Hewlett Packard
Enterprise

HPE StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations

User Guide

Abstract

This guide describes how to install, configure, and use HPE StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations for monitoring performance for HPE 3PAR StoreServ and HPE StoreVirtual Storage Systems. The guide is intended for system administrators that monitor and direct system configurations and resource allocation for HPE Storage Systems.

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1 Introduction

HPE StoreFront Analytics Management Pack for VMware vRealize Operations 3.2 provides integrated and highly automated performance, capacity, configuration compliance, and cost management tools to the vRealize Operations Manager 6.1 Graphical User Interface (GUI). The software uses the vROps analytics engine to monitor and analyze the availability, performance, health, capacity, and workload of the HPE 3PAR and HPE StoreVirtual Storage Array environments (HPE Storage).

Six new dashboards for monitoring, troubleshooting, and viewing the performance of Hewlett Packard Enterprise storage arrays are added to the vRealize Operations Manager 6.1 custom GUI.

- **HPE 3PAR StoreServ Monitoring**—dashboard to monitor 3PAR resources associated with a vCenter environment. The attributes that can be monitored include: storage system health, capacity utilization, and performance metrics. The analytics engine also allows for proactive monitoring of the 3PAR environment and indicates the state of the resources within the storage system. The user can easily configure to trigger and display an alert when a problem occurs by setting thresholds on the different metrics. The analytics engine also provides for proactive prediction which can determine the point in the future when a resource will reach a critical level.
- **HPE 3PAR StoreServ Troubleshooting**—dashboard to troubleshoot 3PAR storage systems. It provides a way to correlate from the virtual environment to the storage environment and it provides tools to drill down and identify problem resources within the storage system to solve load or capacity issues.
- The **HPE 3PAR StoreServ Performance**—dashboard to view how well 3PAR storage systems resources are being utilized and to help balance performance trends before they become issues.
- **StoreVirtual Monitoring**—dashboard to monitor StoreVirtual management groups associated with a vCenter environment. The attributes that can be monitored include: storage system health, capacity utilization, and system alerts. The analytics engine also enables proactive monitoring of the StoreVirtual environment and displays the state of the resources within the storage system. If a problem occurs, an alert is triggered and displayed. The analytics engine also provides for proactive prediction which can determine the point in the future when a resource will reach a critical level.
- **StoreVirtual Troubleshooting**—dashboard to troubleshoot the StoreVirtual virtual machines. It provides a way to correlate from the virtual environment to the storage environment and it provides tools to drill down and identify problem resources within the storage system to solve load or capacity issues.
- **StoreVirtual Performance**—dashboard to view how well the StoreVirtual resources are being utilized and to help balance performance trends before they become issues.

More information

https://www.vmware.com/support/pubs/vrealize-operations-manager-pubs.html

2 Installation

The StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations can be installed with the Advanced and Enterprise editions of vRealize Operations Manager 6.1, but not the Standard edition. If you have an HPE OneView for VMware vROps license, then StoreFront Analytics Pack may be installed with the standard edition too. OneView customers are entitled to a free upgrade from their existing vROps Standard Edition to vROps Advanced Edition. However, the EULA limits these customers to only installing HPE vROps integrations.

- StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations supports VMware vROps 6.0 and later.
- StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations does not support upgrading or migrating data from a previous 5.x vCOPS or StoreFront Analytic Management Pack 2.x environment.
- StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations supports upgrading from the previous StoreFront Analytics Management Pack 3.1 for VMware vRealize Operations .
- Remove any previous versions of StoreFront Analytic Management Pack before starting the installation. See “Deleting adapter instances and related objects of HPE StoreFront Analytic Management Pack” (page 54).

vApp Installation

Prerequisites

- Install the vRealize Operations Manager virtual application.
- Configure the vCenter server and expose the volumes that must be listed on the vROPS UI.

More information

https://www.vmware.com/support/pubs/vrealize-operations-manager-pubs.html
http://kb.vmware.com/kb/2093783

Procedure

1. Download StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations from the following site:

   http://www.hpe.com/support/softwaredepot
2. To obtain the PAK file, extract the downloaded zip file to a temporary folder.
3. To verify the digital signature with the PAK file, use a GnuPG utility (**http://gpg4win.org/**).
4. Log in to the vRealize Operations Manager user interface with administrator privileges.
5. In the left pane of the vRealize Operations Manager, click the Administration icon and then click **Solutions**.
6. On the **Solutions** tab, click the plus sign, and perform the following steps:
   a. Browse to locate the temporary folder.
   b. Select the PAK file.
   c. Click **Upload** and then click **Next**.
7. Read and accept the EULA, and then click **Next**.
8. Click **Finish**.

9. Configure and add the Hewlett Packard Enterprise storage systems after the management pack is deployed and verified.

   Each 3PAR or StoreVirtual system that is configured will be of the type HPE Storage Adapter Instance. It is possible to configure multiple Storage Adapter adapter instances.

More information

vRealize Operations Manager Virtual Application Installation Guide at: **https://www.vmware.com/support/pubs/vrealize-operations-manager-pubs.html**.

Configuring a storage system

1. Log in to the vRealize Operations Manager user interface as an administrator.
2. In the left pane of the vRealize Operations Manager, click on the Administration icon and then click **Solutions**.
3. On the **Solutions** tab, select StoreFront Analytics solution and click **Configure**.
4. In the **Adapter Settings** screen, add the following:
   - **Display name**—Enter a name for the adapter configuration. For example, Display name: Bumblebee Instance.
   - **Description**—(Optional) Enter a description for the adapter configuration.
   - **Auto Discovery**—Set to true.
   - **Hostname/IP Address**—The server name or IP Address of the 3PAR or StoreVirtual system.

     NOTE: For StoreVirtual, use the Virtual IP Address (VIP) of the HPE StoreVirtual Cluster.

   - **CIM Port**—The CIM port on the array.

     NOTE: By default, the port number is 5989, but a different port may have been configured.

   - **Storage System Type**—Select the type of storage system you are adding (3PAR StoreServ or StoreVirtual).
   - **License**—Enter the StoreFront Analytics for VMware vRealize Operations license for the storage system.

     If the **License** field is left blank, the Instant-on license will be applied. The Instance-on license is valid through 60 days. It can be updated to a permanent license within the 60-day period. See “Getting a license for HPE StoreFront Analytics for VMware vRealize Operations” (page 48).

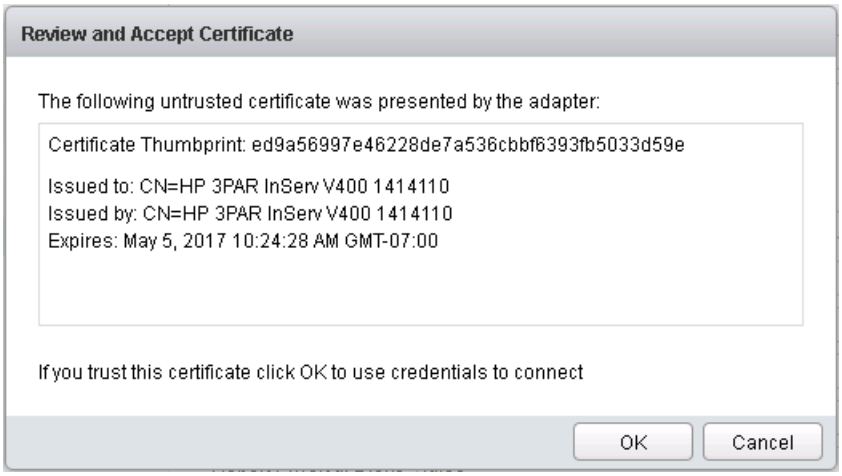
   - **Report Physical Disks**—To monitor the physical disks on the 3PAR array, set to true. By default, the selection is set to false. When it is set to false, the information for the physical disks in the environment will not be reported (not applicable if you are configuring StoreVirtual management group).
   - **Credential**—Click **Add** and enter the credentials for the 3PAR or StoreVirtual array that is being configured.

     For the 3PAR array, you can specify credentials that belong to any of these user accounts:

     - Browse
     - Create

- Edit
- Service
- Super

5. To verify if the parameters are configured correctly, click **Test Connection**. If the parameters are correct, the Review and Accept Certificate screen is displayed. This screen is the certificate for the storage system you are configuring. After verifying the Certificate Thumbprint, click **OK** to use credentials to connect to the storage system.

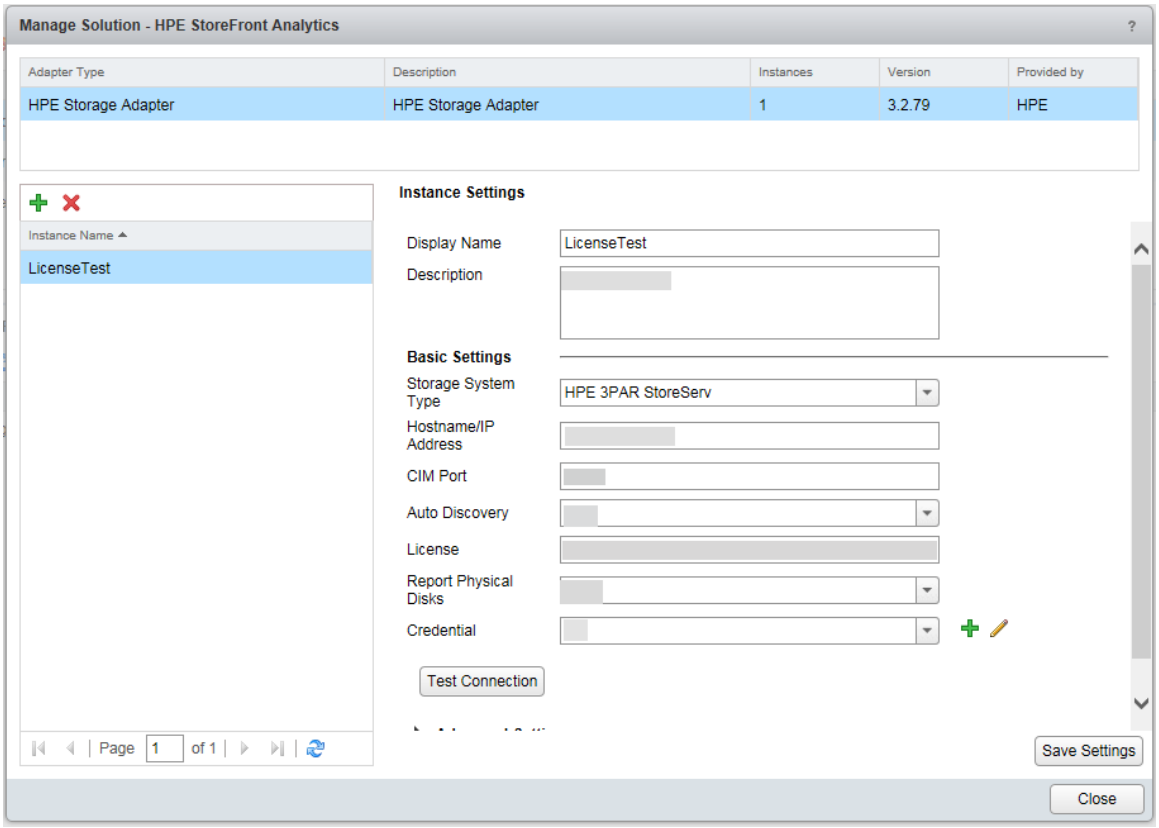


If **Test Connection** fails, see “Configuration Troubleshooting” (page 52).

6. Click **Save Settings**.

A completed configuration for an adapter instance is shown in Table 1 (page 10).

Figure 1 Completed Add Adapter Instance screen



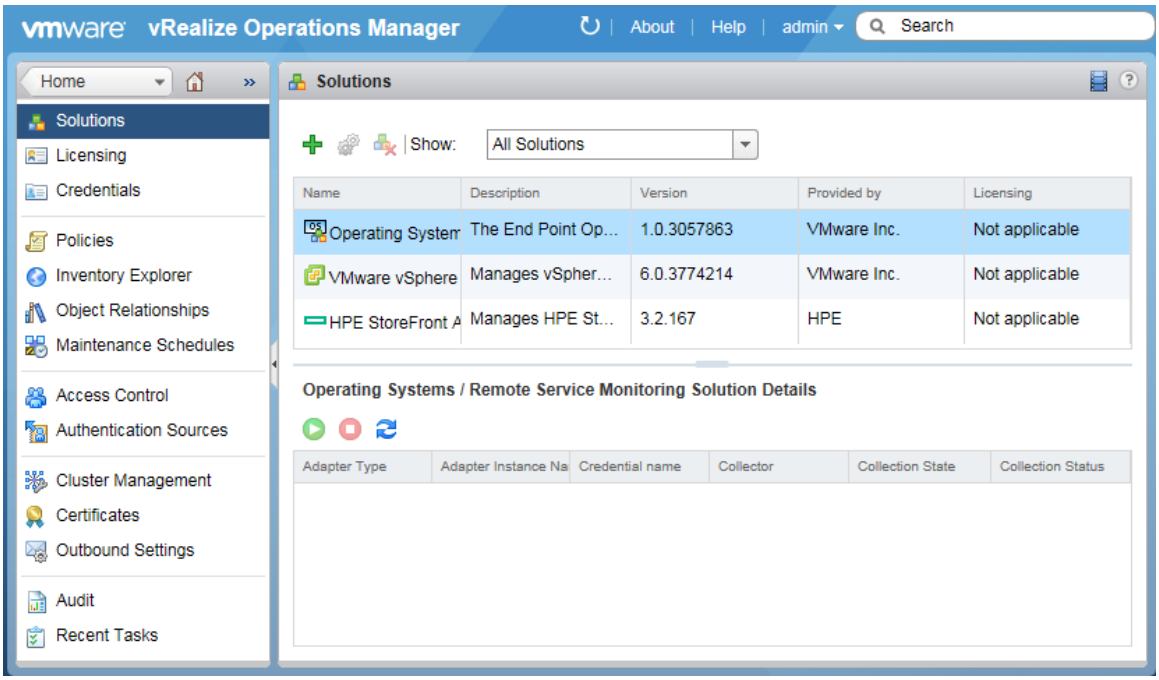
Licensing

StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations provides detailed 3PAR StoreServ and StoreVirtual health information for free. However, advanced performance metrics and capacity information are captured and displayed only during the sixty-day evaluation period. To continue viewing the advanced metrics after the 60-day evaluation period expires, purchase a license.

See “Getting a license for HPE StoreFront Analytics for VMware vRealize Operations” (page 48) for getting a license for StoreFront Analytics for VMware vRealize Operations.

Verifying the software version

1. Log in to the vRealize Operations Manager user interface as an administrator.
2. In the left pane of the vRealize Operations Manager, click on the Administration icon, and then click **Solutions**.
3. On the **Solutions** tab, the StoreFront Analytics solution and version number are displayed.



Notes

Object Types

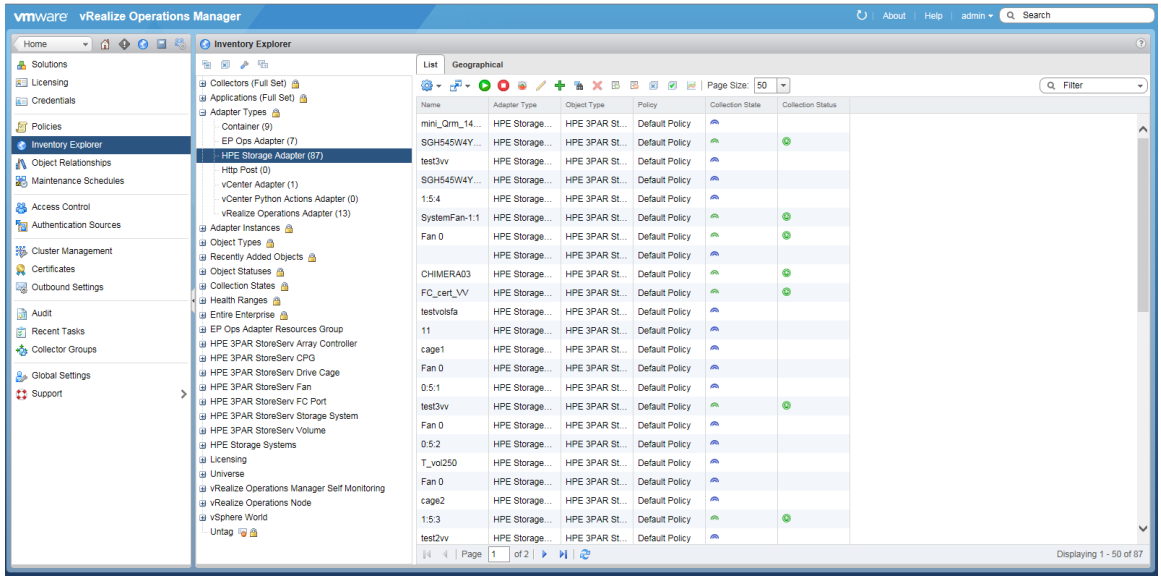
The 3PAR StoreServ object type reported by the Storage Adapter are prefixed with HPE 3PAR StoreServ. For example, HPE 3PAR StoreServ Array, HPE 3PAR StoreServ Array Controller, HPE 3PAR StoreServ Disk Drive. Similarly, the StoreVirtual object types are prefixed with HPE StoreVirtual. For example, StoreVirtual Cluster, etc.

Viewing Adapter Types

1. In the vRealize Operations Manager, click **Administration→Inventory Explorer**.
2. Expand the **Adapter Types** list.
3. Click **HPE Storage Adapter** in the list.

The Storage Adapter resources appear in the **List** tab. This lists all the objects reported by the Storage Adapter across different adapter instances.

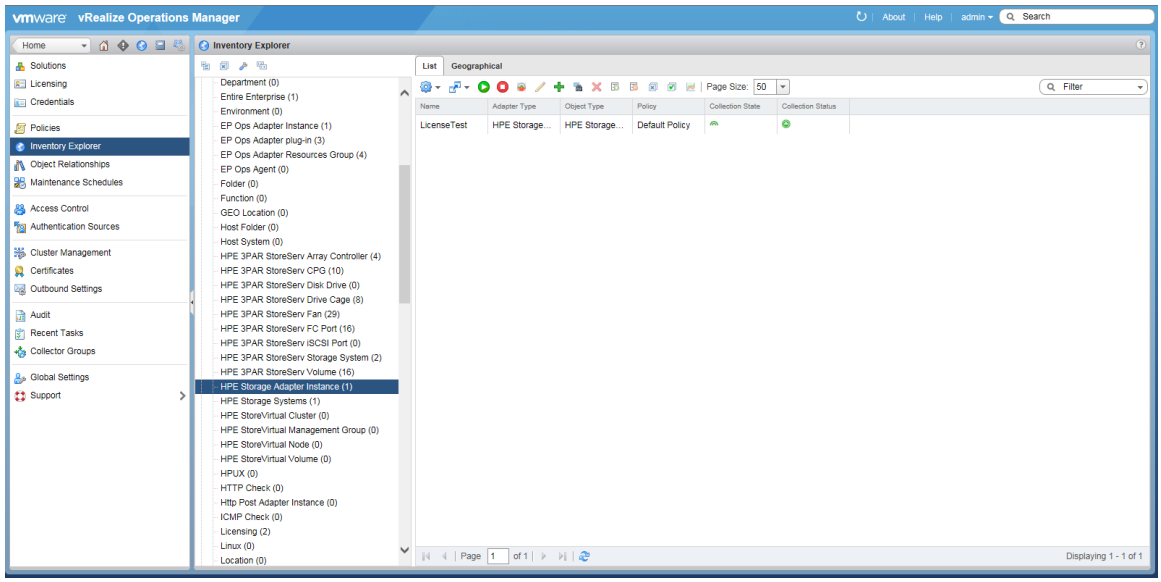
Figure 2 HPE Storage Adapter Type



Viewing Adapter Instances

1. In the vRealize Operations Manager, click **Administration→Inventory Explorer**.
2. In the **Inventory Explorer**, expand **Object Types**.
3. Click on **HPE Storage Adapter Instance**.

Figure 3 HPE Storage Adapter instance



Depending on how many Hewlett Packard Enterprise storage systems are configured, there may be more than one Storage Adapter Instance.

The various Hewlett Packard Enterprise object types that are reported are shown under **Object Types** in the list.

Resource metrics reported for HPE 3PAR StoreServ resources

Table 1 HPE 3PAR resources reported metrics

Resource	Reported Metrics
3PAR StoreServ Array	System Capacity • Available Capacity (GB) • Available Capacity (%) • Total Capacity (GB) • Used Capacity (GB) • Compaction (Ratio) • Deduplication (Ratio) • Available FC Capacity (GB) • Available NL Capacity (GB) • Available SSD Capacity (GB) System Health • State System Performance • Read Throughput (KBps) • Read IOPS • Total Throughput (KBps) • Total IOPS • Write Throughput (KBps) • Write IOPS
3PAR StoreServ Array Controller	Array Controller Health • State
HPE 3PAR StoreServ CPG	CPG Capacity • Available Capacity (%) • Total Capacity (GB) • Used Capacity (%) • Compaction (Ratio) • Deduplication (Ratio) CPG Health • State
3PAR StoreServ Disk Drive	Disk Drive Health • State Physical Disk Performance • Latency (ms) • Average IO Size (KB) • Read Throughput (KBps) • Read IOPS • Total Throughput (KBps) • Total IOPS • Queue Depth

Table 1 HPE 3PAR resources reported metrics *(continued)*

Resource	Reported Metrics
	• Write Throughput (KBps) • Write IOPS
HPE 3PAR StoreServ Drive Cage	Drive Cage Health • State
HPE 3PAR StoreServ Fan	Fan Health • State
HPE 3PAR StoreServ FC Port	FC Port Health • State FC Port Performance • Latency (ms) • Average IO Size (KB) • Read Throughput (KBps) • Read IOPS • Total Throughput (KBps) • Total IOPS • Queue Depth • Write Throughput (KBps) • Write IOPS
HPE 3PAR StoreServ iSCSI Port	iSCSI Health • State iSCSI Port Performance • Latency (ms) • Average IO Size (KB) • Read Throughput (KBps) • Read IOPS • Total Throughput (KBps) • Total IOPS • Queue Depth • Write Throughput (KBps) • Write IOPS
HPE 3PAR StoreServ Storage Volume	Volume Health • State Volume Capacity • Total Capacity (GB) • Used Capacity (GB) • Used Capacity (%) • Compaction (Ratio) • Deduplication (Ratio) • FC Tier (%) • NL Tier (%)

Table 1 HPE 3PAR resources reported metrics *(continued)*

Resource	Reported Metrics
	• SSD Tier (%) • Thin Provisioning Savings (%) Volume Performance • Latency (ms) • Average IO Size (KB) • Read Throughput (KBps) • Read IOPS • Total Throughput (KBps) • Total IOPS • Queue Depth • Write Throughput (KBps) • Write IOPS

Resource metrics reported for HPE StoreVirtual resources

Table 2 HPE StoreVirtual resources reported metrics

Resource	Reported Metrics
StoreVirtual Management Group	Management Group Capacity • Available Capacity (GB) • Total Capacity (GB) • Used Capacity (GB) • Used Capacity (%) Management Group Health • State
StoreVirtual Cluster	Cluster Capacity • Available Capacity (GB) • Total Capacity (GB) • Used Capacity (GB) • Used Capacity (%) Cluster Health • State Cluster Performance • Read Throughput (KBps) • Read IOPS • Read Latency (ms) • Total Throughput (KBps) • Total IOPS • Queue Depth • Write Throughput (KBps) • Write IOPS • Write Latency (ms)
StoreVirtual Node **NOTE:** Failover managers are shown wherever StoreVirtual Nodes are shown because they are treated as a node. However, no metrics are reported against them.	Node Capacity • Available Capacity (GB) • Total Capacity (GB) • Used Capacity (GB) • Used Capacity (%) Node Health • State Node Performance • Read Throughput (KBps) • Read IOPS • Read Latency (ms) • Total Throughput (KBps) • Total IOPS • Queue Depth • Write Throughput (KBps)

Table 2 HPE StoreVirtual resources reported metrics *(continued)*

Resource	Reported Metrics
	• Write IOPS • Write Latency (ms)
StoreVirtual Volume	Volume Capacity • Available Capacity (GB) • Total Capacity (GB) • Used Capacity (GB) • Used Capacity (%) Volume Health • State Volume Performance • Read Throughput (KBps) • Read IOPS • Read Latency (ms) • Total Throughput (KBps) • Total IOPS • Queue Depth • Write Throughput (KBps) • Write IOPS • Write Latency (ms)

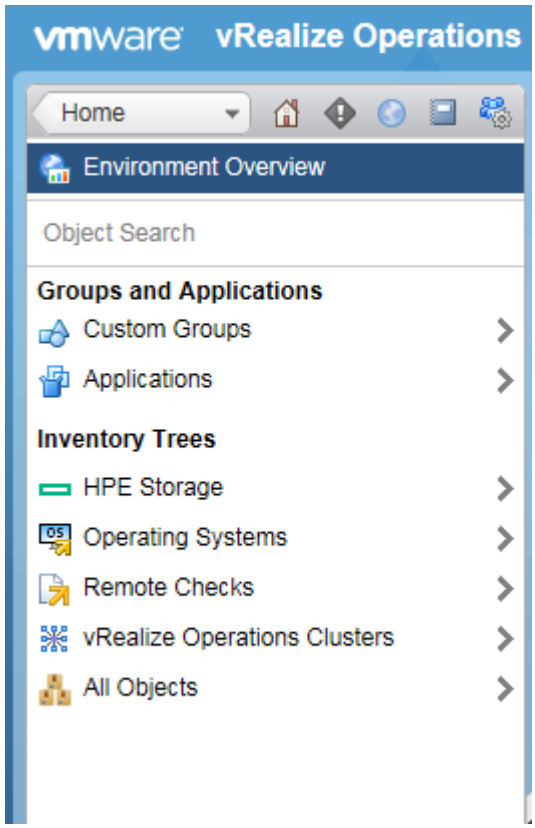
3 Inventory Trees

The Inventory Trees section of the Environment Overview provides a hierarchical view of the objects in the storage systems. The HPE Storage Inventory Tree lists all of the Storage systems that have been configured, and the All Objects Inventory Tree lists all of the objects that are configured within vROps.

Viewing the configured systems

1. For Storage, select **Environment→Inventory Trees→HPE Storage**.
2. For All Objects, select **Environment→Inventory Trees→All Objects**.

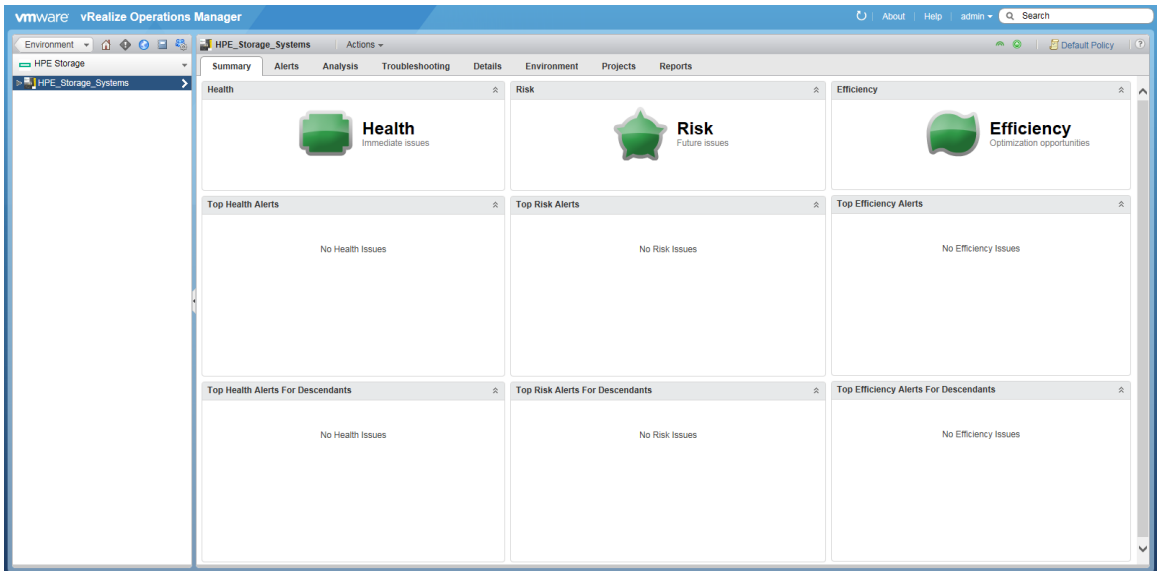
Figure 4 Environment Overview



HPE Storage Inventory Tree

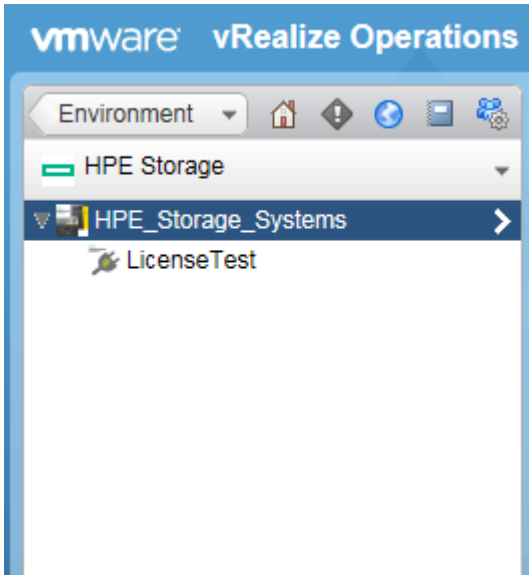
Clicking on the Storage Inventory Tree brings up a new pane on the left with the item HP_Storage_Systems in it. To the right are the Health, Risk and Efficiency alert badges. If there is an alert associated with an object, then those alerts will be displayed when that object is selected.

Figure 5 HPE Storage Systems



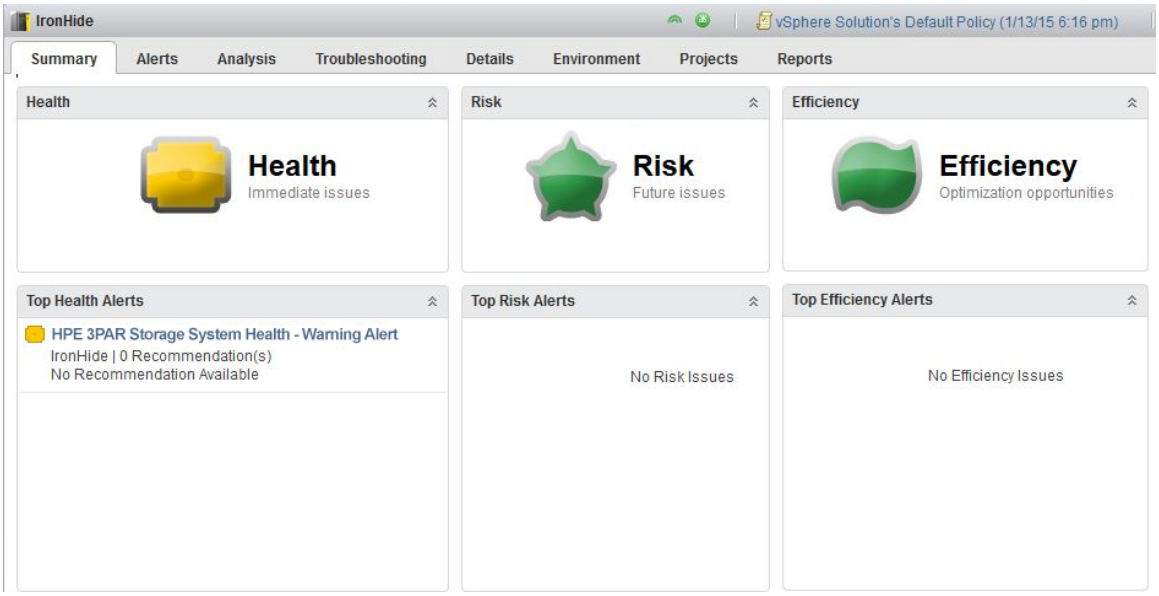
Clicking on HP_Storage_Systems will expand the tree and list all of the Storage systems that have been configured.

Figure 6 HPE Storage Systems Expanded



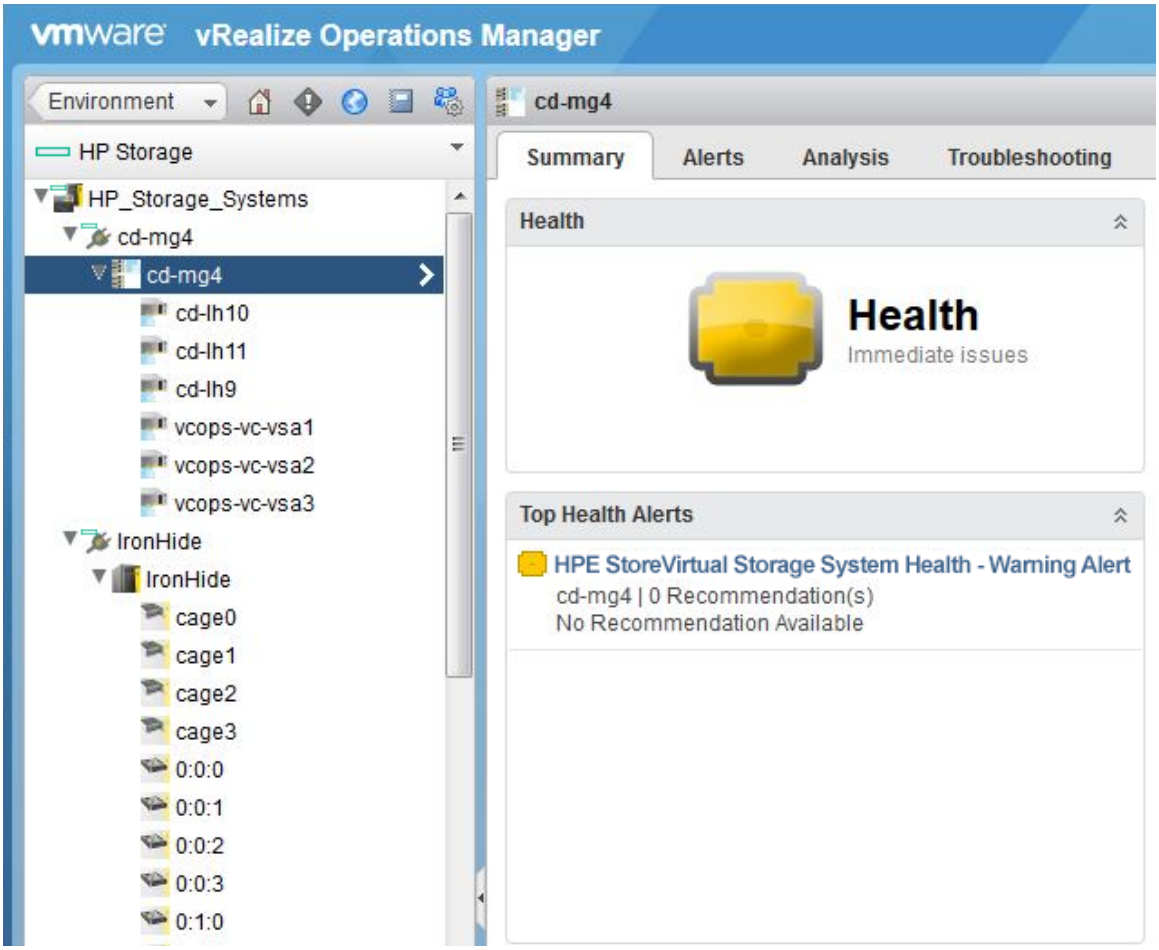
Expanding an individual 3PAR StoreServ Storage System will list the following objects: drive cages, disk drives, fans, array controllers, and ports. Additionally, when the specific storage system is selected its alert badges are displayed as well.

Figure 7 3PAR StoreServ Inventory Tree



When an individual StoreVirtual Storage System is expanded the management group's nodes are listed.

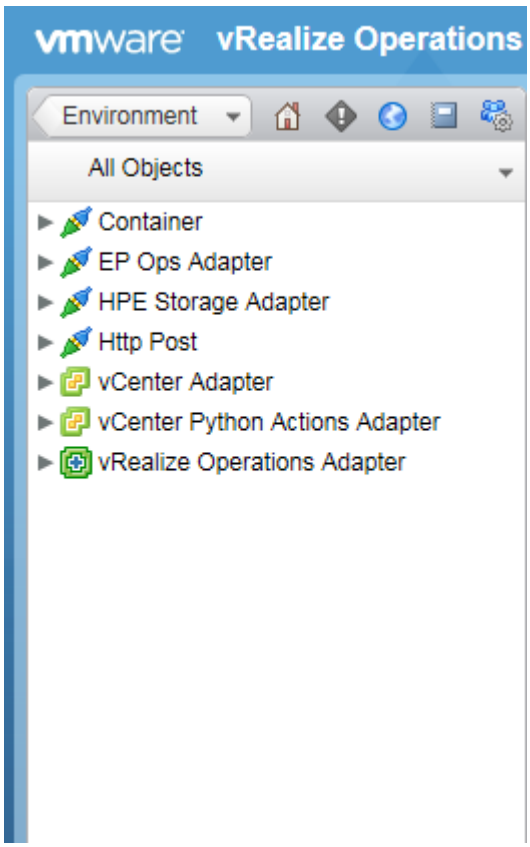
Figure 8 HPE StoreVirtual Inventory Tree



All Objects Inventory Tree

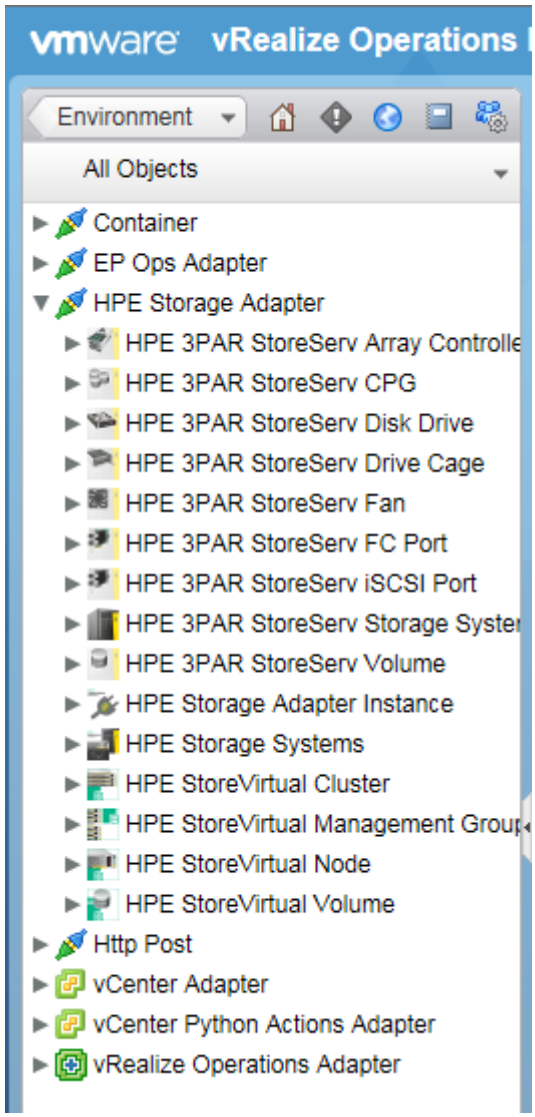
When the All Objects Inventory Tree is selected (**Environment→Inventory Trees→All Objects**), a new left pane is displayed showing all of the objects that have been configured in vROps.

Figure 9 All Objects



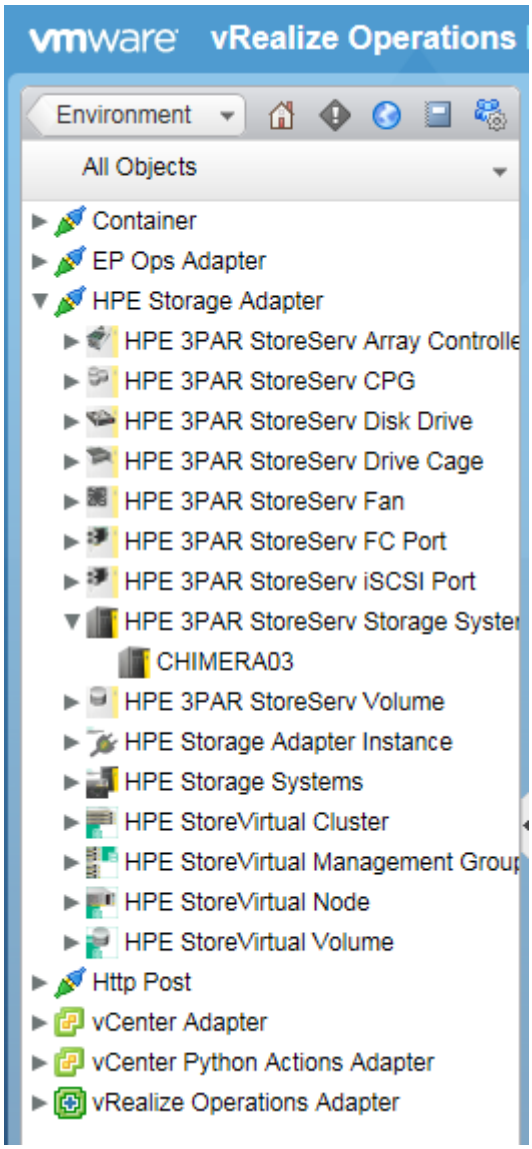
Click on the triangle to the left of HPE Storage Adapter to expand it, and view all of the objects associated with Storage Systems.

Figure 10 All Objects HPE Storage Expanded



Expanding an individual object displays the names of the Storage System objects that have been returned during the collection cycle.

Figure 11 All Objects HPE Storage System Object Expanded

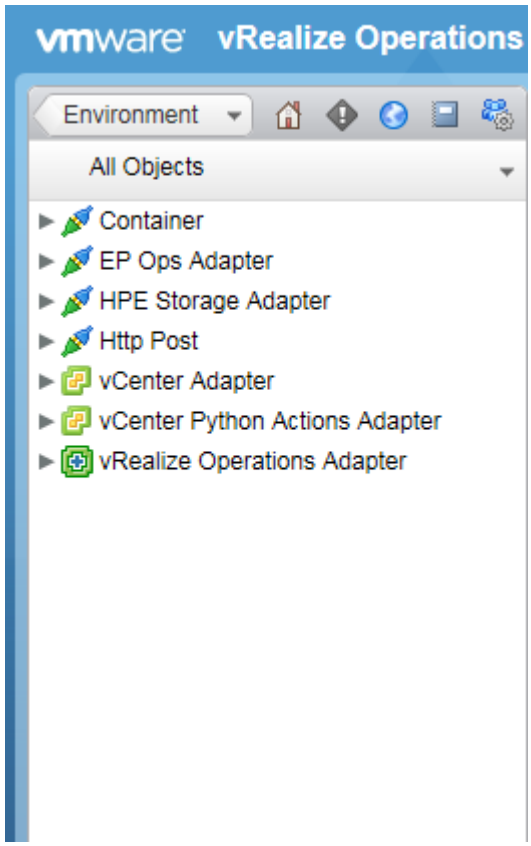


4 Badges and Alerts

Customized Hewlett Packard Enterprise alerts are defined for the storage objects that affect the health and risk badges. Alerts for each storage object are displayed when viewing the **Summary** page of an object.

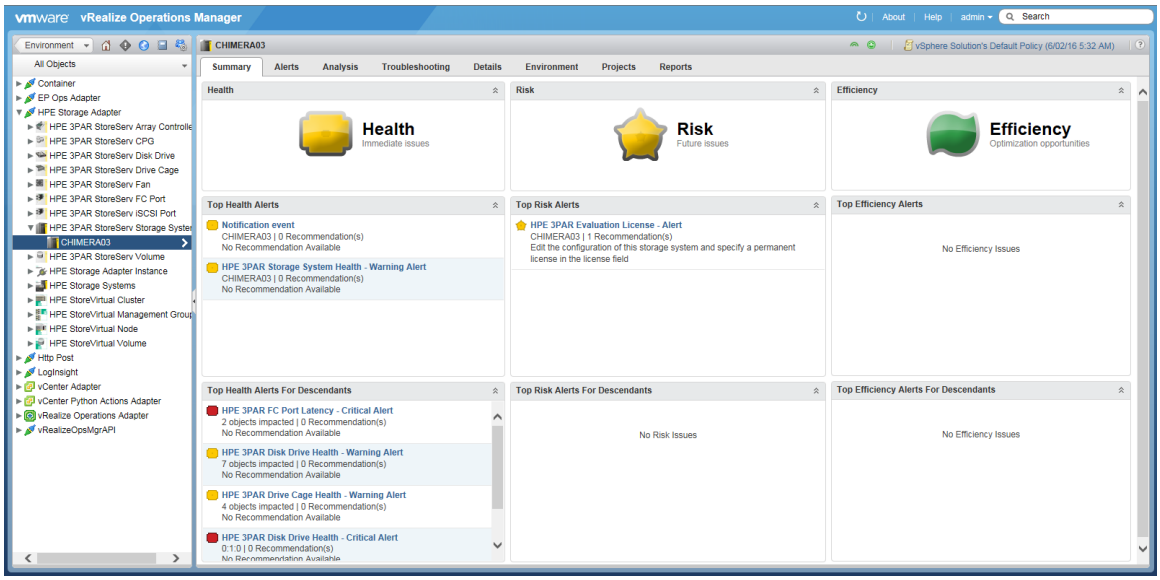
Multiple ways exist to navigate to the **Summary** page of a storage object. One way to view the **Summary** page is to select the **All Object Inventory Tree** option (**Environment→Inventory Trees→All Objects**).

Figure 12 All Objects Inventory Tree



From the **All Objects** inventory tree window, expand **HPE Storage Adapter** which will display a list of the available Storage objects types. Expanding an individual object type displays the names of the Storage System objects that have been returned during the collection cycle. Selecting an individual object (for example, a specific HPE 3PAR StoreServ Storage System) will display the Summary page for that object. The Summary page displays the badges for Health, Risk, and Efficiency, and any alerts that are associated with each badge. Custom Hewlett Packard Enterprise alerts have only been defined for the Health and Risk Badges.

Figure 13 3PAR StoreServ Storage System Badges



Health Badge Alerts

Critical and warning health alerts are defined for both the 3PAR StoreServ and the StoreVirtual storage systems. The warning alert is triggered when the health state of an object is returned with value 75. The critical alert is triggered when the health state of the object returns with value 25 or below.

Health State Numeric Value	Health State
100	Good
75	Warning
25	Critical

The following 3PAR StoreServ object types will generate health alerts:

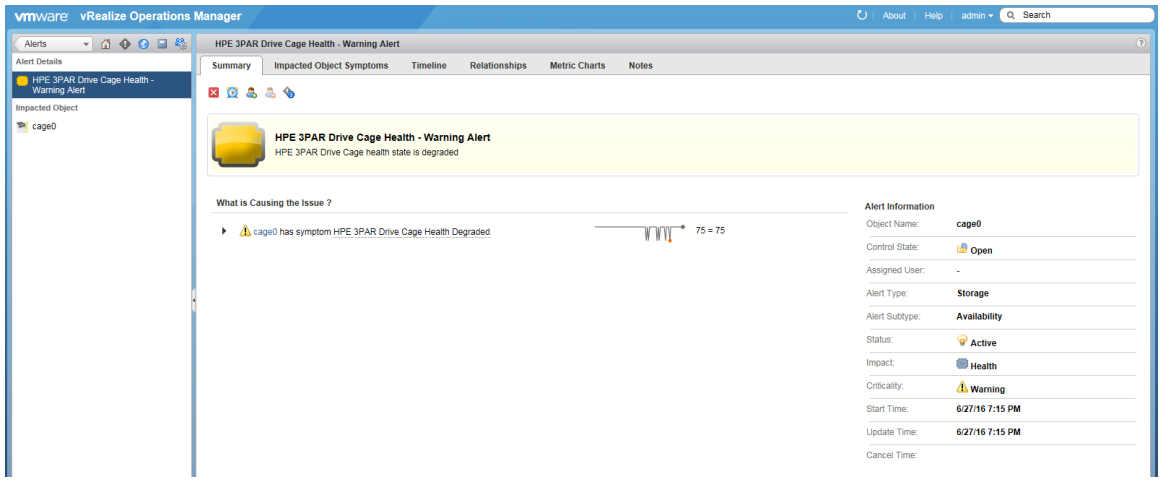
- 3PAR StoreServ Array Controller
- 3PAR StoreServ CPG
- 3PAR StoreServ Disk Drive
- 3PAR StoreServ Drive Cage
- 3PAR StoreServ Fan
- 3PAR StoreServ FC Port
- 3PAR StoreServ iSCSI Port
- 3PAR StoreServ Storage System
- 3PAR StoreServ Storage Volume

The following StoreVirtual object types will generate health alerts:

- StoreVirtual Cluster
- StoreVirtual Management Group
- StoreVirtual Node
- StoreVirtual Volume

Clicking on an alert displays a new page which provides more information as to what caused the alert to be triggered.

Figure 14 HPE 3PAR Health Warning Alert



Latency Health Alerts

Critical and warning latency health alerts are defined for both the 3PAR StoreServ and the StoreVirtual Storage systems.

For 3PAR StoreServ, the latency warning health alert is triggered when the reported latency of an object is greater than 25ms. The latency critical health alert is triggered when the reported latency of an object is greater than 50ms.

For StoreVirtual Storage, the latency warning health alert is triggered when the reported latency of an object is greater than 30ms. The latency critical health alert is triggered when the reported latency of an object is greater than 60ms.

A latency health alert for a Storage System object will affect the health badge color of that object. A warning latency health alert will show as yellow and critical latency health alert will turn the health badge of the object to red.

NOTE: While a latency health alert changes the health badge color of a Storage object to yellow or red, the health metric of that same object, which is collected from the storage array, may show as 100%.

3PAR StoreServ reported latency	Alert
25 ms	Warning
50 ms	Critical

StoreVirtual Storage reported latency	Alert
30 ms	Warning
60 ms	Critical

The following3PAR StoreServ object types will generate risk alerts:

- 3PAR StoreServ Disk Drive
- 3PAR StoreServ FC Port
- 3PAR StoreServ iSCSI Port
- 3PAR StoreServ Storage Volume

The following StoreVirtual object types will generate risk alerts:

- StoreVirtual Cluster
- StoreVirtual Node
- StoreVirtual Volume

Risk Badge Alerts

Critical and warning risk alerts have been defined for both the 3PAR StoreServ and the StoreVirtual Storage Systems. The warning alert is triggered when the reported used capacity percent of an object is 80% or greater. The critical alert is triggered when the used capacity percent of the object is 95% or greater.

Used Capacity Percent	Alert
80%	Warning
95%	Critical

The following 3PAR StoreServ object types will generate risk alerts:

- 3PAR StoreServ CPG
- 3PAR StoreServ Storage System
- 3PAR StoreServ Storage Volume

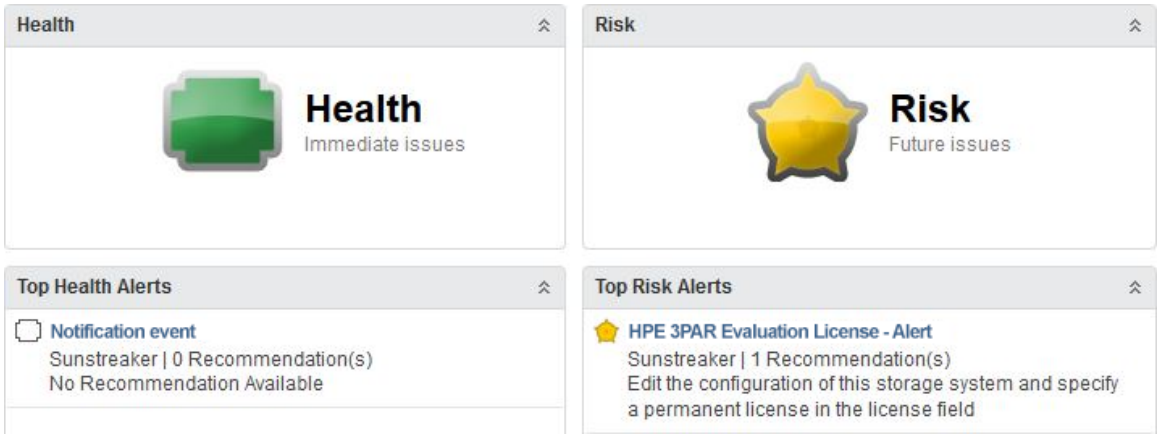
The following StoreVirtual object types will generate risk alerts:

- StoreVirtual Cluster
- StoreVirtual Management Group
- StoreVirtual Node
- StoreVirtual Volume

Licensing Alerts

If a temporary license was entered for the storage system when it was configured, then a Notification event is displayed in the Health Badge, and a warning alert is displayed in the Risk badge. If the temporary license expires and a permanent license has not yet been configured, then a warning alert is displayed in the Health Badge that indicates there is no valid license associated with the storage system.

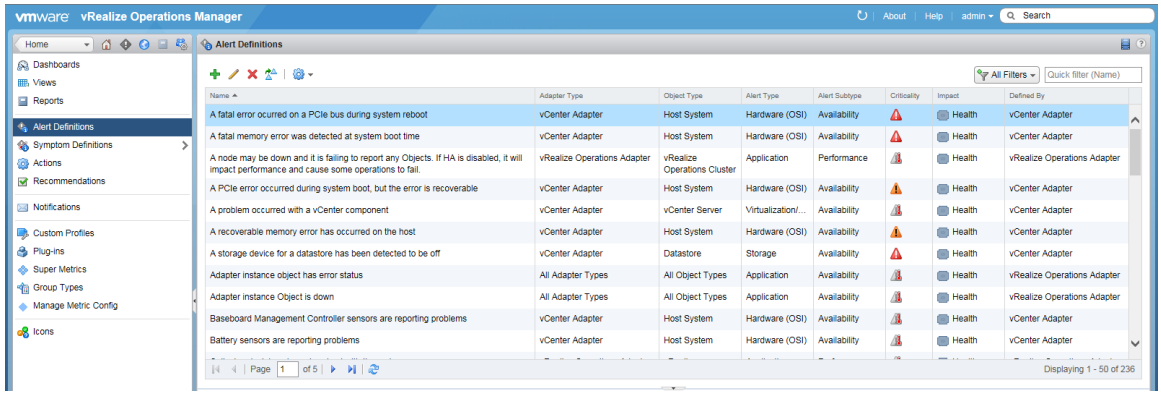
Figure 15 HPE 3PAR Licensing Alerts



Editing Alerts

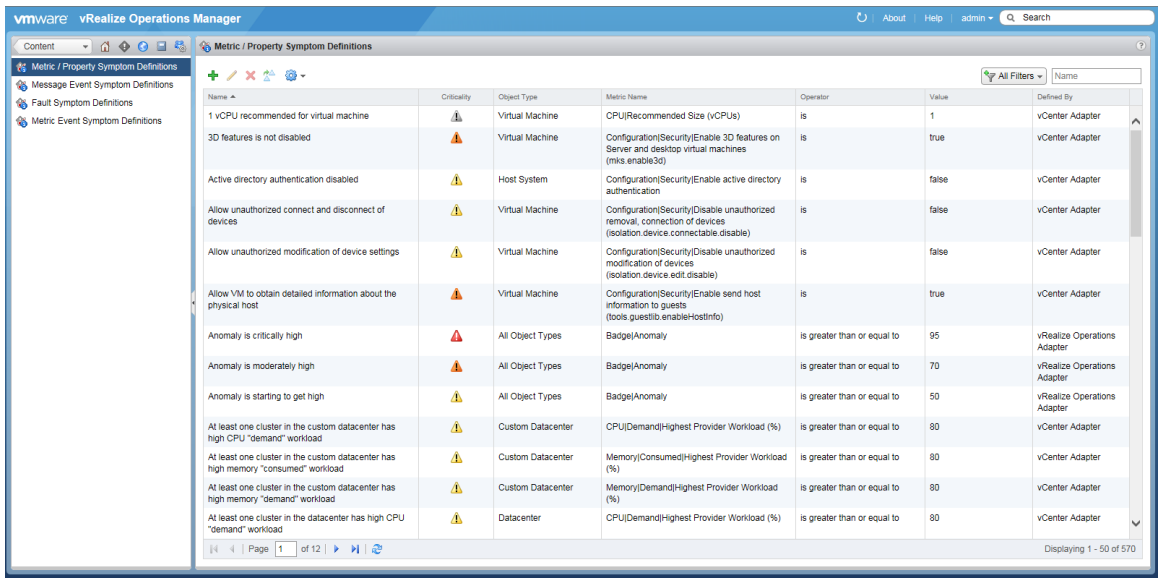
The alert definitions can be edited by going to the Alert Definitions page (**Home→Content→Alert Definitions**).

Figure 16 Alert Definitions



Each alert is triggered by one or more symptoms, which can be edited on the Symptom Definitions page (**Home→Content→Symptom Definitions**).

Figure 17 Symptom Definitions



5 Dashboard

The customized Hewlett Packard Enterprise dashboards are available from the **Dashboard List→HPE Storage** menu in the vRealize Operations Manager home page. There are six dashboards available after installation, three for 3PAR StoreServ and three for StoreVirtual. Once you open the dashboard from the dashboard menu, they will appear as tabs in the vRealize Operations Manager custom GUI.

The dashboard consists of customized widgets with customized interactions and several standard widgets.

To gain deeper visibility of the critical storage resources from within vRealize Operations Manager, specific storage platform adapters are required. The StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations is a software adapter that extends vRealize Operations Manager functionality to support 3PAR StoreServ and StoreVirtual storage systems. VMware administrators using StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations can visualize and analyze data from their Hewlett Packard Enterprise storage array systems on standard and custom dashboards directly within vRealize Operations Manager without the need to switch to another tool. The StoreFront Analytics Management Pack 3.2 for VMware vRealize Operations provides customers using Hewlett Packard Enterprise storage with custom dashboards to gain deep insights and visibility into the health, risk, and efficiency of performance of the storage infrastructure and capacity capabilities.

If you are observing performance issues within the storage system, you can use the performance dashboards to view volumes with high utilization. Using that information, you can use the troubleshooting dashboards to view the details of the volumes to see which virtual machine on the volume has a high utilization and then determine what the virtual machine is doing to cause the high utilization.

Hewlett Packard Enterprise storage information can be accessed from within VMware vRealize Operations Manager in several ways based on the selected object in the user interface.

The dashboards help the user view detailed storage information on the selected objects in different ways:

- **Monitoring Dashboards**—Provides summary and detailed information about the Hewlett Packard Enterprise storage systems in the VMware vSphere environment, including Hewlett Packard Enterprise storage system health, capacity information, 50 Least Healthy Hewlett Packard Enterprise storage resources, and Hewlett Packard Enterprise storage system alerts.
- **Troubleshooting Dashboards**—Provides summary and detailed information about virtual machines and how they map to Hewlett Packard Enterprise storage volumes, pools/clusters, disks and ports. The dashboard includes graphs for key performance metrics such as IOPS and bandwidth, which are displayed in relation to the selected object of the VM to Storage Mapping widget.
- **Performance Dashboards**—Provides tools to view how well the storage system resources are being utilized and to help balance performance trends before they become issues. The dashboard displays graphs for top 5 Utilization Indexes of several capacity and performance metrics of the relevant storage system resources. Selecting a row in one of the widgets and clicking the Resource Detail icon ( ) will display more detail about the resource.

The included Hewlett Packard Enterprise dashboards are provided as an easy way to quickly start viewing common storage metrics that are key to monitoring and analyzing infrastructure health. You can also utilize vRealize Operations Manager widgets to configure your own specialized views based on Hewlett Packard Enterprise storage metrics.

Monitoring dashboards

There are two monitoring dashboards, one to monitor the 3PAR storage systems, and one to monitor the StoreVirtual management groups. These dashboards incorporate the same set of customized widgets and interactions to display information on the selected storage system or resource.

IMPORTANT: To initialize the interactions of the dashboard, you first need to select a storage system in the **HPE 3PAR Storage Systems** widget of **HPE 3PAR StoreServ Monitoring** dashboard, or a management group in the **HPE SV Management Groups** widget of the **HPE StoreVirtual Monitoring** dashboard.

Figure 18 HPE Storage Monitoring dashboard for 3PAR StoreServ Storage Systems

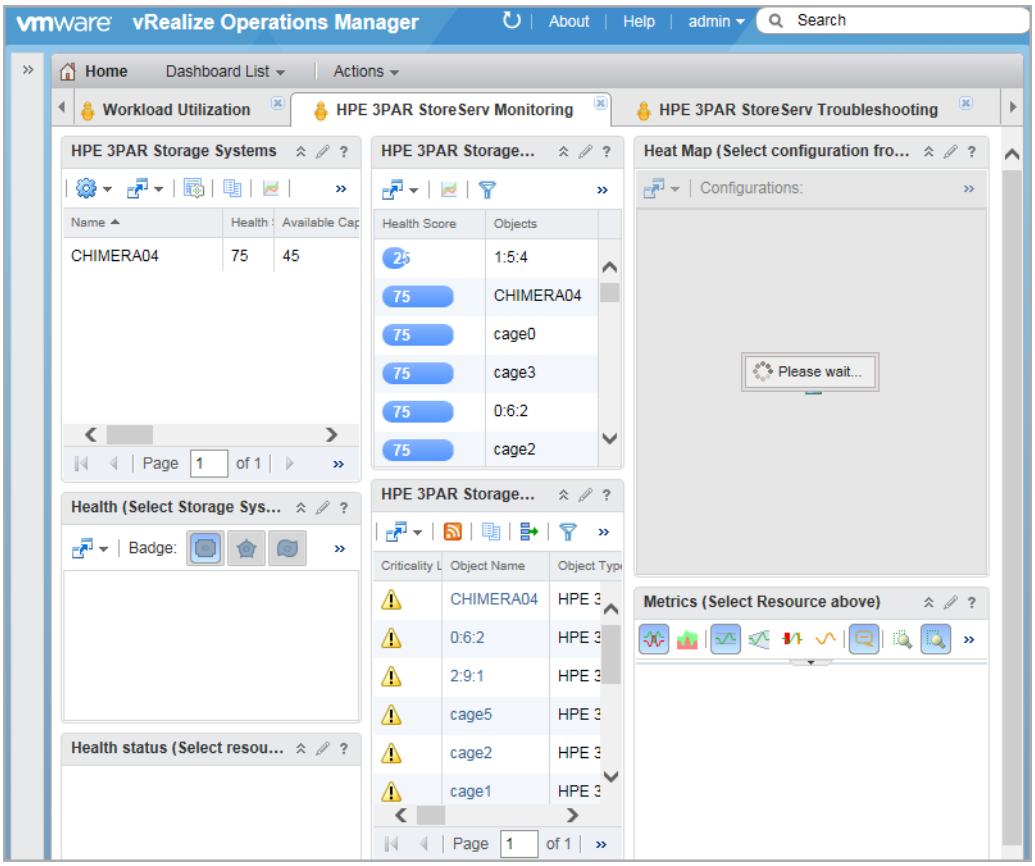
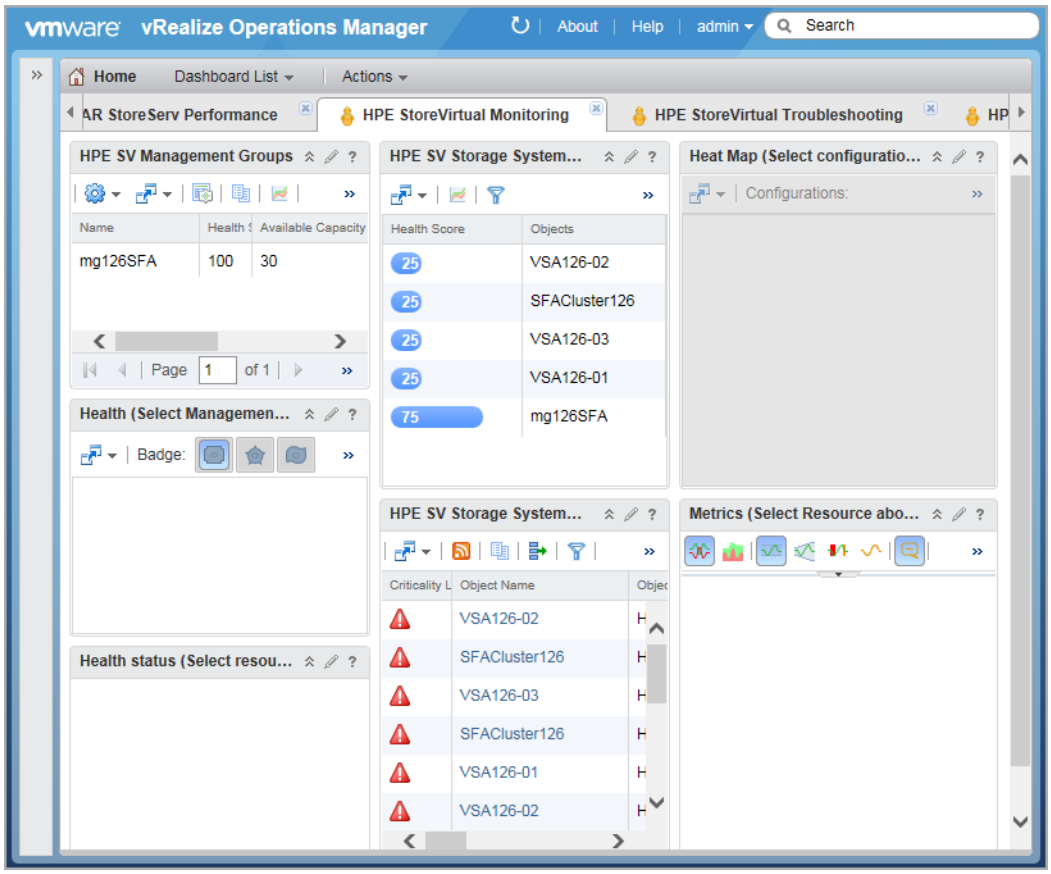


Figure 19 HPE Storage Monitoring dashboard for HPE StoreVirtual Storage Systems



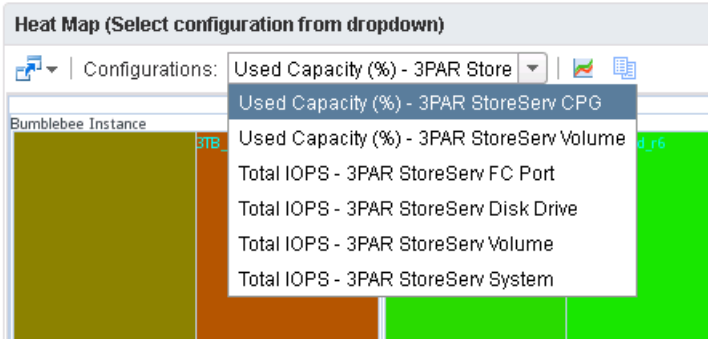
HPE Storage Monitoring dashboard Interactions

The following interactions occur when you select a storage system in the **HPE 3PAR Storage Systems** widget of **HPE 3PAR StoreServ Monitoring** dashboard, or a management group in the **HPE SV Management Groups** widget of the **HPE StoreVirtual Monitoring** dashboard.:

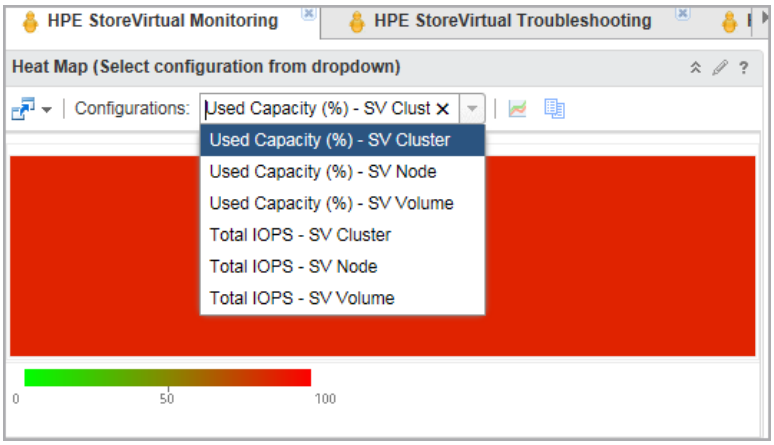
- The **HPE STORAGE SYSTEM ALERTS** widget updates to show alerts for the storage systems that are configured in the environment. There are no alerts reported explicitly from the storage systems. However, Customized Hewlett Packard Enterprise alerts have been defined for the Health and Risk Badges (See “Badges and Alerts” (page 21)), also the user can set hard thresholds on different metrics reported by HPE StoreFront analytics and when these thresholds are violated, the alerts will be generated.
- The **HEAT MAP** widget updates to show information about the selected configuration. When one of the elements in the widget is selected, the **METRICS** widget will be updated to show the details of the selected widget.

  The widget can display information about multiple object types. Select the appropriate object type from the **Configurations** pull-down menu:

  Heat Maps available for **HPE 3PAR StoreServ** (Used Capacity (%) - 3PAR StoreServ CPG, Used Capacity (%) - 3PAR StoreServ Storage Volume, Total IOPS - 3PAR StoreServ FC Port, Total IOPS - 3PAR StoreServ Disk Drive, Total IOPS - 3PAR StoreServ Storage Volume, Total IOPS - 3PAR StoreServ Storage System).



Heat Maps available for **HPE StoreVirtual** (Used Capacity (%) - SV Cluster, Used Capacity (%) - SV Node, Used Capacity (%) - SV Volume, Total IOPS - SV Cluster, Total IOPS - SV Node, Total IOPS - SV Volume).



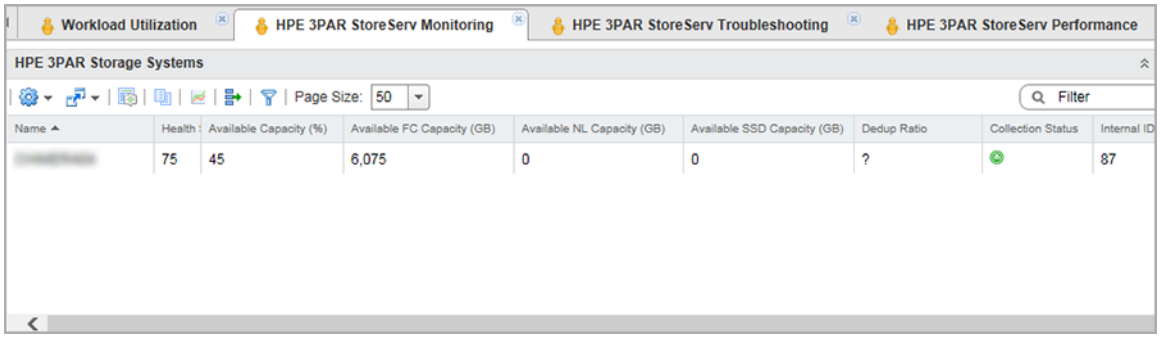
- The **HEALTH** widget updates to show the storage system health for the selected storage system. When you select a resource (disk drive, fan, FC port, etc.) in this widget, the **HEALTH STATUS** widget will be updated with health history information about the selected resource.

NOTE:

- You will need to initially click a storage system, management group, or resource to update the widgets.

HPE 3PAR STORAGE SYSTEMS widget (HPE 3PAR StoreServ Monitoring dashboard)

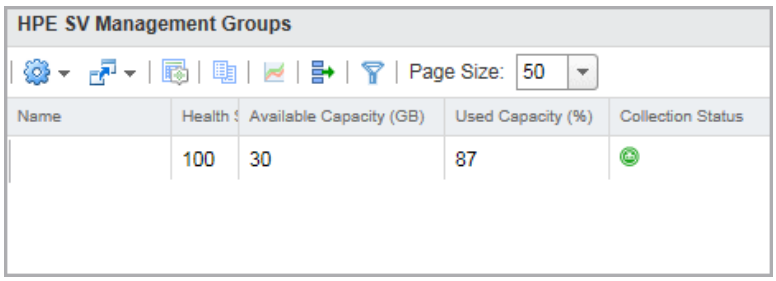
This widget shows the storage systems configured in the environment. Selecting a storage system in this widget displays a heat map of the storage system in the **HEAT MAP** widget as well as a view of all of the resources within the storage system in the **HEALTH** widget. The list can be sorted by column heading.



- **Name** - the name of the storage systems configured by the user.
- **Health** - the health of the storage systems as reported by the vROps analytics.
- **Collection State** - the state of the data collection of the storage systems.
- **Collection Status** - the status of the data collection of the storage systems.
- **Available Capacity (%)**- the reported system capacity | percent free metric.
- **Available FC Capacity (GB)** - free Fibre Channel capacity in GB.
- **Available NL Capacity (GB)** - free Nearline capacity in GB.
- **Available SSD Capacity (GB)** - free Solid State Drive capacity in GB.

STOREVIRTUAL MANAGEMENT GROUPS widget (HPE StoreVirtual Monitoring dashboard)

This widget shows the management groups configured in the environment. Selecting a management group in this widget displays a heat map of the group in the **HEAT MAP** widget as well as a view of all of the resources within the group in the **HEALTH** widget. The list can be sorted by column heading.

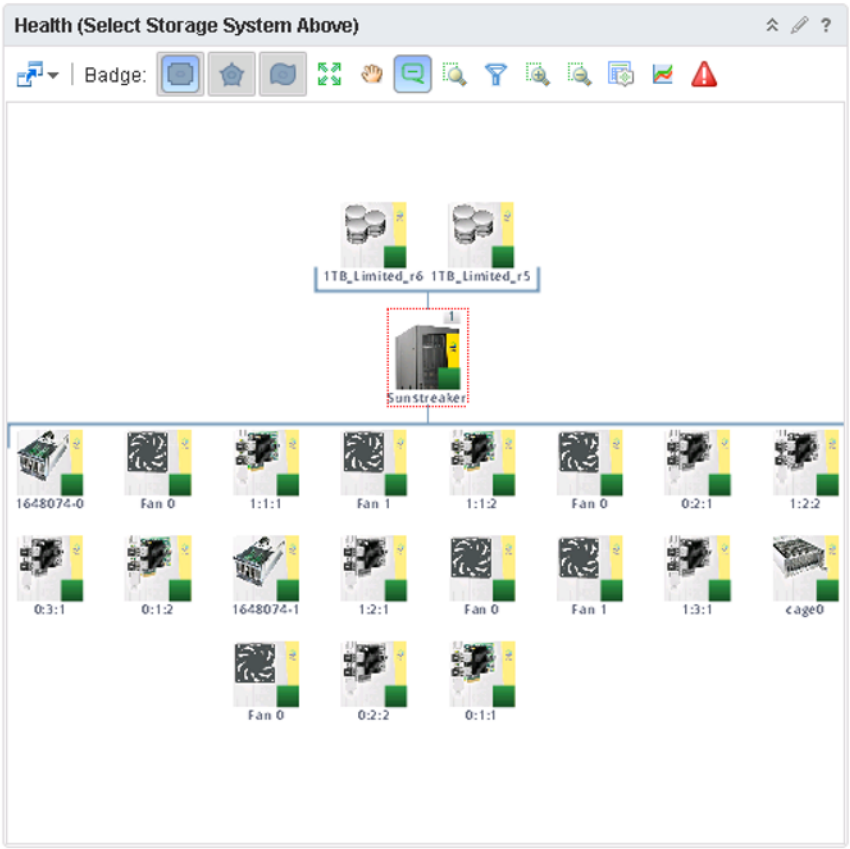


- **Name** - the name of the management group configured by the user.
- **Health** - the health of the management group.
- **Collection Status** - the status of the data collection of the management group.
- **Collection State** - indicates whether vROps should be collecting data for this management group.
- **Available Capacity (GB)** - the reported system capacity in GB.
- **used Capacity (%)** - percent used capacity.

HEALTH widget

This widget shows a graphical representation of the health of the selected storage system as well as the child and parent resources that belong to the selected storage system or management group. An icon is shown for each resource and a colored box indicates the health status.

Double clicking an icon will bring that resource into focus and display a detailed health graphic in the **HEALTH STATUS** widget below.



Storage object icons

The resources are represented by icons in the dashboard. The following is a list of the icons and their association with the resources.

- Storage Systems

- Storage Adapter Instance

- 3PAR StoreServ Storage System

- 3PAR StoreServ Drive Cage

- 3PAR StoreServ Array Controller

- 3PAR StoreServ Disk Drive

- 3PAR StoreServ Fan

- 3PAR StoreServ FC Port or 3PAR StoreServ iSCSI Port

- 3PAR StoreServ CPG

- 3PAR StoreServ Storage Volume

- StoreVirtual Cluster

- StoreVirtual Management Group

- StoreVirtual Node

- StoreVirtual Volume

HEALTH STATUS widget

This widget shows a detailed representation of the health of the selected resource over time. The resources are selected by clicking an icon in the **HEALTH** widget. The timeline and other parameters can be changed using the **Edit Widget** button .

HEAT MAP widget for HPE 3PAR StoreServ Monitoring dashboard

This widget shows a heat map of the selected Configuration. The following configurations are available for selection in the drop-down list for 3PAR StoreServ.

- Used Capacity (%) - 3PAR StoreServ CPG
- Used Capacity (%) - 3PAR StoreServ Storage Volume
- Total IOPS - 3PAR StoreServ FC Port
- Total IOPS - 3PAR StoreServ Disk Drive
- Total IOPS - 3PAR StoreServ Storage Volume
- Total IOPS - 3PAR StoreServ Storage System

The following graphic shows a sample heat map for Used Capacity (%) - 3PAR StoreServ Storage Volume.

Used Capacity (%) - 3PAR StoreServ Storage Volume

HEAT MAP widget for HPE StoreVirtual Monitoring dashboard

This widget shows a heat map of the selected Configuration. The following configurations are available for selection in the drop-down list for StoreVirtual.

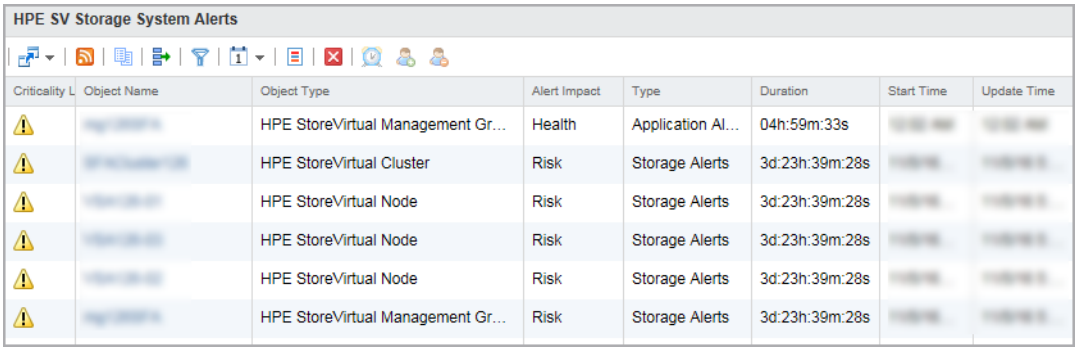
- Used Capacity (%) - SV Cluster
- Used Capacity (%) - SV Node
- Used Capacity (%) - SV Volume
- Total IOPS - SV Cluster
- Total IOPS - SV Node
- Total IOPS - SV Volume

The following graphics show a sample heat map for Total IOPs for SV Cluster object types.

Total IOPS - SV Cluster

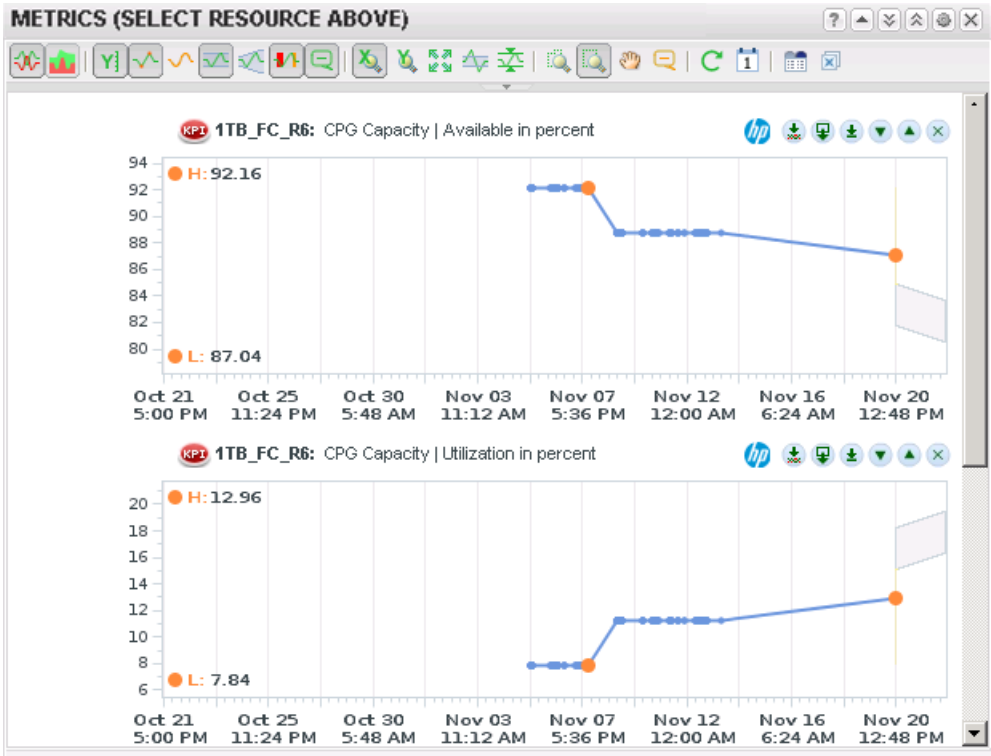
HPE STORAGE SYSTEM ALERTS widget

This widget lists if there are any alerts for the storage systems and provides a convenient way to view and manage alerts. When you double-click an alert in the **ALERTS** widget, the **Alert Summary** page appears with details about the alert.



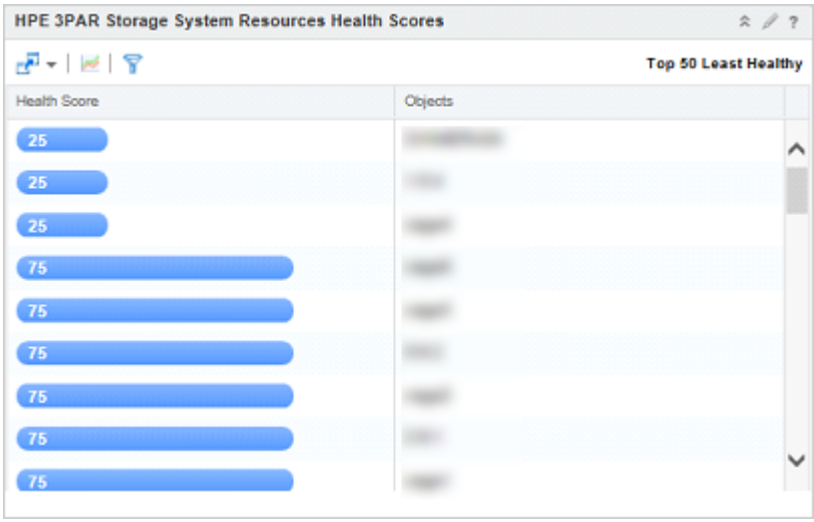
METRICS widget

This widget shows a graph containing different metrics for the selected resource in the HEAT MAP widget. By default, any of the 5 metrics is shown. The user can update this value in the global setting to display 10 metrics if there are more than 5 metrics reported per resource. To view all metrics related to that object, select the object in the heat map and click the show detail icon.



50 LEAST HEALTHY HPE Storage System RESOURCES widget

This widget lists the 50 least healthy resources in the environment. The number and types of items displayed can be modified by editing the widget. The user can get a quick overview of the status of the environment from this widget depending on how many resources have a health score lower than 75.



Troubleshooting dashboards

The **HPE 3PAR StoreServ Troubleshooting** and **HPE StoreVirtual Troubleshooting** dashboards are used to troubleshoot the storage system components.

The dashboards also provide summary information about VMs and how they map to Hewlett Packard Enterprise storage volumes, pools/cluster, disks and ports. The dashboards include graphs for key performance metrics, such as IOPS and Throughput, which are displayed in relation to the selected object of the VM to Storage Mapping widget.

The dashboards incorporates customized widgets and interactions to display information on the selected storage system or resource.

The following customized widgets are installed in both the **HPE 3PAR StoreServ Troubleshooting** and **HPE StoreVirtual Troubleshooting** dashboards:

- VIRTUAL MACHINES
- VM TO STORAGE MAPPING
- MAPPING DETAILS
- METRIC SELECTOR
- METRIC GRAPH

Figure 20 3PAR StoreServ Troubleshooting

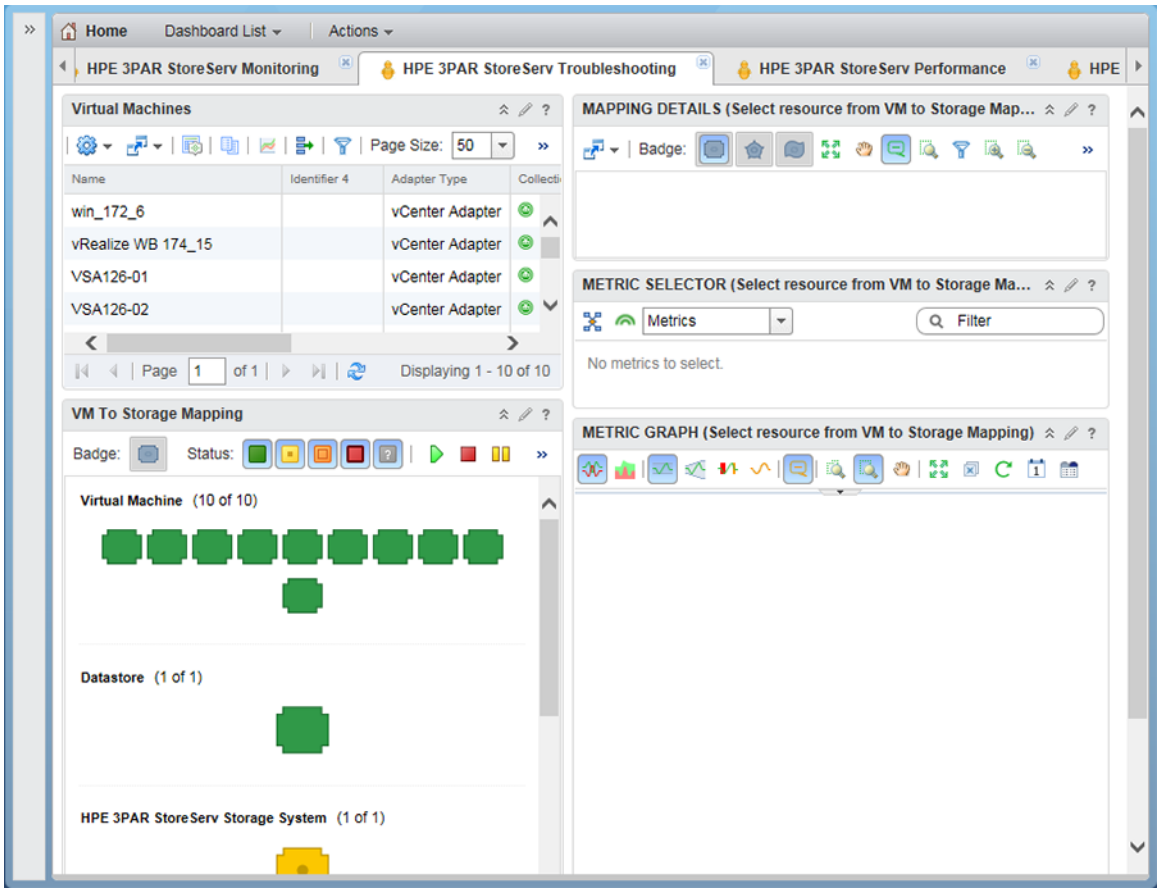
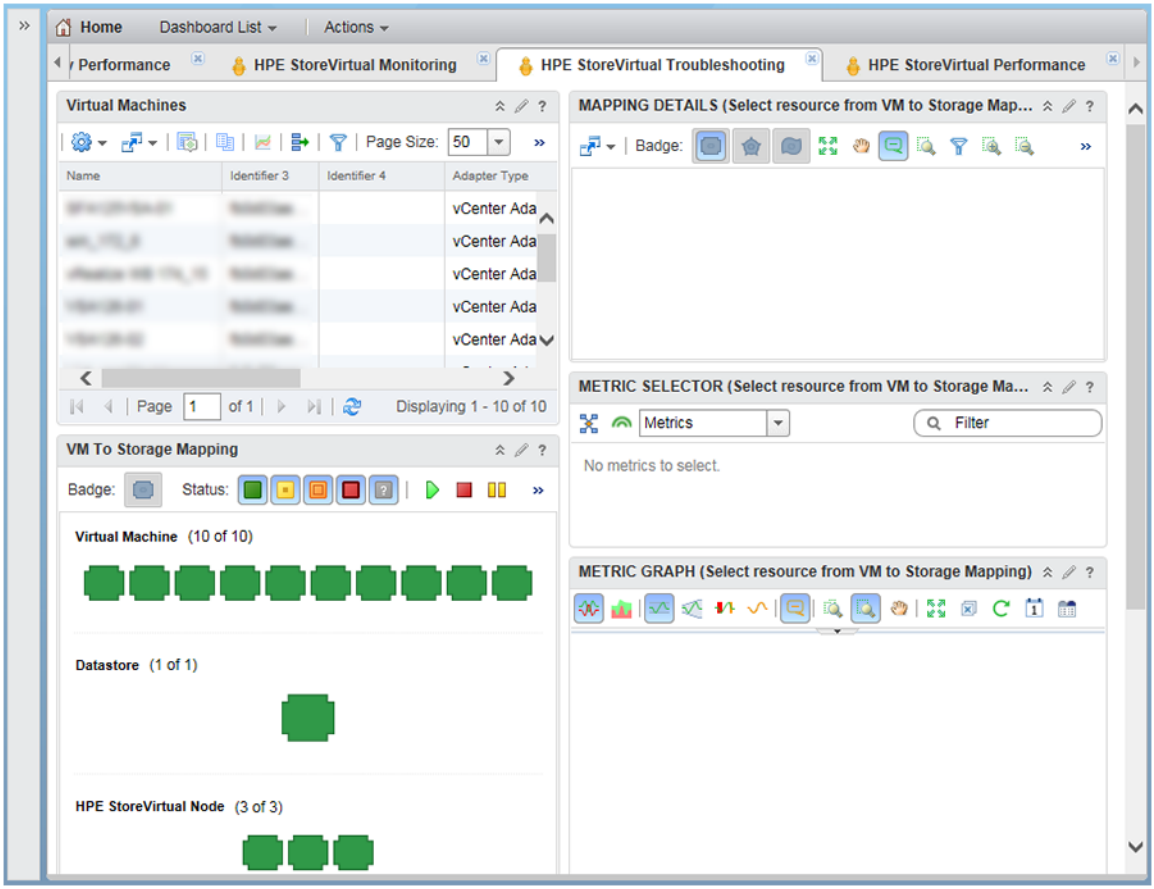


Figure 21 HPE StoreVirtual Troubleshooting dashboard



IMPORTANT: Only FC mapped StoreVirtual volumes are listed on the troubleshooting dashboard.

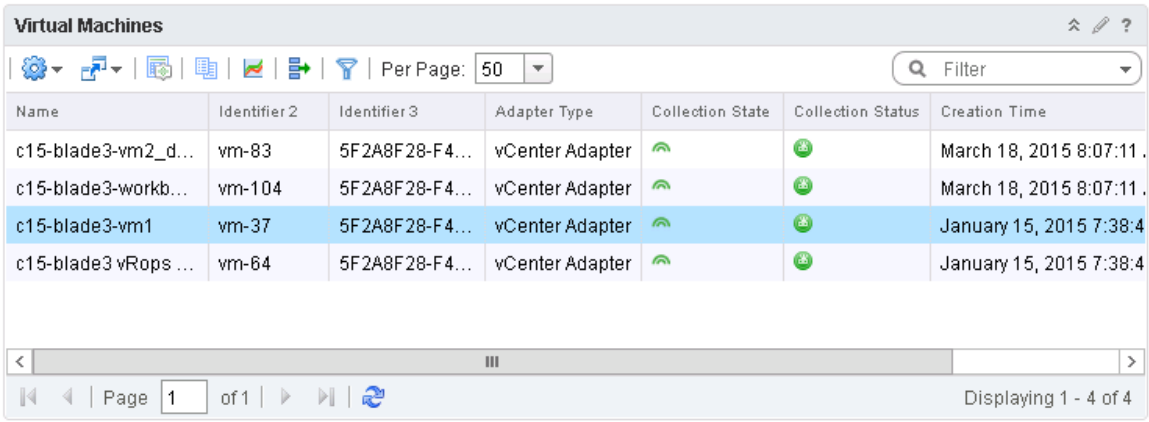
HPE Storage Troubleshooting dashboard Interactions

The following interactions occur within a troubleshooting dashboard when you select a virtual machine in the **VIRTUAL MACHINES** widget:

- The **VM TO STORAGE MAPPING** widget will be updated with status information on the selected virtual machine in the **VIRTUAL MACHINES** widget.
- Selecting a resource in the **VM TO STORAGE MAPPING** widget updates the **Mapping Details** widget and also update the **SELECTED RESOURCE METRIC GRAPH** widget.

VIRTUAL MACHINES widget

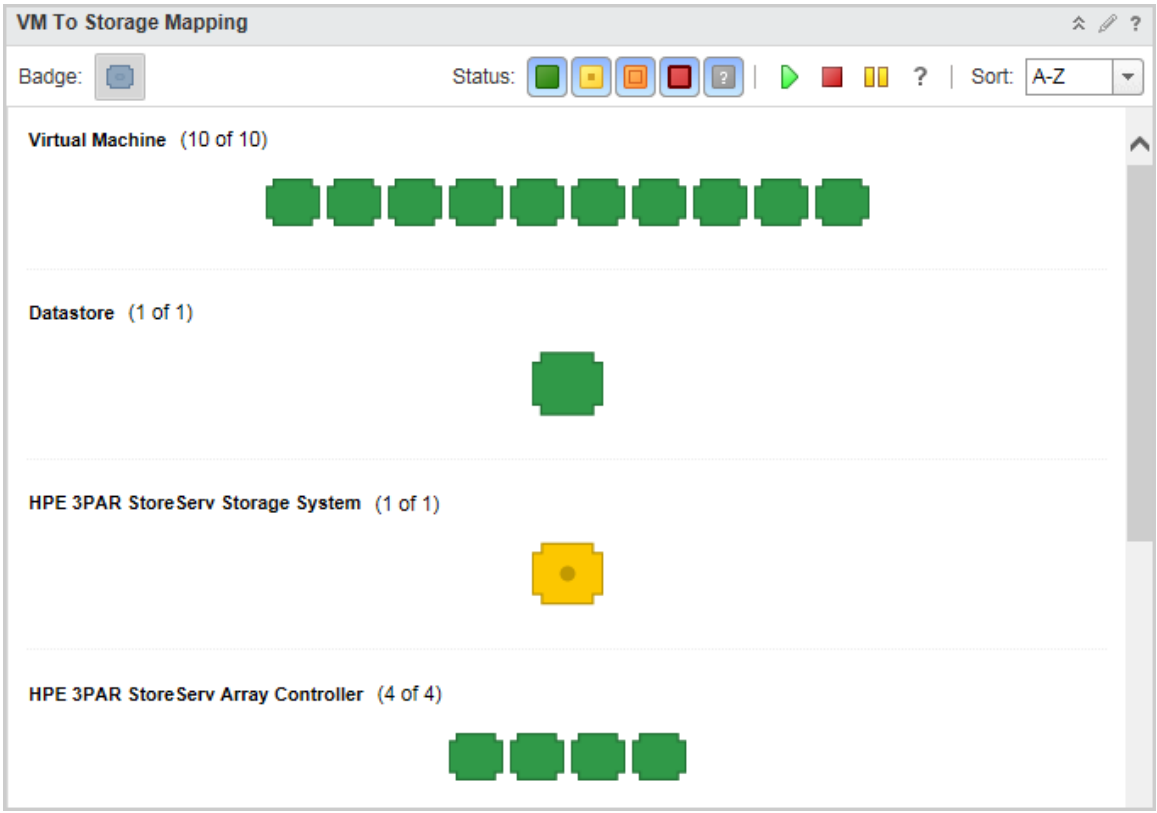
This widget shows the virtual machines that are managed by the registered vCenter. When a virtual machine is selected, the details appear in the **VM TO STORAGE MAPPING** widget.



VM TO STORAGE MAPPING widget

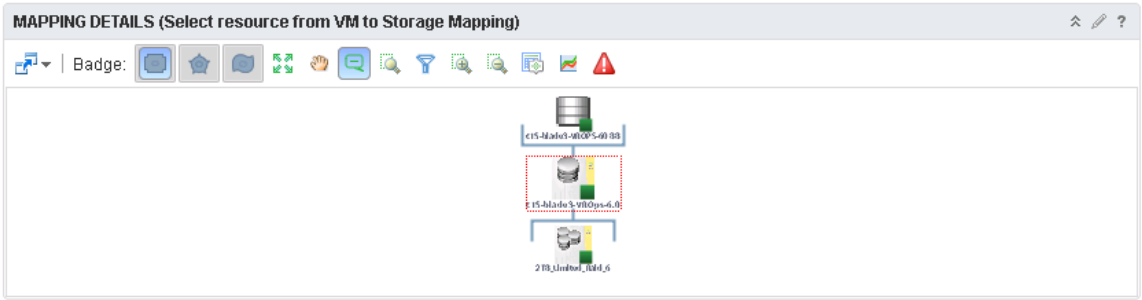
This widget shows the virtual machine-to-storage mapping of the selected virtual machine in the **VIRTUAL MACHINES** widget. This widget provides a correlation between the virtual machine and the different storage resources attached to it.

The widget header contains selection buttons to view the resources by health, workload, or capacity. The resources can also be filtered by selecting one of the **STATUS FILTER** buttons. When a resource is selected, the mapping details are shown in the **MAPPING DETAILS** widget.



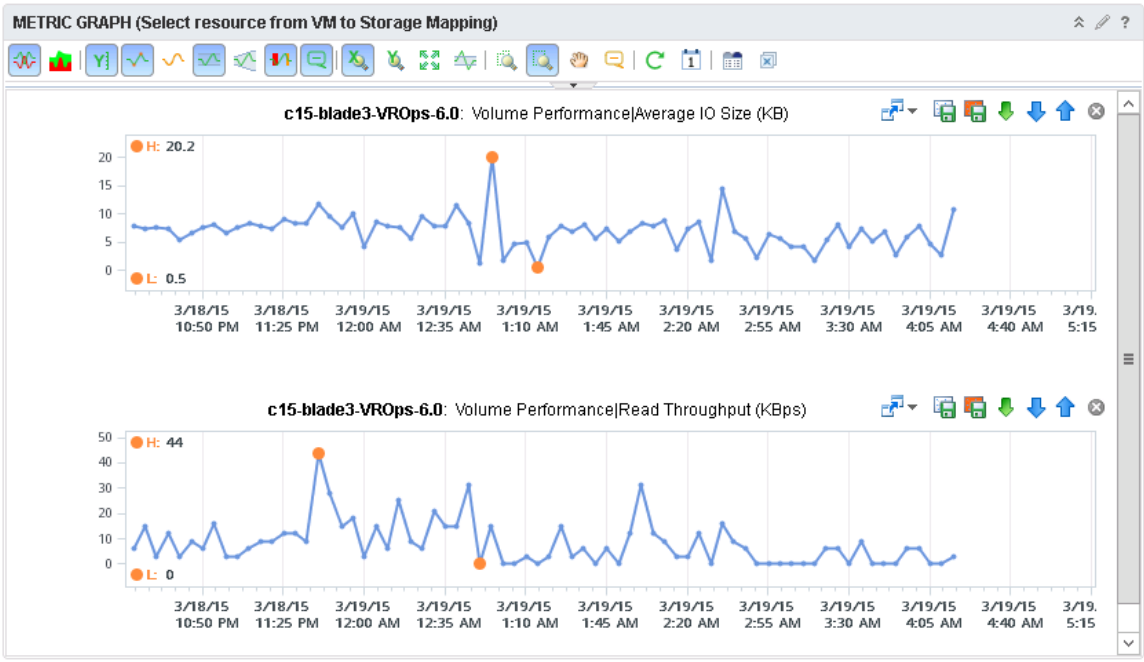
MAPPING DETAILS widget

This widget shows a health tree for the selected resource in the **VM TO STORAGE MAPPING** widget. The selected resource appears in the center of the graphic of the widget and related resources (treated as parents and children) are shown above and below the resource. When a resource is selected, the metrics for the resource are shown in the **SELECTED RESOURCE METRIC GRAPH** widget.



METRIC GRAPH (SELECT RESOURCE FROM VM TO STORAGE MAPPING) widget

The metrics displayed in the screen are determined by the resource selected in the **VM TO STORAGE MAPPING** widget (Virtual Machine, Datastore, 3PAR StoreServ Storage Volume, etc.).



METRIC SELECTOR (SELECT RESOURCE FROM VM TO STORAGE MAPPING) widget

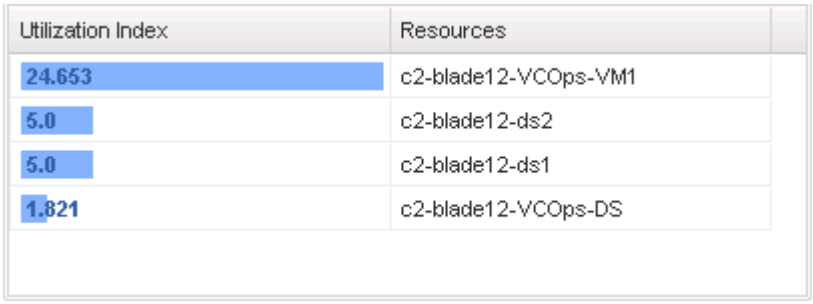
The metrics displayed in the screen are determined by the resource selected in the **VM TO STORAGE MAPPING** widget. Double clicking on a metric here will show details in the Metric Graph widget below it.

Performance dashboards

There are two performance dashboards, one for 3PAR storage systems (**HPE 3PAR StoreServ Performance**) and one for StoreVirtual (**HPE StoreVirtual Performance**). These dashboards are used to monitor the resources with the highest utilization across all storage systems. If the storage system is experiencing performance issues, these dashboard are a good place to start looking for resources with issues. There is no customized interaction between the widgets; however, the widgets are customized to show specific metrics of object types within the storage system that are approaching critical performance values.

If you double click an object in any of the widgets, you will go to the object's summary page.

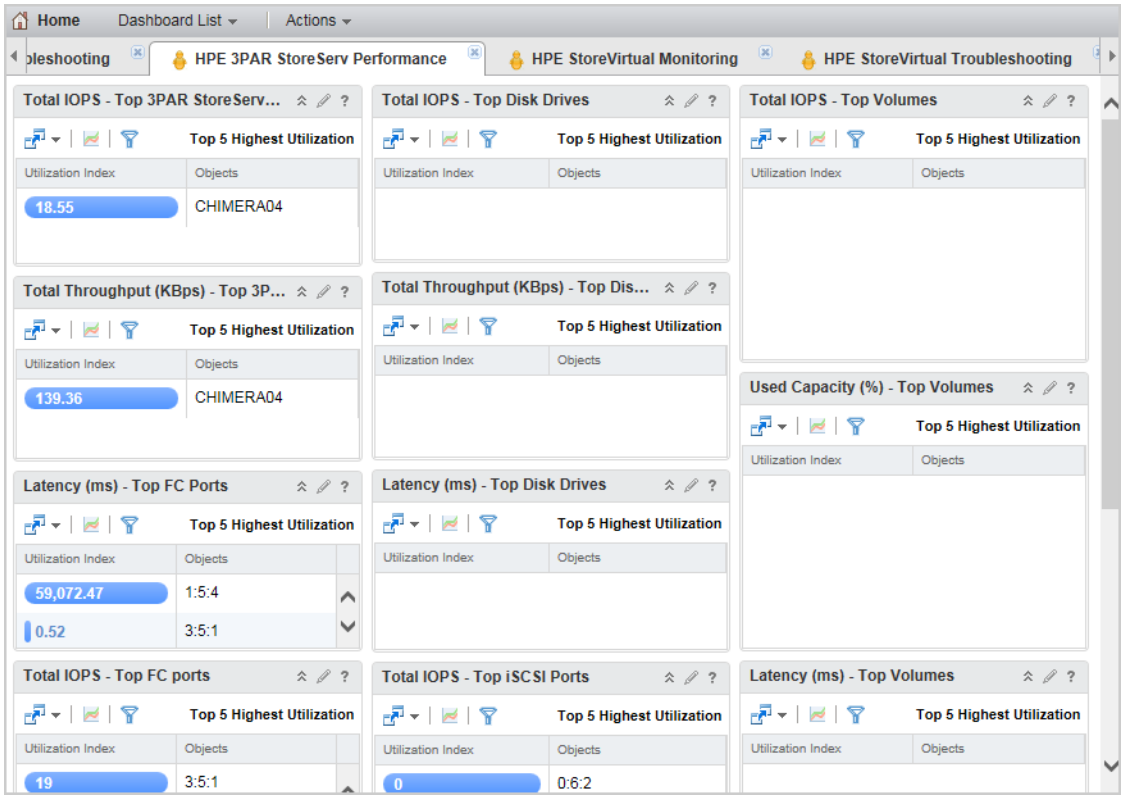
Each widget shows the **Utilization Index** (the value determined by the vROps analytics to indicate a resource usage) and the **Resource** of the index. The utilization value of the resource is shown on each horizontal bar. The lengths of the bars are relative to the longest bar in the widget.



The following customized widgets are installed in the **HPE 3PAR StoreServ Performance** dashboard:

- Total IOPS - Top 3PAR StoreServ Storage System
- Total Throughput (Kbps) - Top 3PAR StoreServ Storage System
- Latency (ms) - Top FC Ports
- Total IOPS - Top FC Ports
- Total IOPS - Top Disk Drives
- Total Throughput - Top Disk Drives
- Latency (ms) - Top Disk Drives
- Total IOPS - Top iSCSI Ports
- Total IOPS - Top Volumes
- Used Capacity (%) - Top Volumes
- Latency (ms) - Top Volumes
- SSD Tier (%) - Top Volumes

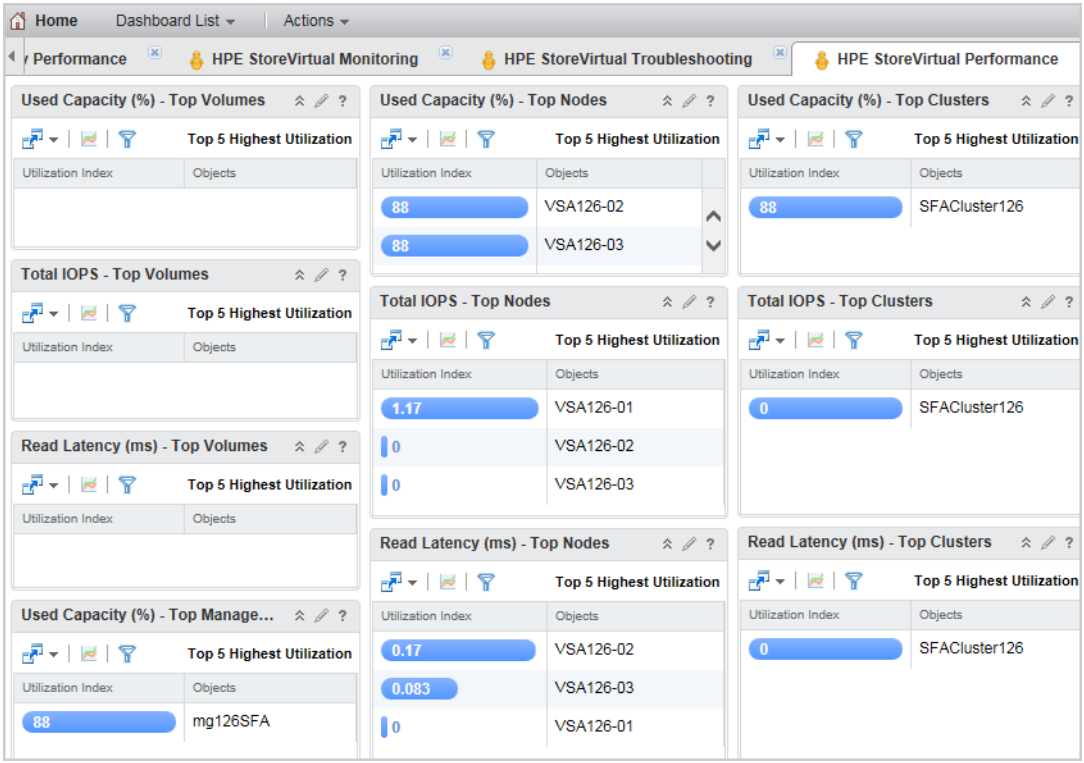
Figure 22 3PAR StoreServ Performance dashboard



The following customized widgets are installed in the **HPE StoreVirtual Performance** dashboard:

- Used Capacity (%) - Top Volumes
- Total IOPS - Top Volumes
- Read Latency (ms) - Top Volumes
- Used Capacity (%) - Top Nodes
- Total IOPS - Top Nodes
- Read Latency (ms) - Top Nodes
- Used Capacity (%) - Top Clusters
- Total IOPS - Top Clusters
- Read Latency (ms) - Top Clusters
- Used Capacity (%) - Top Management Groups

Figure 23 HPE StoreVirtual Performance dashboard



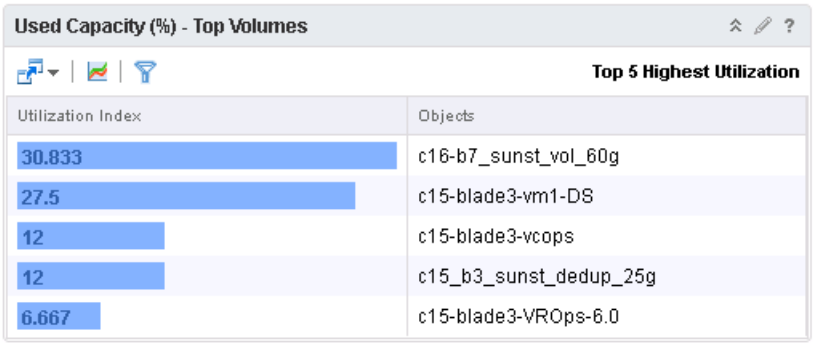
NOTE: The interactions on the Storage Performance dashboard have not been customized.

HPE 3PAR StoreServ Performance dashboard widgets

The following is a list of some of the widgets shown under 3PAR StoreServ Performance dashboard:

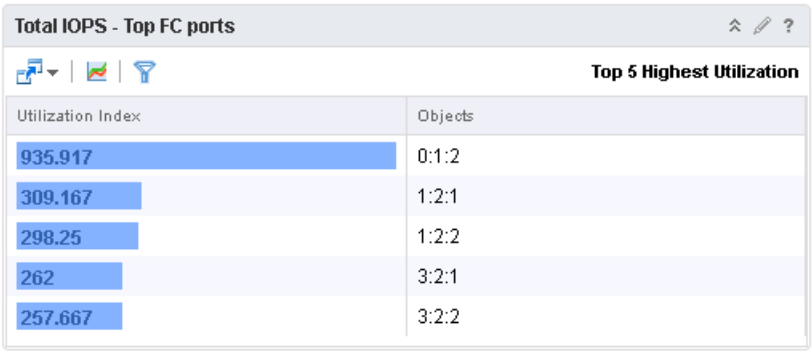
Used Capacity (%) - Top Volumes widget

This widget shows the five volumes with high utilization. The Volume Capacity - Capacity Utilization in percent metric is used to determine the Utilization Index which can be used to rebalance the workload to resources with a lower index.



IOPS -TOP-5 FC PORTS widget

This widget shows the five ports with high input/output operations per second. The FC Port Performance - IOPS metric is used to determine the Utilization Index which can be used to rebalance the workload to resources with a lower index.



6 Support and Other Resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

  www.hpe.com/assistance

- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

  www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
  - Hewlett Packard Enterprise Support Center **Get connected with updates** page:

    www.hpe.com/support/e-updates

  - Software Depot website:

    www.hpe.com/support/softwaredepot

- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

  www.hpe.com/support/AccessToSupportMaterials

IMPORTANT: Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Passport set up with relevant entitlements.

HPE 3PAR documentation

For information about:	See:
Supported hardware and software platforms	The Single Point of Connectivity Knowledge for HPE Storage Products (SPOCK) website:

For information about:	See:
	http://www.hpe.com/storage/spock
Locating 3PAR documents	The HPE 3PAR StoreServ Storage site: **http://www.hpe.com/info/3par** To access 3PAR documents, click the **Support** link for your product.
HPE 3PAR storage system software	
Storage concepts and terminology	HPE 3PAR StoreServ Storage Concepts Guide
Using the HPE 3PAR Management Console (GUI) to configure and administer 3PAR storage systems	HPE 3PAR Management Console User's Guide
Using the HPE 3PAR CLI to configure and administer storage systems	HPE 3PAR Command Line Interface Administrator's Manual
CLI commands	HPE 3PAR Command Line Interface Reference
Analyzing system performance	HPE 3PAR System Reporter Software User's Guide
Installing and maintaining the Host Explorer agent in order to manage host configuration and connectivity information	HPE 3PAR Host Explorer User's Guide
Creating applications compliant with the Common Information Model (CIM) to manage 3PAR storage systems	HPE 3PAR CIM API Programming Reference
Migrating data from one 3PAR storage system to another	3PAR-to-3PAR Storage Peer Motion Guide
Configuring the Secure Service Custodian server in order to monitor and control 3PAR storage systems	HPE 3PAR Secure Service Custodian Configuration Utility Reference
Using the CLI to configure and manage HPE 3PAR Remote Copy	HPE 3PAR Remote Copy Software User's Guide
Updating 3PAR operating systems	HPE 3PAR Upgrade Pre-Planning Guide
Identifying storage system components, troubleshooting information, and detailed alert information	HPE 3PAR F-Class, T-Class, and StoreServ 10000 Storage Troubleshooting Guide
Installing, configuring, and maintaining the HPE 3PAR Policy Server	HPE 3PAR Policy Server Installation and Setup Guide HPE 3PAR Policy Server Administration Guide
Planning for HPE 3PAR storage system setup Hardware specifications, installation considerations, power requirements, networking options, and cabling information for 3PAR storage systems	
HPE 3PAR 7200, 7400, 7450, and 8000 storage systems	HPE 3PAR StoreServ 7000 Storage Site Planning Manual HPE 3PAR StoreServ 7450 Storage Site Planning Manual HPE 3PAR StoreServ 8000 Storage Site Planning Manual
HPE 3PAR 10000 and 20000 storage systems	HPE 3PAR StoreServ 10000 Storage Physical Planning Manual HPE 3PAR StoreServ 10000 Storage Third-Party Rack Physical Planning Manual HPE 3PAR Storeserv 20000 Storage Site Planning Manual
Installing and maintaining HPE 3PAR 7200, 7400, and 7450 storage systems	

For information about:	See:
Installing 7200, 7400, and 7450 storage systems and initializing the Service Processor	HPE 3PAR StoreServ 7000 Storage Installation Guide HPE 3PAR StoreServ 7450 Storage Installation Guide HPE 3PAR StoreServ 7000 Storage SmartStart Software User's Guide
Maintaining, servicing, and upgrading 7200, 7400, and 7450 storage systems	HPE 3PAR StoreServ 7000 Storage Service Guide HPE 3PAR StoreServ 7450 Storage Service Guide
Troubleshooting 7200, 7400, and 7450 storage systems	HPE 3PAR StoreServ 7000 Storage Troubleshooting Guide HPE 3PAR StoreServ 7450 Storage Troubleshooting Guide
Maintaining the Service Processor	HPE 3PAR Service Processor Software User Guide HPE 3PAR Service Processor Onsite Customer Care (SPOCC) User's Guide
HPE 3PAR host application solutions	
Backing up Oracle databases and using backups for disaster recovery	HPE 3PAR Recovery Manager Software for Oracle User's Guide
Backing up Exchange databases and using backups for disaster recovery	HPE 3PAR Recovery Manager Software for Microsoft Exchange 2007 and 2010 User's Guide
Backing up SQL databases and using backups for disaster recovery	HPE 3PAR Recovery Manager Software for Microsoft SQL Server User's Guide
Backing up VMware databases and using backups for disaster recovery	HPE 3PAR Management Plug-in and Recovery Manager Software for VMware vSphere User's Guide
Installing and using the HPE 3PAR VSS (Volume Shadow Copy Service) Provider software for Microsoft Windows	HPE 3PAR VSS Provider Software for Microsoft Windows User's Guide
Best practices for setting up the Storage Replication Adapter for VMware vCenter	HPE 3PAR Storage Replication Adapter for VMware vCenter Site Recovery Manager Implementation Guide
Troubleshooting the Storage Replication Adapter for VMware vCenter Site Recovery Manager	HPE 3PAR Storage Replication Adapter for VMware vCenter Site Recovery Manager Troubleshooting Guide
Installing and using vSphere Storage APIs for Array Integration (VAAI) plug-in software for VMware vSphere	HPE 3PAR VAAI Plug-in Software for VMware vSphere User's Guide

HPE StoreVirtual documentation

For detailed instructions about using StoreVirtual Storage, see the following resources:

- StoreVirtual Storage Online Help —Click **Help→Help Topics** from the menu bar to open the online help. Context-sensitive help is available by clicking the question mark on any screen.
- StoreVirtual Storage User Guide —Provides complete instructions for configuring and managing storage systems and clustered storage volumes.
- HPE StoreVirtual Storage VSA Installation and Configuration Guide —Provides instructions for planning and installing the VSA and getting started with the Centralized Management Console.
- HPE StoreVirtual Storage Remote Copy User Guide —Provides information about configuring and using asynchronous replication of storage volumes and snapshots across geographic distances.

- HPE StoreVirtual Storage Multi-Site Configuration Guide —Provides instructions for designing and implementing the Multi-Site SAN features to synchronously and automatically mirror data between geographic sites.
- HPE StoreVirtual Storage Release Notes —Provides the latest information about the product.

The latest versions of these documents, including localized versions are available at:

- Hewlett Packard Enterprise Support Center: **http://www.hpe.com/support/StoreVirtualManuals**
- Storage Information Library: **http://www.hpe.com/info/storage/docs**

HPE 3PAR branding information

- The server previously referred to as the "InServ" is now referred to as the "HPE 3PAR StoreServ Storage system."
- The operating system previously referred to as the "InForm OS" is now referred to as the "HPE 3PAR OS."
- The user interface previously referred to as the "InForm Management Console (IMC)" is now referred to as the "HPE 3PAR Management Console."
- All products previously referred to as “3PAR” products are now referred to as "HPE 3PAR" products.

Websites

Website	Link
Hewlett Packard Enterprise Information Library	**www.hpe.com/info/enterprise/docs**
Hewlett Packard Enterprise Support Center	**www.hpe.com/support/hpesc**
Contact Hewlett Packard Enterprise Worldwide	**www.hpe.com/assistance**
Subscription Service/Support Alerts	**www.hpe.com/support/e-updates**
Software Depot	**www.hpe.com/support/softwaredepot**
Customer Self Repair	**www.hpe.com/support/selfrepair**
Insight Remote Support	**www.hpe.com/info/insightremotesupport/docs**
Serviceguard Solutions for HP-UX	**www.hpe.com/info/hpux-serviceguard-docs**
Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix	**www.hpe.com/storage/spock**
Storage white papers and analyst reports	**www.hpe.com/storage/whitepapers**

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website:

www.hpe.com/info/insightremotesupport/docs

Documentation feedback

Hewlett Packard Enterprise is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (**docsfeedback@hpe.com**). When submitting your feedback, include the document title, part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.

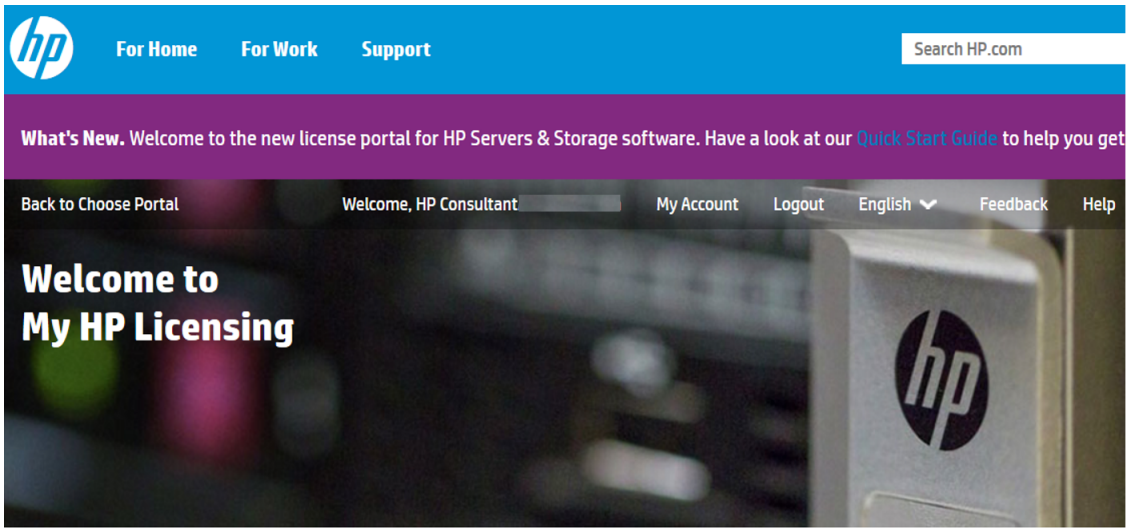
A Getting a license for HPE StoreFront Analytics for VMware vRealize Operations

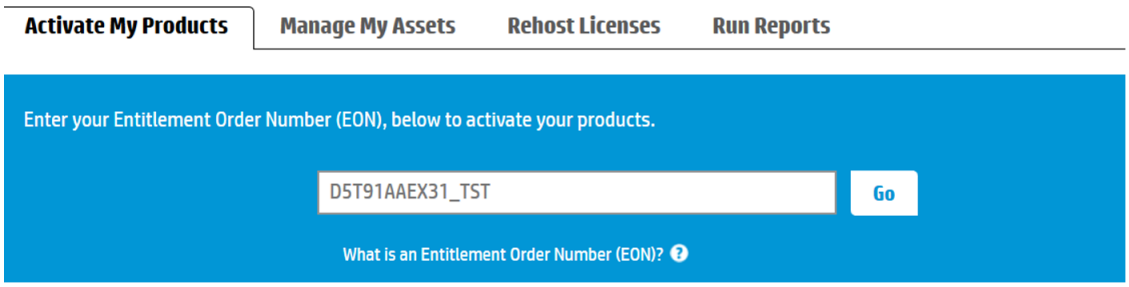
A license is required for each storage system that is configured and monitored in VMware vROps.

Redeem the license key for your 3PAR StoreServ or StoreVirtual storage system online at **http://www.hpe.com/info/mylicensing**. Or, you can use the URL listed in your Certificate of License to Use document.

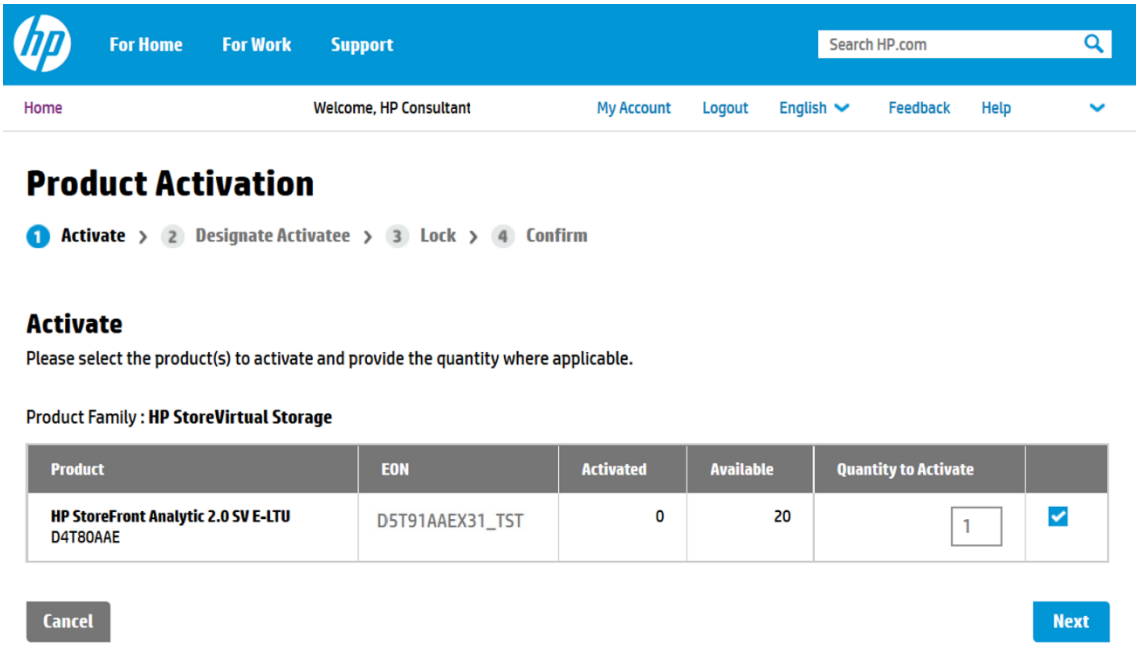
Use the following procedure to redeem the license key:

1. Login to My Hewlett Packard Enterprise Licensing Portal **http://www.hpe.com/info/mylicensing** using your HP Passport login information.
2. Enter your Entitlement Order Number (EON).

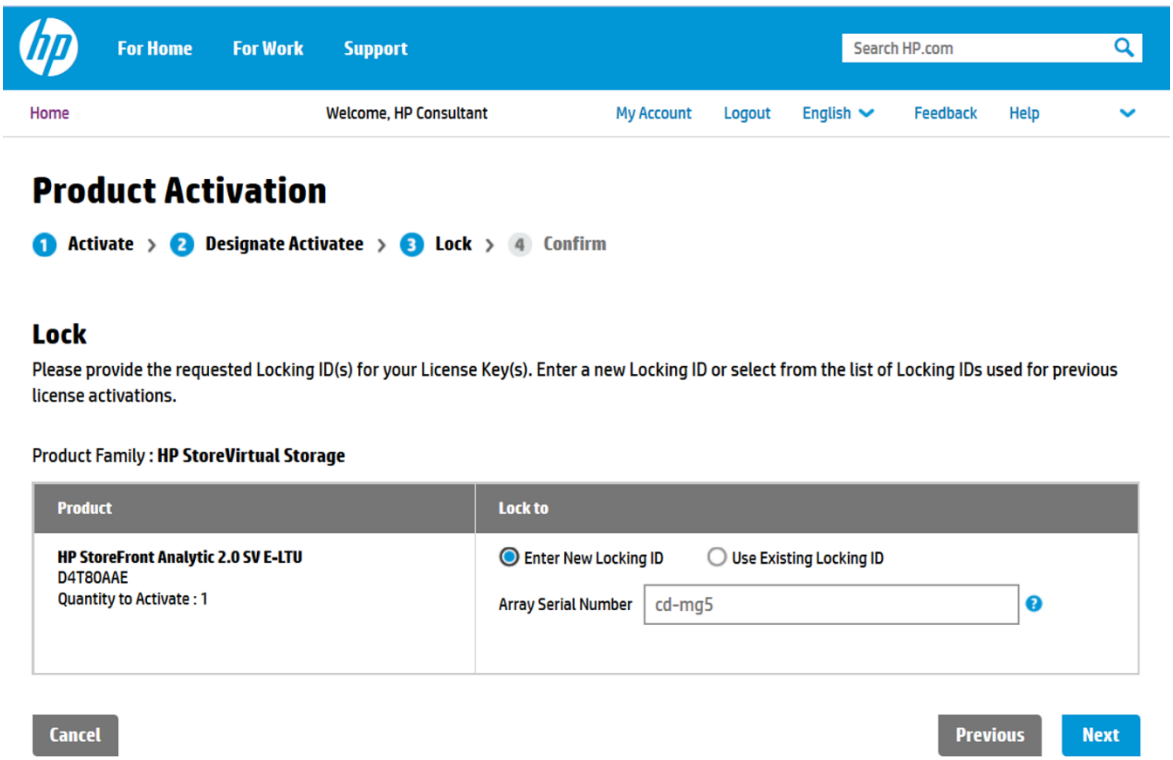




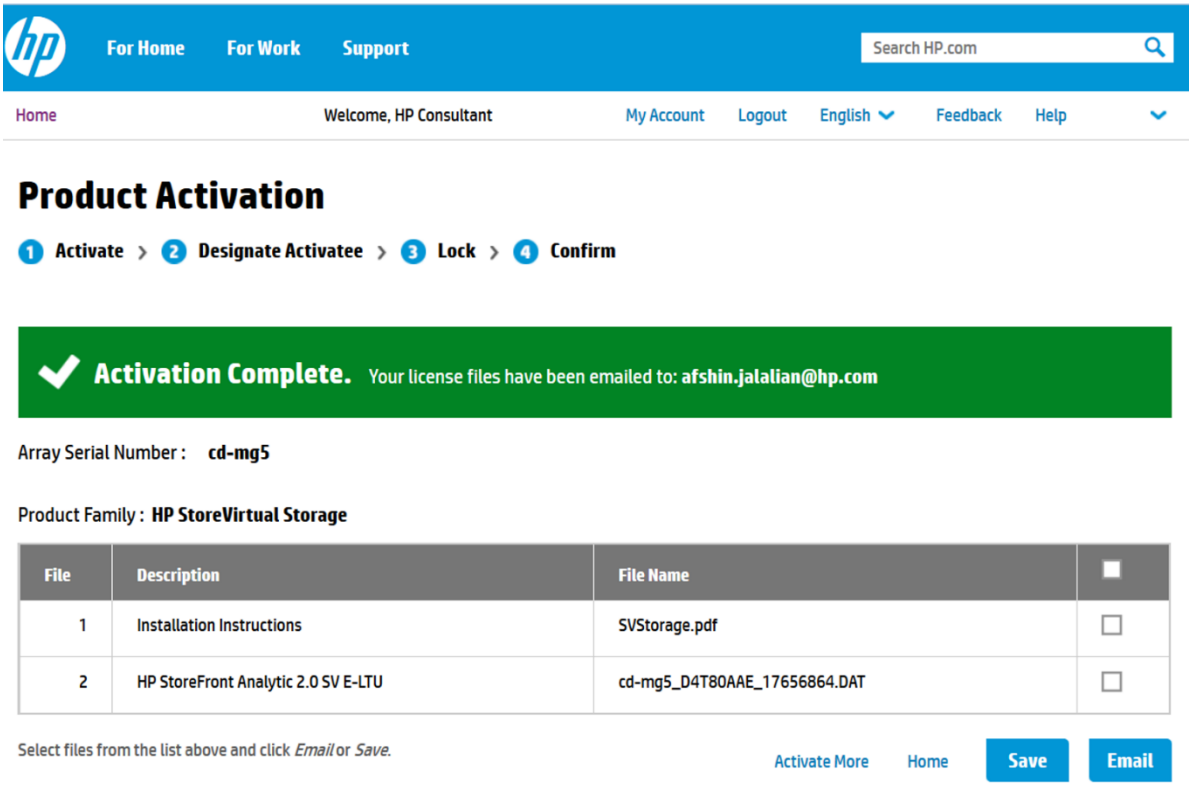
3. On the Product Activation page select the Quantity to Activate and click **Next**.



4. Enter the unique identifier for the storage system and click **Next**.
   - The unique identifier for an 3PAR StoreServ is the serial number of the storage system.
   - The unique identifier for a StoreVirtual is the management group name. The example below shows how to get a license for a StoreVirtual management group with name cd-mg5.



5. The Activation Complete confirmation displays the name of the of the license key file which is emailed to you. The example below shows the confirmation page for a HPE StoreVirtual management group with name cd-mg5. The license key file name is `cd-mg5_D4T80AAE_17656864.DAT`.



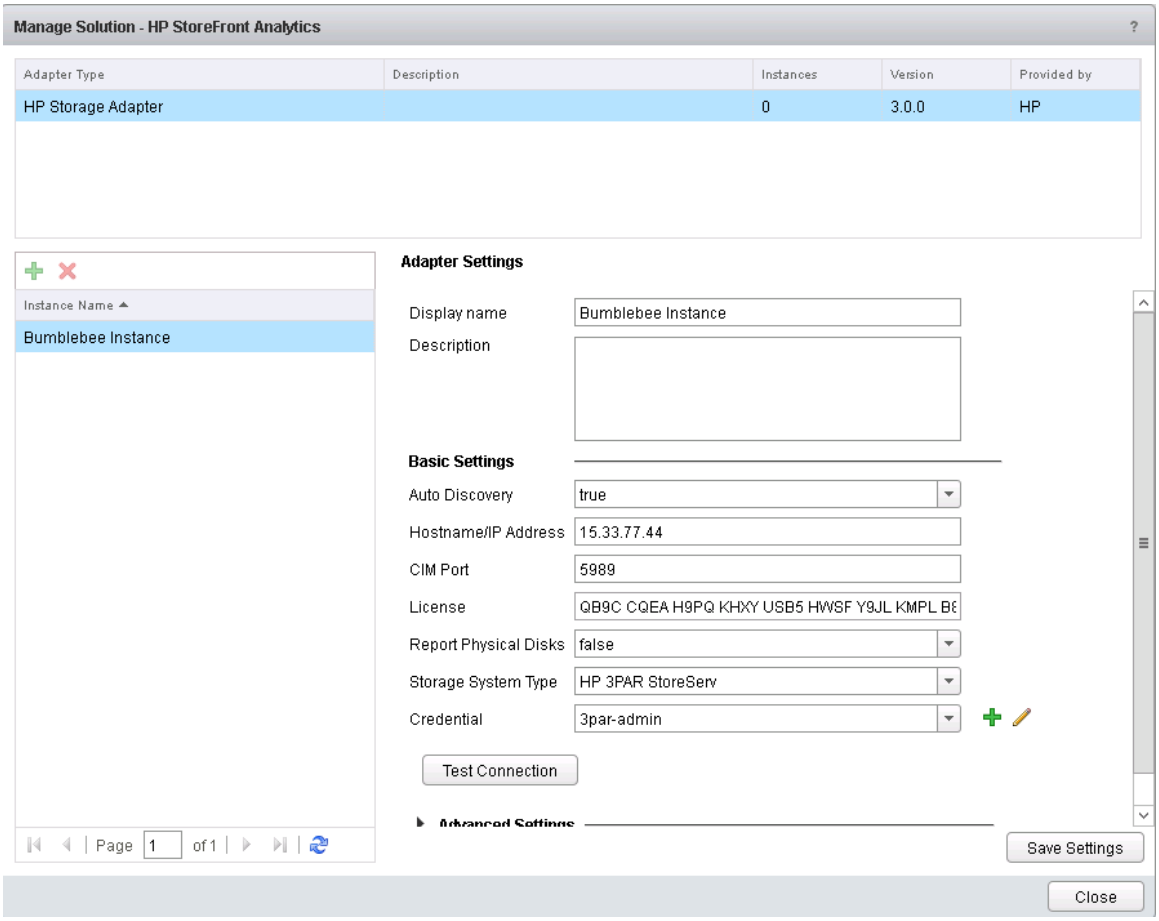
6. Open the license key file and copy the encoded sequence of the license key shown in italic in the example.

   For the StoreVirtual management group example cd-mg5 the license key is:

   #HPE StoreFront Analytic 2.0 SV E-LTU

   QB8G BQEA H9PQ KHW3 USB5 HWSF Y9JL KMPL B89H MZVU DXAU 2CSM GHTG L762 CQUZ FTN4 KJVT D5KM EFVW TSNJ ZPLN 6WW6 KP2K 9E62 99YX 3VNR MWSM AY9Y N3Q2 HHCQ XJUL LUQH ZUWD 9AAC NJ79 CEJC FS66 FC4X SPQX KNSU FMZ8 5EHN 6KKK EKPE 52KV FMT8 58KE 52DX ZGYZ 4CD4 6R9D 8T42 TW9S X4YR NGGT EHM3 "D4T80AAEX20_TST D4T80AAE HPE StoreFront Analytic 2.0 SV E-LTU"

IMPORTANT: Ensure that you copy only the license string, excluding the comment line, as shown:



7. Paste the license key in the License field in the Add Adapter Instance configuration dialog box.

B Troubleshooting

Configuration Troubleshooting

When adding an HPE 3PAR array during configuration, testing the connection fails.

This situation can occur when the CIM service is not started on the array.

To verify that the CIM service is running on the storage system:

1. Open an SSH session to the storage system and run the `showcim` command. The output should indicate the state of the service as **Active**

   Figure 24 `SHOWCIM` command output

   ```
   bwi40g_Stg1_3par_e200_002 cli% showcim
   -Service-   -State--   --SLP-     - SLPPort-   -HTTP-   - HTTPPort-    -HTTPS-    -HTTPSPort-  -PGVer-   -CIMVer-
   Enabled    Inactive    Enabled         427      Enabled      5988       Enabled       5989        2.5.1      2.3.1

   bwi40g_Stg1_3par_e200_002 cli%
   ```

   If the **State** is inactive, you can activate it by running `startcim` command. After about 5 minutes, run the `showcim` command to check the status of the CIM service. If it is still **Inactive**, you can issue `stopcim` command followed by `startcim` command.

   NOTE: For HPE 3PAR OS 3.2.1 MU1, try restarting the CIM service (`cimstop` and `cimstart`) on the 3PAR, wait a couple minutes, and then retry adding the 3PAR array. There is a well-known issue in 3.2.1 MU1 where the CIM service reports that it is running but is actually in a hung state. This is always the case on 3.2.1 MU1 after upgrading or restarting the system.

2. Make sure you have correctly selected the “Storage System Type”. Select **HP 3PAR StoreServ** if you are configuring a 3PAR storage system or select **HPE StoreVirtual** if you are configuring a StoreVirtual system.
3. Verify vROps VM has access to the network on which the Hewlett Packard Enterprise storage system exists. Make sure you are able to ping the storage system from the vROps system.
4. The StoreFront analytics uses both SSH (port 22) and SMIs (port 5989) to retrieve metrics from the 3PAR array and only SMIS to retrieve metrics from the StoreVirtual management group. Ensure these ports are not blocked by the firewall.

General Troubleshooting

Known troubleshooting information can help you diagnose and correct problems with the Storage Adapter. Log files contain valuable information about adapter instance operation.

Troubleshooting an HPE Storage Adapter Instance

To diagnose and correct problems with a Storage Adapter instance, do the following:

1. To view the collection status and collection state for the adapter instance resource on the GUI:
   a. Select **Administration→Solutions** on the left pane.
   b. Select the **Solutions** tab on the right pane.
   c. Click on **HP StoreFront Analytics** solution.

2. Check the adapter and collector log files for errors. You can view Storage Adapter errors in the adapter and collector log files.

   To View the Storage Adapter logs from the custom GUI, do the following:

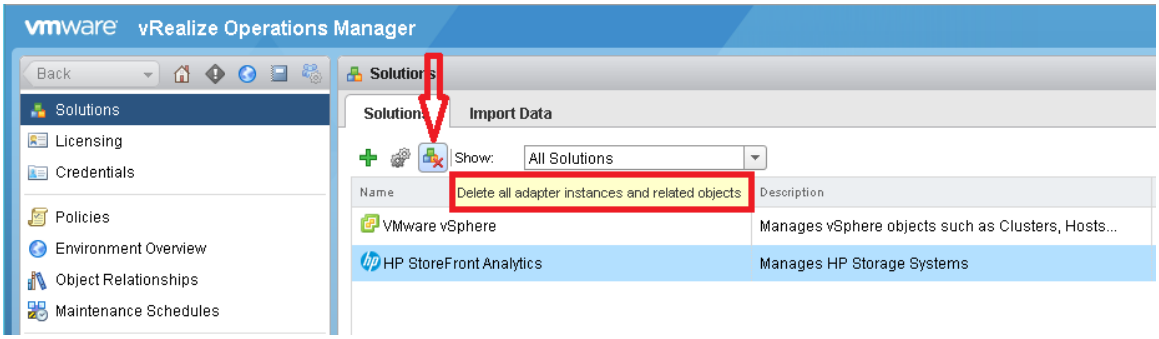
   1. Log in to the vRealize Operations Manager user interface.
   2. Click the **Administration** tab, and then select **Support→Logs**.
   3. In the Logs list, expand the **COLLECTOR** folder.
   4. Double click an **HPE Storage Adapter_##.log** file in the list to view the log.

   The content of the log file appears in the **Log Content** area.

   NOTE: The log file for storage systems is identified by adding the storage system ID to the end of the log file. For instance, HPE Storage Adapter_*38*.log identifies a log file for a storage system with ID *38*.

C Deleting adapter instances and related objects of HPE StoreFront Analytic Management Pack

1. Log in to the vRealize Operations Manager user interface as an administrator.
2. In the left pane of the vRealize Operations Manager, click on the Administration icon, and then click **Solutions**.
3. On the **Solutions** tab, click on StoreFront Analytics solution.
4. Click on the **Delete all adapter instance and related objects** icon.



Glossary

CPG	Common Provisioning Group - defines the Logical Disk creation characteristics, such as RAID type, set size, disk type for chunklet selection, plus total space warning and limit points. A CPG creates a virtual pool of LDs that allows Volumes to share resources and to allocate space on demand. A volume created from a CPG can automatically be grown on demand by mapping new regions from the LDs associated with the CPG.
KPI	Key Performance Indicator (as in the VMware metric - Full Set - Active KPI Breach Count)
Utilization Index	A value that is calculated by the vROps analytics to indicate the usage level of a resource. The higher the value, the greater the resource is being used.
vApp	A collection of virtual machines.
VM	Virtual Machine
vROps	vRealize Operations Manager

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