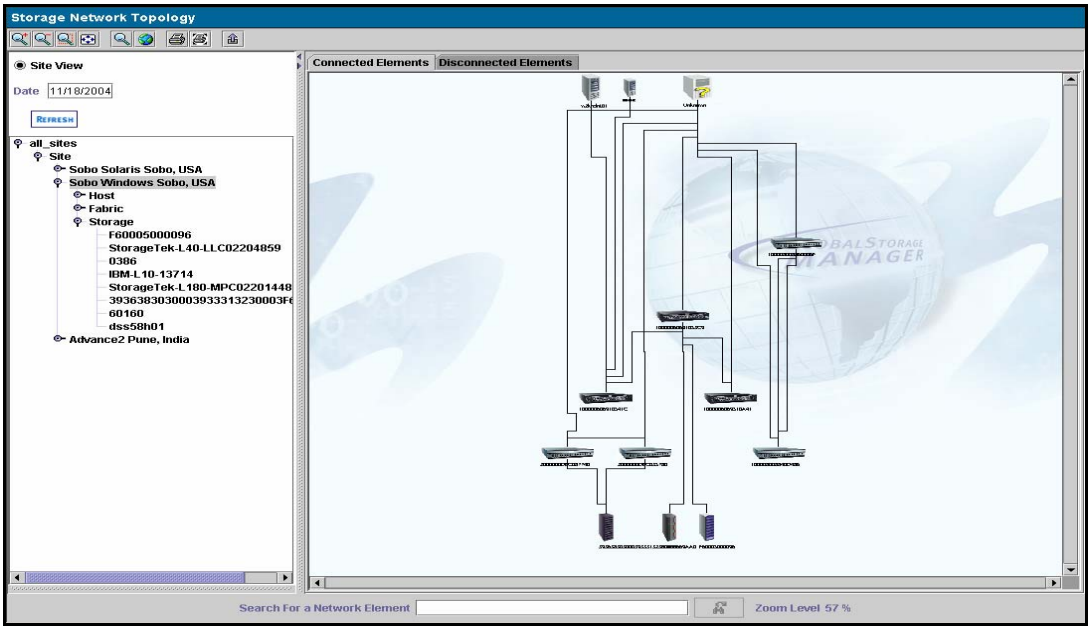


Figure 57 - Storage Network Topology - Site

The Storage Network Topology report is divided into two panels.

- The left panel provides controls to enter start date for the report, a refresh button and a tree.
    - Date text box allows entering start date for the report.
    - Clicking the **Refresh** button refreshes the navigation pane on the left side of the report.
    - The tree represents the hierarchy under a site in the form of Hosts, Fabrics and Storage.
- The right panel shows the graphical layout for the selected element, representing the various network elements connected to that item.

The Tool Bar provides additional functionality that helps you to optimize the view of the storage network topology. Each toolbar icon and its respective function are described below. Refer Table 2.

Icon	Description
	Zooms in on the topology map, keeping map centered.
	Zooms out on the topology map, keeping map centered.
	Selects a portion of the topology map, and zoom in on that portion.
	Resizes the map to fit the screen.
	Provides a magnifying glass to magnify elements on the topology map.
	Opens a miniature representation of the map and allows navigation of the full map display.
	Prints the map.

	Prints the map to fit to page.
	Allows exporting the map in Visio 2003 xml format.

Table 4 - Storage Network Topology Toolbar

The following figure shows the connected elements under a fabric.

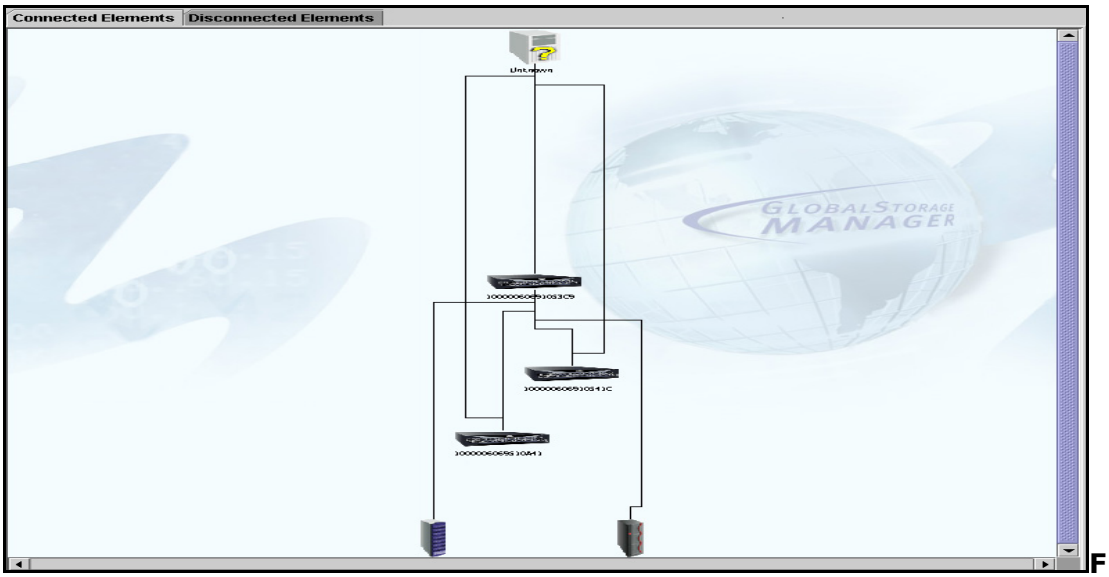


Figure 58 - Site View: Fabric Network Elements

If information on certain network elements is unavailable, these network elements are collectively represented by a single device-neutral icon, displayed as a question mark and the designation, 'Unknown'.

USING TOOL TIPS

Tool tips provide additional detail for each element in the graphical view. To view tool tips, mouse over a network element.

- **Host level** - The tool tip contains Name, IP address, Model and OS.
- **Switch level** - The tool tip contains Switch WWN, Fabric WWN, Vendor, Model, Active and Unused ports.
- **Fabric level** - The tool tip contains Switch WWN, Fabric WWN, Vendor, Model, Active and Unused ports.
- **Array level** - The tool tip contains Name, Array ID, Vendor and model.

Tool tip level help on connectors shows list of ids or WWNs that are the end points of this connector.

DISCONNECTED ELEMENTS VIEW

If no connections are found between network elements at a selected level, the details are shown in a tabular form in the Disconnected Elements tab as shown in Figure 36.

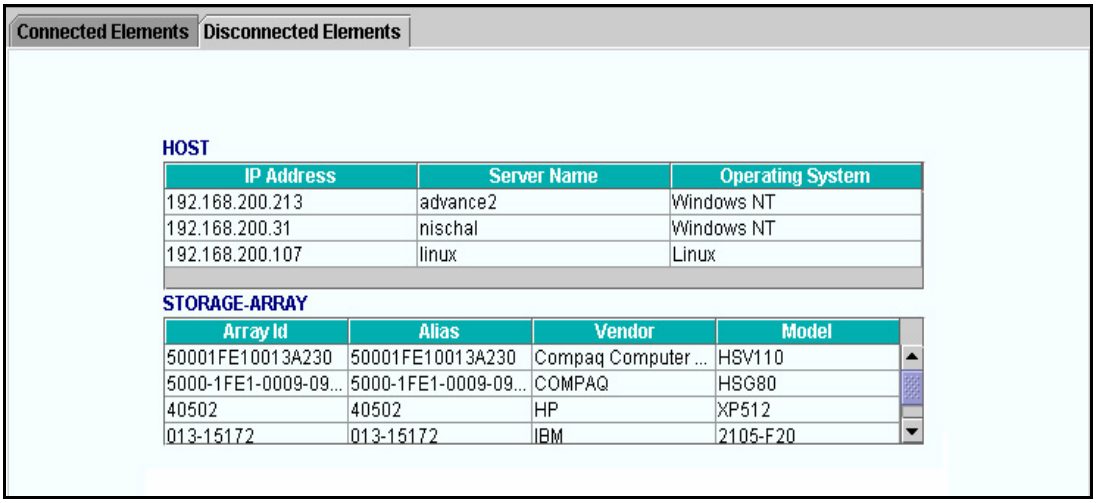


Figure 59 - Disconnected Elements View

SEARCH TOOLBAR

Using the Search toolbar, provided at the bottom of the report as shown in Figure 73, you can search for any network element.

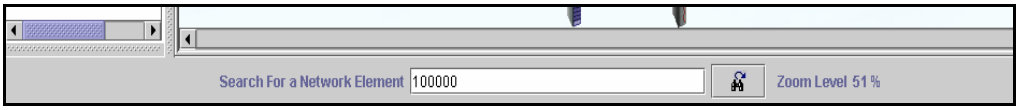


Figure 60 - Search Toolbar

After you enter an array id or wwn, the interface searches the element in the graphical layout and selects it. Partial entries will also find a match, so a complete id or WWN is not required.

EXPORTING TO VISIO 2003 FORMAT:

To export the topology map into Microsoft Visio's XML format, proceed as follows:

1. Click on the **Export to XML** toolbar button that is shown in Table 2. The Topology Export window appears as shown below.

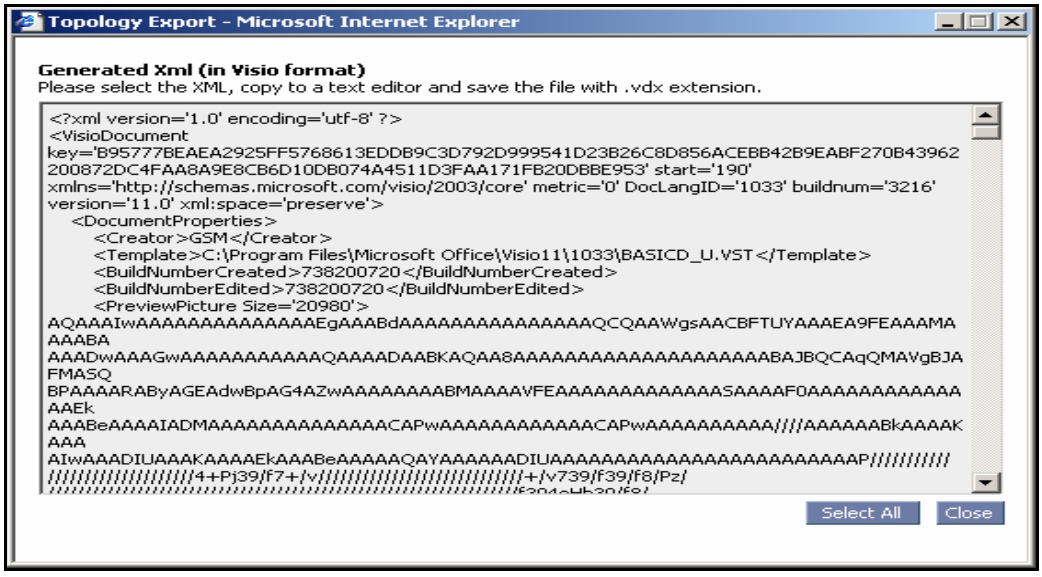


Figure 61 - Topology Export

2. Follow the instructions that are provided on this window. You will need to create the .VDX file that Visio requires manually by selecting and copying the generated XML into a text file.
3. To view the exported topology map, you will require Visio 2003.

Note: This feature will not work if any pop up blocker is being used. Please disable any pop-up blocker while using the Topology report. This is especially true when you are using some Internet Explorer add-ins or newer versions of Internet Explorer with pop-up blocking functionality. AOL, Yahoo SearchBar, and the Google Toolbar are examples of software providing pop-up blocking functionality.

Fabric Configuration

The Fabric Configuration report provides a high-level fabric summary report as well as the capability to obtain detailed reports on fabrics and connected hosts or storage arrays.

1. Select **Fabrics** from the Home Page.
2. Select **Fabric Configuration** and the top-level Fabric Configuration report appears.

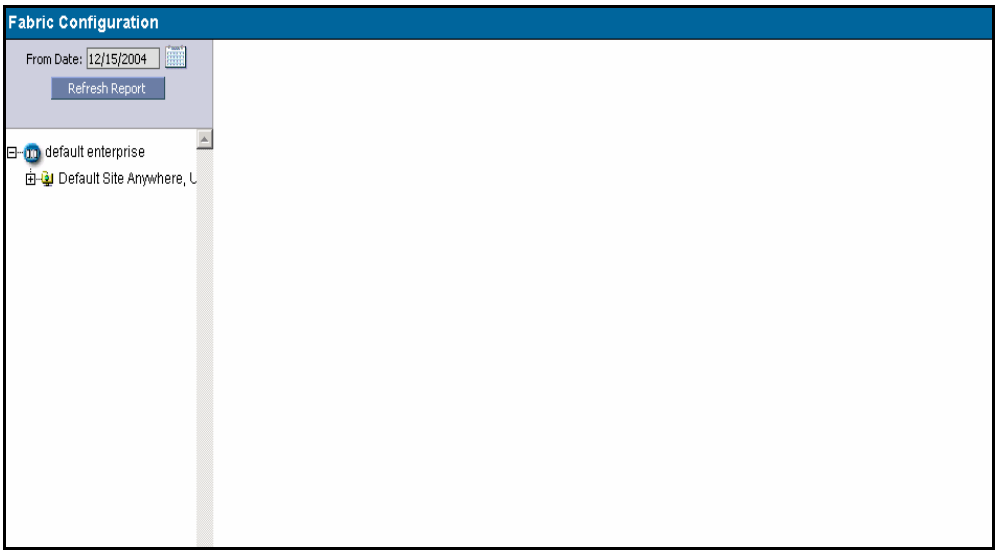


Figure 62 - Fabric Configuration - Top Level

3. Expand a site in the navigation Pane to view its fabrics. If you click the Fabric icon the Site Summary Fabric report is displayed. It shows the principal switch name, fabric WWN, fabric management IP address, number of member switches, total number of ports in the fabric, number of attached nodes, and the number of ISL connections for each monitored fabric.
4. Click on the plus sign (+) next to the Fabrics heading to see all the fabrics at your site.
5. Clicking on a particular fabric switch in the navigation pane displays the **Detailed Fabric Report**. The report shows the principal switch name, the fabric WWN, the IP address where the Fabric Agent is installed, the number of member switches, the

zoning status, the total number of ports in the fabric, the number of inter-switch links, and the effective zone set.

6. Clicking on a **switch name** link in the **Member Switches** section of the report displays the **Detailed Switch Report**. Mouse over a field (e.g., Principal Switch Name) to display help text for that field. This view shows the Domain ID, switch model, status, and port usage information in the switch detail table. View detailed port status information (port number, status, attached device name, attached device WWPN) in the port status table.

Expanding the **Fabric**s heading in the navigation pane allows you to:

- View the Active Zone Set and identify the zones and member of the zones configured in the enabled zone set.
- View the zone sets that exist in the fabric configuration.
- View the zones (member alias, WWN, WWPN, or port) in the zone sets.
- View the alias name, member list, and zone containers for fabric aliases
- View details on the member switches in a fabric.
- View physical node connectivity details on nodes connected via the fabric.

Detailed Node Connection Report

By expanding the **Arrays** heading and clicking on an Array, you display the Detailed Node Connection report that contains the Physical Connection Summary and Zone Member Report tables.

The **Physical Connection Summary** table allows the SAN administrator to quickly identify how the storage adapter is plugged into the SAN. The Fabric report link displays the Detailed Fabric Report, and the Attached Switch report link displays the Switch Detailed Report. In the Zone Member Report table, "Path" is a number assigned to the path between the reported node and the member node.

Detailed Switch Report

Clicking on a switch in the navigation pane displays the Detailed Switch Report.

The Switch Detail table provides useful configuration management information, including the switch name/WWN, fabric WWN, vendor, model, domain ID, status, and number of connected zones. The Port Status table drills down to show port-level status and configuration details (e.g., WWN). The Fabric WWN report link displays the Detailed Fabric report.

Detailed Node Connection Report – Host

To display the **Detailed Node Connection Report** for a host, proceed as follows:

1. Expand the **Hosts** heading in the navigation pane.
2. Click on the desired host and the **Detailed Node Connection View** report appears.
   The report shows the host-to-switch connectivity. The table identifies the HBA vendor, the HBA model, the effective speed, the link status, the World Wide Node Name and WW Port Name, and the HBA firmware version running on the adapter.

   Clicking on a **WW Port Name link** displays the **HBA Connection View** report that identifies the host's connectivity to the storage array's Front End Controller.

Detailed Node Connection Report – Host

To display the Detailed Node Connection Report for a library, proceed as follows:

1. Expand the **Tape Library** heading in the navigation pane.
2. Click on the desired library and the Detailed Node Connection Report appears for that library. The report shows the Library-to-switch connectivity.

CHAPTER FIVE – BACKUP/RESTORE

This chapter describes the different reports available through the Management Console's **Backup/Restore** pull down menu. You must be assigned Backup Administrator privilege using User Administration to access the Backup Exceptions, Meta Database Capacity, Real Time Events, Backup Exposure, and TSM Daily Administration reports. Refer to the User Administration section of the **Administration** documentation to obtain additional information.

The following table provides an overview of the reports provided by Sun StorageTek Business Analytics Release 5 which correlate data from backup applications, managed servers, and tape libraries to provide a comprehensive view of corporate data protection and compliance. For a detailed list of supported backup software versions and tape library models, see the *Sun StorageTek Business Analytics Support Matrix*.

Report Type	Report	Task
General Backup Application Reports	Backup Exposure	Spot possible data protection issues by identifying Sun StorageTek Business Analytics-managed servers which are not backed up.
	Meta Database Capacity	Analyze backup catalog disk utilization over the specified time interval.
Legato and NetBackup Application Reports	Backup/Restore Job Summary	View successful jobs, unsuccessful jobs, total jobs, and backed up GB over a specified date range.
	Media Trending	Plan tape library media purchasing based on tape library utilization over a specified time interval.
	Meta Database Capacity	Analyze the backup catalog disk utilization over the specified time interval. The Calendar function in the navigation pane allows setting both a date and a time (hh:mm) for filtering extracted data.
	Backup Exposure	List the hosts that are not associated with any backup client and the backup clients that are not associated with a Host Agent. The report is designed to help spot possible data protection problems.
	Job Report Wizard	Create customized reports related to backup jobs information.
	Media Report Wizard	Produce customized reports related to backup media.
	Backup Success Wizard	Analyze performance of backup success metrics.

Report Type	Report	Task
NetBackup Specific Application Reports	Backup Exceptions	Show all hosts, file systems, and databases that are not part of an active backup job.
	Backup Schedules	Display types of backups scheduled for a seven day period as of the current date. Provides a graphical depiction of various types of backup operations, including all scheduled, full, user backup, user archive, and cumulative-incremental for that week.
	NetBackup Charting Wizard	Creates customized bar, line, or pie chart presentations of job, performance, or media statistics.
Tivoli Storage Manager Reports	TSM Daily Administration	The TSM Event Summary report provides access to site-level and server-level reports on scheduled TSM events. Comprehensive reports provide information on Events, DB/Log, Migration, Expiration Disk Pools, Reclamation Reclaimable Tapes, and Tape Devices for the TSM backup application. Detailed information is presented in application-specific terminology, providing relevant data for backup managers and staff.
	TSM Event Summary	View the overall health of all TSM servers at a site.

Table 5 - Backup Reports Summary

REPORTING WIZARDS

The Reporting Wizards menu selection provides access to the following report wizards:

- Job Report Wizard
- Media Report Wizard
- Backup Success Wizard

The reporting wizards allow you to create custom reports based on data in the Sun StorageTek Business Analytics backup tables. You specify a list of data columns, filters, and sorting criteria to formulate the SQL query used to extract the report data.

The reporting wizard screens may have the following buttons enabled:

- **Delete** – Delete a specified existing view. Is not enabled when creating a new view
- **Back** – Return to previous screen.
- **Next** – Go to next step in the process.
- **Finish** – Skip the remaining steps and display the view based on the current query criteria.
- **Cancel** – Abort process and exit.
- **Close** – Close a displayed report.

For report security, you can only see private reports which you created. You can also see reports that other users created and share globally. The group share option is currently unimplemented.

JOB REPORT WIZARD

The Job Report Wizard allows you to create, save, and display a custom report regarding backup jobs stored in the Sun StorageTek Business Analytics database.

1. Select **Backup/Restore** -> **Reporting Wizards**->**Job Report Wizard** from the Home Page. The first page of the Job Report Wizard appears. You can choose to:
   - Create a new report
   - Delete an existing report (if any exists)
   - Verify/change how a report is shared as (Global or Private)
   - Generate a report using existing saved parameters through the Available Reports list box

2. Click **Next>>** on the Job Report Wizard window and the **Step 2 of 4: Job Report Wizard - Choose Columns** window. The **Columns Available** list box is a scrollable, multi-select list box that displays the list of columns available for inclusion and the order to display them in the final view. Initially, no columns appear in the Columns to Display list box. After you add fields to the **Columns to Display** list box, you can highlight a field and click the Up or Down arrow to move the field up or down, respectively.

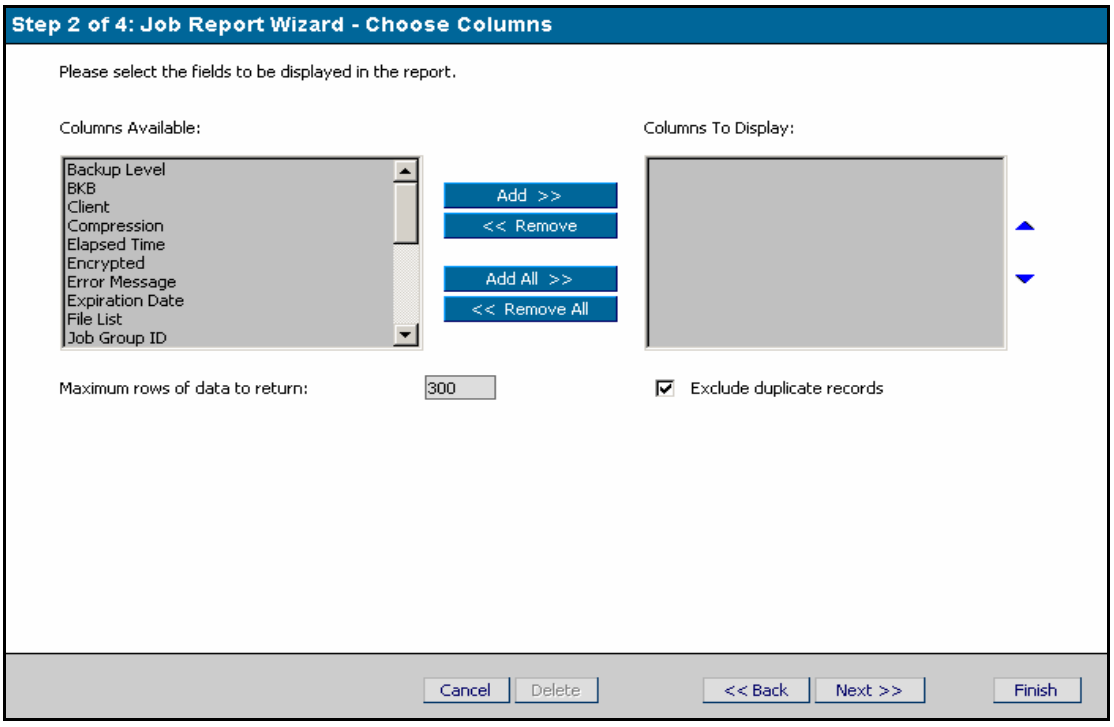


Figure 63 - Step 2 of 4: Job Report Wizard - Choose Columns

3. Add/remove columns to the new (or existing) report and click **Next>>**. The **Step 3 of 4: Job Report Wizard - Select Filters** window appears. It allows you to specify rules to filter the extracted rows of data and, thereby, add constraints to the database query.

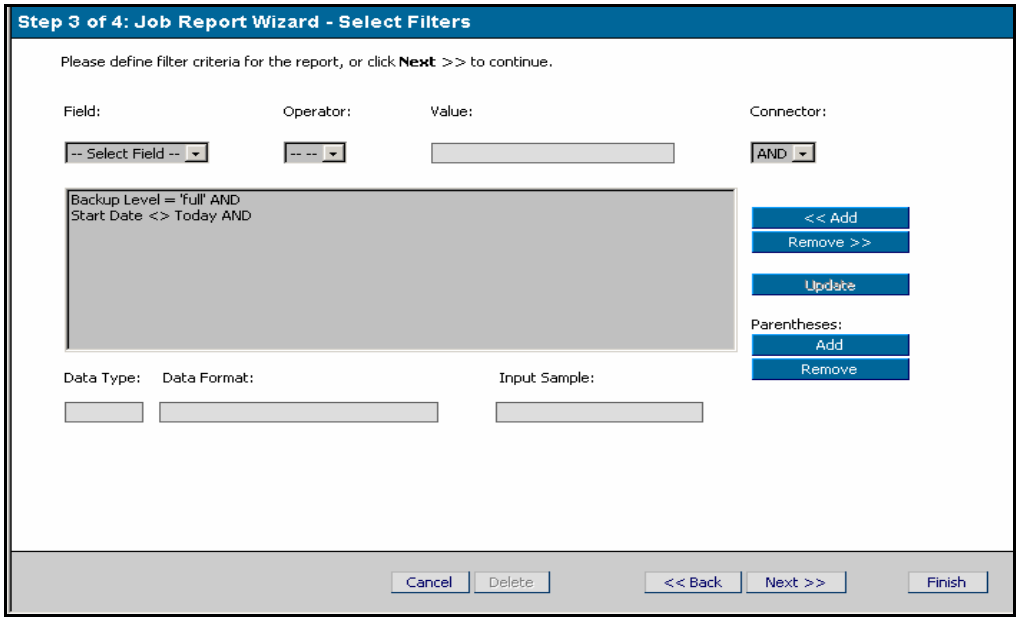


Figure 64 – Step 3 of 4: Job Report Wizard - Select Filters

The data types for the fields are identified in the following table.

Field	Data Type
Job ID	String
Job Type	Numeric
Client	List
Class/Group	List
Schedule	List
File List	String
Start Date	Date
Elapsed Time	Date
Backup Server	List
Expiration Date	Date
BKB	Numeric
Backup Level	List
Job Status	String
Nbr Files	Numeric
Nbr Copies	Numeric
Nbr Fragments	Numeric
Error Message	String
MB/sec	Numeric

Field	Data Type
Storage Unit	List
Compressed	Boolean
Encrypted	Boolean
Client Version	String

Table 6 – Job View Field Data Types

The **Operator** drop-down list box contains a list of operators that are valid for the chosen field. The relationship between the fields and the operators is described in the table below.

Data Type	Valid Operators
Numeric	=, <>, >, >=, <, <=, IN
Date	=, <>, >, >=, <, <=, IN
String	Equal To, Like, In
List	IN
Boolean	=, <>, IN

Table 7 - Data Types and Valid Operators

The type of control in the value column also depends on the data type of the field chosen, as shown in the following table.

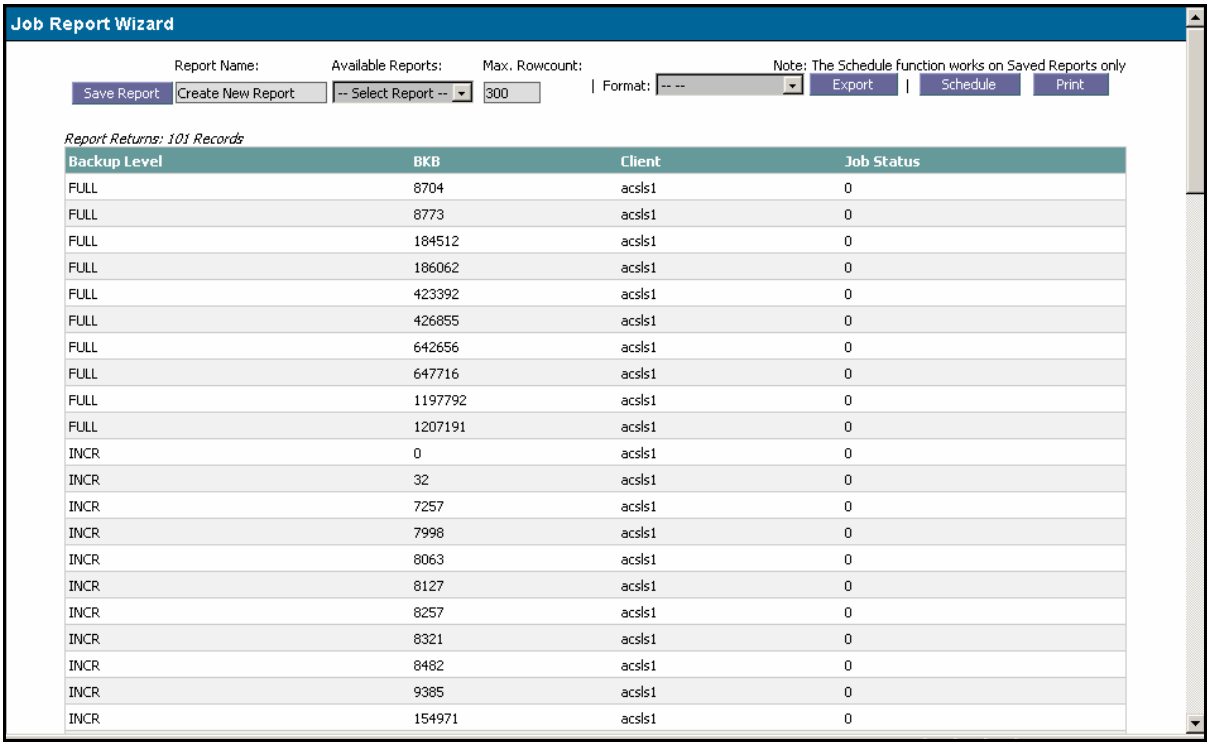
Data Type	Valid Operators	Control Type(s)	Value Types
Numeric	=, <>, >, >=, <, <=, IN	Data Entry Field	Single value (e.g. 999) OR a set of values (e.g. 1, 2, 150 in the case of the IN operator is selected)
Date	=, <>, >, >=, <, <=, IN	Calendar Widget + Data Entry Field	Single value (e.g. 12/31/2002) OR a set of values (e.g. 12/01/2002, 12/02/2002, 12/31/2002 in the case of the IN operator is selected)
String	Equal To, Like, In	Data Entry Field	Single value (e.g. "Oracle Backups") OR A set of values (e.g. "Oracle Backups", FSBackups, MSSQL in the case of the IN operator is selected). Strings with white space must be double-quoted.

Data Type	Valid Operators	Control Type(s)	Value Types
List	IN	Drop-Down List Box	A set of values based on the actual valid values for that field in the database (e.g. "Oracle Backups", FSBackups, MSSQL in the case of the IN operator is selected to operate on the Class Type field). Strings with white space must be double-quoted.
Boolean	=, <>, IN	Static Drop-Down List Box	Single value (e.g. Y) chosen from the possible values Y or N.

Table 8 – Data Type and Control Types

4. Set any optional constraints to the database query in the Select Filters window and click **Next>>**. The Step 4 of 4: Job Report Wizard - Sorting window appears. It allows you to select the fields to be sorted when data returns. By default, returned data is sorted in ascending order. Customize your sort criteria to sort in ascending or descending order using the Sort Options radio box for a selected field.

5. Click **Finish** to display the report. Your custom report appears. Optionally type a name for the report in the Report Name input box and click **Save Report** if you want to save the report for subsequent use. A sample report is shown below.



Backup Level	BKB	Client	Job Status
FULL	8704	acsls1	0
FULL	8773	acsls1	0
FULL	184512	acsls1	0
FULL	186062	acsls1	0
FULL	423392	acsls1	0
FULL	426855	acsls1	0
FULL	642656	acsls1	0
FULL	647716	acsls1	0
FULL	1197792	acsls1	0
FULL	1207191	acsls1	0
INCR	0	acsls1	0
INCR	32	acsls1	0
INCR	7257	acsls1	0
INCR	7998	acsls1	0
INCR	8063	acsls1	0
INCR	8127	acsls1	0
INCR	8257	acsls1	0
INCR	8321	acsls1	0
INCR	8482	acsls1	0
INCR	9385	acsls1	0
INCR	154971	acsls1	0

Figure 65 - Sample Job Report Wizard Report

MEDIA REPORT WIZARD

The Media Report Wizard allows you to create custom reports related to backup media stored in the Sun StorageTek Business Analytics database. Proceed as follows:

1. Select **Backup/Restore** -> **Reporting Wizards->Media Report Wizard**. The **Step 1 of 4: Media Report Wizard** window appears. It allows you to specify whether you want to:
   - Create a new report
   - Delete an existing report (if any exists)
   - Verify/change how a report is shared as (Global or Private)
   - Generate a report using existing saved parameters through the Available Reports list box
2. Select an existing report or simply click **Next**>> to create a new report. The **Step 2 of 4: Media Report Wizard** - **Choose Columns** screen appears.

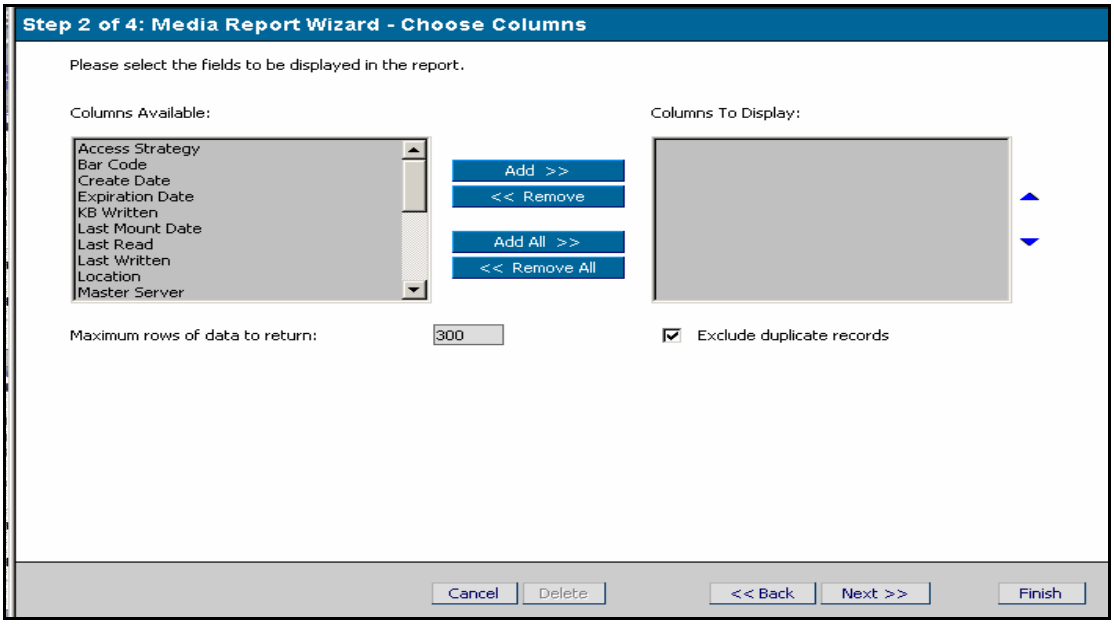


Figure 66 - Step 2 of 4: Media Report Wizard - Choose Columns

3. Select the data columns for the media report. To do so, highlight a column and click **Add>>** or click **Add All>>** to add all the columns from **Columns Available** to **Columns to Display**.
4. Click **Next>>** and the **Step 3 of 4: Media Report Wizard - Select Filters** screen appears. The following table lists the data types for the fields you can choose to construct a filter.

Field	Data Type
Volume ID	String
Media Type	List
Bar Code	String
Volume Pool	List
Pool Type	List
Robot	List
Robot Slot	Numeric
Create Date	Date
Last Mount Date	Date
Nbr of Mounts	Numeric
Expiration Date	Date
Last Written	Date
Last Read	Date
Max Mounts	Numeric
Retention	List
Media Status	List
Nbr Images	Numeric
Location	String

Table 9 - Media Report Field Data Types

5. Set any optional filters or constraints for the database query and click **Next>>.** The **Step 4 of 4: Media Report Wizard - Sorting** window appears.
6. Set up the sort order or accept the default sort order (ascending) and click **Finish** to display the new or edited report.
7. Enter a report name in the Report Name field and click **Save Report** to save the new/edited report. A sample media report appears below.

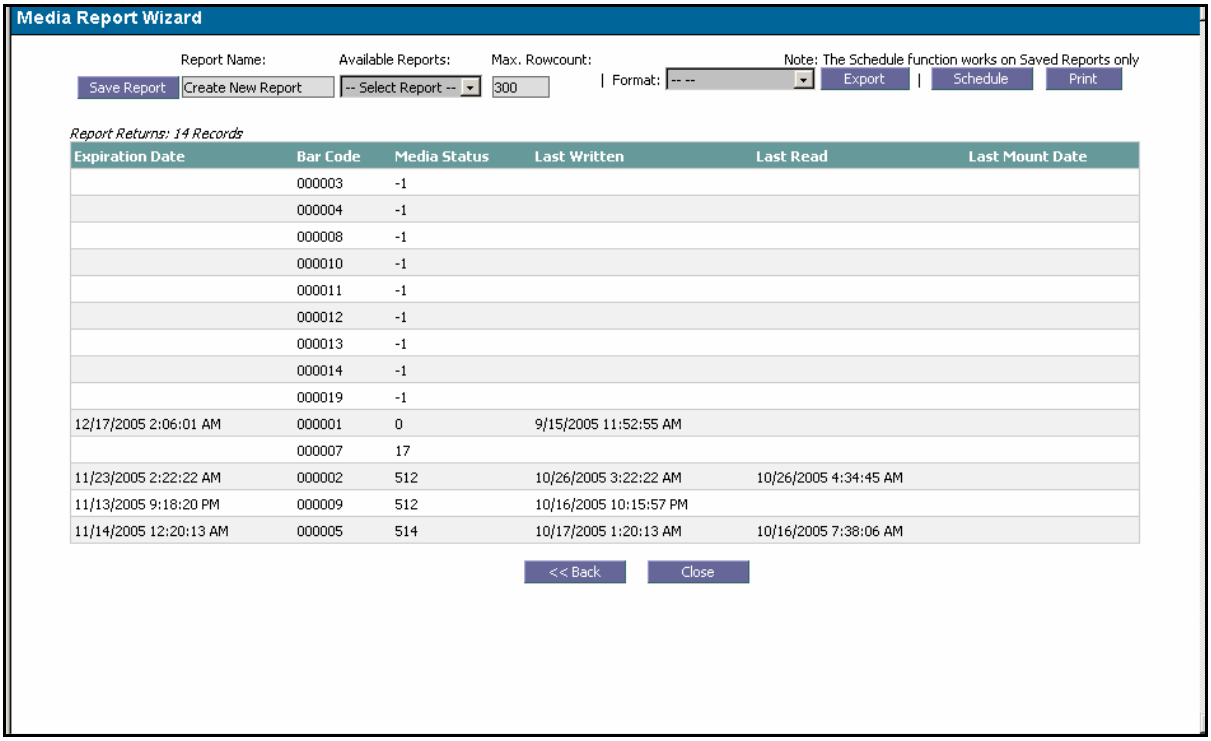


Figure 67 - Sample Media Report Wizard Report

Sample Media Reclamation Report

The Media Report Wizard may be used to create reports that assist you in monitoring tapes for reclamation within your tape vaulting strategy. An example follows.

1. Select **Backup/Restore** -> **Reporting Wizards->Media Report Wizard**. The **Step 1 of 4: Media Report Wizard** window appears.
2. Select to create a new report and click Next> to continue. The **Step 2 of 4: Media Report Wizard - Choose Columns** window appears. Highlight the columns in the **Columns Available** selection box and click the **Add>>** button to specify these columns are to be displayed in the report.
3. In this example, the Volume ID, Master Server, Media Type, Volume Pool, Expiration Date, Last Mount Date, KB Written, Unexpired Images, and Location columns are selected.
4. Click **Next>>** to display the **Step 3 of 4: Media Report Wizard - Select Filters** window. Use the default "Snapshot" and Expiration Date columns to filter the media that will be selected by the SQL Query.
5. Click **Next>>** and the **Step 4 of 4: Media Report Wizard - Sorting** window appears. Add the sort keys to the SQL Query and click **Next>>.** The report is generated based on your inputs.

Backup Success Wizard

The Backup Success Report Wizard allows you to create custom daily performance reports related to backup report metrics that you specify. Proceed as follows:

1. Select **Backup/Restore** -> **Reporting Wizards->Backup Success Wizard**. The **Step 1 of 3: Select Date Range** screen appears.

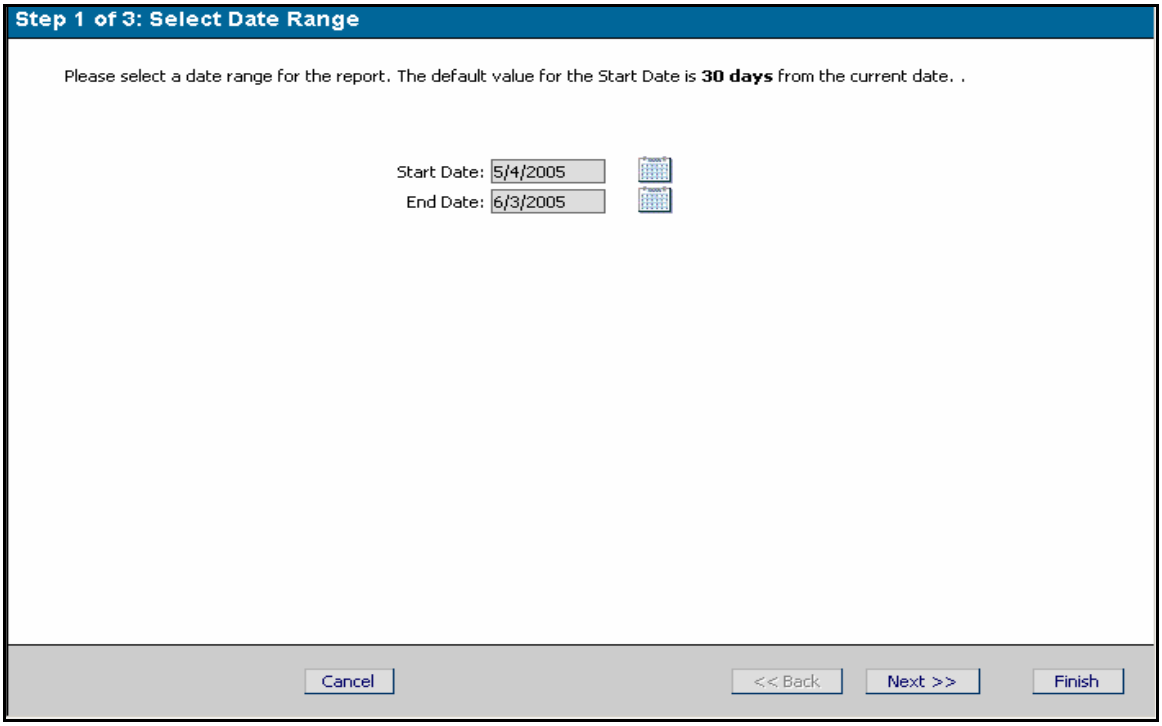


Figure 68 - Step 1 of 3: Select Date Range

2. Select a date/time range. The default value for End data is today, current time. The default value for the start date is today – 30 days, midnight local time. Clicking the **Cancel** button exits the wizard. Clicking **Next>>** you to Step 2 of the parameter selection wizard. Clicking **Finish** skips the rest of the steps and the report is created using default values from here.
3. After you set the date range and click **Next>>**, the **Step 2 of 3: Select Report Metrics** screen appears.

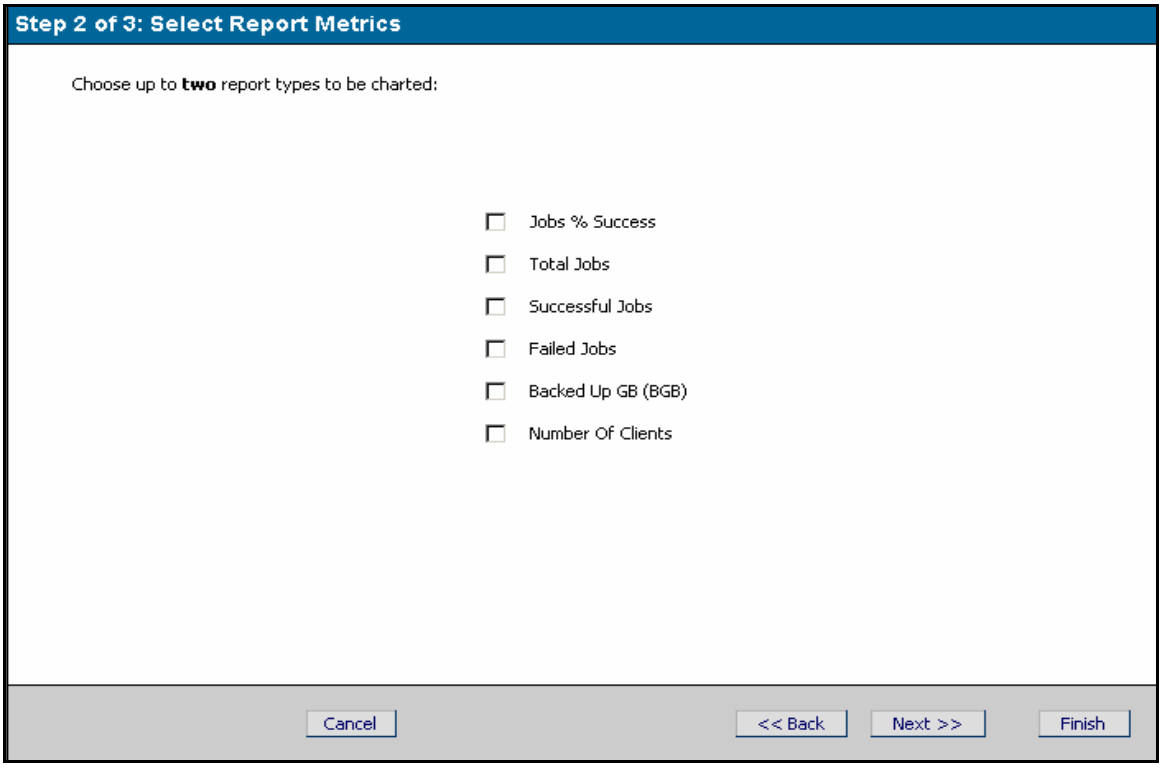


Figure 69 - Step 2 of 3: Select Report Metrics

4. Choose at least one but no more than two of the following report types and click **Next>>** to display the **Step 3 of 3: Choose Filters** window.

   - Jobs % Success
   - Total Jobs
   - Successful jobs
   - Failed jobs
   - Backed up GB (BGB)
   - Number of Clients

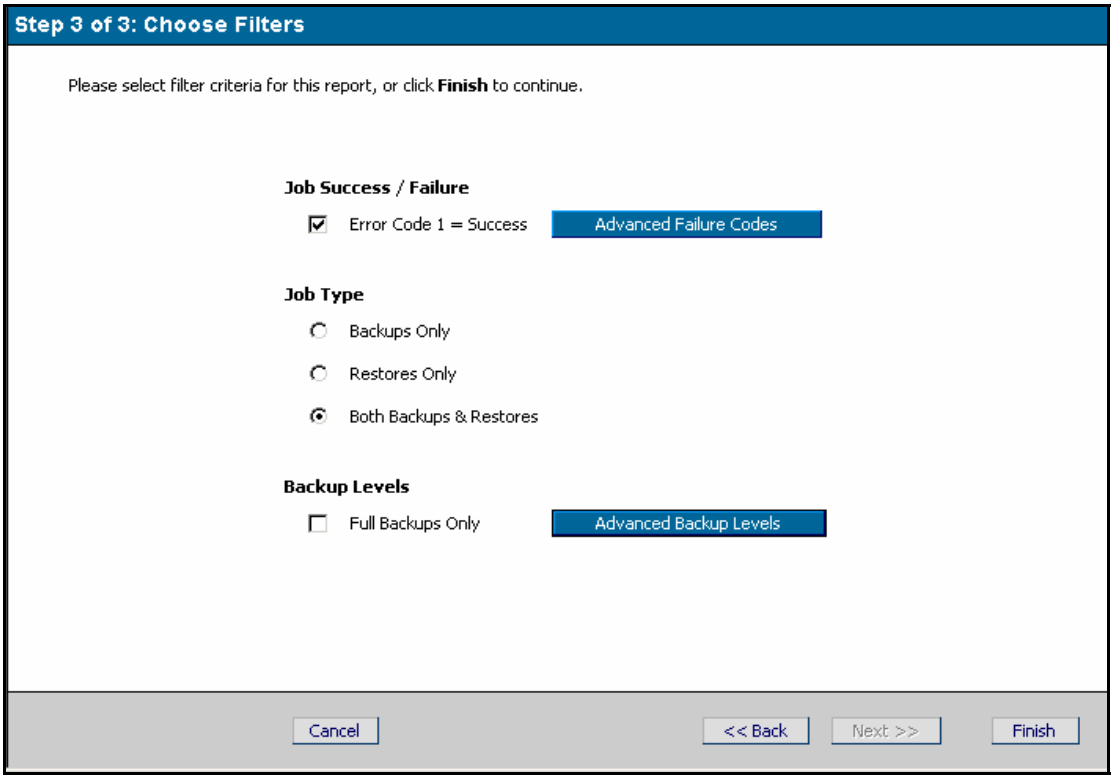


Figure 70 – Step 3 of 3: Choose Filters

5. On the **Step 3 of 3: Choose Filters** window, the **Jobs Success/Failure** check box tells the system whether to interpret error code 1's as a success or failure. The default value is on. The **Advanced Failure Codes** button takes you to an additional dialog that allows you to specify specific error codes as failures. The default value is ALL failure codes are counted as failures.

   The Job Type radio group allows you to filter jobs by backup type (e.g., Backups Only). The default job type is backup only.

   The **Backup Levels** check box tells the system which backup levels to include as a part of the database search criteria. The default value for the checkbox is disabled (unchecked).

   The **Advanced Backup Levels** button takes you to an additional dialog that allows you to specify specific backup levels to include in the search. By default, ALL backup levels are included in the search.

6. Choose the filters and click **Finish** to display **Backup Success View** for the specified date range appears. Initially, the report displays all sites managed by the user. Report metrics, such as report metrics % Success, Total Jobs, Successful Jobs, Failed Jobs, BGB, Nbr Clients, selected for all sites appear in the right pane using a line chart and tabular format.

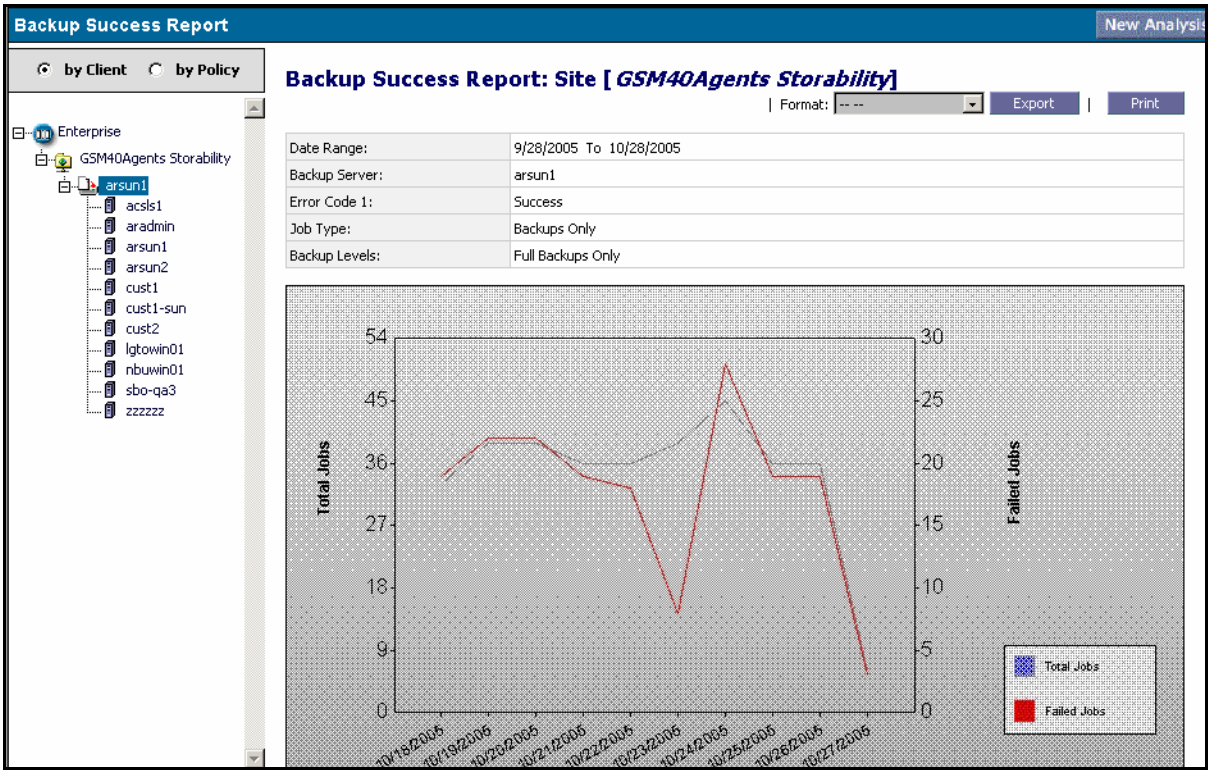


Figure 71 - Backup Success Report

Clicking the **New Analysis** button returns you to Step 3 where you can set new filters for another database query.

Note: The **Client/Policy** radio group you allows you to select whether to display a list of clients or a list of policies in the deepest level of the navigation pane underneath master server.

Backup/Restore Job Summary

The Backup/Restore Job Summary report provides a listing of all backup jobs collected throughout an enterprise. It allows you to navigate to a specific client's jobs to determine the job history for a specific period of time. The report incorporates two levels:

- A summary level (the Job Summary sub-report) which displays successful, failed, and total job counts as well as the number of backed up gigabytes (BGBs) for each site and backup client.
- A detail level (the Job Details sub-report) which displays the individual backup job details including job ID, job status, start time, duration, etc. for each job in the given period.

The navigation tree begins at the site level and allows you to drill down to a specific backup client in any site.

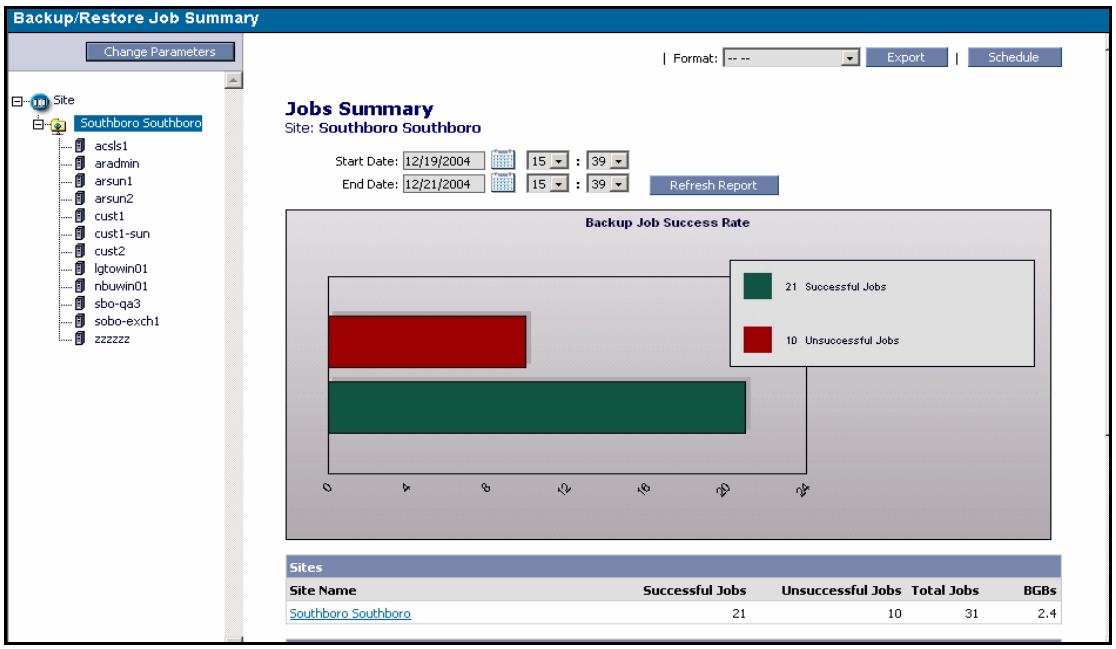


Figure 72 - Backup Restore Job Summary (Site Level)

After you select a site in the navigation tree, the Job Summary pane displays a summary of the job counts as well as the backed up gigabytes (BGBs) for that site. The job counts for all backup clients in a site are displayed after you click on the site name hyperlink in the Job Summary pane.

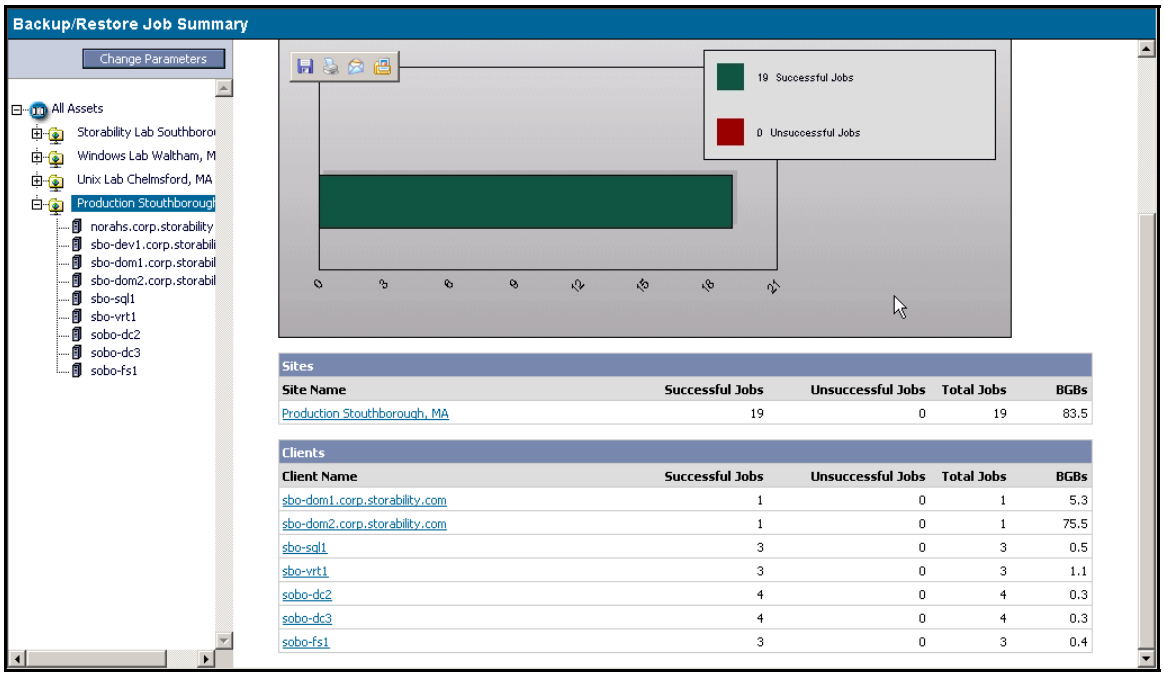


Figure 73 - Job Summary (Client Level)

You display the Job Details report by either:

- Clicking a specific client in the navigation pane.
- Clicking a specific client in the Job Summary pane.

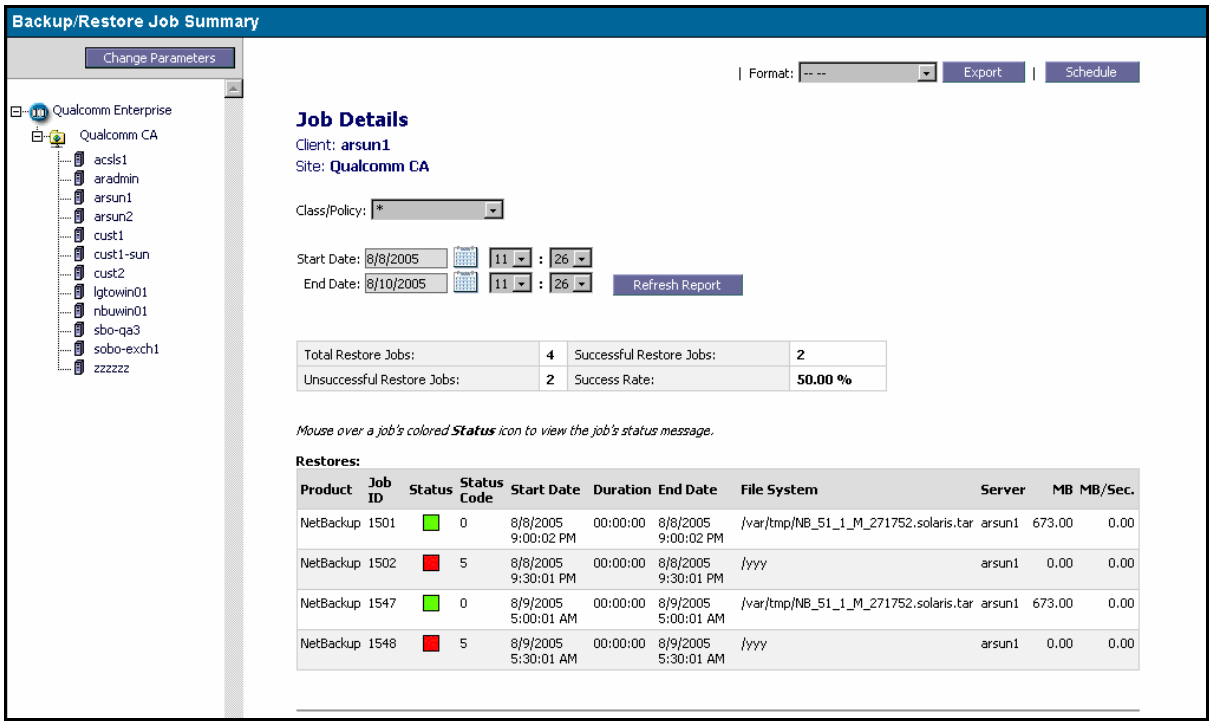


Figure 74 - Job Details

The Job Details report identifies the backup application, job identifier, start date, duration, end date, file system, server name, and total amount backed up/restored, and the amount per second.

BACKUP EXCEPTIONS

Backup Exceptions is a Veritas NetBackup only report that provides summary-level information on backup clients that have backup exceptions (failures, warnings, jobs never started) over a given time period. The report is available at the site, master server, and client or policy level and covers the last two days by default. This report provides information based on backup clients and schedules, not individual backup jobs.

Proceed as follows:

1. Select **Backup/Restore** from the Home Page.
2. Select **Backup Exceptions**. The Select Date Range control panel screen appears.
3. Specify the desired date and time range and click **Generate Report**. The top-level Backup Exception report appears for the specified time interval. The report pane shows in a bar graph the number of backups jobs that never started and the number of failed jobs. The data used to produce the bar graph appears beneath it in a table.

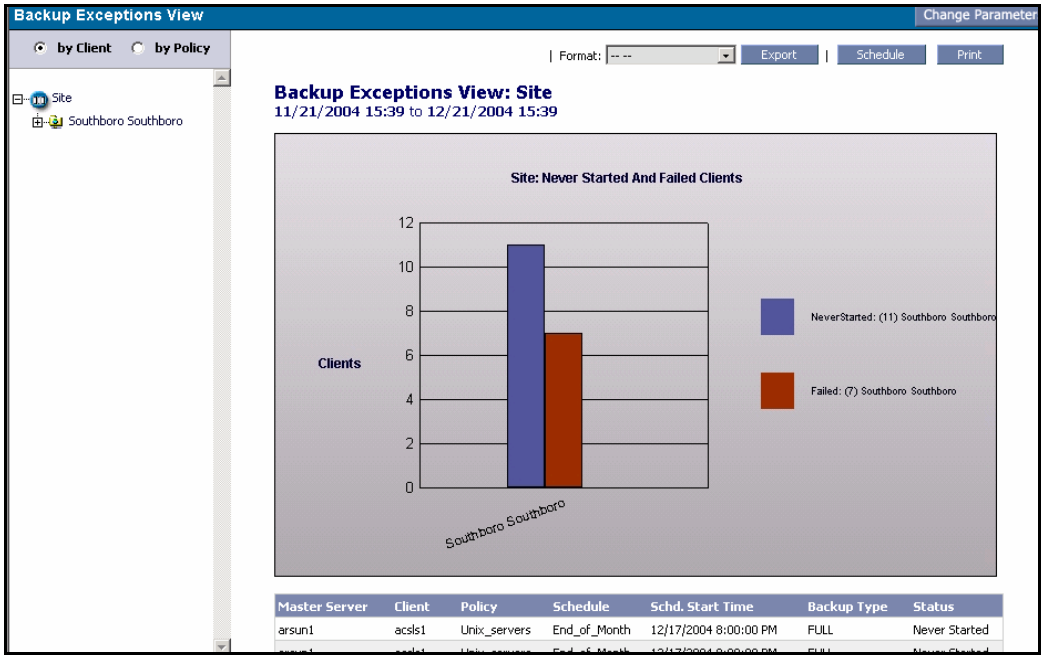


Figure 75 - Backup Exceptions

By expanding a **site** in the navigation pane, you view a listing of all **master servers** contained within that site. Select a desired **site** in the navigation pane and the bar graph and table update showing all the master servers for the selected site.

Each master server has unique clients and policies (NetBackup) in their configuration. These appear in the navigation pane. You can obtain additional information on backup job exceptions for a desired master server by:

- Choosing to update the information by client (default) or by policy using the radio button
- Clicking on the desired master server in the navigation pane

If you select to view backup exceptions by client, the table data will show a list of clients for that master server that have exceptions. The bar graph does not change. If you select to view backup exceptions by policy, the table data shows a list of policies that have exceptions. Again, the bar graph does not change.

Each client or policy may be associated with backup exceptions that are categorized as either a backup job that never started or failed. Clicking on a particular **client** or **policy** in the navigation pane displays a list of backup exceptions that exist in the database for the selected date and time range, where the default report range is the previous day.

MEDIA TRENDING

The Media Trending Report allows you to generate backup media trending graphs for media utilization and capacity management analysis for Veritas NetBackup and Legato NetWorker. The report provides an estimation of future trends based on the results of a database search for media that match the your search criteria.

The Media Trending Report allows you to provide a number of parameters:

- A list of media pools - Allows you to narrow search criteria to one or more specific media pools. The default value for this parameter is all media pools.
- A list of media types - Allows you to narrow search criteria to one or more specific media types. The default value for this parameter is all media types.
- Media Expiration Days – Matches volumes due to expire within the number of days provided. This is used within media availability forecasting. The default value for this parameter is seven days.
- Originally Written Months – Matches volumes which where originally written more than N months ago. Because magnetic media does not have an infinite life expectancy, this parameter can help to identify media volumes first written long enough ago to be considered suspicious. The default value for this parameter is 48 months (i.e. four years).
- Mounted At Least N(umber) Times – Matches media volumes that have been mounted at least "N" times. This is another parameter that helps identify media that is reaching its life expectancy. The default value for this parameter is 50 times.
- Read at Least N(umber) Times – Matches media volumes that have been read from at least "N" times. This parameter helps to identify media volumes with the most restore activity. The default value for this parameter is four times.

You can select a date range to be used for forecasting using the following choices:

- Daily Trend – Provides a default search range of sixty days for a daily media trend. Media counts for each calendar day are calculated for the sixty day range and used to generate a forecast.
- Weekly Trend – Provides a default search range of sixty days for a weekly media trend. Media counts for the beginning of each calendar week are calculated for the 60 day range and used to generate a forecast. The default date range can be overridden to a maximum of 365 days.
- Monthly Trend – Provides a default search range of sixty days for a monthly media trend. Media counts for the first day of each calendar month are calculated for the sixty day range and used to generate a best-fit forecast. The default date range can be overridden to maximum of 5 times 365 or 1725 days.

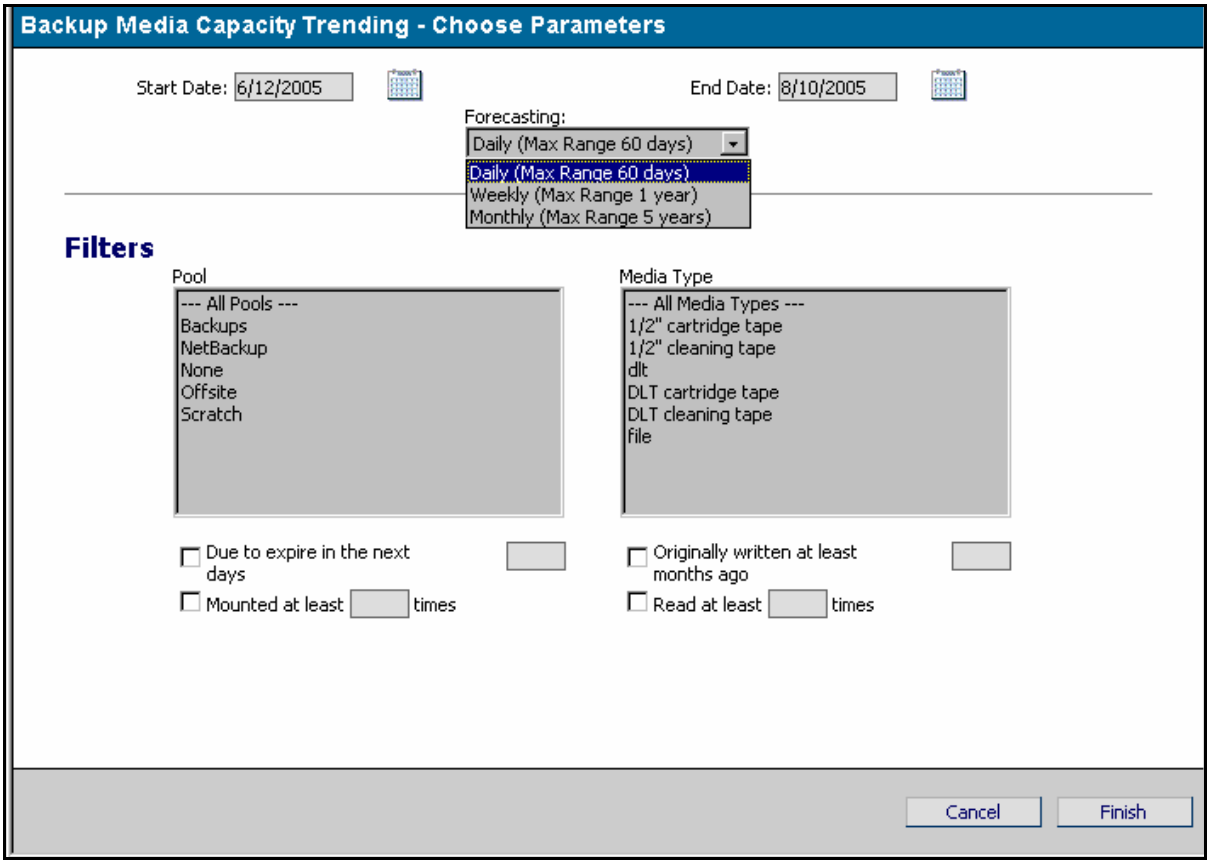


Figure 76 – Backup Media Capacity Trending - Choose Parameters

After you enter the report parameters, click **Finish** to generate the report. The report contains a left-hand navigation pane that lists all the sites in the environment and expands to list all of the backup servers in each site. You can produce a media trending report for the entire environment, an entire site, or a specific backup server.

The right-hand report pane consists of two objects:

- A line chart at the top containing a graphical representation of the results of the database search – including the prediction.
- A table below the chart containing the raw data used to draw the chart.

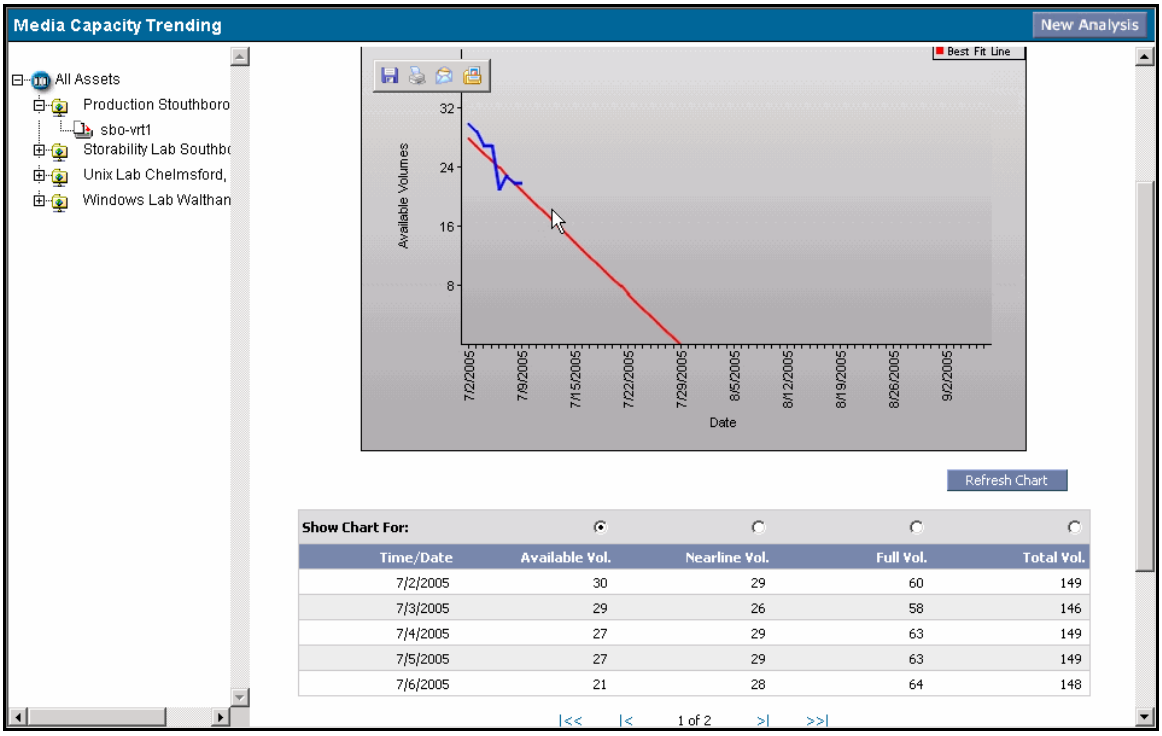


Figure 77 - Media Capacity Trending

The report contains media counts for four distinct media statuses:

- Available Media – Media in the backup server media database available for writing. For Veritas NetBackup, available media volumes are volumes that are not Full, Suspended (either manually or taken off-site), Imported (from another NetBackup server), or Frozen. For Legato NetWorker, an available volume is a volume that is not full, eligible for recycling, and not read-only.
- Full Media – Media in the backup server media database available that is full.
- Nearline Media – Media in the backup server media database available that currently resides in a tape library.
- Total Media – All media in the backup server media database.

Backup Schedules

The Backup Schedules report displays the types of backups scheduled for a seven day period as of the current date. It provides a graphical depiction of various types of backup operations, including all scheduled, full, user backup, user archive, and cumulative-incremental for that week. The report is available by site.

At the site level, the Backup Schedule Report displays the backup schedules as follows:

- Organized by each day of the week
- Shown for each Veritas NetBackup server in the environment and for the current calendar week.

This includes automatic schedules such as full and incremental backups as well as on demand type backup schedules such as client-initiated user backups and archives.

The Backup schedule Report contains two sections:

- A graphical view containing a visual mapping of the backup scheduled start window for all the clients and schedules for the current calendar week.

- A tabular listing of the backup schedules.

1. Select **Backup/Restore->Backup Schedules** from the Home Page. The Step 1 of 3: Select Site screen appears.
2. Select the site from the drop down box and click **Next>>**. If you select a site that does not have a master server configured, a dialog box is displayed that states no master servers exist at the site.
3. Specify the backup master server on the **Step 2 of 3: Select Master Server** screen and how data extraction is filtered. The selection criteria consist of by client or by policy. The radio group, Filter By, defaults to "by client". The filter you select determines if a list of backup clients or a list of policies or classes appears on the last step of the process.

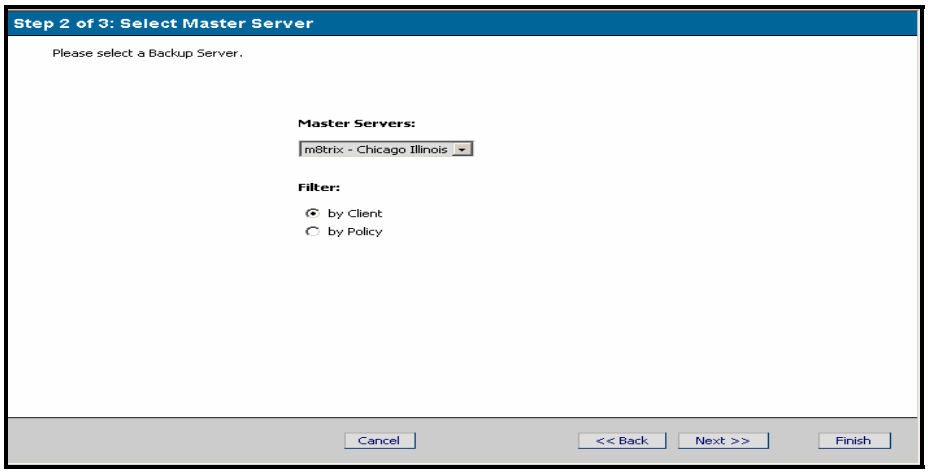


Figure 78 - Step 2 of 3: Select Master Server

4. Review/select the backup master server and accept the default filter or click the by Policy radio box. **Click Next>>**. The Step 3 of 3: Choose (Client) or Choose (Policy) screen appears.

   Highlight (select) a field in the Available Client (or Policy) table and click **Add>** to add it to the Chosen Client (or Policy) table. To add all available fields to the Chosen table, **click Add All>>**. Use the **<Remove** or **<<Remove All** controls to selectively remove or remove all existing fields from the Chosen table.

4. Click **Finish** and the Backup Graphical Schedule View appears. It provides a graphical (and tabular) depiction of various types of backup operations, including all scheduled, full, user backup, user archive, and cumulative-incremental for that week. The Schedule Graph uses colors, as described below.

Color	Legend	Description
Pink	Full	All files designated are backed up

Yellow	Incremental	Only files modified since last backup are backed up
Green	User Backup	Files specified by the user are to be backed up
Light Blue	User Archive	Files specified by the user are archived. An archive is a backup with a deletion of the original files.
Red	Cumulative-Incremental	Only files modified since last archive are backed up.
Dark Blue	All Schedules	

By clicking the **Display Table** control button, you can view the specific backup jobs by class in a tabular format that make up the schedule graph.

The tabular view displays the class, schedule, schedule type, the open window, the close window, as well as the frequency of scheduled backups.

META DATABASE CAPACITY

The Meta Database Capacity report is an administration report that allows backup application administrators to monitor the size of the backup application's meta database and the available space disk allocated to contain it over a specified date range.

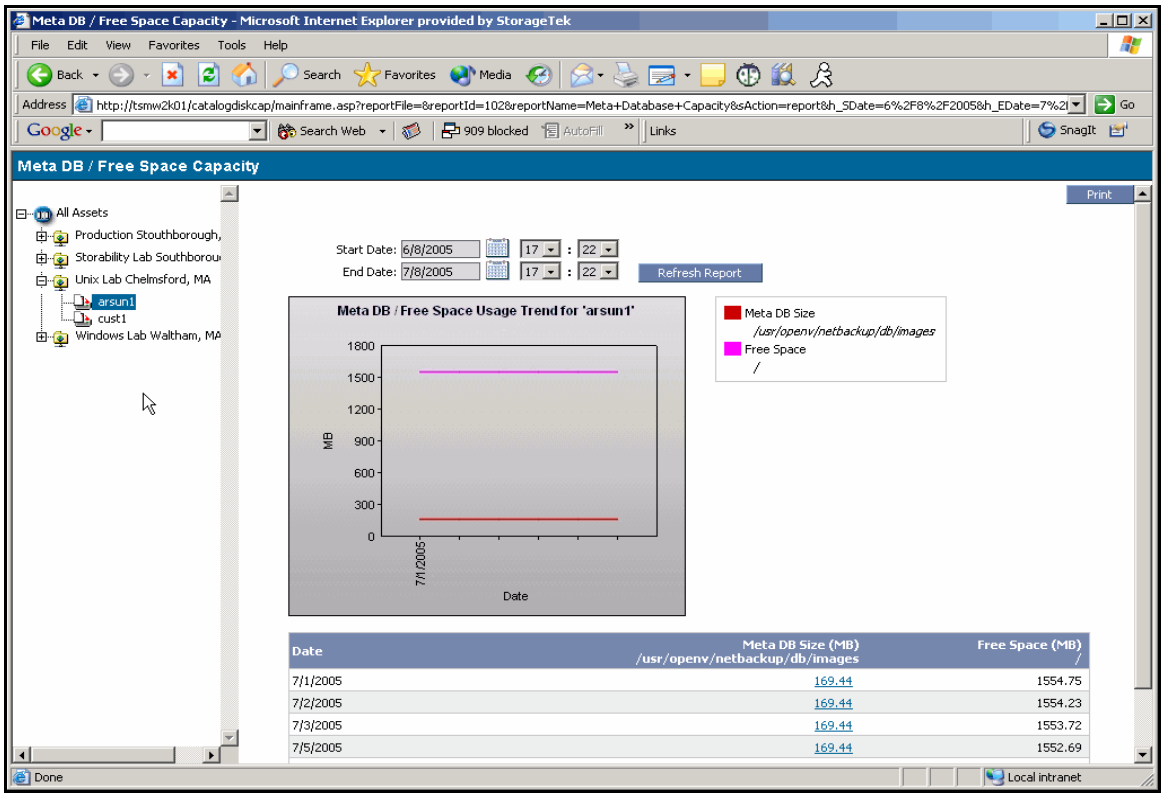


Figure 79 - Meta Database/Free Space Capacity

The term meta database is a generic term that is used to describe all three backup applications. It refers to the backup application's combined configuration, backup history, and media databases. Each backup application has its own nomenclature for these databases. However, the meta database concept applies to all three backup products.

VERITAS NETBACKUP

The meta database in Veritas NetBackup is called the NetBackup catalog. It resides on the NetBackup master server. They normally exist in /usr/openv/netbackup/db/images on Unix and <drive>:\Program Files\VERITAS\NetBackup\db\images on Windows. For the Meta Database Capacity report, it is the size of the database files on disk that determine the size the database. That being said, it is the size of the file system (or file systems) in which the files exist (more specifically, the available space on those file systems) that determine the available space.

To determine file system available space on a host, Sun StorageTek Business Analytics uses a Sun StorageTek Business Analytics Host Agent. For this reason, a prerequisite of the Meta Database Capacity report for NetBackup is that both a NetBackup Agent and a Host agent are installed on the NetBackup master server. For NetBackup, the Meta Database Capacity report plots the size of the files systems containing the NetBackup catalog and their available space on a chart in the report, allowing a NetBackup administrator to determine if there may be a problem.

LEGATO NETWORKER

The meta database in Legato NetWorker is called the index database. It resides on the NetWorker server. The NetWorker indexes normally exist in /nsr/index on Unix and <drive>:\Program Files\nsr on Windows. For the Meta Database Capacity report, it is the size of the database files on disk that determine the size the database. It is the size of the file system (or file systems) in which the files exist (more specifically, the available space on those file systems) that determine the available space.

Therefore, a prerequisite of the Meta Database Capacity report for Legato NetWorker is that both a Legato Agent and a Host agent are installed on the Legato server. For NetWorker, the Meta Database Capacity report plots the size of the files systems containing the NetWorker indexes and their available space on a chart in the report, allowing the Legato administrator to determine if there may be a problem.

TIVOLI STORAGE MANAGER (TSM)

TSM calls its meta database "the TSM database". TSM implements its meta database differently than Veritas and Legato. In TSM the database is an actual relational database that can be queried using SQL. It also incorporates a transaction log.

The Storability TSM Agent collects the total assigned capacity and the maximum percentage used of the TSM database and transaction log. From these, the Meta Database Capacity report can determine the space available in the TSM database and log.

Be aware that:

- The Meta Database Capacity report uses the assigned capacity of the TSM database, not the allocated capacity to determine the available space. The assigned capacity is more critical because the TSM database size cannot grow beyond the assigned capacity without intervention by the TSM administrator.

- The Meta Database Capacity report uses the maximum percent utilization of the TSM database rather than the current percent utilization. Maximum percent utilization is a historical high water mark for database and log utilization.

Real Time Events

The Real Time Events report allows the backup administrator to quickly identify which backup jobs are failing. The report requires the NetBackup SNMP Extension (formerly called Event Notification Extension) software package is installed on the NetBackup master server and is configured to send its job completion traps to the NetBackup Agent on that master server. The Realtime Events Report contains NetBackup jobs collected within the last 24 hours. You can refresh the report at any time by pressing the Refresh Report button. Otherwise, you can turn on the auto-refresh parameter which results in the report refreshing every five minutes.

The left-hand panel displays a navigation tree containing all the sites in the environment along with a percent success for that site. Each site expands into a list of policies collected for that site. If the success rate is greater than or equal to 95 percent, the percentage will be displayed as green. If the percentage is less than 95 percent, the percentage will be displayed as red.

The right-hand report pane displays the job event detail. This includes the job ID, job schedule name, schedule type, end time of the job and the completion status

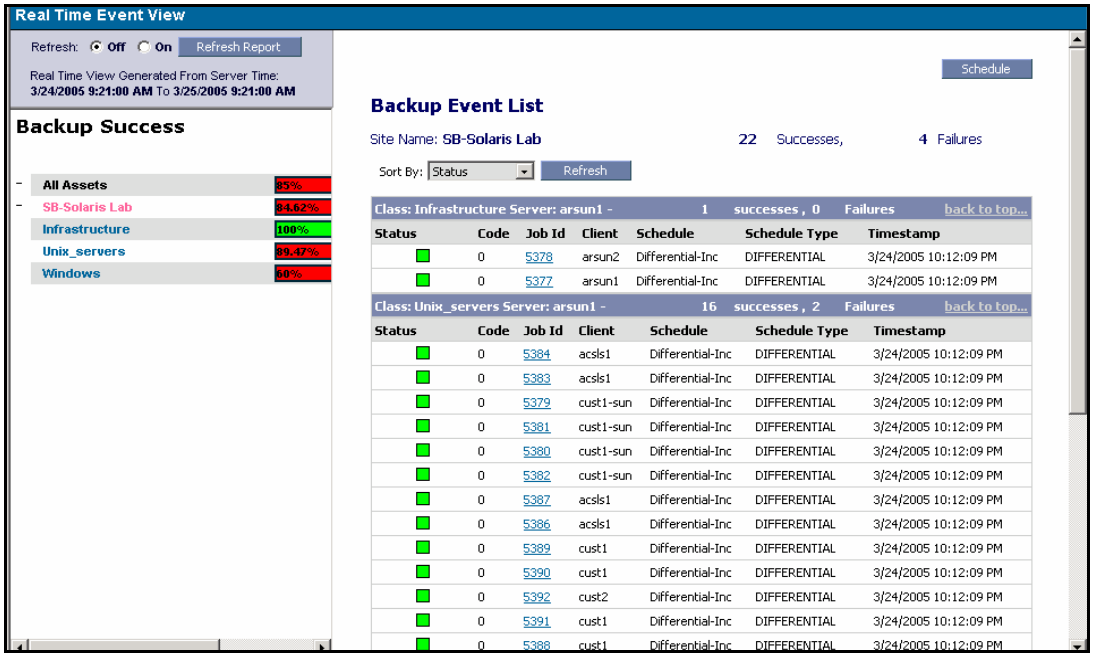


Figure 80 - Backup Event List

By clicking a job ID, the details of the job appear in a separate window. These include a description of the file list and more detailed explanation of the job status.

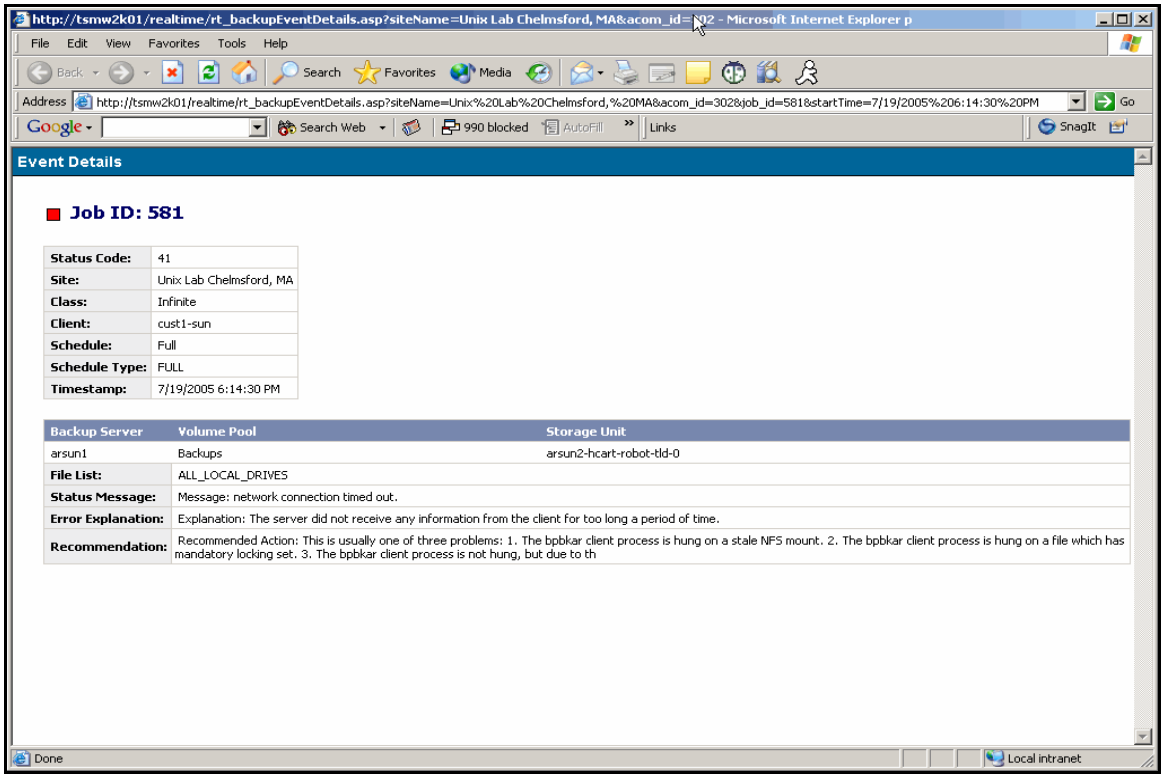


Figure 81 - Real Time Events Job Details

BACKUP EXPOSURE

The Backup exposure Report uses data from backup agents (including TSM, NetBackup and Legato) and host agents to find backup exposure in an environment. It can serve two purposes:

- Identify potential backup clients in the enterprise that are not being backed up.
- Identify backup clients that do not have a Storability Host Agent installed.

By identifying servers not equipped with a Host Agent, the Backup Exposure Report can serve as a Sun StorageTek Business Analytics management report. For asset management and other storage resource management purposes, it may be optimal to have host agents installed on all important servers in the enterprise.

However, the primary purpose of Backup Exposure Report is to help identify potential backup clients in the enterprise that are not being backed up. For optimal usability, the following prerequisites must be satisfied:

- There must be a Storability Host Agent running (either locally or remotely) for all potential backup clients. These may be a local Host Agent or a remote Storability Remote Host Agent.
- A valid and accurate IP address for each TSM backup client (node) must exist in the NODES table in the TSM database.

The control pane contains a checkbox at the top that allows you to hide hosts that you have excluded through the selection box in the report pane. You can use the **Calendar** and **Refresh** button to refresh the report to a selected date.

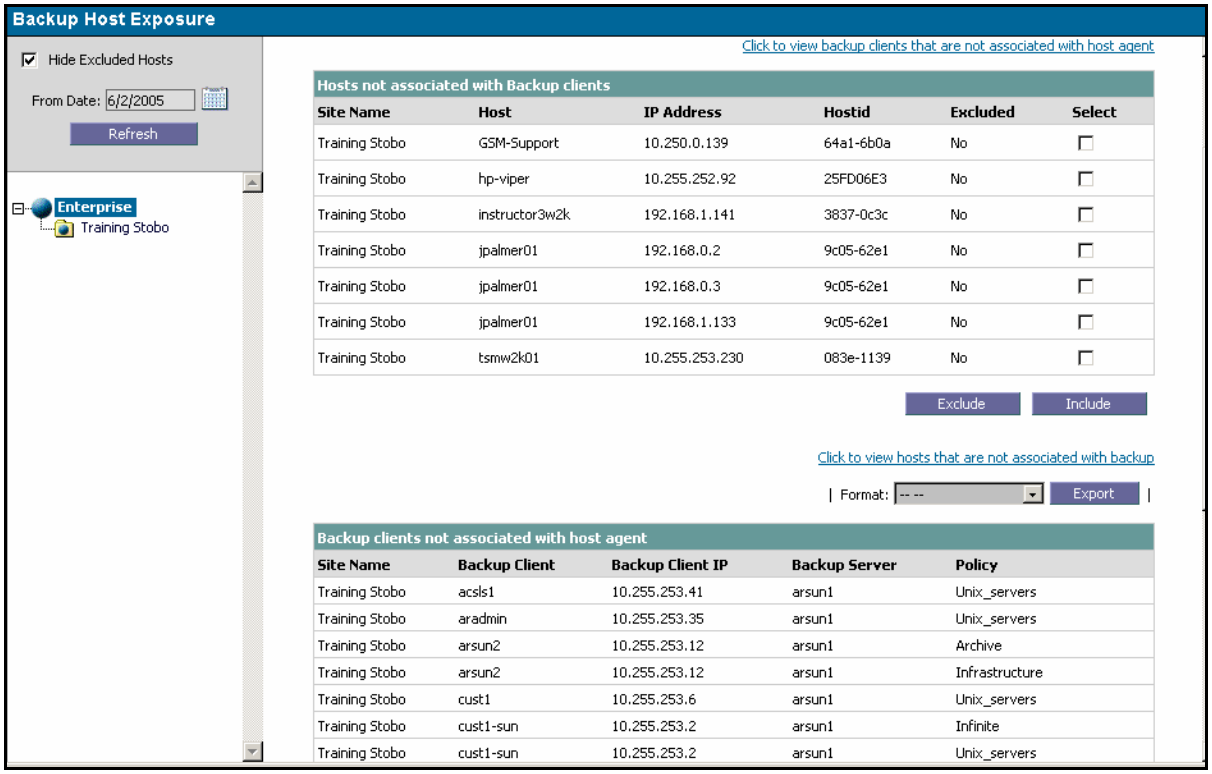


Figure 82 – Sample Backup Host Exposure Report

The "Hosts not associated with Backup clients" table identifies hosts not identified in the database as being a backup client. For these hosts, the columns identify the site, host name, the host's IP address, and host ID.

The "Backup clients not associated with a host agent" table identifies the site name, backup client, the backup client's IP address, the backup server, and the policy.

The report allows you to suppress a host that is not backed up by design from being displayed in future reports. To exclude a server from being displayed in future reports, click the selection box associated with that server and click **Exclude**. Conversely, click the selection box associated with a server and click **Include** to have the server reported when you refresh the report

TSM DAILY ADMINISTRATION

The TSM Daily Administration Report provides a TSM administrator an overview of the performance of the TSM environment over the previous 24 hours or over the course of a configured backup window. It consists of a main summary report that reports a status of all the TSM servers in a site or a single TSM server and a number of detailed sub-reports. You may want to disable access (see User Administration in the Administration chapter) to this report for non-TSM administrators.

1. Select **Backup/Restore->TSM Administration** from the home page. The TSM Daily Status main window is displayed. Your view appears at the top level of the navigation pane. You can click on a site to generate a site-level report or expand the site to choose a particular TSM server and generate a server-level status report.

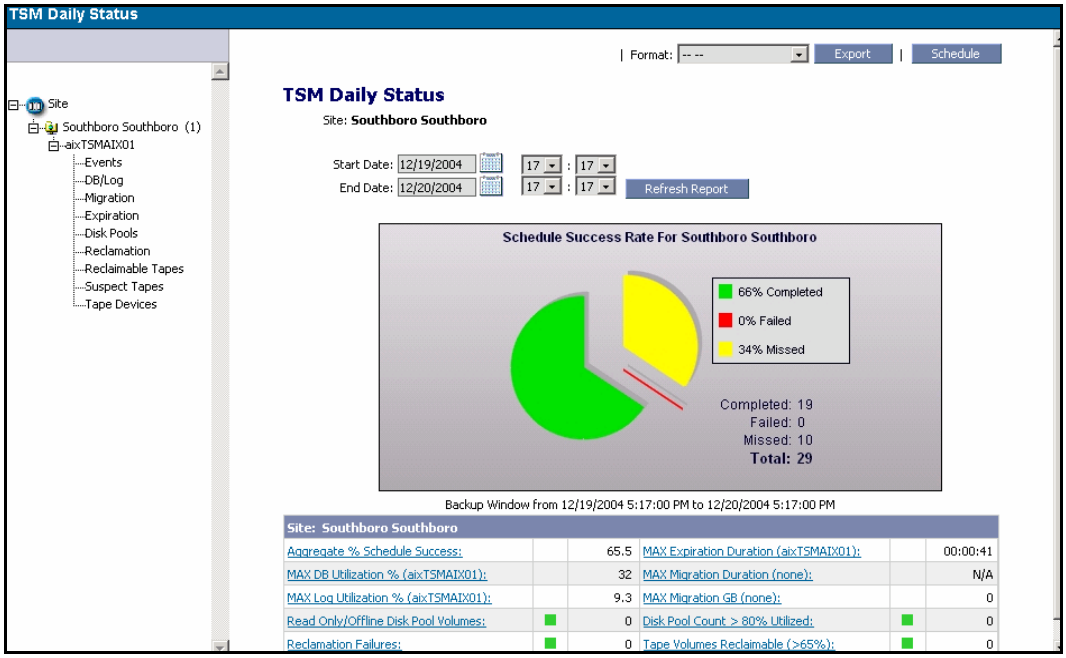


Figure 83 - TSM Daily Status - Site Level

2. The following TSM server functions are reported on in the TSM Daily Administration report:

   - Scheduled Events Completed, Failed or Missed status
   - TSM database and log status
   - Expiration duration and status
   - Migration duration and status
   - Disk pool status utilization
   - Reclamation status
   - Suspect tape listing
   - Tape library and drive status

   A red (critical)/yellow (warning)/green (OK) indicator is displayed on the main report next to each of the critical status areas. These indicators alert the TSM administrator at a glance to a critical or degraded performance condition. The thresholds parameters that control the color of each status indicator are administered using TSM Report Parameters, which is accessed under the Tools pull down menu.

3. The table beneath the pie chart provides links to the following reports:
   - **Aggregate % Completion Success** – Click this report link to display the Scheduled Event Completion Summary report showing the aggregate backup schedule % success data in tabular format.
   - **MAX DB Utilization %** – Click this report link to display the Database Status Summary report showing the server name, percentage of capacity utilized, and largest database percentage utilization in the site.

- **MAX Log Utilization %** – Click this report link to display the Database Status Summary report showing the server name, percentage of capacity utilized, and largest transaction log percentage utilization in the site.
- **Read Only/Offline Disk Pool Volumes** - Click this report link to display the Disk Pool Volumes report showing an aggregate status of the disk pool volumes used by all the TSM servers in the site. The status indicators are described as follows:

    - A status of "None" (with a green indicator) means that all disk pool volumes are "ONLINE" and "READWRITE".
    - A status of "Warning" (with a yellow indicator) indicates at least one but < 10 % of the total volumes in any disk pool are either not "ONLINE" or not "READWRITE".
    - A status of "Error" (with a red indicator) indicates that > 10 % of the disk pool volumes in any disk pool are not "ONLINE" or not "READWRITE".
- **Reclamation Failures:** - Click this report link to display the Reclamation Status report showing the reclamation sessions used to move data from a set of fragmented tapes to a smaller number of tapes.
- **Suspect Tapes –** Click this report link to display the Suspect Tapes report showing tape pool volumes with a status unequal to "READWRITE".
- **MAX Expiration Duration –** Click this report link to display the Expiration Status report showing the server name and duration of the longest expiration process for the previous day (or other specified report interval).
- **MAX Migration Duration –** Click this report link to display the Migration Status report showing the server name and duration of the longest migration process for the previous day (or other specified report interval).
- **MAX Migration (GB)** – Click this report link to display the Migration Status report showing the server name and amount of data migrated during the migration process for the previous day.
- **Disk Pool Count > 80% Utilized** – Click this report link to display the Disk Pools Volume report showing an aggregate status of the % utilization of the disk pools used by all the TSM servers in the site.
    - A status of "None" (with a green indicator) means that all disk pools are < 80% utilized.
    - A status of "Warning" (with a yellow indicator) indicates at least one disk pool is at least 80% but less that 90% utilized.
    - A status of "Error" (with a red indicator) indicates that at least one disk pool is > 90 % utilized.
- **Tape Volumes Reclaimable (>65%)** - Click this report link to display the Reclaimable Tapes report showing an aggregate status of the reclamation processes that ran during the previous day on all the TSM servers in the site.
    - A status of "None" means that all reclamation processes ran successfully.
    - A status of "Warning" means that at least one but < 10% of all reclamation processes failed.
    - A status of "Error" means that > 10% of all reclamation processes ran at the site failed.

- **Tape Drives/Paths** - Click this report link to display Tape Devices report showing an aggregate tape path status for the site.
    - A status of "Online" (green) indicates all servers in the site have no tape paths in an offline state.

- A status of "Warning" (yellow) indicates at least one server in the site has at least one tape path in an offline state but < 10% of that server's tape paths offline.
- A status of "Error" (red) indicates at least one server in the site has > 10% of its tape paths in an offline state.

Note: Refer to the **TSM Report Parameters** section of the **Administration** chapter to obtain information on how to set the thresholds that are associated with TSM parameters shown in the TSM Daily Administration report.

You can display the following sub-reports for a selected site or TSM server by clicking on the respective heading in the navigation pane:

- Events – Displays the Scheduled Event Details report for the given site or server. It provides a complete event listing for the specified date range. The event details include the scheduled start, actual start, duration, activity, and status.
- DB/Logs – Displays the Database Status Summary report that shows an overall status of both the TSM database and transaction log for specified date range. The TSM server contains a database whose primary purpose is to manage backup history (i.e. metadata) and media information. This database also contains TSM server configuration, security, activity logging information. It operates and is managed much like other databases. It contains a database and a transaction log.
- Migration – Displays the Migration Status report that shows all the migration event detail for the last 24 hours. It displays both scheduled and non-scheduled (server-initiated) data migrations events for the TSM servers in the environment. Migration is a process on the TSM server that moves data from one storage pool to another (e.g. from disk to tape) based on a configured set of pool attributes. Many TSM administrators choose to migrate data only outside the backup window.
- Expiration – Displays the Expiration Status report that shows all the expiration event detail for the last 24 hours. It displays both scheduled and non-scheduled expiration (server-initiated) events for the TSM servers in the environment. Expiration is a process on the TSM server that purges backup history from the TSM database after it has expired according to some pre-configured policies. It is a critical and time-consuming component of basic TSM server administration that often occurs outside the daily backup window.
- Disk Pools – Displays the Disk Pool Volumes report that shows the disk pool name, volume, device class, capacity (MB), percentage utilized, status (e.g., online), and access (e.g., READWRITE). Disk Pools are a typical staging area for backup data on a TSM server. Backups are most often written to disk (i.e. disk pools) and the migrated to other disk pools or tape pools. It is common for an organization to keep 24 hours (and sometimes much more) worth of backup on disk. In most TSM implementations, TSM administrators need to monitor the overall state of their disk pools. If a volume contained within a disk pool goes offline, it could mean backups and/or restores may be affected. If a disk pool fills completely and unexpectedly, the TSM server may begin migrating the data to tape, again, potentially affecting backups and restores.
- Reclamation – Displays the Reclamation Status report showing a listing of all reclamation sessions that moved data from a set of fragmented tapes to a smaller number of tapes over the past 24 hours. Reclamation is the process of reclaiming empty space on tape that results from TSM expiration. Put another way, reclamation

is a form of eliminating fragmentation within a TSM storage pool. In most TSM environments, reclamation applies primarily to tape. When a reclamation process is in progress, the TSM server copies all of the unexpired data from a set of tapes to a new (yet smaller) set of tapes. The result is that the same amount of recoverable data now resides on a smaller set of tapes and the original tapes are sent to the scratch pool, making them available to be written to again.

- Reclaimable Tapes – Displays the Reclaimable Tapes report that provides a listing of all tapes that meet a certain reclamation threshold. It displays not only the tape volume's status but also its location. The reclamation threshold is set on the TSM Report Parameters window accessed under the Tools pull down menu. The default reclamation threshold is 65 %.
- Suspect Tapes – Displays the Suspect Tapes report that provides a list of "suspect" tape volumes along with some of the data that describes the condition of each of the volumes. A suspect tape is any tape that is not writable or has had a read or write error detected at some point in time.
- Tape Devices – Displays the Tape Devices report showing the most recent status of all the tape and library drives and device paths..

TSM Event Summary

The TSM Event Completion Summary report is designed to allow non TSM administrators to view TSM events without having access to the full TSM Daily Administration report. All users that have the "TSM Backup Product" option enabled in their current dashboard can view the status of TSM scheduled events. Full Sun StorageTek Business Analytics view security is implemented in the TSM Event Summary report. That is, a Sun StorageTek Business Analytics administrator may create different views (e.g. for different business units) within the application just for TSM users. After assigning individual TSM nodes to each of the views, different users can be assigned to a particular view. In this way, non-TSM administrators can view the status of their events (and only their events).

You can navigate to the Scheduled Event Completion Summary in either of the following two ways:

- The TSM Daily Administration Report has navigation hyperlink to the Event Completion Summary at the site level. However, only TSM administrators have access to the TSM Daily Administration report where there is no view security applied. TSM administrators see all TSM scheduled events for all nodes – not just those for a given business unit.
- The Backup/Restore pull down menu contains a TSM Event Summary option. This menu option is available to all users that have "TSM enabled in their current dashboard.

Tape Libraries

A user, who is assigned "Backup Administrator" administrative rights, can access the following reports from the **Tape Libraries** menu selection in the Backup/Restore pull down menu:

- Library Asset Report
- Global Status Report
- Library Statistics Report
- Backup Media Search
- Tape Drive Allocation

Library Asset Report

The Library Asset Report enables the Backup Administrator to monitor the utilization of tape libraries. The report is available at the site and tape library levels. For a selected site, you can obtain information on the drives and cells for its tape libraries.

Proceed as follows:

1. Select **Backup/Restore -> Tape Libraries -> Library Asset Report**.
2. Select a site to display the Tape Library Utilization report. The Tape Library Utilization report appears in the report pane.

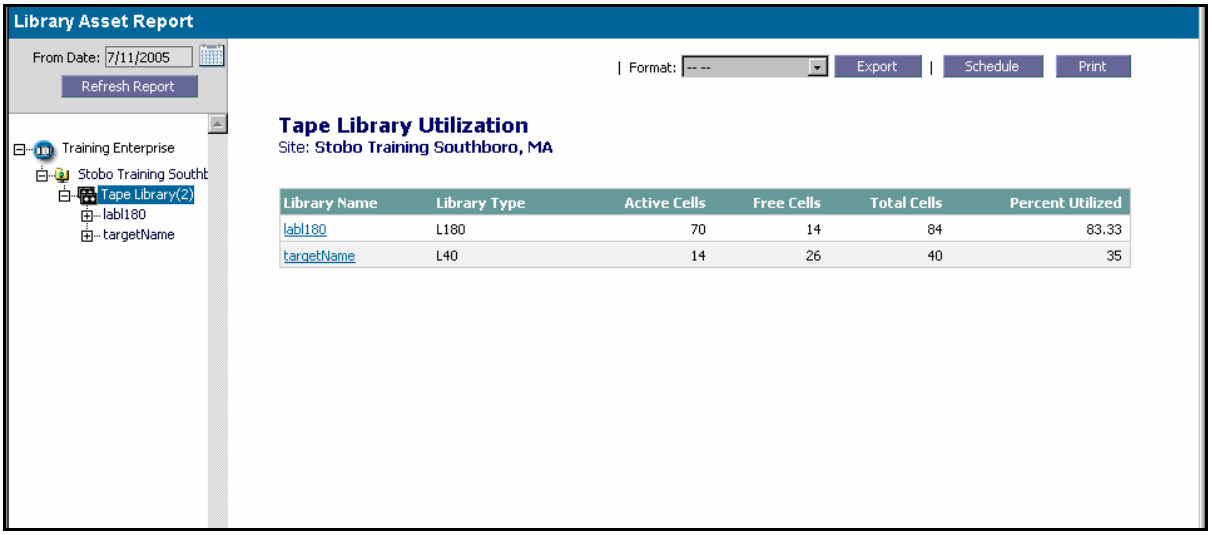


Figure 84 – Library Asset Report

Tape library utilization shows the library name, library type, number of free cells, number of active cells, total cells, and percentage of cells utilized. Clicking on the **Library Name** link displays the tabular device report, Detailed Library Configuration, for the selected tape library. Refer to Chapter 2 for a description of the tabular device report, Detailed Library Configuration.

3. Optionally use the **Calendar** function to select a date or accept the default value of the current date.
4. Expand a **site** in the navigation pane and view a list of all tape libraries contained at that site.
5. Click on a **tape library** in the navigation pane to view the tabular device report, Detailed Library Configuration View, for that tape library.

Global Status Report

The Global Status Report provides the Backup Administrator general library and CAP status information. The report is available at the enterprise and site levels. Proceed as follows:

1. Select **Backup/Restore -> Tape Libraries -> Global Status Report** and the Global Status Report appears.

2. Click enterprise or the desired **site** in the navigation pane and the Library Status View Report appears in the center pane.

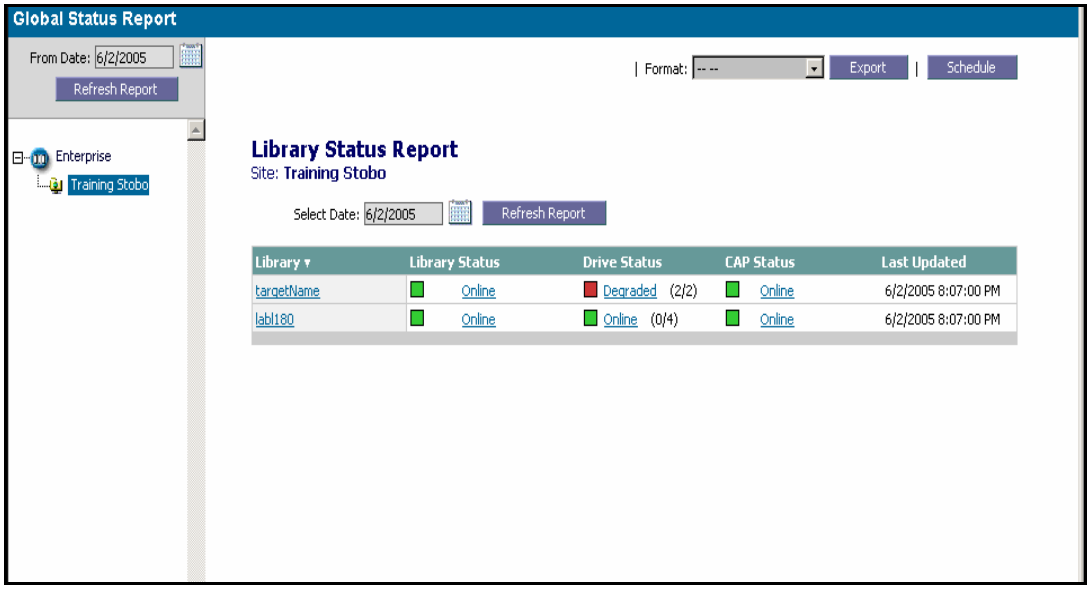


Figure 85 - Global Status Report

For each tape library, the library status, drive status, and cap status appear. The **Library** link displays the Library Configuration View.

The Library Configuration View contains a utilization pie chart, a trending line graph, and the library's hardware/software configuration in tabular format.

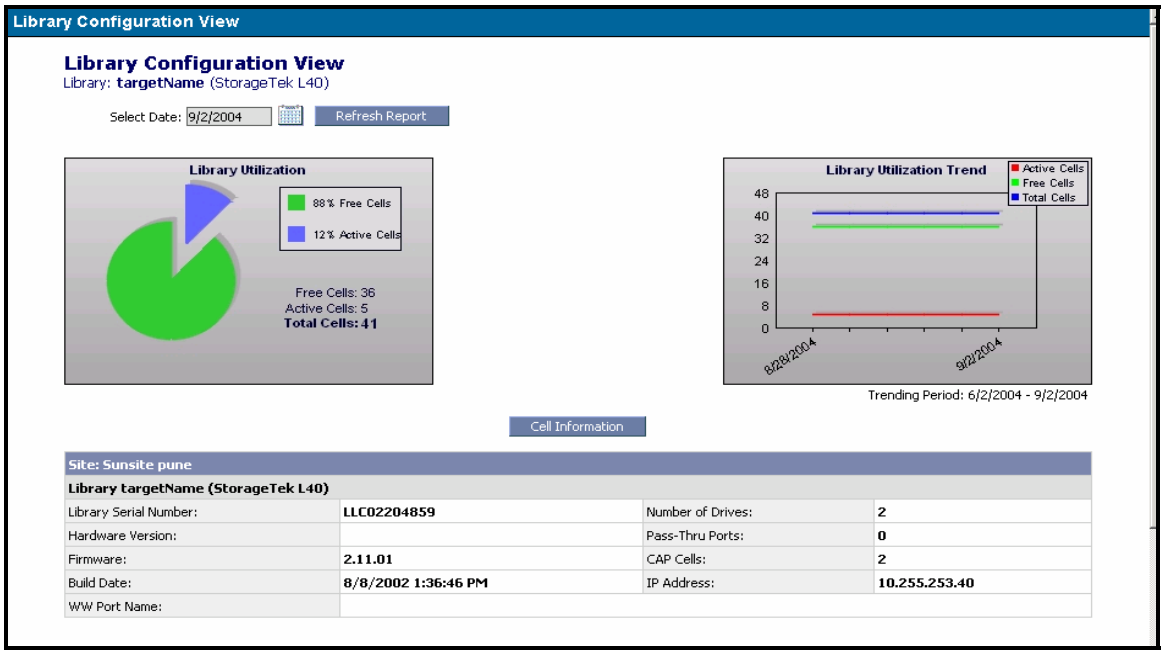


Figure 86 - Library Configuration View

The trending information covers the last three months, such as the above report's date range of 6/2/2004 through 9/2/2004 where the report was generated on 9/2/2004.

Clicking the **Cell Information** button displays the Cell Information report. For the library, it shows the Cell ID, Label, and Media Type. The **Label** link displays the Backup Media Details report. This detailed report shows the media capacity, status, number of

backup images, number of restores, its volume pool, when it was last read, mounted, and written. It also allows the administrator to see how much data (MB) has been written and whether or not the media is full. Sun StorageTek Business Analytics obtains this information if it is available from the backup application.

If the agent is successfully communicating with the tape library, the status is indicated as "Okay" and the status box is green. If the agent is not successfully communicating with the tape library, the status is indicated as "Unknown" and the status box is yellow. An error status is flagged using a status box of red. Clicking on a component with an error status displays a more detailed component report. For example, clicking on a drive status of "Degraded" displays the Drive Status View, shown below.

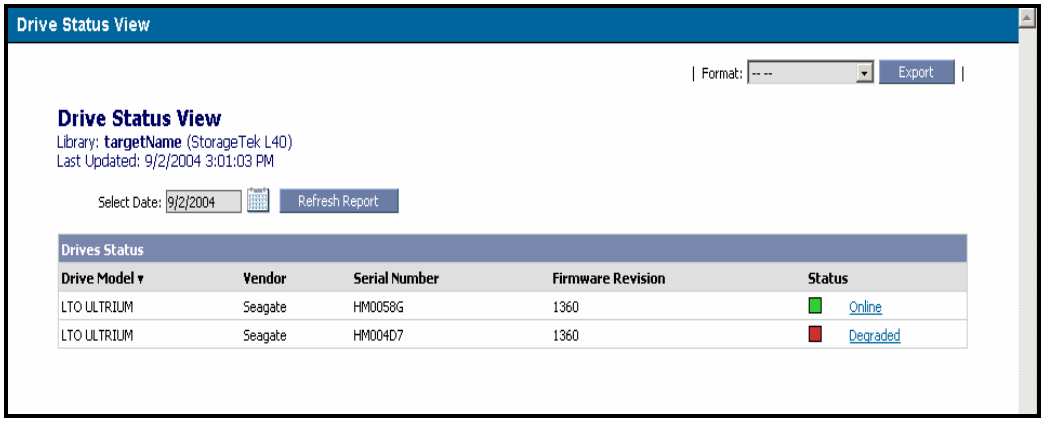


Figure 87 - Drive Status View

The backup administrator can view the drive model, vendor, serial number, and firmware revision to more expediently address the problem.

Clicking the **Degraded** link displays the Drive Status Detail report that lists any available events in the Events table. The Events table shows the event ID, source, description, and time.

Library Statistics Report

The Library Statistics Report provides library usage statistics that include the number of initializations, exchange rate per hour and total number, the percentage of target reads that were successful, and the number of retries for a selected site.

For a site, the report contains the library name, number of initializations, exchange rate/hour, total number of exchanges, the percentage of target reads that were successful, and the number of retries for target reads. The **Library Name** link displays the Library Configuration Report.

If a specific tape library is selected, the Library Statistics Report header provides the site name, library name, and Calendar functions to set a start date and time and an end date and time.

Clicking the **Drives** button displays the Library Drive Statistics report. It shows the Drive ID, number of mounts, number of mount retries, the number of dismounts, and the number of dismount retries.

The report provides the following line graphs:

- **Library Activity** – Shows resets, moves, door opens, and empty reads
- **Mounts and Dismounts** – Shows mounts and dismounts
- **Label Reads** – Shows retries, failures, and successful reads
- **Target Reads** - Shows retries, failures, and successful reads
- **Media Retrieval Activity** – Shows retries, failures, and retrievals
- **Media Insertion Activity** – Shows, retries, failures, and insertions
- **Enters and Ejects** – Shows enters and ejects

For planning purposes, a **Trending** button is located beside each line graph in the report. Trending data is based on the collection of statistics on a daily basis over the past thirty days.

Backup Media Search

The Backup Media Search report is allows you to locate tape media tracked in the database by entering one of the following search strings:

- Tape label
- Backup client
- Backup server

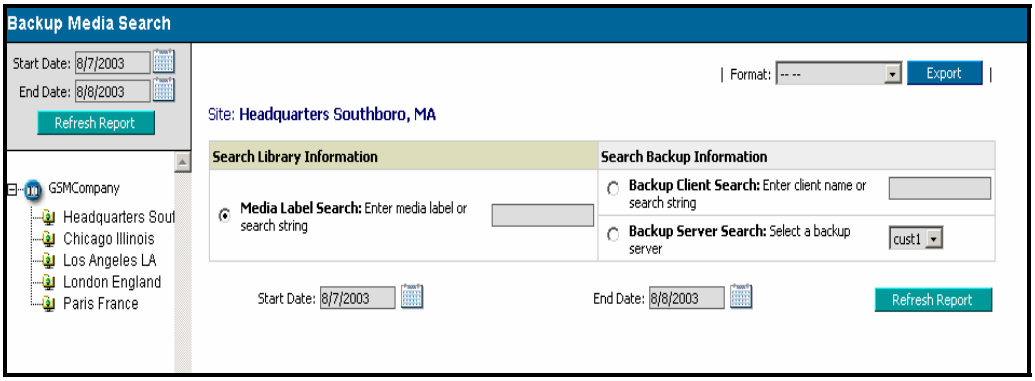


Figure 88 - Backup Media Search

The Backup Media Search report is currently available for the Veritas NetBackup (not Legato NetWorker) backup application.

The Backup Media Search report allows you to locate tape media by entering a tape label as a search string, entering a backup client as a search string, or by entering a backup server as a search string.

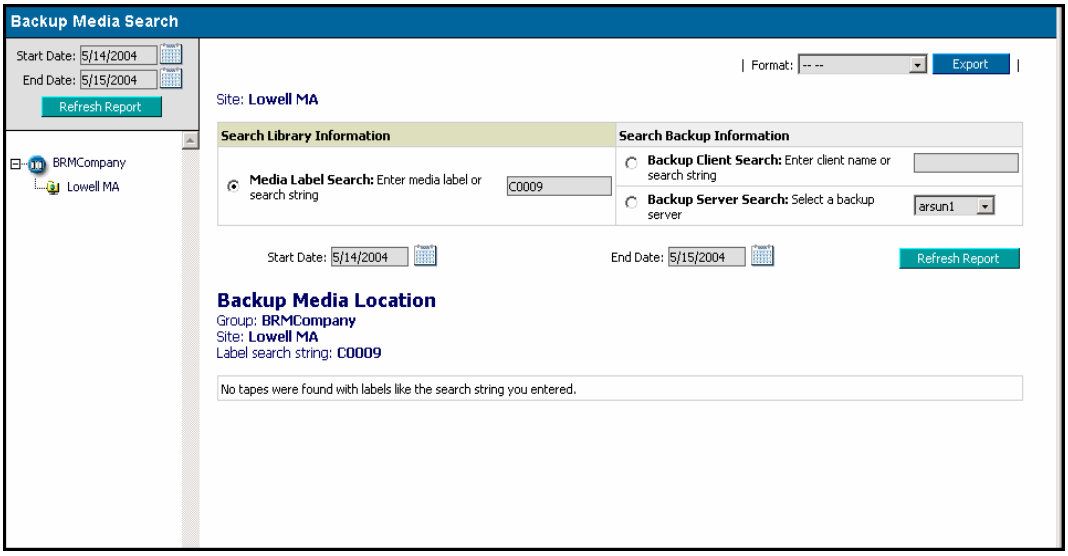


Figure 89 - Backup Media Search

After you specify your search criteria, click **Refresh Report**. If the media is located, the report will display the Backup Media Location table, similar to the one shown below.

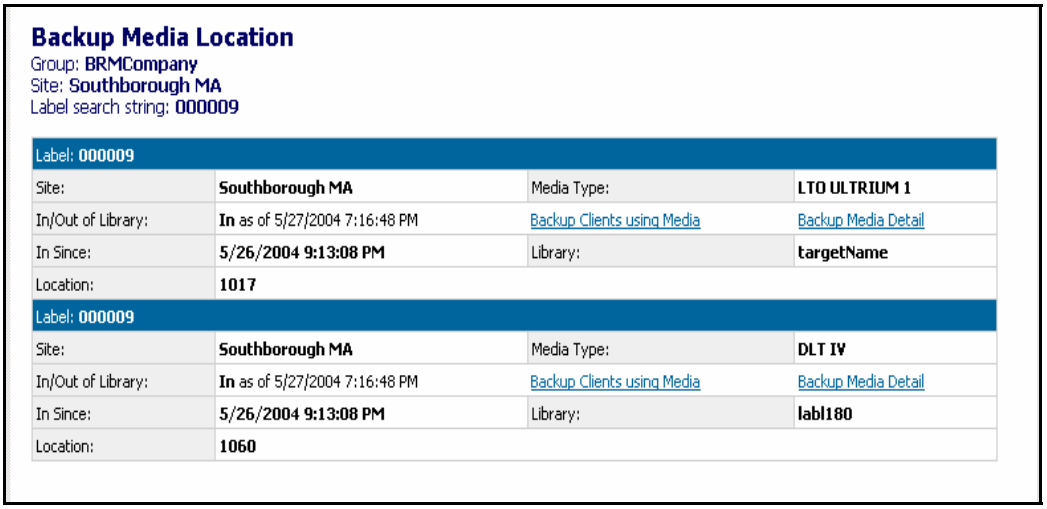


Figure 90 - Backup Media Location

The table shows the site, how long the media has been in the library, and the media type. Clicking on the Backup Media Link displays the Backup Media Details report, similar to the one shown below.

Clicking the **Backup Clients using Media** link displays the backup client name, the master server, and the media id.

Clicking the **Backup Media Detail** link displays the Backup Media Detail report, similar to the one that follows.

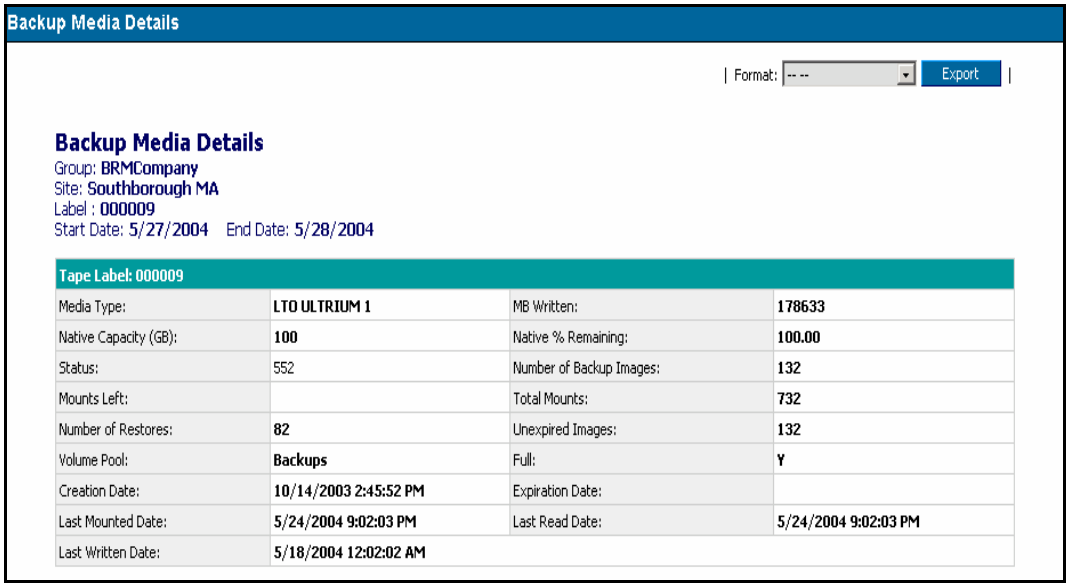


Figure 91 - Backup Media Details

This detailed report shows the media capacity, status, number of backup images, number of restores, its volume pool, when it was last read, mounted, and written. It also allows the administrator to see how much data (MB) has been written and whether or not the media is full. Sun StorageTek Business Analytics obtains this information if provided by the backup application.

TAPE DRIVE ALLOCATION

Tape Drive Allocation provides two reports:

- **Daily Tape Drive Allocation Summary** – Shows for a particular library a summarized (count by status) during a twenty-four hour interval.
- **Daily Tape Drive Allocation Detail** – Shows the status for each drive installed in the library during a 24-hour day.

You only see tape libraries (assets) for which you have authorization through your view.

1. Select **Backup/Restore -> Tape Libraries -> Tape Drive Allocation** and the Tape Drive Allocation report main window appears.
2. Expand the desired **site** in the navigation pane and the tape libraries are listed.
3. Click on the icon for the desired tape library and the Daily Tape Drive Allocation Summary report is displayed.

   The report header identifies the site name, location, report interval, and total number of drives installed in the library at the specified time. The Library Name is a report link to the Library Configuration report.

   As indicated in the navigation pane, time is in GMT format.

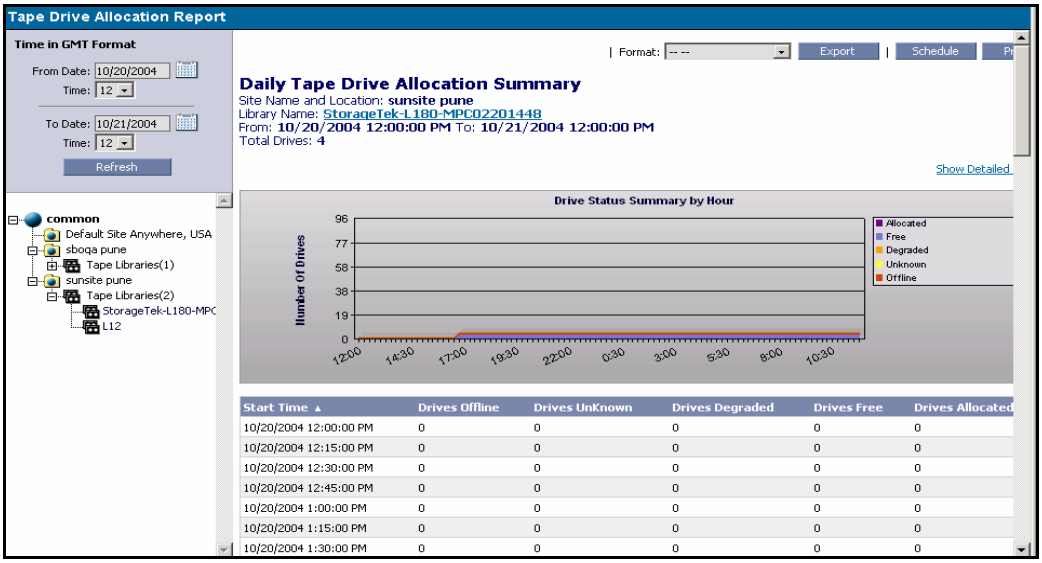


Figure 92 - Daily Tape Drive Allocation Summary

The navigation pane allows you to change the default start date/time and end date/time. The default value is the previous 24-hour day but it can be less than twenty-four (24) hours.

The Drive Status Summary by Hour area chart shows the number of drives per status by hour. The statuses are color-coded in the chart. These include allocated (busy/loaded), free (empty), degraded, Unknown (okay/unknown), and offline (offline/init).

The table beneath the area chart shows the data that was used to produce the chart. The drive status is calculated in increments of fifteen (15) minutes. For ease of use, times are rounded to the nearest "neat" time. For example, if data was collected at 1:06 and 1:21, the first data value will be presented as 1:00, and the second will be presented as 1:15.

4. To display detail-level tape library allocation report, click the **Show Detailed Report** link above the area chart.

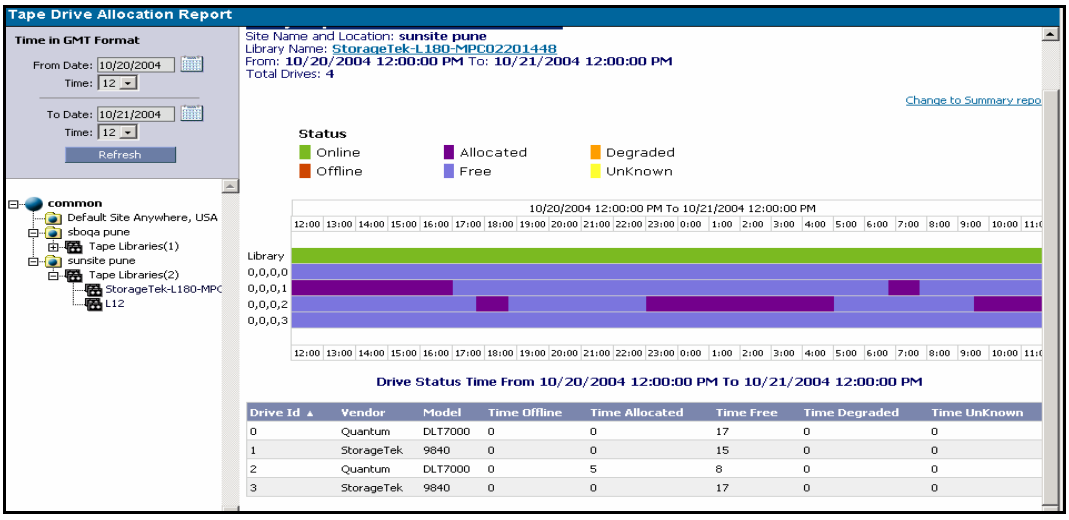


Figure 93 - Daily Tape Drive Allocation Detail

The report header identifies the site name, location, report interval, and total number of drives installed in the library at the specified time. The Library Name is a report link to the Library Configuration report.

As indicated in the navigation pane, time is in GMT format.

The top section of the report pane displays a schedule chart showing the summarized status for each identified drive. The X-axis shows the times in increments of fifteen minutes and the Y-axis identifies each installed library drive. Beneath the schedule graph, the data that was used to produce the graph appears in tabular format.

The Drive ID, Vendor, Model, Time Offline, Time Allocated, Time Free, Time Degraded, and Time Unknown headings can be clicked to change the sort order. The current sort order is signified by the triangle icon appearing beside that table column heading. For example, the data is sorted by Drive ID in the above sample report.

Clicking the **Change to Summary report** link displays the Daily Tape Drive Allocation Summary report.

Chapter Six - Servers

This chapter describes the different reports available through the Management Console's **Servers** pull down menu.

HBA Configuration

The HBA Configuration report displays the vendor model, WWN, IP address, node name and driver revision level of each Host Bus Adapter (HBA); it also summarizes this information by enterprise or site.

HBA configuration details are presented in a pie chart, which shows the amount and percentage of HBAs by vendor. The table beneath the pie chart contains the following information:

- Node Name
- World Wide Name (WWN) for the Adapter
- IP Address of Host
- Vendor Model of the Adapter
- Driver Revision of Microcode
- Operating System

Proceed as follows:

1. Select **Servers** from the Home Page.
2. Select **HBA Configuration** and the HBA Configuration main window is displayed.
3. In the upper left section of the menu control tree, use the **Sort By** radio box to set the report to be generated by Site or by Vendor.
4. Use the **Calendar** function to set the start date.
5. Click on a view or site to generate a report for the enterprise or selected site, respectively.

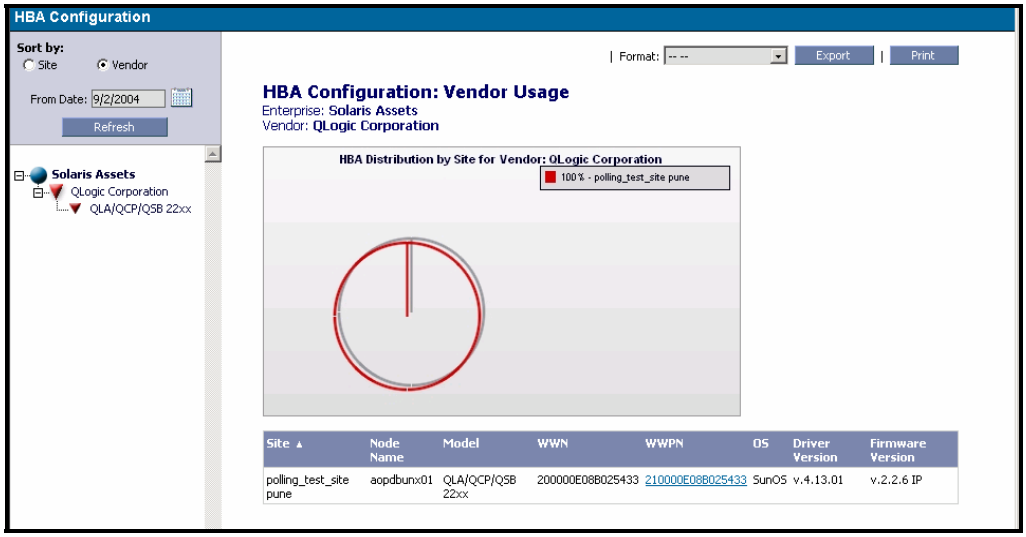


Figure 94 - HBA Configuration: Vendor Usage

Clicking the **WWPN** link displays the **HBA Details** report, similar to the one shown below.

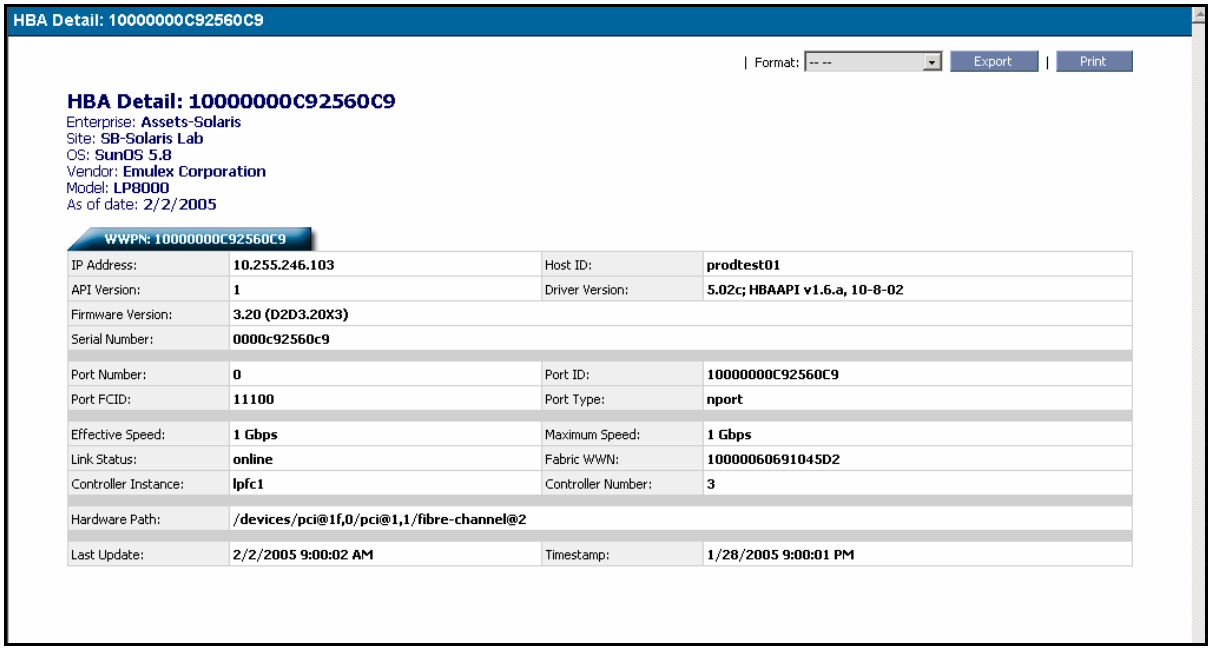


Figure 95 - HBA Detail

OS TYPE

The OS Type report shows you the operating system of each server, and the percentage of operating system types by site. At the level of the individual server, it shows you the node name, the IP address, and the kernel patch level.

Clicking a **Site** will expand the listing to show the different operating systems deployed at that site. Clicking an **Operating System** will produce a report detailing each system running the selected operating system type.

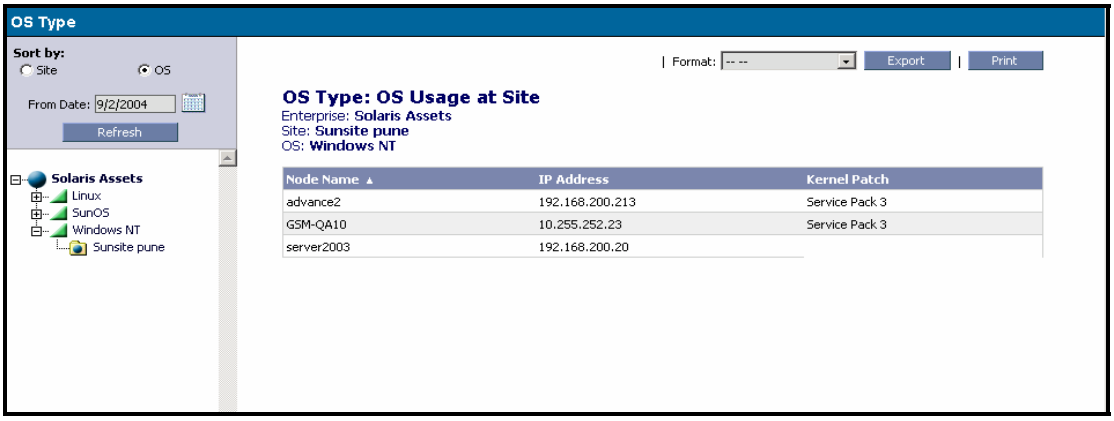


Figure 96 - OS Usage at Site

Server Trending and Forecasting

The Server Trending and Forecasting report allows you to determine the filesystem utilization patterns for organization. The report is available at the view, site, server, and filesystem levels.

The navigation pane provides options as follows:

- Trending - The Trending option allows you to analyze historical consumption for a file-system, server, site, or the entire enterprise. This option only looks at past consumption.
- Forecasting - The Forecasting option allows you to project future file-system requirements based upon past usage and planned projects. Use this report to determine when you will need to allocate additional storage to the server.
- Date Range - These fields indicate the date range that the report should use to calculate the forecast. If the range is less than a month long, the report will use a value from the end of each day to calculate the forecast. If the range is between 1 and 6 months, the report will use a value from the end of each week to calculate the forecast. If the range is longer than 6 months, the report will use a value from the end of each month to calculate the forecast.
- Forecast Period - Enter how far into the future you would like the report to forecast.
- Targeted Maximum Consumption - If you wish to maintain a reserve of space, indicate the amount as a percentage of your total. In other words, if you wish to manage your file-system to 90% maximum usage (and maintain a 10% reserve), then enter 90% into this field. The report will indicate the date when you can anticipate running out of space based on historical usage.

Filesystem Utilization

To assist in activities like backup planning and storage provisioning, the Filesystem Utilization report provides the Sun StorageTek Business Analytics administrator insight into the distribution of files and their relative sizes across the various file systems.

The information for each file system includes:

- Host name
- File system name

- Type (e.g., NTFS)
- Total size (MB)
- Used size (MB)
- Percentage used (numerical and bar graph formats)

If a particular drive is configured as raw storage for a database, it is interpreted as 100% utilized within the filesystem utilization reports. The control pane provides the "Suppress Filesystems with 100% utilization check box. Putting a check mark in the check box allows you to suppress drives that are reported as 100% utilized.

The navigation pane allows you to:

- Select a sort order of either by site or by OS
- Use the **Calendar** function to refresh data to a desired date

A sample filesystem listing appears below.

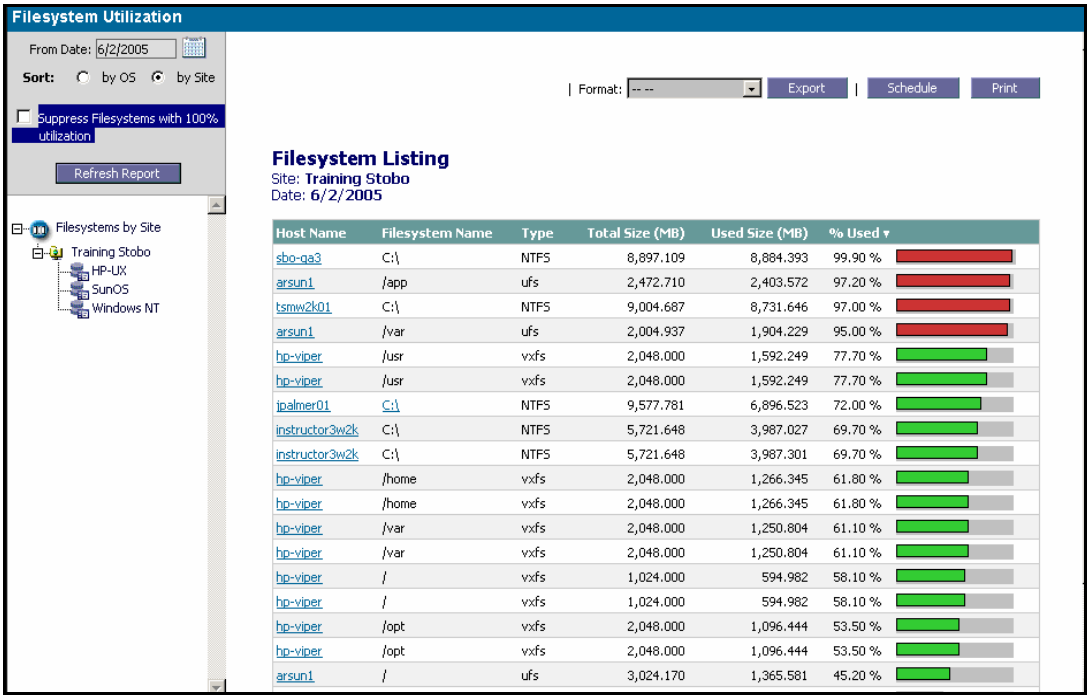


Figure 97 - Filesystem Listing

Note: In general, the file system reports provide a set of buttons at the bottom of the screen that allow you to navigate forwards (>), backwards (<), to a particular page, to the first page (|<), or to the last page (>|) of a report. Click **Show All** to display all the details without pagination.

Clicking the **Host Name** link displays the Detailed Host Configuration and Utilization tabular report for the selected host server. Refer to Chapter 2 to obtain information on this tabular report.

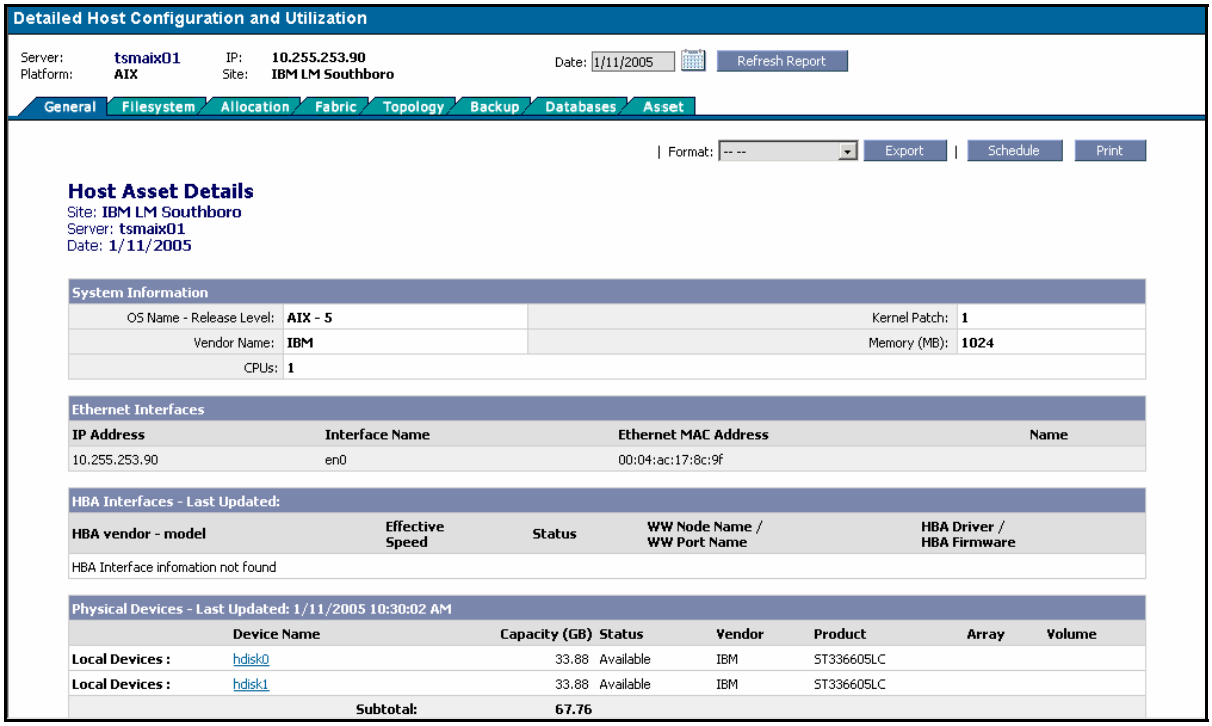


Figure 98 - Detailed Host Configuration and Utilization

FILESYSTEM CONSUMERS

This report illustrates the amount of storage capacity used by particular hosts. The navigation pane allows you to select the enterprise, site, or host server.

The report pane provides the following information:

- Host Name
- Consumer Name (file system owner)
- Group Name
- Consumed Space (MB)

Use the **Calendar** function to display a report for a date other than the current date. Clicking the **Host Name** link displays the Detailed Host Configuration and Utilization report. Refer to the previous Host Configuration section for additional information on the Detailed Host Configuration and Utilization report.

A sample Filesystem Consumers report follows.

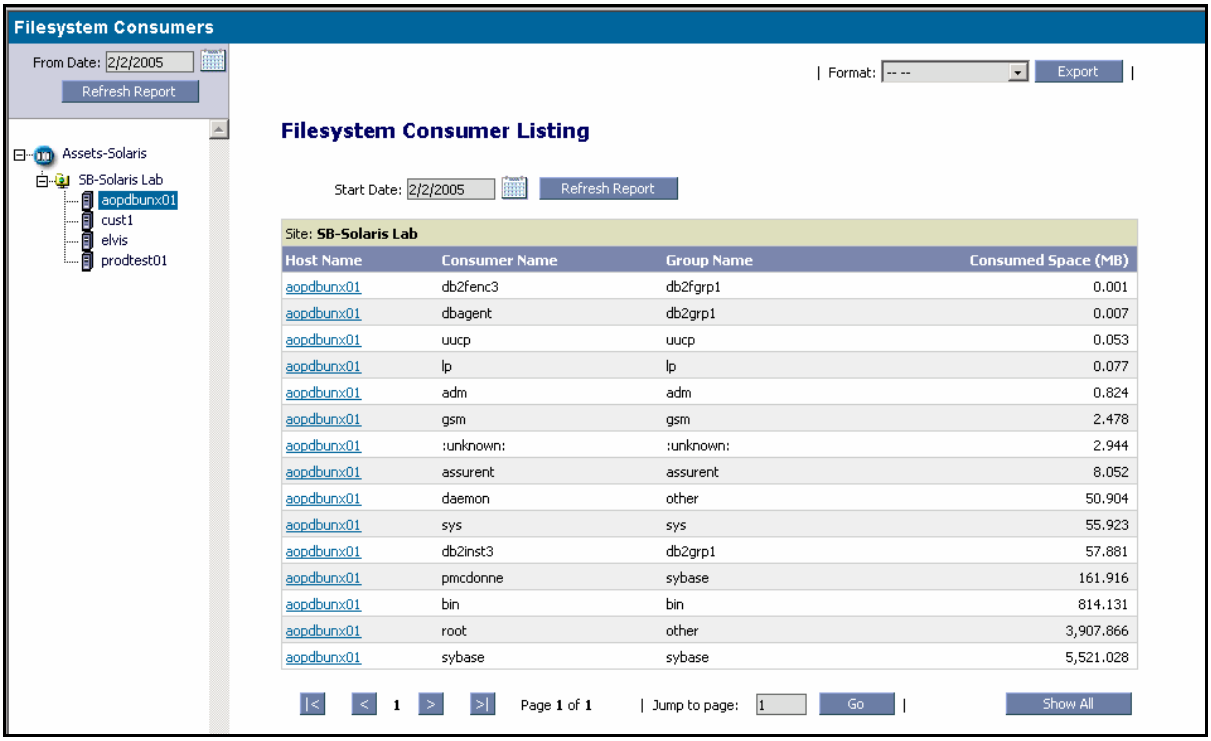


Figure 99 - File System Consumers – Server Level

Clicking the plus sign (+) allows you to browse the various servers at a site. Choosing a **server** displays the capacity usage, shown in the above figure, for the selected host server.

FILESYSTEM AGE

The File System Age menu selection provides access to three reports:

- File System Age:% Accessed
- File System Age: %Modified
- File System Age: %Created
- Wizard

Note: If a particular drive is configured as raw storage for a database, it is interpreted as 100% utilized within the File System Age reports. The control pane of these reports provides the "Suppress Filesystems with 100% utilization check box. Putting a check mark in the check box allows you to suppress drives that are reported as 100% utilized in these reports.

FILESYSTEM AGE: % ACCESSED REPORT

This report helps the Sun StorageTek Business Analytics administrator to determine obsolete files that are candidates for deletion on a selected host server. The navigation pane allows you to select the desired aging factor of one hour, one day, seven days, one month, three months, one year, or seven years. Clicking an age factor (e.g., 1 day) displays the Filesystems: Accessed report for all sites. It identifies the site (by ID), the host server name, the file system name, the Total Size (MB), the Used Size (MB), the Size Accessed (MB), and the percentage % Accessed.

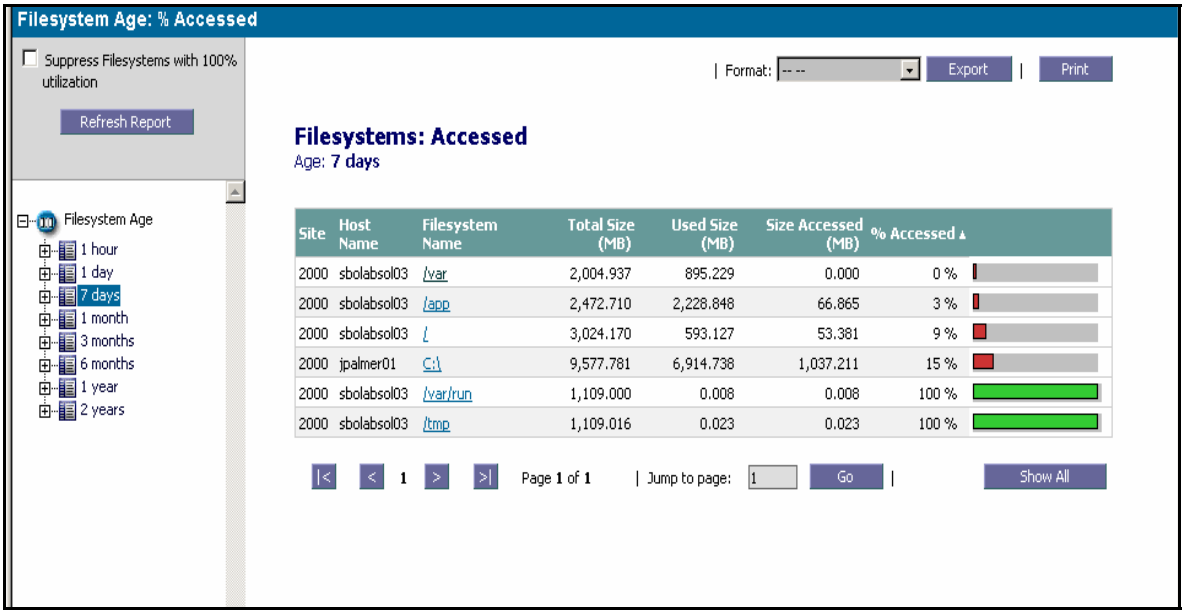


Figure 100 - Sample Filesystem Accessed Report

You can expand an aging factor in the navigation pane and click a particular **site** to generate the site-level Filesystems: Accessed report.

Choosing a particular site displays the report at the site level. Choosing a particular host server displays the Filesystems: Accessed report for the selected server in the center pane.

You can use the toolbar at the bottom of the screen in some reports to navigate through the reports. Various tool bar buttons are enabled or disabled depending on what view level is current. The Navigation Toolbar is shown below.

The table that follows describes the navigational controls.

Left stop	Go to the first page
Left arrow	Go to the previous page
Jump to Page	Go to the page specified
Right arrow	Go to the next page
Right stop	Go to the last page
Show All	Show entries without pagination
ShowPagination	Show entries with pagination

Table 10 - Navigational Toolbar for Filesystem Reports

FILESYSTEM LEVEL DETAILS

Choosing a particular **Filesystem Name** in any of the Filesystem Age reports will display the **Filesystem Level Details** report in the center pane.

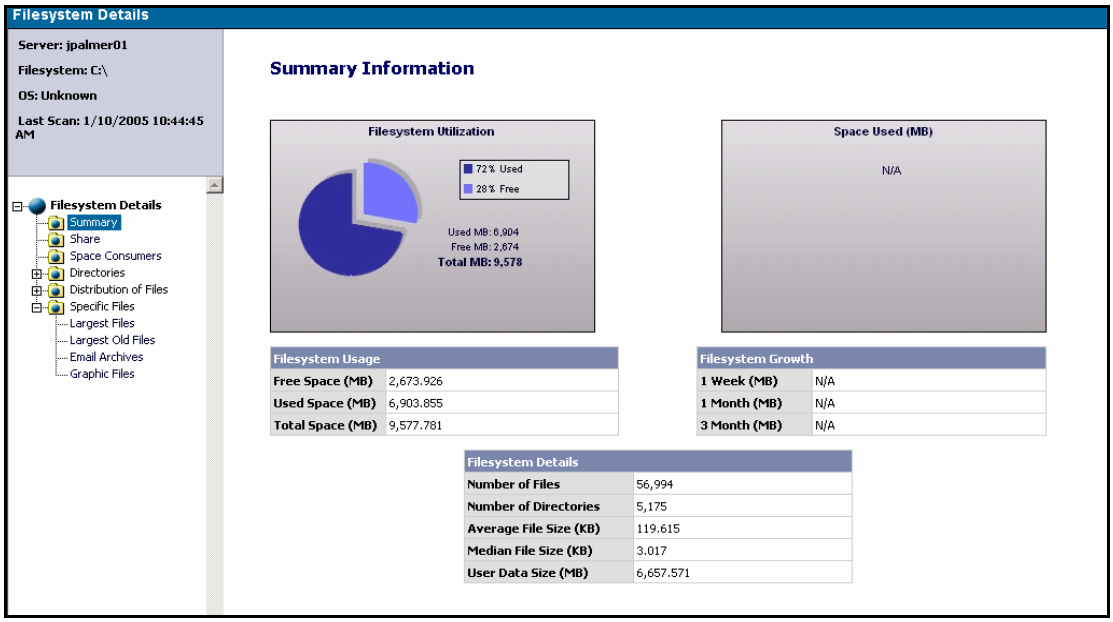


Figure 101 - Filesystem Level Details

The navigation pane allows you to select Summary Information, Share, Directories, Distribution of Files, or Specific Files reports.

- Summary Information – Shows the file system usage, file system growth, and file system details (e.g., number of files).
- Share – Lists the share name, the share type, the share path, the filesystem name, and options.
- Space Consumers – Identifies the user name, the group name, and the consumed space (MB) for various filesystem consumers

Expanding the **Directories** heading allows you to select Temporary Directories, which shows the directory name, the owner, and the space used (MB). This heading also provides access to Nth level directory reports, if this configuration option is set up in the SRM Agent Configuration File (config_srm.xml).

Expanding the **Distribution of Files** heading allows you to select generating the report by file type or file size. Specific Files provides access to reports on largest files, largest old files, email archive, and any user-defined, specific file types defined in the SRM Agent Configuration File.

The pie charts in the center pane show file system utilization and space used in MB. This data appears in tabular format beneath the pie charts.

FILESYSTEM AGE: % MODIFIED REPORT

This report can also help the Sun StorageTek Business Analytics administrator to determine obsolete files that are candidates for deletion on a selected host server. The navigation pane allows you to select the desired aging factor of one hour, one day, seven days, one month, three months, one year, or seven years.

You can select an aging factor and then click a **site** in the navigation pane to display a site-level report.

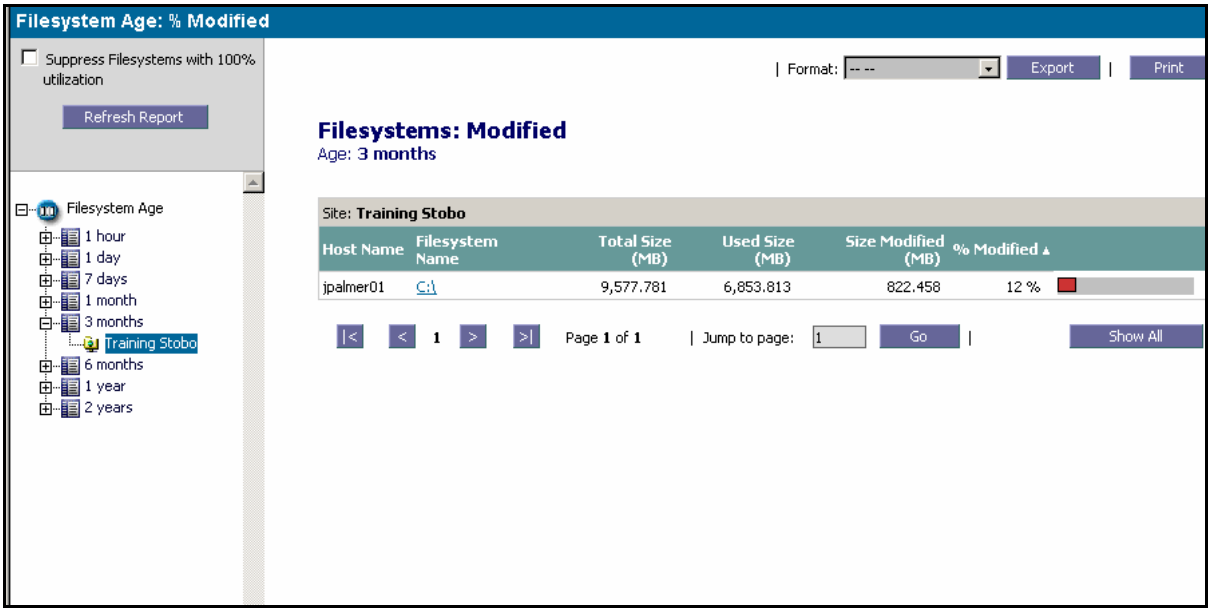


Figure 102 - Filesystem Age: % Modified

The site, host name, file system name, total space, used space, sized modified, and percentage modified appears for each file system.

Filesystem Age: % Created Report

This report also helps the Sun StorageTek Business Analytics administrator to determine to what extent storage capacity is utilized via the creation of new file systems. This information can help to provision storage as necessary to accommodate growth and to configure backup policies to handle new file systems.

The navigation pane allows you to select the desired aging factor of one hour, one day, seven days, one month, three months, one year, or seven years.

You can select an aging factor and then click a site in the navigation pane to display a site-level report.

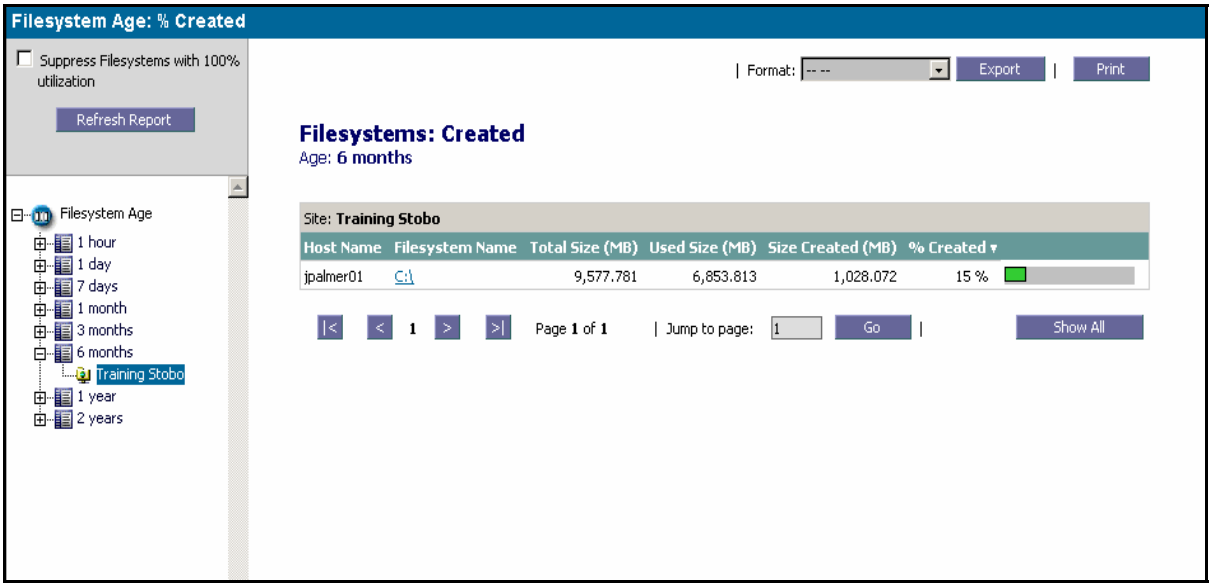


Figure 103 - Sample Filesystem Age: % Created Report

FILE-LEVEL WIZARD

The File-Level Wizard allows you to generate and save personal reports. It provides the following standard capabilities:

- Select fields (from a pre-defined list)
- Enter conditions (or filters) that control what data records are displayed
- Determine the order in which records displayed
- Use the above conditions to generate a report that can be printed and/or saved for future use
- Export data to standard formats (ASCII, Excel, .XML)

Proceed as follows:

1. Select **Servers->Reporting Wizards-> File-Level Wizard**. The **Step 1 of 4: SRM Files Wizard** window is displayed. The default option is to create a new report by clicking **Next>>** to continue. You can select a report from the Available Reports dropdown list, click **Finish>>** to execute report without changing parameters, or select a report and Click the **Delete>>** button to delete a saved report.
2. After you create **Next>>**, the **Step 2 of 4: SRM Files Wizard - Choose Columns** window is displayed.

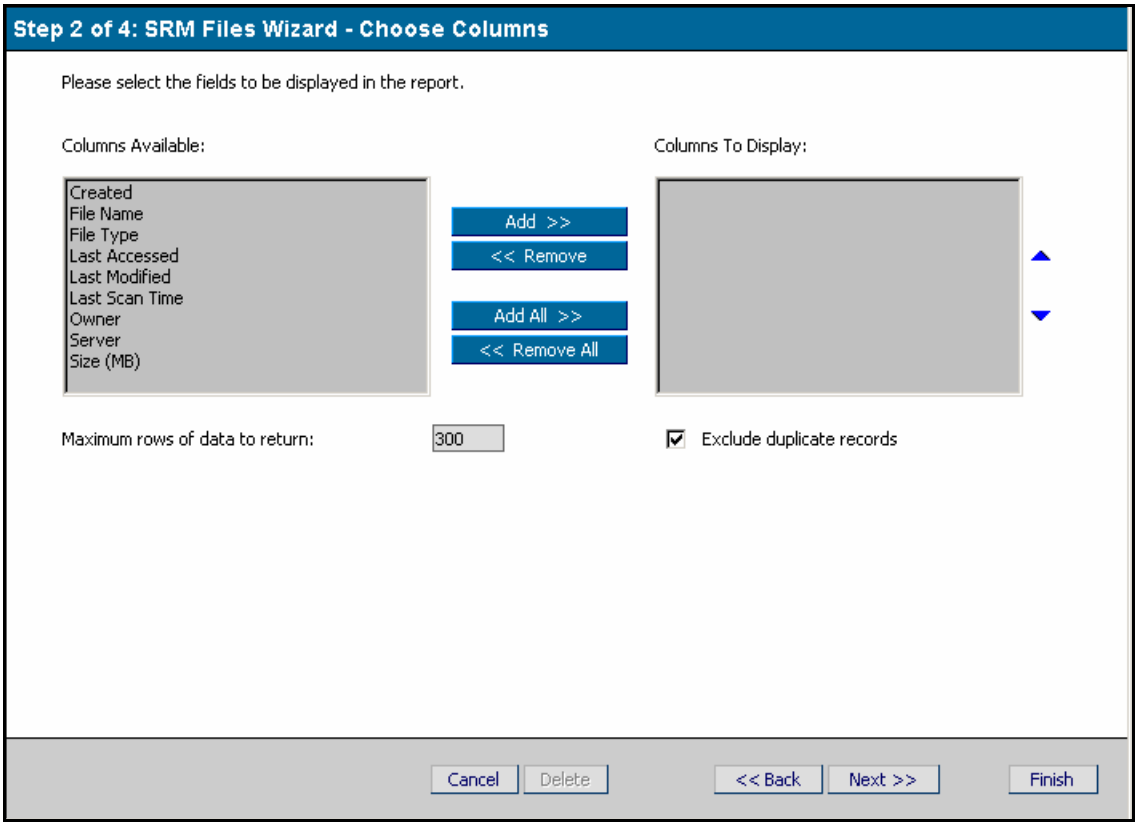


Figure 104 - Step 2 of 4: SRM Files Wizard - Choose Columns

3. All columns that can be selected for the report are displayed in the **Columns Available** list box. Column names must be in right panel to display. To select the columns for your report, use the **Add>>**, **Remove>>**, **Add All>>**, and **Remove All>>** control buttons to add/remove columns to/from the **Columns to Display** list box. The default maximum number of rows to be displayed is 300. This can be changed for an individual execution of report, but is not saved. You can select a Column Name and press one of the blue arrows to move it up or down in the list. This is the order in which they will display (left to right) in the resulting report. "Exclude duplicate records" is enabled by default.
4. After you select the columns and click **Next>>**, the **Step 3 of 4: SRM Files Wizard - Select Filters** window is displayed.

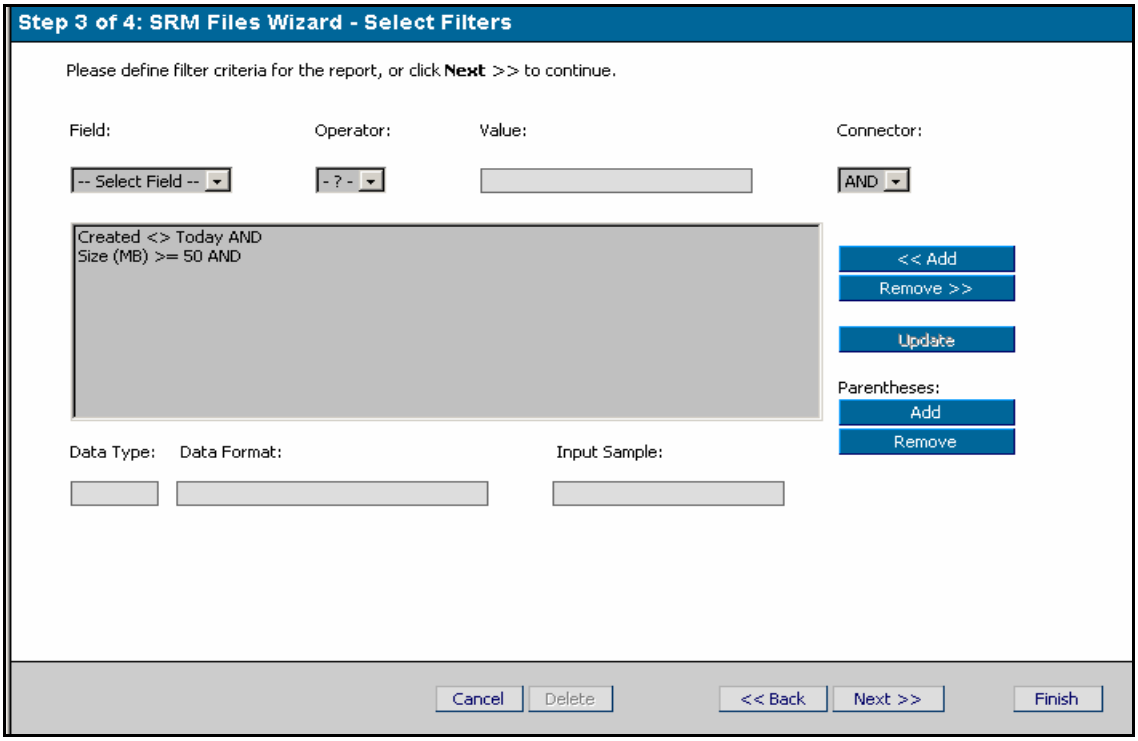


Figure 105 - Step 3 of 4: SRM Files Wizard - Select Filters

5. Set optionally any desired record selection criteria for the SQL query that is used to extract data for the report. To do so, use the Field, Operator and Value parameters. You can enter a relative date, where the syntax is "Today-n" and n sets the number of days. For example, "Today – 60" will deliver all files that have not been accessed in the past 60 days.
6. After you select filters and click **Next>>**, the **Step 4 of 4: SRM Files Wizard - Sorting** window is displayed. The columns you add to the Sort Keys list box determine the sort order for the report.
7. After you define the sort order and click **Next>>**, the customized report is generated and displayed. To save a report, enter a report name, and then press the **Save Report** button. The **Available Reports** list box will allow you to generate previously saved wizard reports.

   To export the data, first select an export format and click the **Export** button.

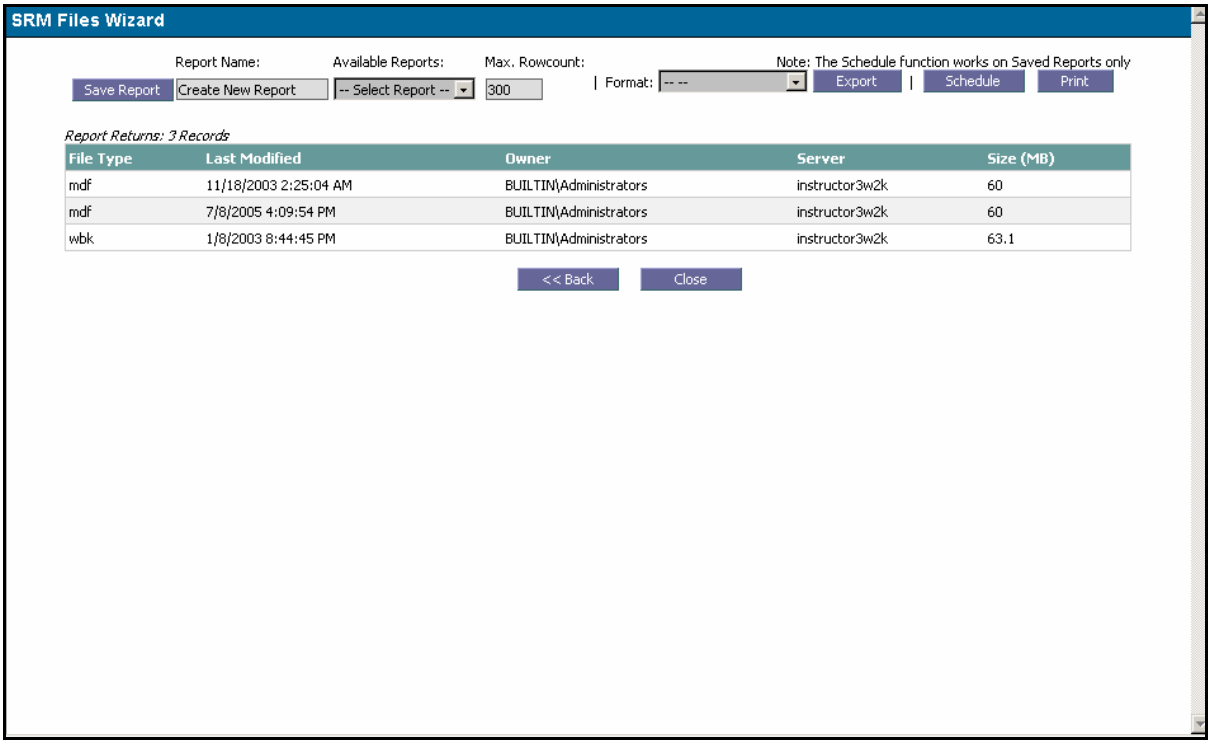


Figure 106 - Sample SRM Files Wizard Report

HOST FILESYSTEM REPORT WIZARD

The Host Filesystem Report Wizard allows you to create custom reports using the host filesystem table. You specify a list of data columns, filters, and sorting criteria when you use the wizard.

The wizard may have the following buttons enabled:

- Delete – Delete a specified existing report.
- Back – Return to previous template window.
- Next – Go to next step in the process.
- Finish – Skip the remaining steps and display the report based on the current query criteria.
- Cancel – Abort the procedure and exit.

Proceed as follows:

1. Select **Servers** from the Home Page.
2. Select **Reporting Wizards** -> **Filesystem Wizard**. The **Step 1 of 4: Host Filesystem Report Wizard** window appears. The default option is to create a new report by clicking **Next>>** to continue. You can select a report from the **Available Reports** dropdown list, click **Finish>>** to execute report without changing parameters, or select a report and Click the **Delete>>** button to delete a saved report.
3. After you click **Next>>** to create a new report, the **Step 2 of 4: Host Filesystem Report Wizard - Choose Columns** window is displayed.

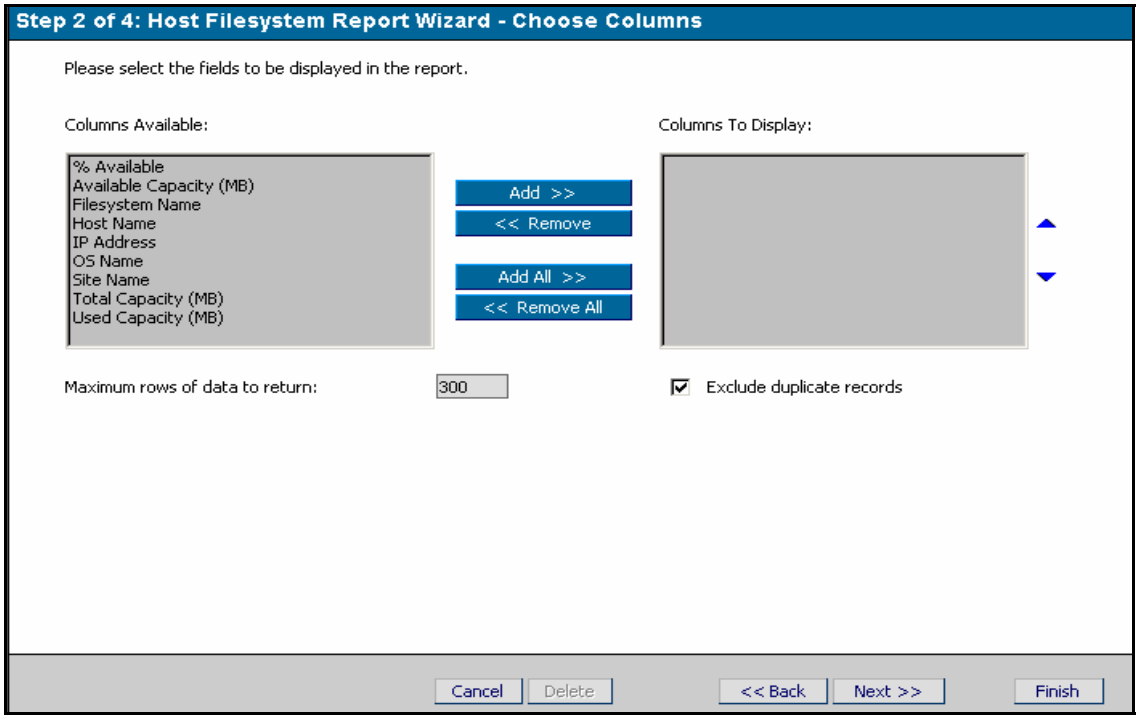


Figure 107 – Step 2 of 4: Host Filesystem Report Wizard – Choose Columns

4. All columns that can be selected for the report are displayed in the **Columns Available** list box. Column names must be in right panel to display. To select the columns for your report, use the **Add>>**, **Remove>>**, **Add All>>**, and **Remove All>>** control buttons to add/remove columns to/from the **Columns to Display** list box. The default maximum number of rows to be displayed is 300. This can be changed for an individual execution of report, but is not saved. You can select a Column Name and press one of the blue arrows to move it up or down in the list. This is the order in which they will display (left to right) in the resulting report. "Exclude duplicate records" is enabled by default.
5. After you select the columns and click **Next>>**, the **Step 3 of 4: Host Filesystem Report Wizard - Select Filters** window is displayed.
6. Set optionally any desired record selection criteria for the SQL query that is used to extract data for the report. To do so, use the Field, Operator and Value parameters.
7. After you select filters and click **Next>>**, the **Step 4 of 4: Host Filesystem Report Wizard - Sorting** window is displayed. The columns you add to the Sort Keys list box determine the sort order for the report.
8. After you define the sort order and click **Next>>**, the customized report is generated and displayed. To save a report, enter a report name, and then press the **Save Report** button. The **Available Reports** list box will allow you to generate previously saved wizard reports.

   To export the data, first select an export format and click the **Export** button.

Server Report Wizard

The Server Report Wizard allows you to create custom reports based on information stored in the host configuration table. You specify a list of data columns, filters, and sorting criteria when you use the wizard.

The wizard may have the following buttons enabled:

- Delete – Delete a specified existing report.

- Back – Return to previous template window.
- Next – Go to next step in the process.
- Finish – Skip the remaining steps and display the report based on the current query criteria.
- Cancel – Abort the procedure and exit.

Proceed as follows:

1. Select **Servers** from the Home Page.
2. Select **Reporting Wizards** -> **Server Wizard**. The **Step 1 of 4: Server Report Wizard** appears. The default option is to create a new report by clicking **Next>>** to continue. You can select a report from the **Available Reports** dropdown list, click **Finish>>** to execute report without changing parameters, or select a report and Click the **Delete>>** button to delete a saved report.
3. After you click **Next>>** to create a new report, the **Step 2 of 4: Server Report Wizard - Choose Columns** window is displayed.

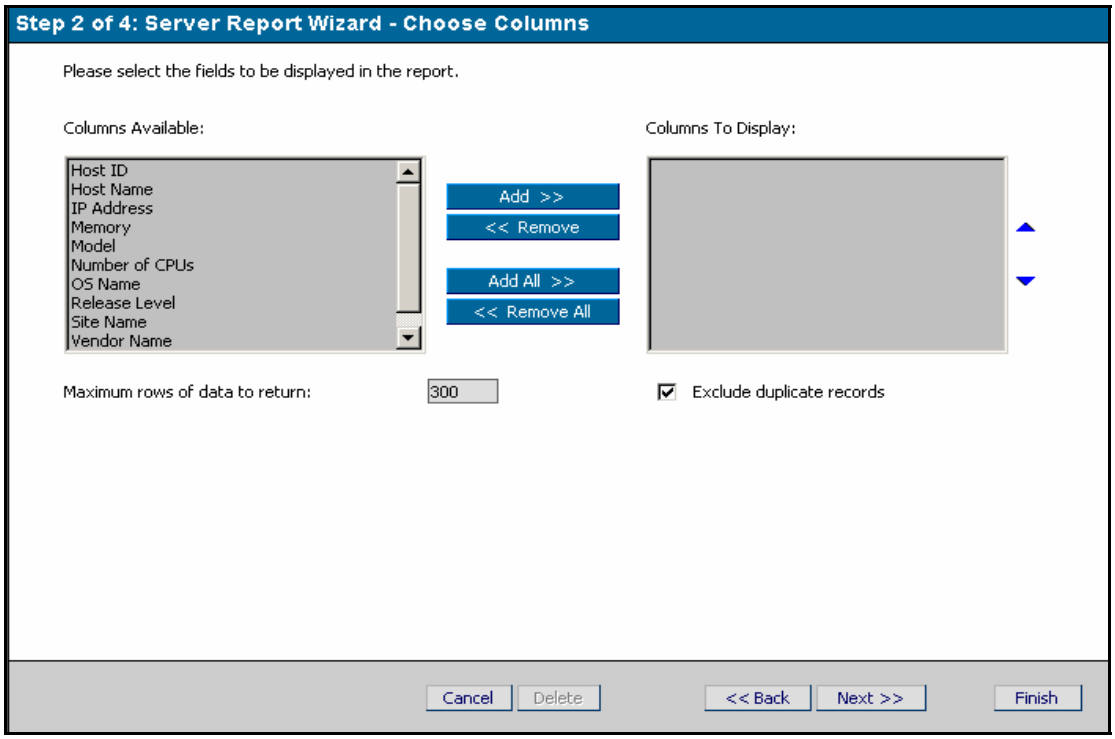


Figure 108 – Step 2 of 4: Server Report Wizard – Choose Columns

4. All columns that can be selected for the report are displayed in the **Columns Available** list box. Column names must be in right panel to display. To select the columns for your report, use the **Add>>**, **Remove>>**, **Add All>>**, and **Remove All>>** control buttons to add/remove columns to/from the **Columns to Display** list box. The default maximum number of rows to be displayed is 300. This can be changed for an individual execution of report, but is not saved. You can select a Column Name and press one of the blue arrows to move it up or down in the list. This is the order in which they will display (left to right) in the resulting report. "Exclude duplicate records" is enabled by default.

5. After you select the columns and click **Next>>**, the **Step 3 of 4: Server Report Wizard - Select Filters** window is displayed.

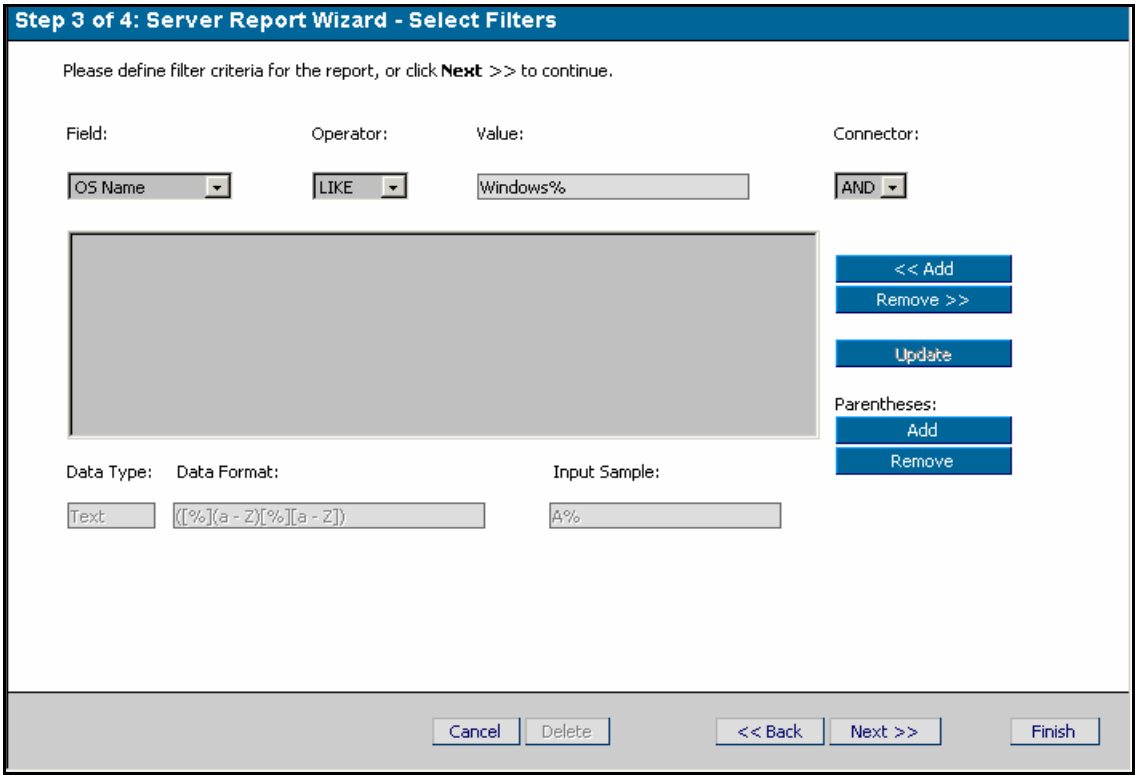


Figure 109 - Step 3 of 4: Server Report Wizard - Select Filters

6. Set optionally any desired record selection criteria for the SQL query that is used to extract data for the report. To do so, use the Field, Operator and Value parameters.
7. After you select filters and click **Next>>**, the **Step 4 of 4: Server Report Wizard - Sorting** window is displayed. The columns you add to the Sort Keys list box determine the sort order for the report.
8. After you define the sort order and click **Next>>**, the customized report is generated and displayed. To save a report, enter a report name, and then press the **Save Report** button. The **Available Reports** list box will allow you to generate previously saved wizard reports.

HOST HBA REPORT WIZARD

The Host HBA Report Wizard allows you to create custom reports based on information stored in the host bus adapter table. You specify a list of data columns, filters, and sorting criteria when you use the wizard.

The wizard may have the following buttons enabled:

- Delete – Delete a specified existing report.
- Back – Return to previous template window.
- Next – Go to next step in the process.
- Finish – Skip the remaining steps and display the report based on the current query criteria.
- Cancel – Abort the procedure and exit.

Proceed as follows:

1. Select **Servers** from the Home Page.

2. Select **Reporting Wizards** -> **HBA Wizard**. The **Step 1 of 4: Host HBA Report Wizard** window appears. The default option is to create a new report by clicking **Next>>** to continue. You can select a report from the **Available Reports** dropdown list, click **Finish>>** to execute report without changing parameters, or select a report and Click the **Delete>>** button to delete a saved report.
3. After you click **Next>>** to create a new report, the **Step 2 of 4: Host HBA Report Wizard - Choose Columns** window is displayed.

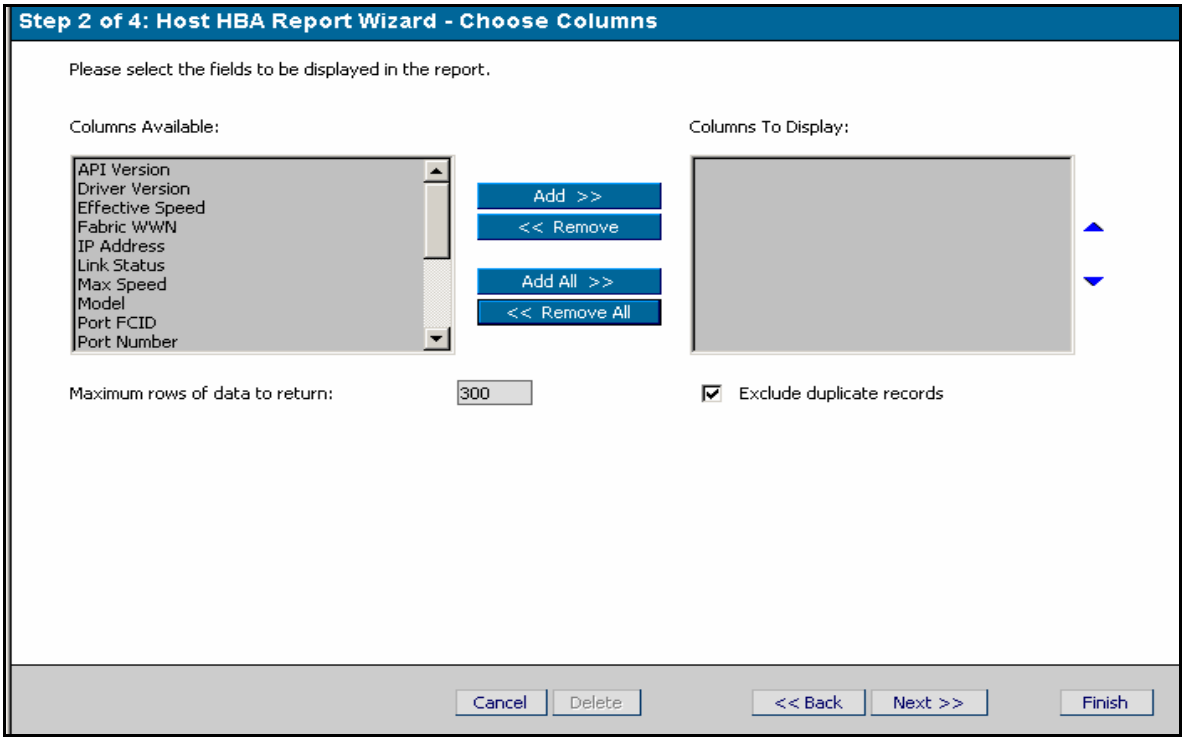


Figure 110 – Step 2 of 4: Host HBA Report Wizard – Choose Columns

4. All columns that can be selected for the report are displayed in the **Columns Available** list box. Column names must be in right panel to display. To select the columns for your report, use the **Add>>**, **Remove>>**, **Add All>>**, and **Remove All>>** control buttons to add/remove columns to/from the **Columns to Display** list box. The default maximum number of rows to be displayed is 300. This can be changed for an individual execution of report, but is not saved. You can select a Column Name and press one of the blue arrows to move it up or down in the list. This is the order in which they will display (left to right) in the resulting report. "Exclude duplicate records" is enabled by default.
5. After you select the columns and click **Next>>**, the **Step 3 of 4: Host HBA Report Wizard - Select Filters** window is displayed.
6. Set optionally any desired record selection criteria for the SQL query that is used to extract data for the report. To do so, use the Field, Operator and Value parameters.
7. After you select filters and click **Next>>**, the **Step 4 of 4: Host HBA Report Wizard - Sorting** window is displayed. The columns you add to the Sort Keys list box determine the sort order for the report.
8. After you define the sort order and click **Next>>**, the customized report is generated and displayed.

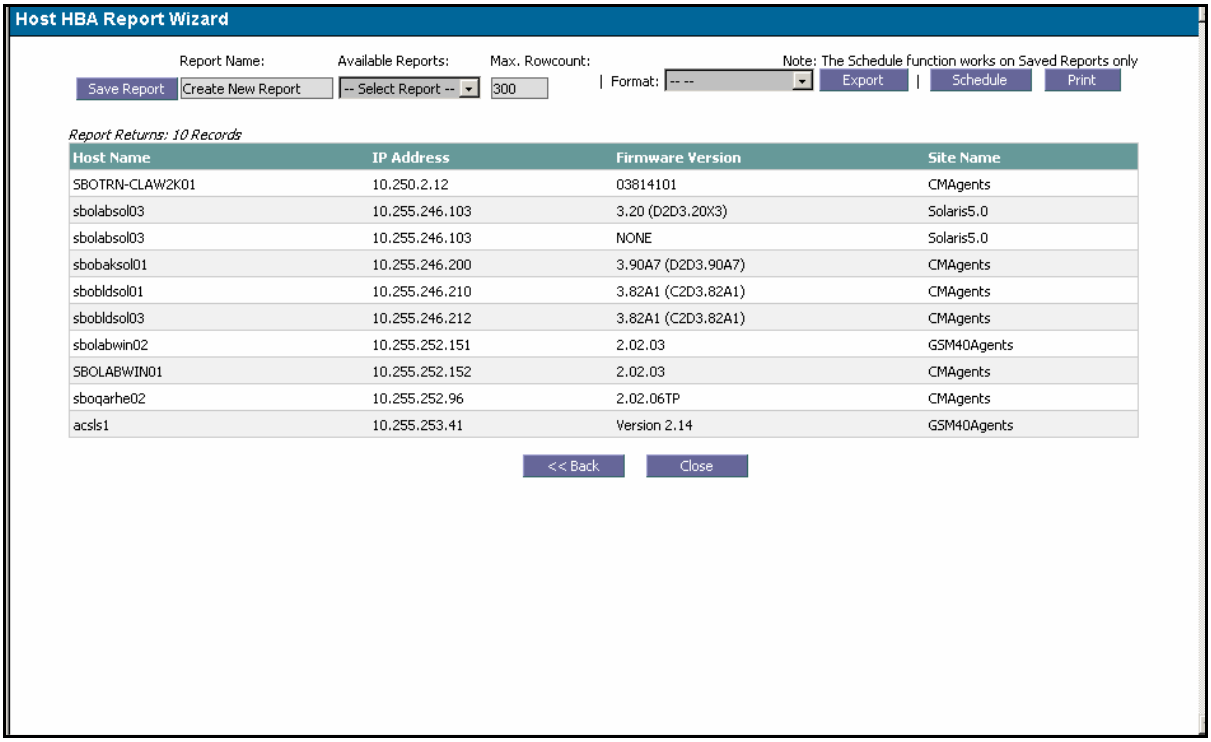


Figure 111 - Sample Host HBA Report

To save a report, enter a report name, and then press the **Save Report** button. The **Available Reports** list box will allow you to generate previously saved wizard reports.

To export the data, first select an export format and click the **Export** button.

DISKS REPORT WIZARD

The Disks Report Wizard allows you to create custom reports based on information stored in the host physical volume tables. You specify a list of data columns, filters, and sorting criteria when you use the wizard.

The wizard may have the following buttons enabled:

- Delete – Delete a specified existing report.
- Back – Return to previous template window.
- Next – Go to next step in the process.
- Finish – Skip the remaining steps and display the report based on the current query criteria.
- Cancel – Abort the procedure and exit.

Proceed as follows:

1. Select **Servers** from the Home Page.
2. Select **Reporting Wizards** -> **Disks Wizard**. The **Step 1 of 4: Disk Report Wizard** window appears. The default option is to create a new report by clicking **Next>>** to continue. You can select a report from the **Available Reports** dropdown list, click **Finish>>** to execute report without changing parameters, or select a report and Click the **Delete>>** button to delete a saved report.
3. After you click **Next>>** to create a new report, the **Step 2 of 4: Disk Report Wizard - Choose Columns** window is displayed.

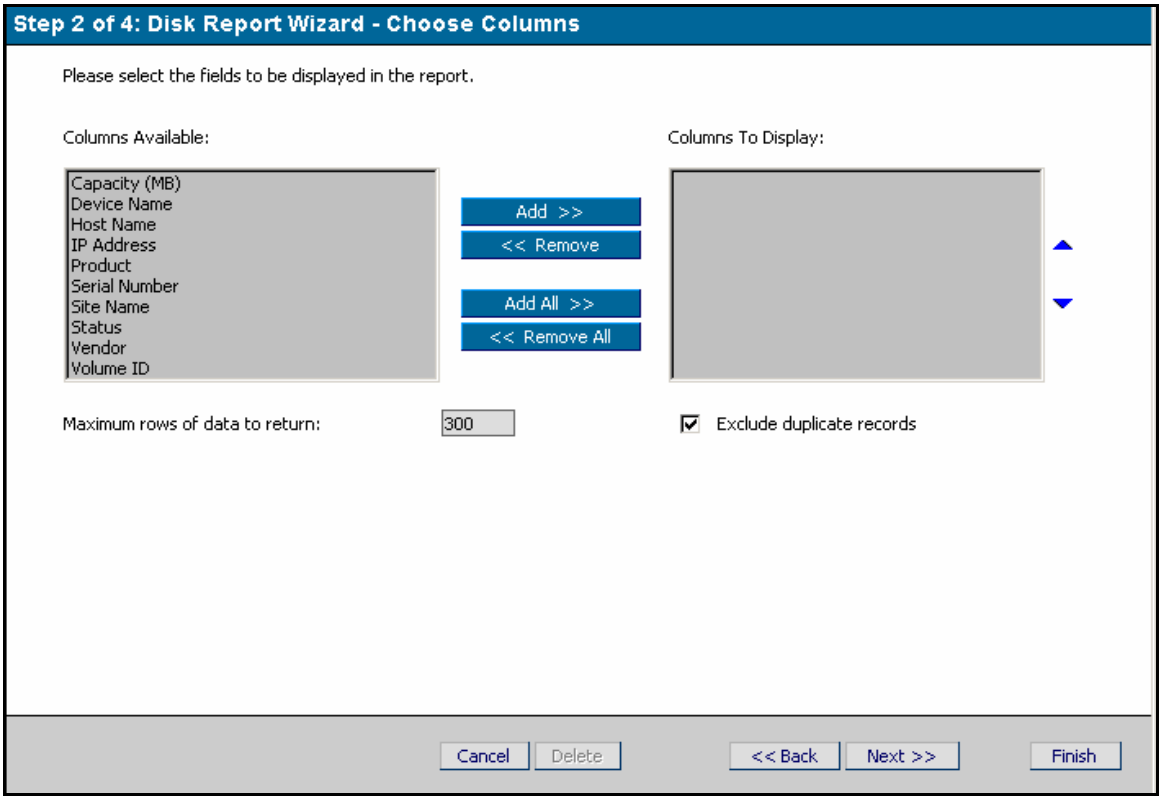


Figure 112 – Step 2 of 4: Disk Report Wizard – Choose Columns

4. All columns that can be selected for the report are displayed in the **Columns Available** list box. Column names must be in right panel to display. To select the columns for your report, use the **Add>>**, **Remove>>**, **Add All>>**, and **Remove All>>** control buttons to add/remove columns to/from the **Columns to Display** list box. The default maximum number of rows to be displayed is 300. This can be changed for an individual execution of report, but is not saved. You can select a Column Name and press one of the blue arrows to move it up or down in the list. This is the order in which they will display (left to right) in the resulting report. "Exclude duplicate records" is enabled by default.
5. After you select the columns and click **Next>>**, the **Step 3 of 4: Disk Report Wizard - Select Filters** window is displayed.
6. Set optionally any desired record selection criteria for the SQL query that is used to extract data for the report. To do so, use the Field, Operator and Value parameters.
7. After you select filters and click **Next>>**, the **Step 4 of 4: Disk Report Wizard - Sorting** window is displayed. The columns you add to the Sort Keys list box determine the sort order for the report.
8. After you define the sort order and click **Next>>**, the customized report is generated and displayed. To save a report, enter a report name, and then press the **Save Report** button. The **Available Reports** list box will allow you to generate previously saved wizard reports.

   To export the data, first select an export format and click the **Export** button.

Chapter Seven - Databases

This chapter describes the different reports available through the Management Console's **Databases** pull down menu.

Database Configuration/Capacity

The report is provided at the site and database server level. To access the report, proceed as described below.

1. Click **Database Configuration/Capacity** on the pull-down menu.
2. On the **Change Parameters** screen, specify the **date range** to generate the report and click **Generate Report**. The DB Agent View screen appears. The menu control tree lists the top-level site. You must click the **plus sign** (+) to expand to the site and database server level. At the Site level, the table shows the database servers that the Database agent manages at a particular site.
3. Click the desired Site in the menu control tree to view the site-level report, similar to the one shown below.

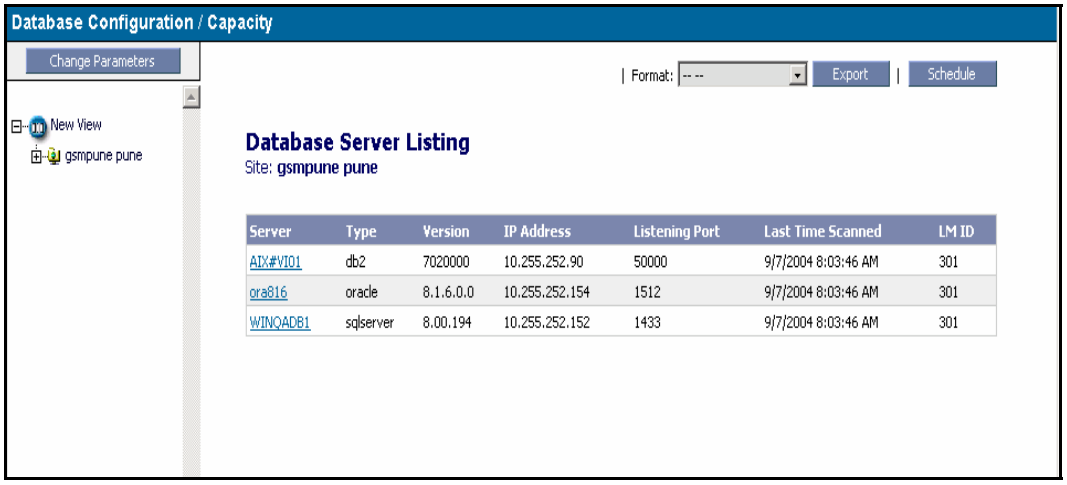


Figure 113 – Database Server Listing

For the selected site, you can view the database server name, type (e.g., SQL server), software version, IP address of the installed Database Agent, instance port number, date and time last polled, and the Local Manager ID.

4. Clicking a listed **Server** link in the menu control tree or clicking the **Server** report link in the Database Server Listing report displays the Database Server Detail report, which is a detailed report for that database server. This report provides three tables: Database Server Overview, Databases, and Physical Storage Units.

   - The **Database Server Overview** table at the top of the report lists the type (e.g., SQL server), software version, IP address of the installed Database Agent, port number, date and time last polled, and the Local Manager ID for the selected database server.
   - The **Databases** table shows the database server name, the owner, the number of tables and views, the number of indices, and the number of users.

- The **Physical Storage Units** table provides information on the physical disks that accommodate the transaction logs and data. This section of the report shows the unit name, unit type, physical name, physical type (file), used space (KB), total space (KB), and percentage of the total space utilized by that unit type (e.g., log file), auto increment, and auto increment maximum limit.

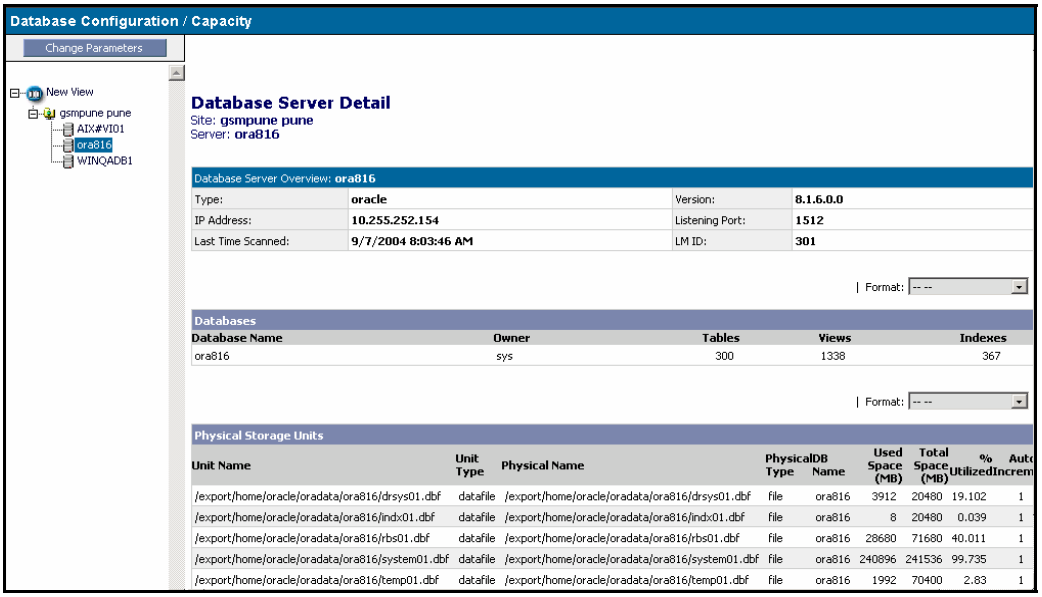


Figure 114 - Database Server Detail

Note: Because of a Database Agent CLI/API restriction, the Database Agent for IBM DB2 does not currently report on used storage for the following storage elements of the DB2 database server:

- Container (file, directory)
- System Managed Storage (SMS)

As a result, the Database Configuration/Capacity report in the Management Console shows the utilization for System Managed Storage, Database Managed Storage, and SMS tablespaces as 100% utilized. However, the Database Managed Storage tablespace utilization is correctly reported in this report.

Chapter Eight - Provisioning

This chapter describes the different reports available through the Management Console's **Provisioning** pull down menu on the home page. You must be assigned the additional administrative right of **GSM Provisioning Menu** in your user profile to access and use the GSM Provisioning menus.

Introduction to Provisioning

Sun StorageTek Business Analytics Provisioning allows the administrator to:

- Quickly locate available storage for allocation to a host server.
- Produce reports that can be useful in performing active provisioning and chargeback functions in other software applications.

Storage Provisioning Wizard

The Storage Provisioning Wizard provides the following options:

- Provision Storage and Connectivity
- Provision Storage

Provision Storage is the default option.

Provision Storage – Create New Request

1. Select **Storage Provisioning Wizard** under the **Provisioning** pull-down menu on the home page and the Step 1: Select a Provisioning Scenario window appears.

   If applicable, you can select any of the last five (5) provisioning requests to copy in the table displayed the Provision Storage heading. Each table entry identifies the following information:

   - Host – Identifies the host reserved storage capacity.
   - Array Name/ID – Specifies the alias name or array ID of the array that is providing this volume to the server. This is the array alias if one exists or the array id number if no alias exists.
   - Vol(ume) ID – The volume identifier.
   - Vol. Size/Amount Reserved – Capacity reserved (GB)
   - RAID Group – Type of RAID (e.g., RAID-1)
   - Spindles – Number of spindles
   - Protection Level – Protection level of High, Medium, or Low. High refers to mirrored storage. Medium refers to storage using parity RAID. Low refers to unprotected storage (JBOD)

- Availability – Available or unavailable if already reserved to GSM provisioning
- Status – Status of the storage reservation

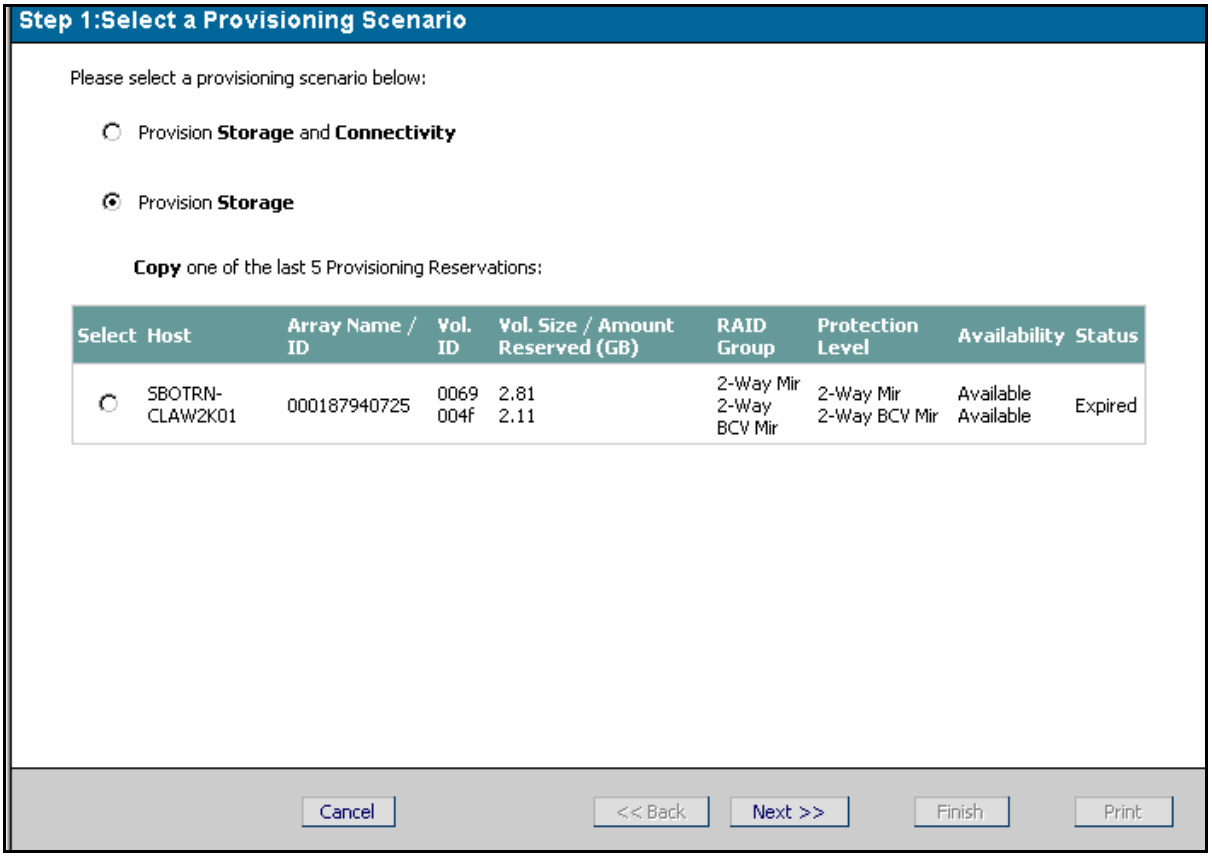


Figure 115 - Select a Provisioning Scenario

2. To create a new request, accept the **Provision Storage** option (default) on the Select a Provisioning Scenario window and click Next>>. The **Select a Host** screen appears. This screen allows you to choose a host by typing the host name in the "Enter a Host Name" input field or choosing a host from the "Select a Host" list box.

3. Choose the host server and click Next>>. The Select Storage Requirements window appears.

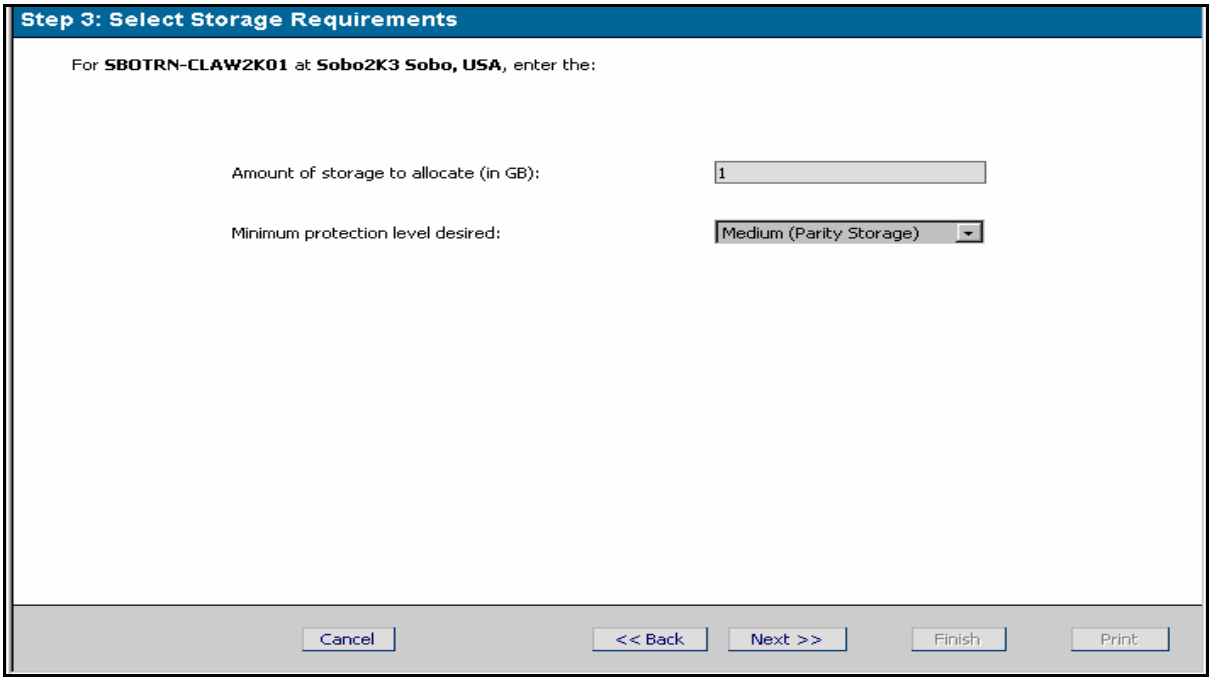


Figure 116 - Select Storage Requirements

4. On the Select Storage Requirements screen, you enter the following information:

    - **Amount of Storage to Allocate (in GB)** – Enter the amount of storage in GB.
    - **Minimum protection level desired –** Use the list box to select a desired data protection level of High (Mirrored Storage), Medium (Parity Storage) or Low (Unprotected Storage).

5. Click **Next>>** and the **Select an Array** window appears.

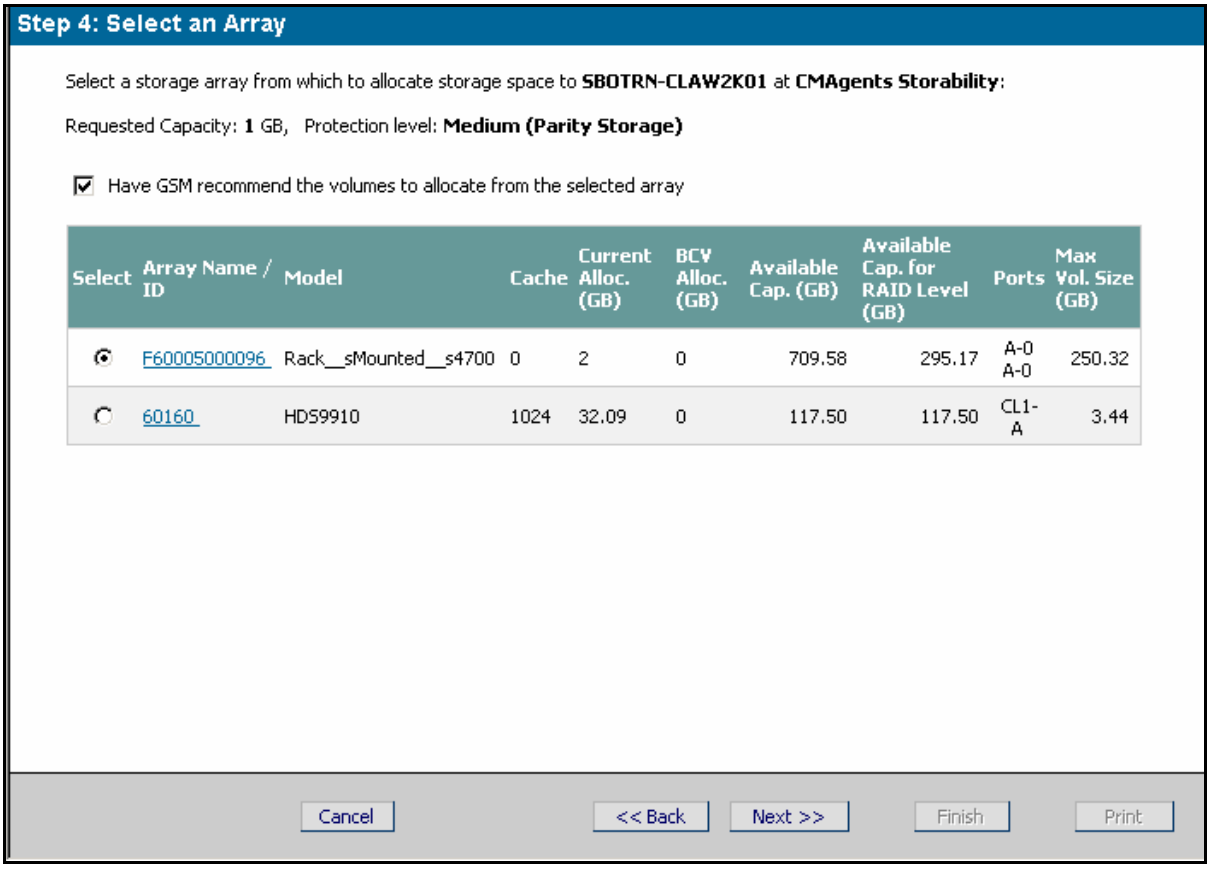


Figure 117 - Select an Array

This window lists storage arrays with sufficient capacity to meet the provisioning request at the selected data protection. The array alias name (or array ID) the array model, cache, current allocation (GB) to the host, current BCV allocation to the host (if applicable), available capacity, available capacity for selected RAID level, front end controller ports, and maximum volume size (GB) are displayed for each storage array that can satisfy the request. The "Have GSM recommend the volumes to allocate from the selected array" check box is enabled by default. Remove the check if you want to choose from all volumes that may be used.

The message

"The following arrays have enough storage to satisfy your request, but not at the appropriate protection level. Please go back and change your selections."

will appear if there are arrays with sufficient storage to fulfill the request but not at the requested RAID level. In this case, click Back<< to return to the Select Storage Requirements window and adjust the "Minimum protection level desired" setting.

5. Use the radio button to select the desired array and click **Next>>**. The **Select Storage to Allocate** screen appears. For the selected array, you can select the type of storage capacity to allocate from three types, Configured Volumes, Free Space in existing RAID Groups, or Unconfigured Raw Space. A summary of available space and reserved capacity (if applicable) for each type of storage capacity appears besides its heading on the screen.

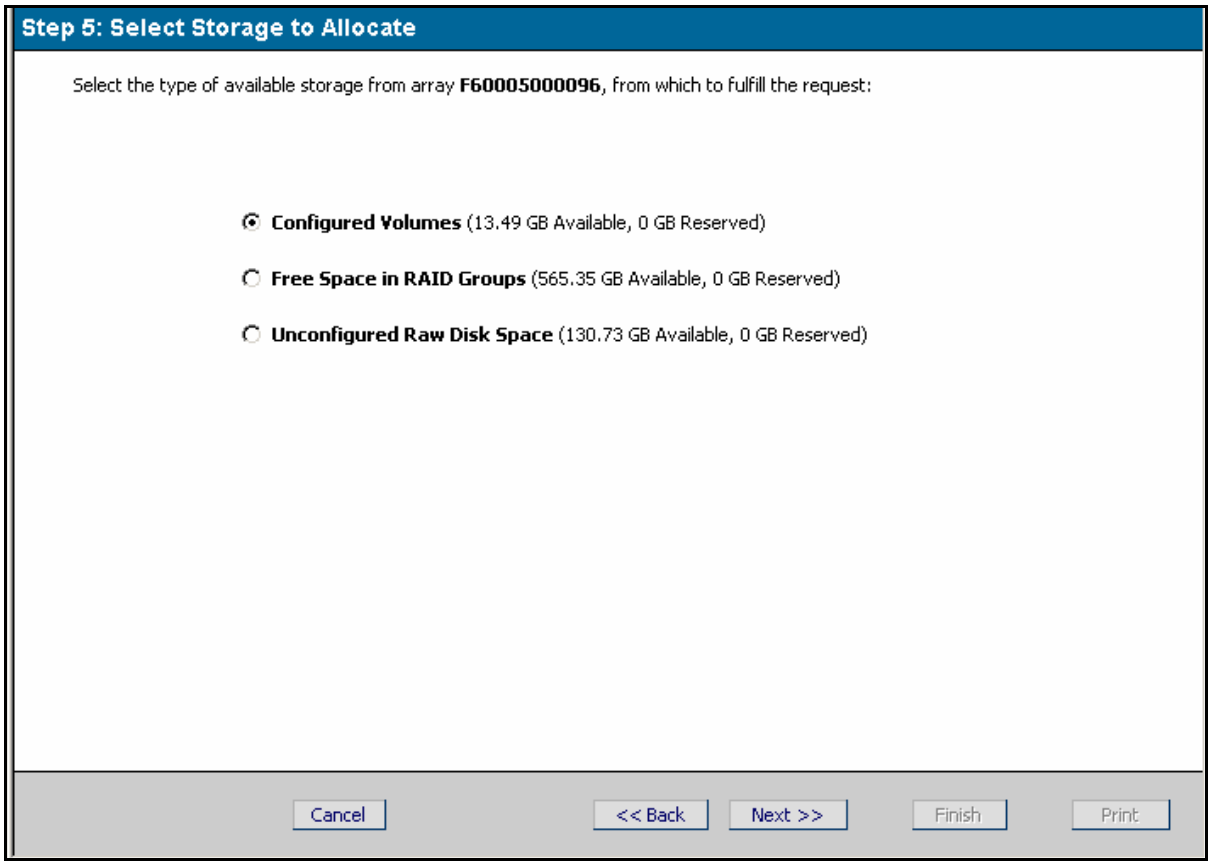


Figure 118 - Select Storage to Allocate

6. Select the desired type of storage (e.g., Configured Volumes) and click **Next>>**. The next window that appears depends on whether you selected Configured Volumes, Free Space in RAID Groups, or Unconfigured Raw Disk Space the on the Select Storage To Allocate screen.

   - **Select Storage to Allocate – Configured Volumes -** Provides a table of available volumes to satisfy the request. The top of the window contains text that identifies the requested protection level and requested capacity (in GB). The table identifies the Volume ID, Volume Size (GB), RAID Group, number of spindles, protection level, and Reservation Status is displayed for each volume. If you checked the box "Have GSM recommend the volumes to allocate from the selected array" the Provisioning Wizard will have recommended the volumes to allocate. The bottom of the window identifies the number of volumes and the total allocation in GB.

- **Select Storage to Allocate - Free Space in RAID Groups** - Provides a table of free space configured in existing RAID groups. The top of the window contains text that identifies the requested protection level and requested capacity.The table lists the RAID Group, Protection Level, Spindles, Space Available, and Reserved.

- **Select Storage to Allocate - Unconfigured Raw Disk Space** – The top of the window contains text that identifies the requested protection level and requested capacity. The table identifies the Available Capacity (GB), Spindle Size(MB), Spindles, Reserved Size(GB) Spindles Reserved and RAW Capacity Required (GB) to satisfy the request. The Usable Amount to Reserve (GB) input box allows you to specify the desired amount (in GB), and the selected amount will update the value displayed in the Total Allocation list box at the bottom of the window. Click the **Clear Selection** button to clear an existing requested capacity.

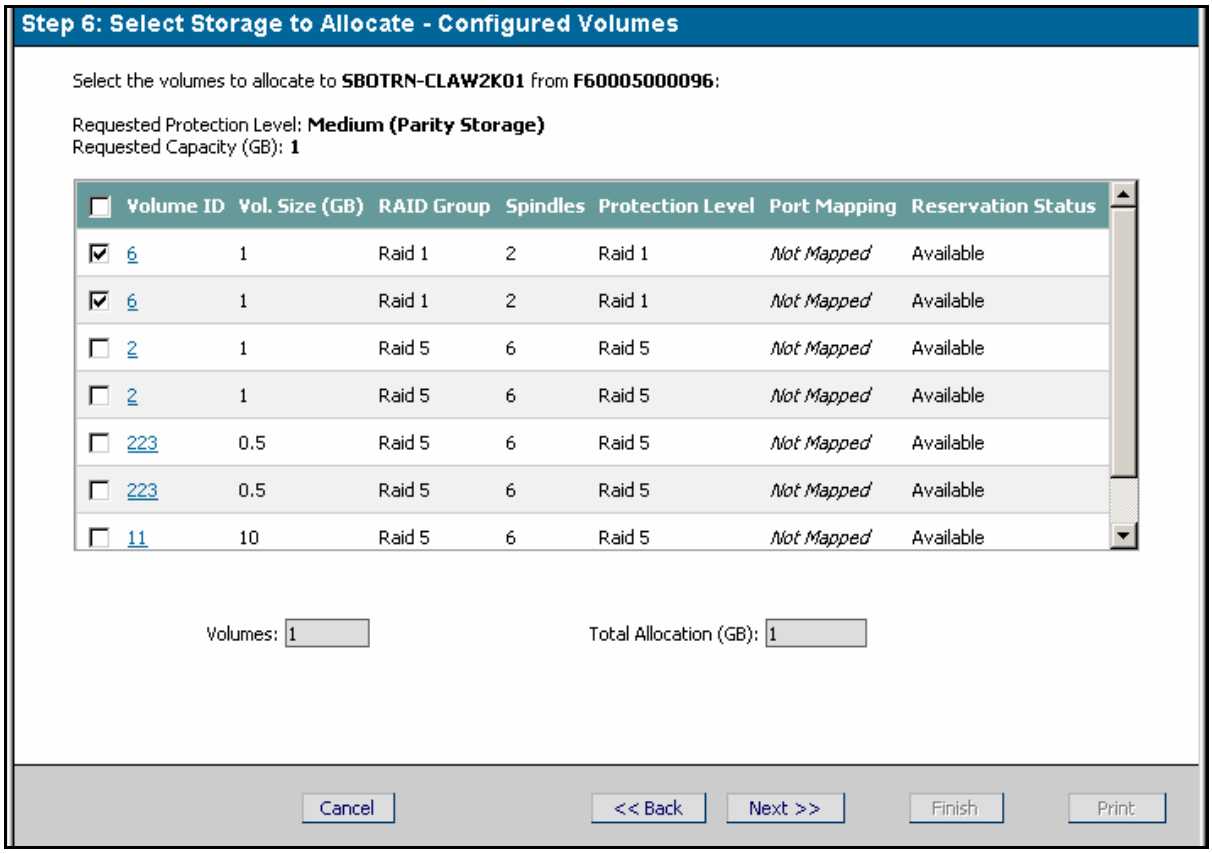


Figure 119 Sample Select Storage to Allocate – Configured Volumes

7. Choose the desired capacity to request and click **Next>>. The Reserve the Selected Storage** is displayed for the selected storage type, similarly to the one displayed below where "Free Space in RAID Groups" was previously chosen.

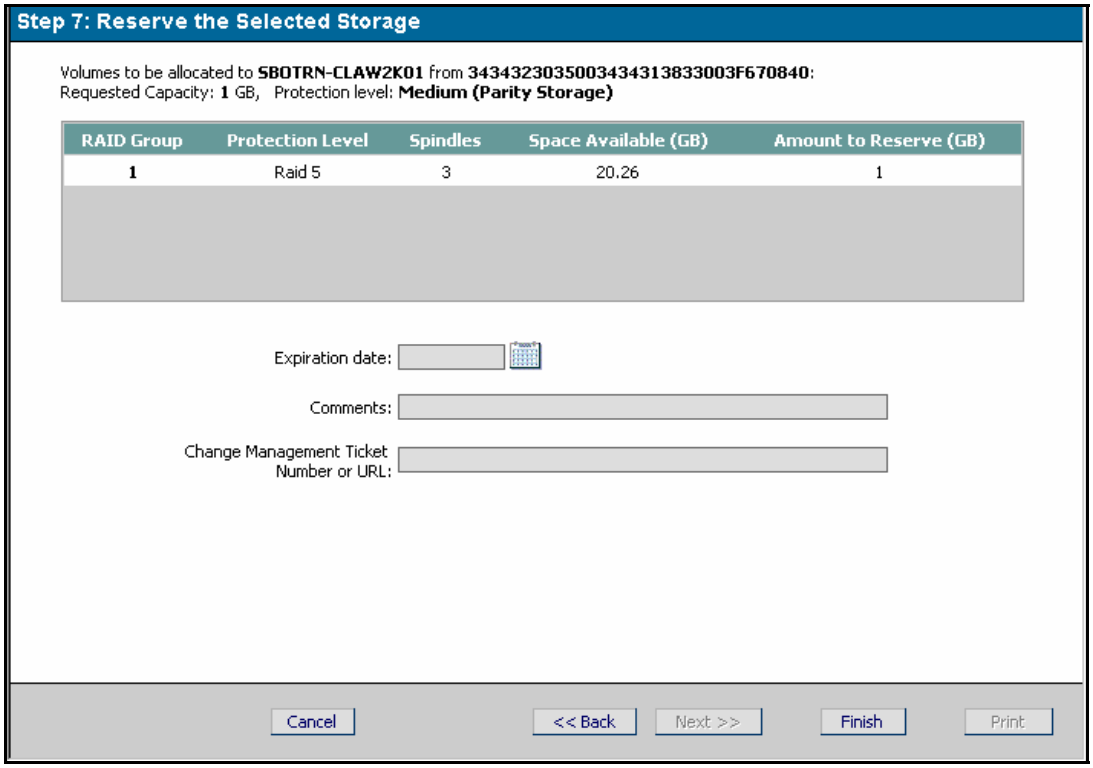


Figure 120 - Reserve the Selected Storage

8. Enter information in the following fields to define the reservation:

   - **Expiration Date** – Specifies the expiration date for the reservation. Click the Calendar icon to set the desired expiration date.
   - **Comments** - Enter a comment about the reservation.
   - **Change Management Ticket or URL** – Enter the corresponding change management ticket number or a link to a ticketing system if appropriate.

9. Click Finish and the Allocation Summary window is displayed. Click View/Print to view/print the window or Close to close the Allocation Summary window.

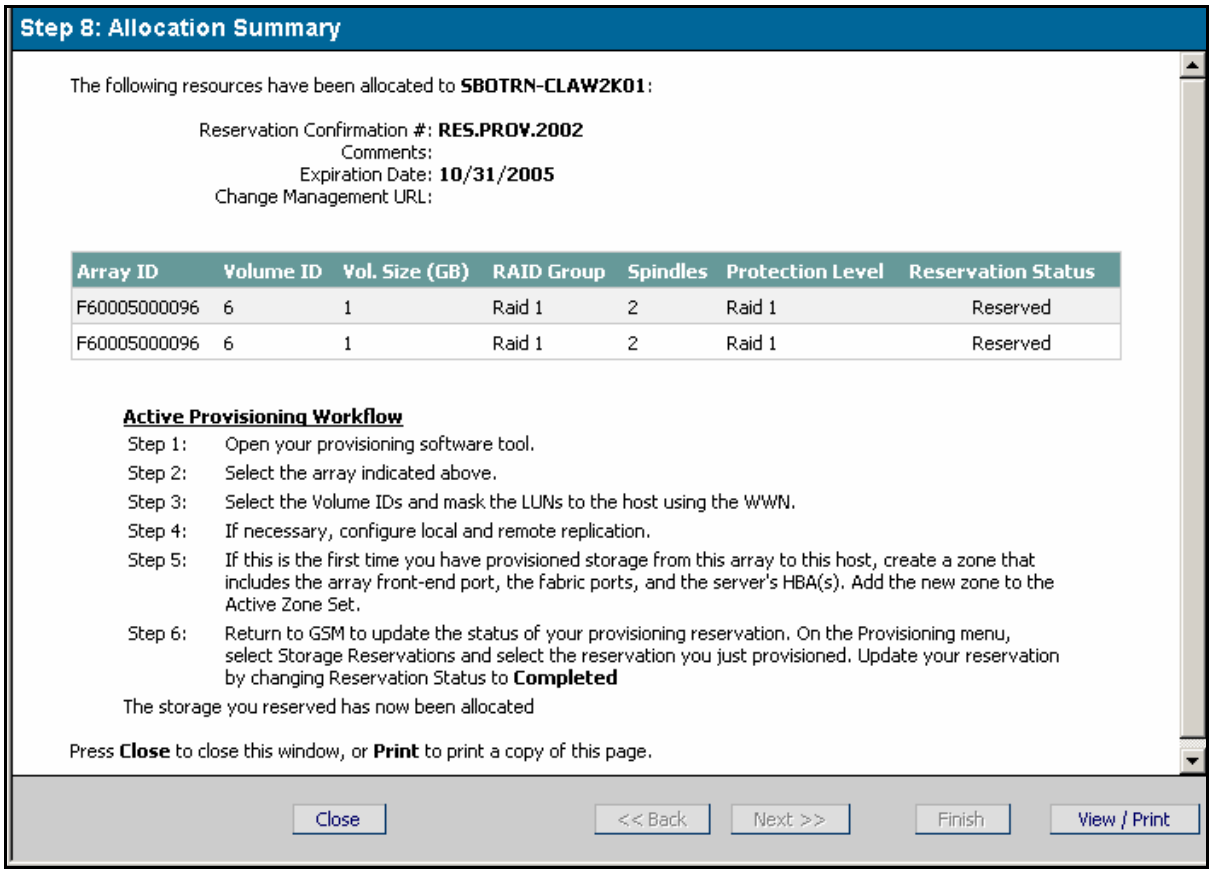


Figure 121 - Allocation Summary

PROVISION STORAGE – COPY EXISTING STORAGE RESERVATION

This section describes how you create a new storage reservation by simply copying one of the last five (5) existing storage reservations in the applicaton. Proceed as follows.

1. Select **Storage Provisioning Wizard** under the **Provisioning** menu on the home page to display the **Select a Provisioning Scenario** window. The window contains two options:

   - Provision Storage and Connectivity
   - Provision Storage

   Beneath the "Provision Storage" Heading, the last 5 Provisioned Reservations table is displayed. For each of the last five (5) provisioned reservations, the following fields are displayed.

   - Array ID – The array ID of the array that is providing this volume to the server. This is the array alias if one exists or the array id number if no alias exists.
   - Volume ID – The volume identifier.
   - Size – Size of volume (GB)
   - RAID Group – Type of RAID (e.g., RAID-1)
   - Spindles – Number of spindles

- Protection Level – Protection level of High, Medium, or Low. High refers to mirrored storage. Medium refers to storage using parity RAID. Low refers to unprotected storage (JBOD).

- Availability – Available or unavailable if already reserved.

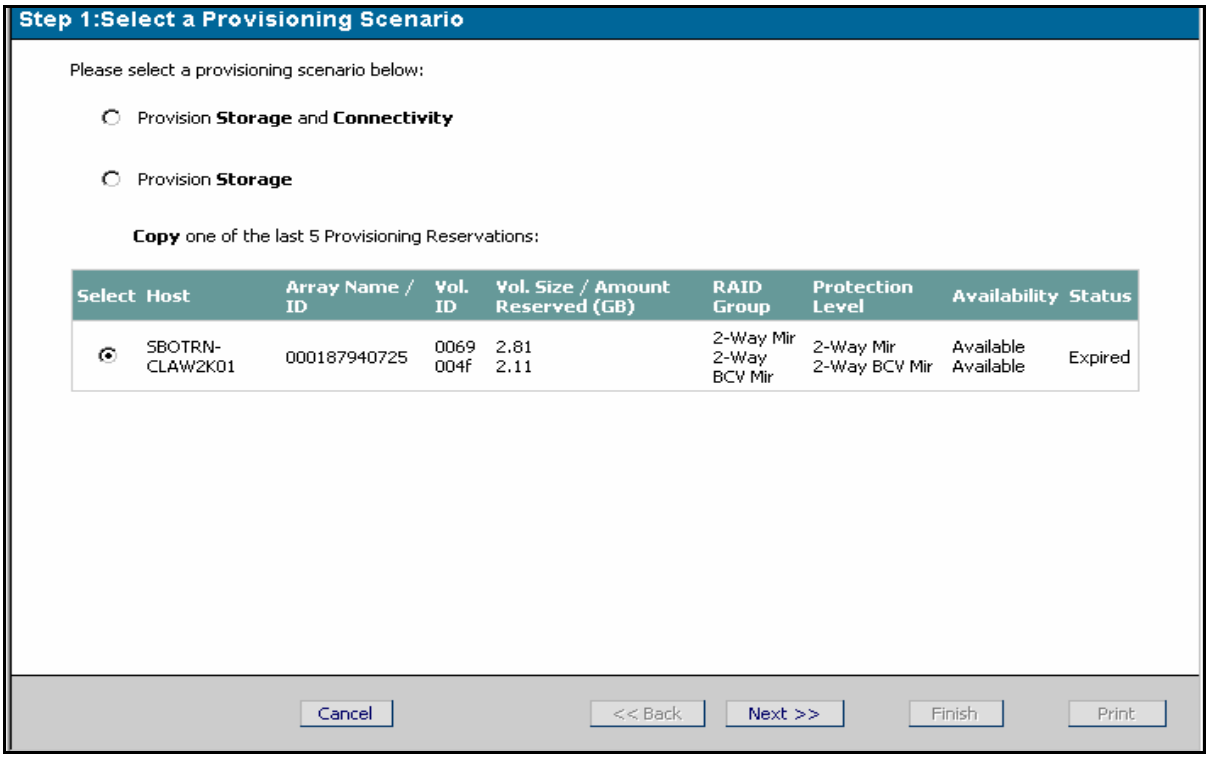


Figure 122 - Select a Provisioning Scenario with Provisioning Reservation

2. Using the radio button, select the existing storage reservation to copy and click Next>>. The **Set Capacity Requirements** window for the type of storage (e.g., Configured Volumes) is displayed. The following steps are based on copying an existing storage reservation for configured volumes.

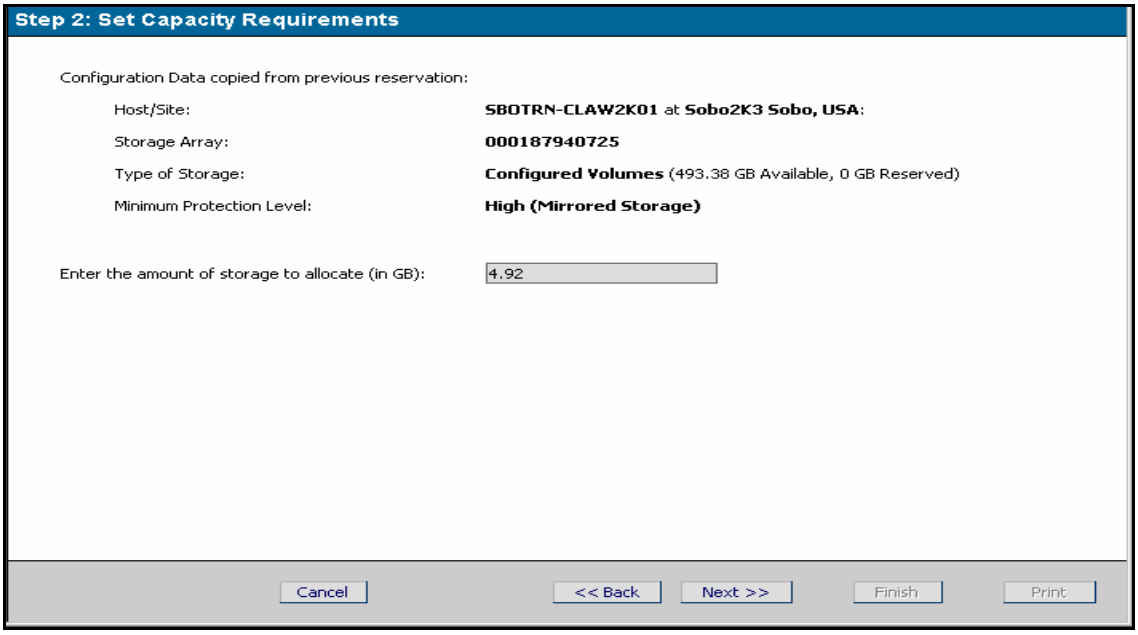


Figure 123 - Set Capacity Requirements

3. Enter a different amount of storage in the "Enter amount of storage to allocate" input box or simply click Next to accept the amount in the request being copied. The **Select Storage to Allocate - Configured Volumes** is displayed for this storage type. If the copied request allowed Sun StorageTek Business Analytics to select the volumes, a check mark appears in the check box beside the respective volume's Volume ID.

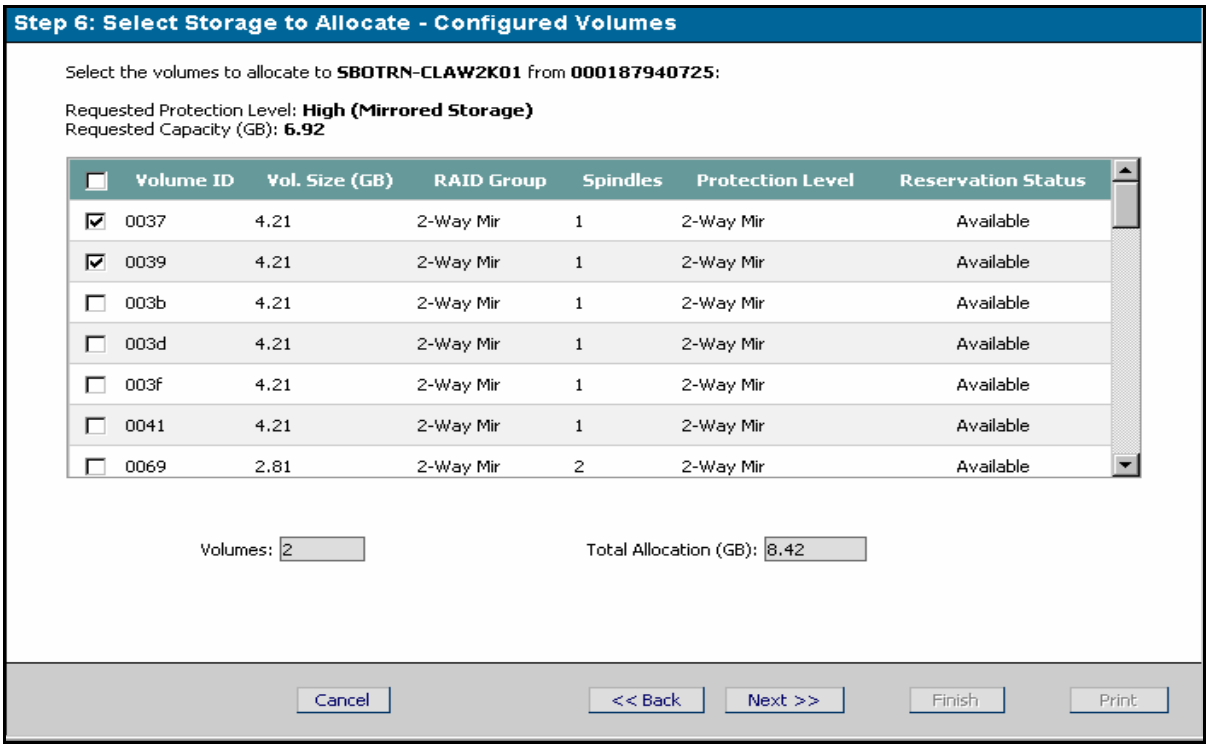


Figure 124 - Select Storage to Allocate - Configured Volumes

4. Review/change the selected volume(s) and click Next to continue. The **Reserve the Selected Storage** window appears, similar to the one displayed below.

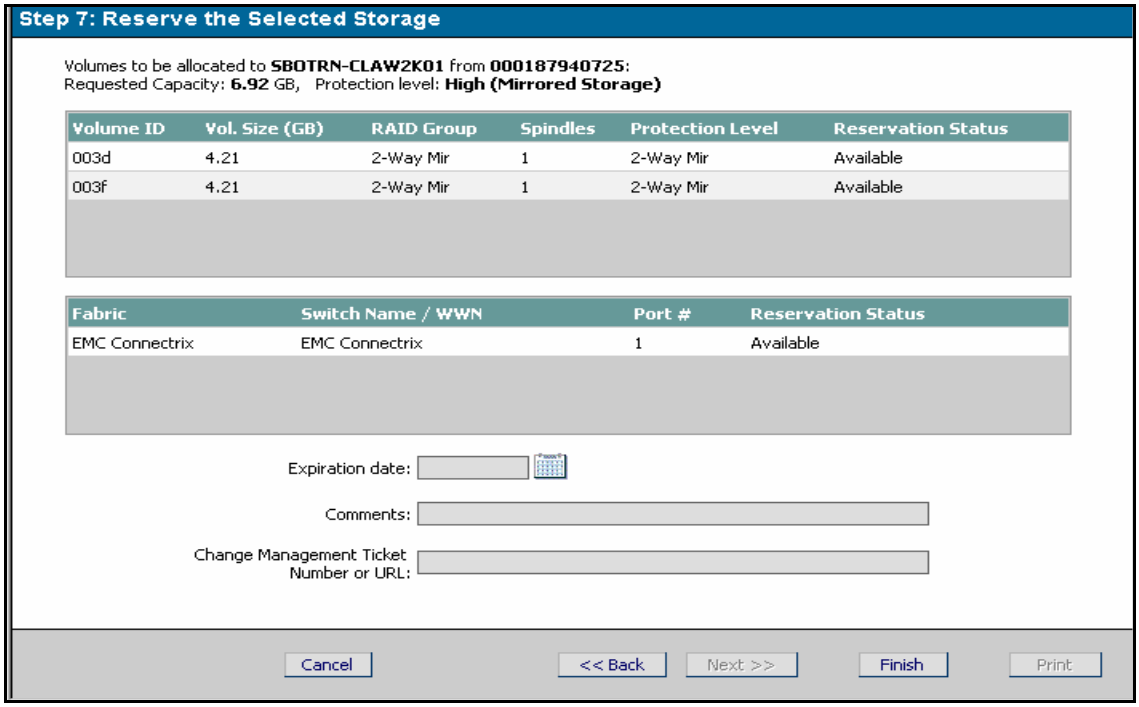


Figure 125 - Reserved the Selected Storage

5. Enter information in the following fields to define the reservation:

   - **Expiration Date** – Specifies the expiration date for the reservation. Click the Calendar icon to set the desired expiration date.
   - **Comments** - Enter a comment about the reservation.
   - **Change Management Ticket or URL** – Enter the corresponding change management ticket number or a link to a ticketing system if appropriate.

6. Click **Finish>>** and the Allocation Summary window appears. The Allocation Summary window contains the details of the provisioning reservation at the top section of the window, including the host name, fabric name, and switch name.

   The bottom section of the window details the steps you perform typically to perform the storage provisioning.

   Active Provisioning Workflow

   Step 1: Open your provisioning software tool.

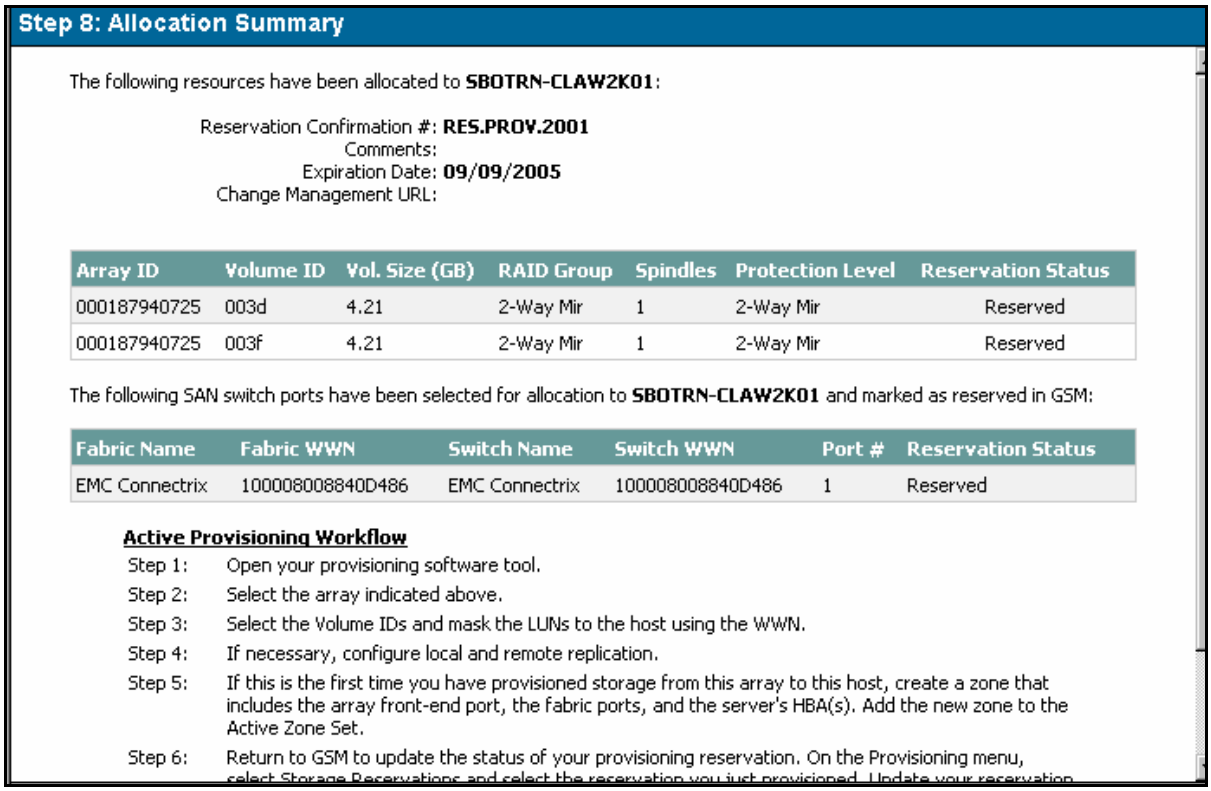
   Step 2: Select the array indicated above.

   Step 3: Select the Volume IDs and mask the LUNs to the host using the WWN.

   Step 4: If necessary, configure local and remote replication.

   Step 5: If this is the first time you have provisioned storage from this array to this host, create a zone that includes the array front-end port, the fabric ports, and the server's HBA(s). Add the new zone to the Active Zone Set.

Step 6: Return to GSM to update the status of your provisioning reservation. On the Provisioning menu, select Storage Reservations and select the reservation you just provisioned. Update your reservation by changing Reservation Status to Completed.



Step 8: Allocation Summary

The following resources have been allocated to **SBOTRN-CLAW2K01**:

Reservation Confirmation #: **RES.PROV.2001**
Comments:
Expiration Date: **09/09/2005**
Change Management URL:

Array ID	Volume ID	Vol. Size (GB)	RAID Group	Spindles	Protection Level	Reservation Status
000187940725	003d	4.21	2-Way Mir	1	2-Way Mir	Reserved
000187940725	003f	4.21	2-Way Mir	1	2-Way Mir	Reserved

The following SAN switch ports have been selected for allocation to **SBOTRN-CLAW2K01** and marked as reserved in GSM:

Fabric Name	Fabric WWN	Switch Name	Switch WWN	Port #	Reservation Status
EMC Connectrix	100008008840D486	EMC Connectrix	100008008840D486	1	Reserved

Active Provisioning Workflow

Step 1: Open your provisioning software tool.
Step 2: Select the array indicated above.
Step 3: Select the Volume IDs and mask the LUNs to the host using the WWN.
Step 4: If necessary, configure local and remote replication.
Step 5: If this is the first time you have provisioned storage from this array to this host, create a zone that includes the array front-end port, the fabric ports, and the server's HBA(s). Add the new zone to the Active Zone Set.
Step 6: Return to GSM to update the status of your provisioning reservation. On the Provisioning menu, select Storage Reservations and select the reservation you just provisioned. Update your reservation

Figure 126 - Allocation Summary

7. Click View/Print to optionally view/print the window or Close to close the window.

PROVISION STORAGE AND CONNECTIVITY

The Provisioning Storage and Connectivity option allows you to configure a storage reservation for a host server including the amount and the connectivity (SAN-attached or direct-attached).

1. Select **Storage Provisioning Wizard** under the **Provisioning** menu on the home page to display the **Select a Provisioning Scenario** window. The window contains two options:

   - Provision Storage and Connectivity
   - Provision Storage

   Beneath the "Provision Storage" Heading, the last 5 Provisioned Reservations table is displayed.

2. Using the radio button, select Provision Storage and Connectivity and click Next.

3. The **Select a Host** screen appears. This screen allows you to choose a host by typing the host name in the "Enter a Host Name" input field or choosing a host from the "Select a Host" list box. Because you are provisioning storage to a new host, use the "Site (for new hosts only)" list box to choose the site containing the host server's Local Manager. Click Next to continue.

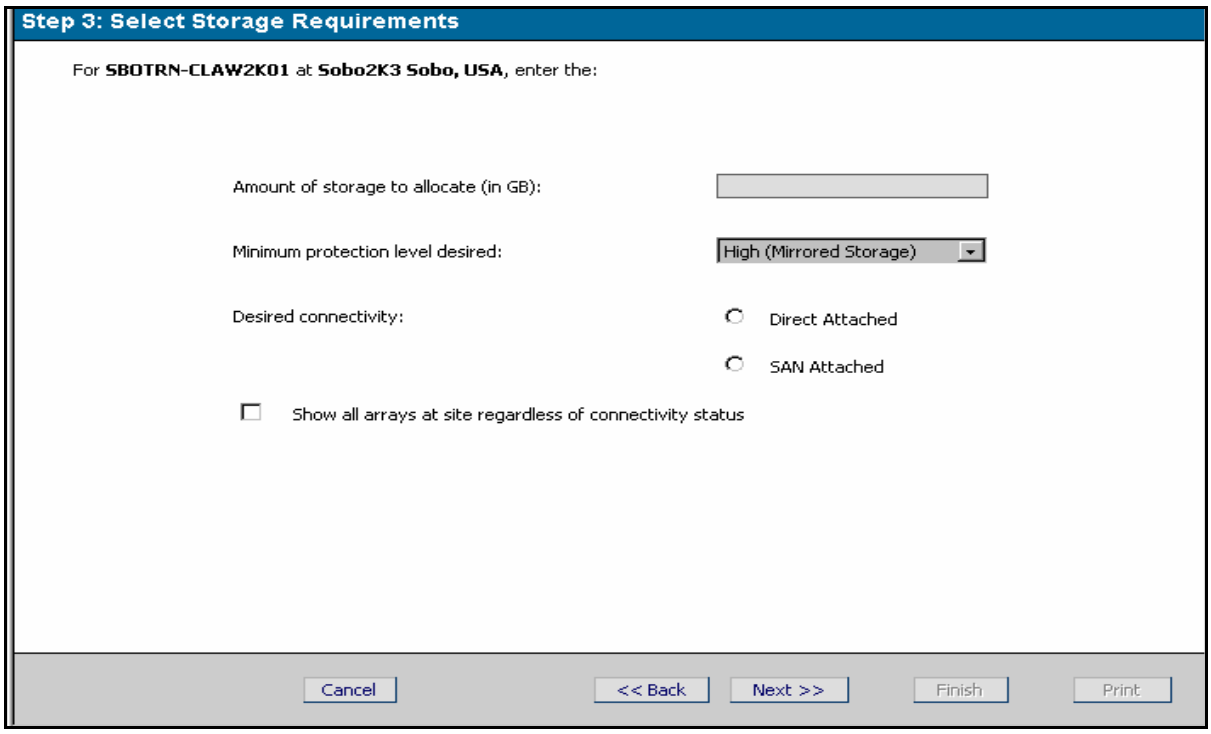


Figure 127- Select Storage Requirements

4. The **Select Storage Requirements** window appears. Enter the amount of storage in GB. The number is checked for validity when you click **Next>>**. In addition, specify the desired minimum protection level desired using the list box. The data protection levels are described below.

   - High – RAID-1 (mirroring)
   - Medium – Other RAID data protection scheme (e.g., RAID-5)
   - Low – No RAID data protection scheme

   Using the respective radio box, choose to reserve SAN-attached or Direct-Attached storage. Optionally put a check in the check box to see all arrays at the site regardless of their connectivity status. Click Next to continue.

5. The **Select an Array** window appears if you chose SAN-attached storage.

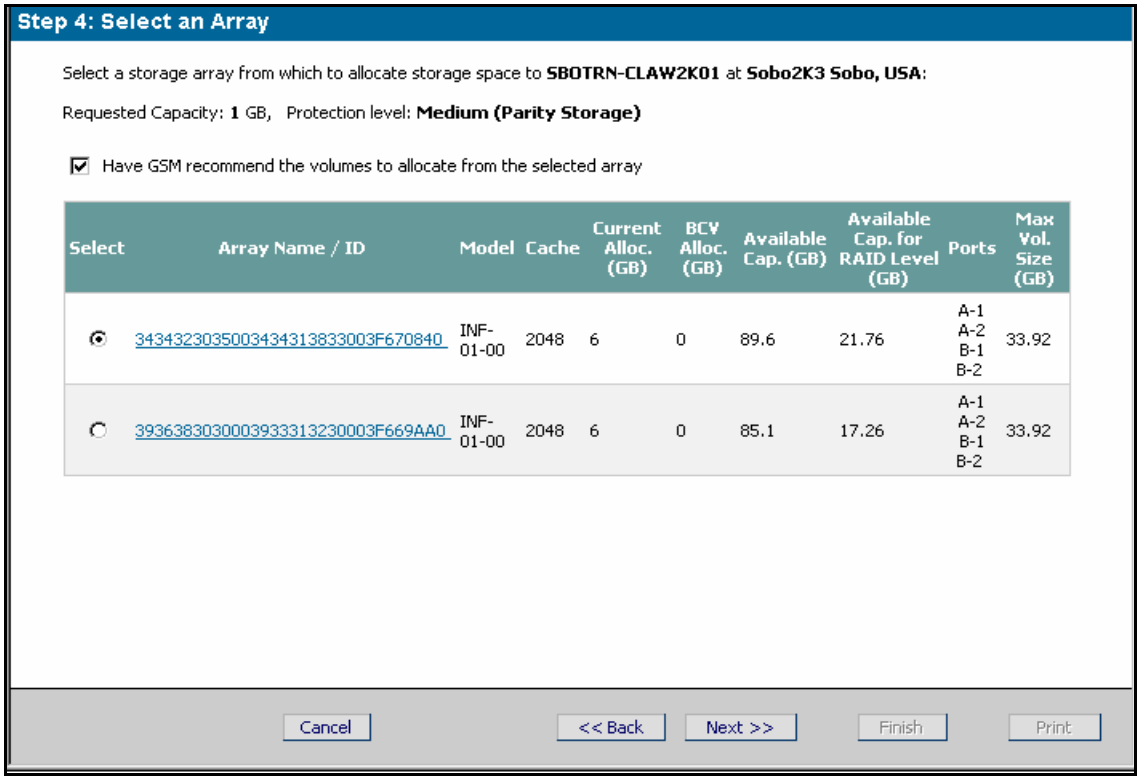


Figure 128 - Select an Array

This window lists storage arrays with sufficient capacity to meet the provisioning request at the selected data protection. The array alias name (or array ID) the array model, cache, current allocation (GB) to the host, current BCV allocation to the host (if applicable), available capacity, available capacity for selected RAID level, front end controller ports, and maximum volume size (GB) are displayed for each storage array that can satisfy the request. The "Have GSM recommend the volumes to allocate from the selected array" check box is enabled by default. Remove the check if you want to choose from all volumes that may be used.

The message

"The following arrays have enough storage to satisfy your request, but not at the appropriate protection level. Please go back and change your selections."

will appear if there are arrays with sufficient storage to fulfill the request but not at the requested RAID level. In this case, click Back<< to return to the Select Storage Requirements window and adjust the "Minimum protection level desired" setting.

Note: If you choose an array from which storage has already been allocated, the system displays a window that allows you to continue creating a new storage request or to allocate additional storage to the selected host server.

6. Use the radio button to select the desired array and click **Next>>**. The **Select Storage to Allocate** screen appears. For the selected array, you can select the type of storage capacity to allocate from three types, Configured Volumes, Free Space in existing RAID Groups, or Unconfigured Raw Space. A summary of available space

and reserved capacity (if applicable) for each type of storage capacity appears besides its heading on the screen.

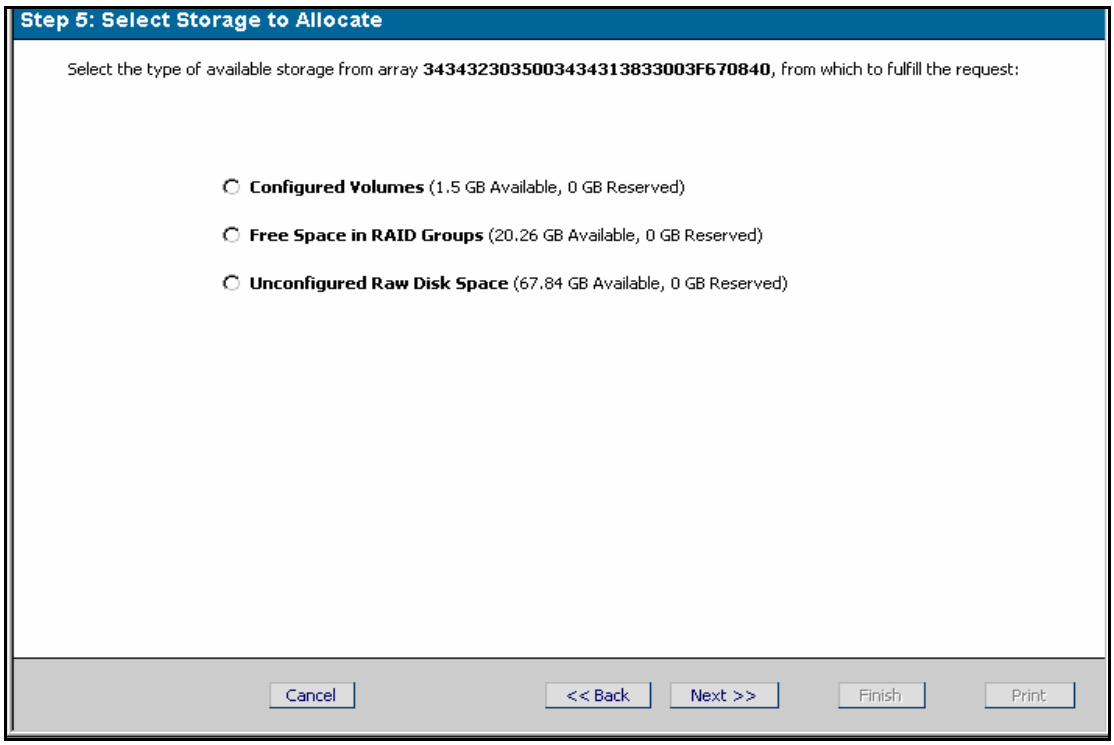


Figure 129 - Select Storage to Allocate

7. Select the desired type of storage (e.g., Configured Volumes) and click **Next>>**. The next window that appears depends on whether you selected Configured Volumes, Free Space in RAID Groups, or Unconfigured Raw Disk Space the on the Select Storage To Allocate screen.

   - **Select Storage to Allocate – Configured Volumes -** Provides a table of available volumes to satisfy the request. The top of the window contains text that identifies the requested protection level and requested capacity (in GB). The table identifies the Volume ID, Volume Size (GB), RAID Group, number of spindles, protection level, and Reservation Status is displayed for each volume. If you checked the box "Have GSM recommend the volumes to allocate from the selected array" the Provisioning Wizard will have recommended the volumes to allocate. The bottom of the window identifies the number of volumes and the total allocation in GB.

   - **Select Storage to Allocate - Free Space in RAID Groups** - Provides a table of free space configured in existing RAID groups. The top of the window contains text that identifies the requested protection level and requested capacity. The table lists the RAID Group, Protection Level, Spindles, Space Available, and Reserved (GB). The

- **Select Storage to Allocate - Unconfigured Raw Disk Space** – The top of the window contains text that identifies the requested protection level and requested capacity. The table identifies the Available Capacity (GB), Spindle Size (MB), Spindles, Reserved Size(GB) Spindles Reserved and RAW Capacity Required (GB) to satisfy the request. The Usable Amount to Reserve (GB) input box allows you to specify the desired amount (in GB), and the selected amount will update the value displayed in the Total Allocation list box at the bottom of the window. Click the **Clear Selection** button to clear an existing requested capacity.

8. After you select the type of storage and click Next>>, the **Select Switch Ports** window appears for SAN-attached storage requests. Using the check box, select the desired fabric port and fabric switch and click Next>>.

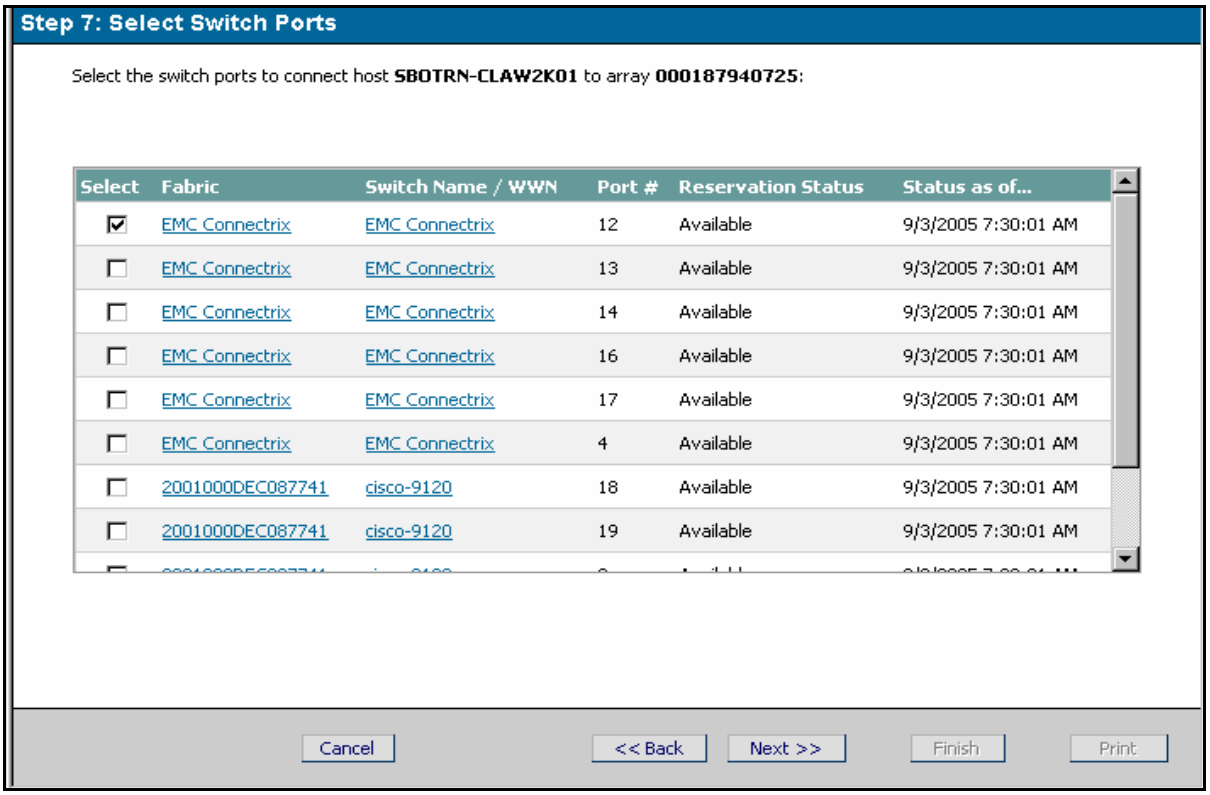


Figure 130 - Select Switch Ports

9. The **Reserve the Selected Storage** window is displayed for the selected storage type, similarly to the one displayed below where "Free Space in RAID Groups" was previously chosen.

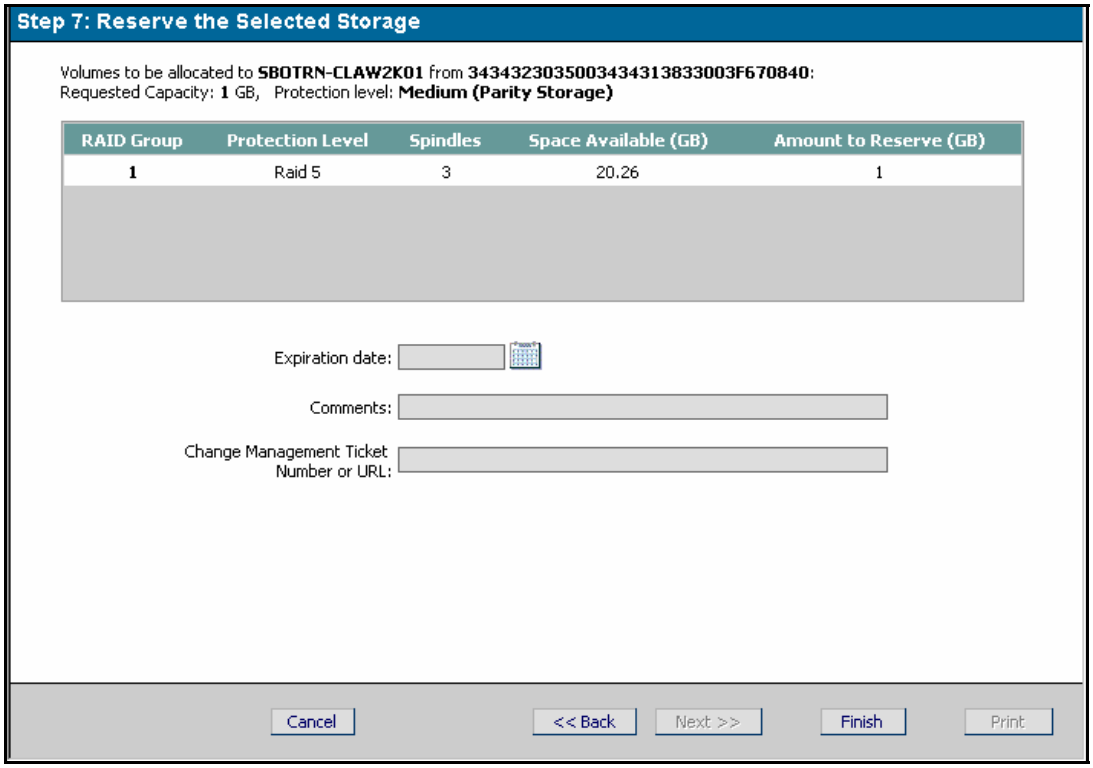


Figure 131 - Reserve the Selected Storage

9. Enter information in the following fields to define the reservation:

   - **Expiration Date** – Specifies the expiration date for the reservation. Click the Calendar icon to set the desired expiration date.
   - **Comments** - Enter a comment about the reservation.
   - **Change Management Ticket or URL** – Enter the corresponding change management ticket number or a link to a ticketing system if appropriate.

9. Click Finish and the **Allocation Summary** window is displayed. Click View/Print to view/print the window or Close to close the **Allocation Summary** window.

STORAGE RESERVATIONS

Storage Reservations allows you to display all of the reservations in the system and allows you to view, verify, and update reservations.

1. Select **Storage Provisioning** under the **Provisioning** pull-down menu on the home page.

2. Select **Storage Reservations** and the **Storage Reservations** screen appears.

3. Review the existing reservations in the system. Each reservation in the table is identified by the Sun StorageTek Business Analytics-generated Reservation Number, Status, Expiration Date, Comment, and user who defined the reservation. This information is defined as part of creating a storage reservation request.

4. If reservations exist in the system, you click on a reservation number in the table to display the **Check Reservation** window.

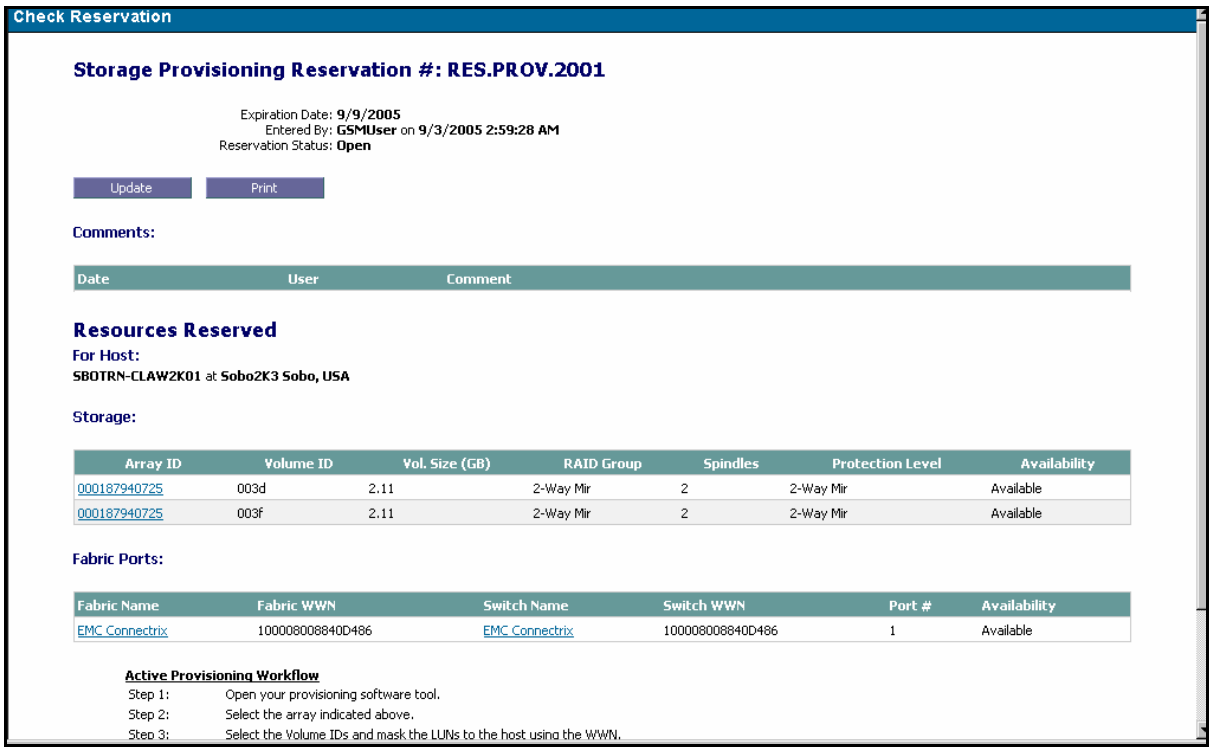


Figure 132 - Check Reservation

This screen provides shows the expiration date, entered by, reservation status, Change Management URL at the top of the window. Resources Reserved table identifies array details including the array ID.

The Fabric Ports table shows information (e.g., fabric name) on the fabric switch used for the storage allocation.

The report contains the following hyperlinks:

- **Array Id** – Click to display the Detailed Array Configuration report.
- **Fabric Name** – Click to display the Detailed Fabric Configuration report.
- **Switch Name** – Click to display the Detailed Switch Configuration report.

5. To update an existing reservation in the system:

   a. Click **Update** on the **Check Reservations** screen.

   b. Enter the reservation number when prompted or select the reservation from the pull-down list.

   c. Modify the Expiration Date or Status (Open, Completed, Cancelled, Incomplete).

6. Click **Update** to commit the changes.

Select the "Go to Detailed" Provisioning Steps" button to display the Provisioning Reservation Detail window.

Chapter Nine - Help

This chapter describes the different reports available through the Sun StorageTek Business Analytics Management Console's **Help** pull down menu.

Content and Index

Use Context/Index to launch the Management Console help engine. The Contents functionality allows you to choose displaying help information based on the individual types of Sun StorageTek Business Analytics reports. Index displays an index of important terms in the help engine.

The help engine also provides a search capability to allow you to query the help repository based on your input.

About GSM

The About GSM report provides the software version information for the Management Console and Database software components. This information may be useful for troubleshooting or planning a Sun StorageTek Business Analytics software upgrade.

Click **Database Upgrade History** to view the Central Manager Database upgrade history:

- Software version
- Action (install or upgrade)
- Date and time the software install or upgrade occurred