

HP Virtualization Performance Viewer

For the Linux operating system

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Chapter 1: Introduction to HP Virtualization Performance Viewer

HP Virtualization Performance Viewer (HP vPV) is a web-based analysis and visualization tool that analyzes performance trends of elements in virtualized environments. It enables virtualization monitoring by providing an overview of the environment, near-real-time and historical data analysis and triaging using an interactive dashboard. It also enables monitoring for cloud and hypervisor environments. HP vPV helps you visualize performance data for elements in the context of each other to rapidly analyze bottlenecks. HP vPV provides performance monitoring, graphing, and reporting in a single interface.

Key features of HP vPV are as follows:

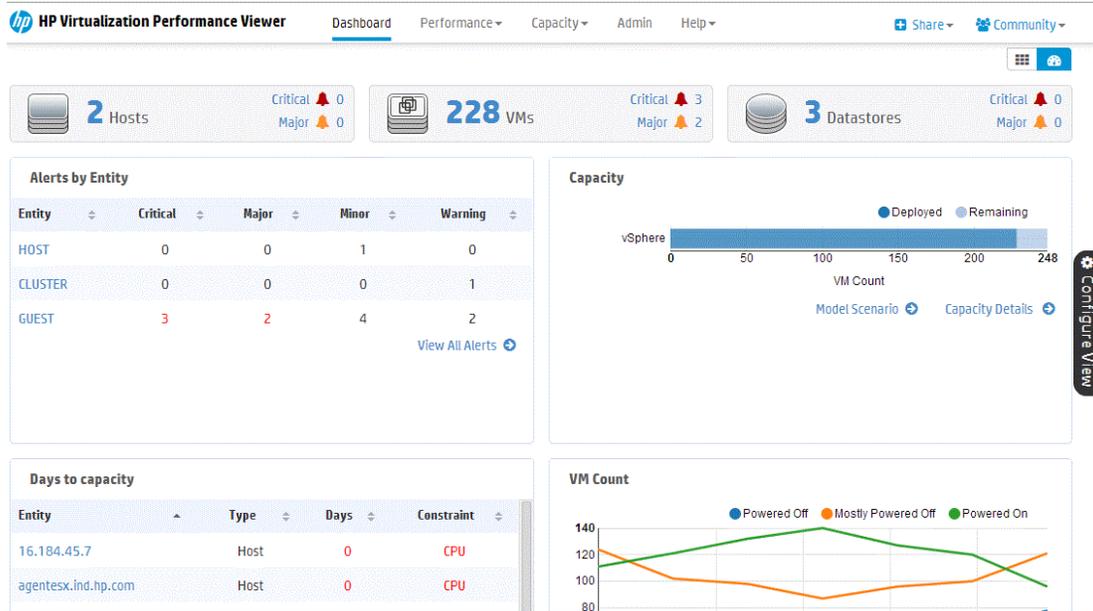
- Monitor the health and performance of the virtualized environment from Dashboard view.
- Triage analysis with the Workbench and capability to trend server utilization across days, weeks, and a month.
- Proactive monitoring of the entities that may cause disruptions in the environment. Use Treemap to identify and view the problems at a glance.
- Analyze the capacity, usage, and allocation trends for various resources in a virtualized environment.
- Right sizing recommendation based on historical resource utilization and reclaiming unused resources.
- Analyze the impact of increasing the workload.
- Determine the impact of adding or deleting resources in your environment.
- Estimate the future capacity utilization in order to proactively plan your hardware requirements.

Note: HP vPV supports the VMware vCenter Server versions 5.0, 5.1, and 5.5

To get the overview about the all the HP vPV features and capabilities, see [Getting Started](#).

Chapter 2: About the HP vPV Console

The HP vPV console consists of the following features as shown in the diagram:



Feature	Description
Dashboard	Quick overview of performance, capacity, usage, and forecast details of entities in your environment.
Performance	View the performance data of the entities. To view the data, navigate to the following: <ul style="list-style-type: none"> Workbench - Draw graphs and generate reports for performance data. Alerts - Monitor alerts in the environment.
Capacity	View the capacity and usage data of entities. To view the data, navigate to the following: <ul style="list-style-type: none"> Overview - Capacity usage trends of entities in environment. Forecast - View forecast on resource utilization. Modeler - View impact of adding resources in the environment. Placement - Recommends the distribution of new resources in the environment.

Feature	Description
Admin	<p>To administer the following HP vPV functions. For more information, see "Configuring HP vPV by Using Admin Tab" on page 21</p> <ul style="list-style-type: none">• Data Sources - Add data sources to start monitoring the resources in the environment.• Data Management - Information about the data retention in the database.• Integrations - Integrate HP vPV with other HP products.• License Management - Information about HP vPV licenses.
Help	<p>Access help on the product.</p> <ul style="list-style-type: none">• Help for HP vPV - Opens the Online Help documentation.• Troubleshooting Tips - View troubleshooting tips for different domains.• About HP vPV - Know product specific details.

Chapter 3: Getting Started with HP vPV

The following table describes HP vPV capabilities that help you monitor and plan the resources in virtualized and cloud environment. You can monitor and accomplish the tasks by using the respective features from the vPV console.

Task	Feature
<ul style="list-style-type: none"> • Monitor the health and performance of the virtualized environment from a single view. • Make your own view. • Quick and easy navigation to other vPV views. 	Dashboard
<ul style="list-style-type: none"> • Graphical representation of the health of the environment. • Identify and view the problems at a glance. • Quick analysis of the entities (Datacenter, Host, or VMs) that are in an optimal range. Analyze patterns such as performance hotspots. • Proactive monitoring of the entities that may cause disruptions in the environment. 	Treemap
<ul style="list-style-type: none"> • Visualize and triage the performance of the monitored resources. • Troubleshoot problems that occurred in the past for a specific time period. • Draw and view graphs with the help of available metrics. Additionally, save frequently used graphs as favorites. 	Workbench
<ul style="list-style-type: none"> • Optimize the virtualized environment. • Right size recommendation of the resources in the environment. • Reclaim storage space and unused resources. 	Capacity Overview
Suggestions for adding new VMs based on available or reclaimable capacity.	Placement
<ul style="list-style-type: none"> • Project future capacity utilization levels of different resources for a predefined time period. • Determine the Days to Capacity information to make optimal allocation and placement. 	Forecast
Identify and troubleshoot the action for the alert generated in your virtualized environment.	Alerts

Task	Feature
<ul style="list-style-type: none">• Determine the impact of adding or deleting resources in your environment.• Estimate the future capacity utilization to proactively plan your hardware requirements.	Modeler
<ul style="list-style-type: none">• Detects overloads in the environment. Find the VM that cannot serve the workload.• Advanced performance troubleshooting to detect the issue. Drill down to determine the VM performance overload issue.	Real Time Guest Drill Down

Chapter 4: Working with HP vPV Dashboard

After adding data sources, when you launch HP vPV, the Dashboard view opens. The HP vPV dashboard provides a quick overview of the performance and usage of entities in your environment. Following are the key features of the HP vPV Dashboard:

- **At-a-glance overview**

Separate tables and graphs to quickly view the Performance, Capacity, Forecast, and Alerts. It also provides information of your environment and you can drill down for details.

- **Create your Dashboard View**

Customize the dashboard to view data specific to your role or requirement.

For example, if you are an IT Capacity Planner, you may want to see only the Capacity related information when you log in to HP vPV. After logging in to HP vPV for the first time, you can customize the tables and graphs that must appear when you log on to HP vPV. The next time you log in, you will see only the customized data on the Dashboard page.

Click on **Configure View** to reset or update the dashboard contents by selecting the components on the right side of the dashboard page.

Persona

- Virtualization Administrator
- IT Planner

Navigation

To access the feature, select **Dashboard**. From the drop-down, select **Overview**.

Using the HP vPV Dashboard

The following table lists the tasks you can perform from the HP vPV Dashboard:

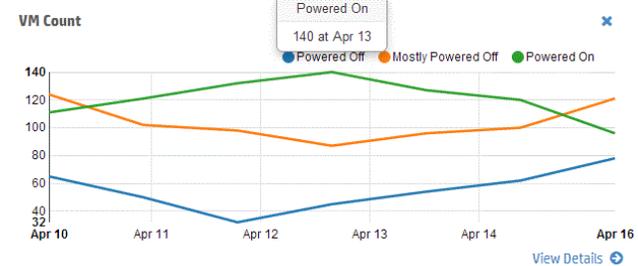
Tasks	Description
View Treemap	Provides an overview of the performance of the entities in your environment and helps in taking corrective actions. For more information, see "Use Case: Viewing Data in the Treemap"

Tasks	Description
Monitor Environment Performance	<p>By analyzing the following:</p> <ul style="list-style-type: none"> • Alerts by Entity - Provides an overview of the alerts generated for the respective entity in the domain. • VM count - Provides the total number of VMs that are in Powered Off, Mostly Powered Off, and Powered On state. • VM/Host Resource Usage - Provides an overview of the CPU and memory utilization for the particular VM or Host. • Top Datastore/VM IO By Latency - Provides an aggregated value of the read and write latency consumed by the datastore or VM. • Top Datastore By FreeSpace - Provides an aggregated value of the used and free space consumed by the datastore. <p>For more information, see "Monitoring Environment Performance"</p>
Monitor Environment Capacity	<p>By analyzing the Capacity, the graph gives an overview of the total VMs available for the selected domain. You can also check the total VMs utilization and derive the allocation and usage of the remaining VMs. For more information, see "Monitoring Environment Capacity"</p>
View Forecast data	<p>By analyzing the Days to Capacity, you can view the number of days the VM will reach the maximum resource capacity. For more information, see "Viewing Forecast Data".</p>
View Alerts	<p>Provides an overview of the critical or major alerts generated for Hosts, VMs, or Datastores respectively. For more information, see "Viewing Alerts"</p>

Monitoring Environment Performance

The following table lists the possible ways to view Performance data from the HP vPV Dashboard:

Action	Result	Further Action, if any																				
<p>View the Alerts By Entity</p>	<p>To get an overview of the total number of alerts that are in Critical, Major, Minor, and Warning states. The alerts generated are displayed based on the Entity.</p> <p>Example</p> <div data-bbox="537 527 1198 787" style="border: 1px solid #ccc; padding: 5px;"> <p>Alerts by Entity x</p> <table border="1"> <thead> <tr> <th>Entity</th> <th>Critical</th> <th>Major</th> <th>Minor</th> <th>Warning</th> </tr> </thead> <tbody> <tr> <td>HOST</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>CLUSTER</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>GUEST</td> <td>2</td> <td>4</td> <td>2</td> <td>3</td> </tr> </tbody> </table> <p style="text-align: right;">View All Alerts ↻</p> </div> <p>Derivation</p> <p>Guest entity has 2 Critical alerts and if you want to view the cause of the alert, navigate to View All Alerts.</p>	Entity	Critical	Major	Minor	Warning	HOST	0	1	0	0	CLUSTER	1	0	0	0	GUEST	2	4	2	3	<p>In the Alert messages page, you can view all the alerts corresponding to different entities and their detailed description.</p> <p>Alternatively, you can also click the Entity to view filtered alerts based on the specific entity.</p> <p>The alerts are generated based on sensitivity. For more information, see "Sensitivity"</p>
Entity	Critical	Major	Minor	Warning																		
HOST	0	1	0	0																		
CLUSTER	1	0	0	0																		
GUEST	2	4	2	3																		

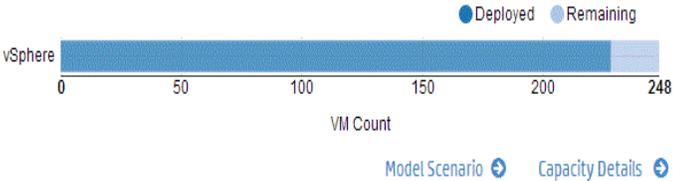
Action	Result	Further Action, if any
<p>View the VM Count</p>	<p>To get a total count of the number of VMs in your environment that are in the Powered On, Off, and Mostly Powered Off states.</p> <p>Example</p>  <p>Derivation</p> <p>Currently 140 VMs are in the Powered On state. To use the resources optimally, navigate to the PowerState for VM page.</p>	<p>Use the VM count page to get detailed information on the performance of the individual VMs.</p> <p>Based on the analysis, you can reclaim the possible VMs that are mostly Powered Off and Powered On for longer periods, thereby improving the performance of your environment.</p>

Action	Result	Further Action, if any
View the VM/Host Resource Usage	<p>To get an overview of the maximum CPU and memory utilization for a particular VM or Host.</p> <p>Example</p> <p><small>Last updated at May 15, 2014 1:55:10 PM View all VMs</small></p> <p>Derivation</p> <p>The scattered graph displays the CPU and memory utilization for the particular VM. If you find the resource utilization high or low, you can plan the allocation of the resources to suit your environment needs.</p>	Based on the analysis, you can allocate the resources to improve the performance of your environment.
View the Top Datastore/VM IO By Latency	To get an overview of the read/write latency in milliseconds on the datastore or VM. Lists the top five most utilized resources.	
View the Top Datastore By Freespace	To get an overview of the used or free space in GB on the datastore. Lists the top five most utilized resources.	

Monitoring Environment Capacity

The following section details information on using the HP vPV Dashboard to view the capacity and usage data of entities. You can view a summarized or detailed analysis of your existing infrastructure that helps you improve the efficiency of resources by optimal sizing and placement of the VMs.

The following table lists the possible ways to view Capacity and Usage data from the HP vPV Dashboard.

Action	Result	Further Action, if any
<p>View the Capacity</p>	<p>To get an overview of the total remaining capacity of VMs for the monitored domain.</p> <p>If you see that the remaining capacity for the VMs is less, you can take appropriate actions from the data derived.</p> <p>Example</p> <p>Capacity</p>  <p>Derivation</p> <p>There are 228 VMs deployed and remaining capacity of 20 VMs for a vSphere domain. To view the CPU, memory, and storage utilization of the VMs navigate to the Capacity Details page and to allocate the resources navigate to Model Scenario page.</p>	<p>To analyze how the environment would perform after allocating or removing the resources.</p>

Viewing Forecast Data

The following table lists the possible ways to view Forecast data from the HP vPV Dashboard:

Action	Result	Further Action, if any																								
View the Days to Capacity	<p>To get an overview of the entities reaching capacity in the next few days.</p> <p>You can analyze the table and take required actions based on the data.</p> <p>Example</p> <table border="1"> <caption>Days to capacity</caption> <thead> <tr> <th>Entity</th> <th>Type</th> <th>Days</th> <th>Constraint</th> </tr> </thead> <tbody> <tr> <td>BLR-CHERRY</td> <td>Cluster</td> <td>0</td> <td>MEMORY</td> </tr> <tr> <td>16.184.45.7</td> <td>Host</td> <td>0</td> <td>CPU</td> </tr> <tr> <td>agentesx.ind.hp.com</td> <td>Host</td> <td>0</td> <td>CPU</td> </tr> <tr> <td>datastore1-106</td> <td>Datastore</td> <td>0</td> <td>USAGE</td> </tr> <tr> <td>datastore1</td> <td>Datastore</td> <td>0</td> <td>USAGE</td> </tr> </tbody> </table> <p>Aggregated Forecast Details</p> <p>Derivations</p> <p>2 datastores and 1 cluster reached or reaching capacity in the next 11 days. Based on the constraint you can view the entity that has reached the maximum capacity. Navigate to the Aggregate Forecast page to get an overview of the CPU, Memory, and Storage utilization and make necessary changes to the entity reaching capacity.</p>	Entity	Type	Days	Constraint	BLR-CHERRY	Cluster	0	MEMORY	16.184.45.7	Host	0	CPU	agentesx.ind.hp.com	Host	0	CPU	datastore1-106	Datastore	0	USAGE	datastore1	Datastore	0	USAGE	With the forecast data of the entities, you can plan the resource allocation effectively.
Entity	Type	Days	Constraint																							
BLR-CHERRY	Cluster	0	MEMORY																							
16.184.45.7	Host	0	CPU																							
agentesx.ind.hp.com	Host	0	CPU																							
datastore1-106	Datastore	0	USAGE																							
datastore1	Datastore	0	USAGE																							

Viewing Alerts

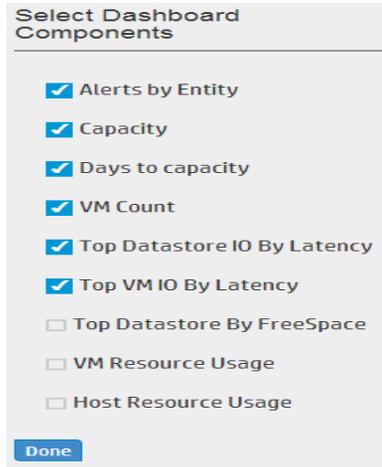
The following table lists the possible ways to view alerts from the HP vPV Dashboard:

Action	Result	Further Action, if any
View the top pane listing the Critical and Major alerts corresponding to entities.	<p>To view if there are any alarming issues in the environment that need immediate attention.</p> <p>Example</p>  <p>Derivations</p> <p>1 Critical and 2 Major alerts corresponding to the VMs in the environment. Navigate to the Alert messages to view detailed information about the alert or Workbench to troubleshoot the problem.</p>	To get detailed information about the alert. Also, you can troubleshoot the problem or draw graphs for the particular metrics.

Customizing the Dashboard View

After logging into HP vPV, you can customize the Dashboard View to show only those cards which are relevant to your area of expertise or profile. To customize the view, perform the following steps:

1. Click **Configure View** available at the right corner of the page. The **Select Dashboard Components** pane appears.



Select Dashboard Components

- Alerts by Entity
- Capacity
- Days to capacity
- VM Count
- Top Datastore IO By Latency
- Top VM IO By Latency
- Top Datastore By FreeSpace
- VM Resource Usage
- Host Resource Usage

Done

2. Clear the check boxes corresponding the cards you do not want to view.
3. Click **Done**.
4. Refresh or reload the page to view the Dashboard with only the selected cards.

Note: Alternatively, you can also close a card to remove it from the Dashboard view. The closed card is not available when you log in the next time.

Chapter 5: Configuring HP vPV by Using Admin Tab

As a HP vPV Administrator, you can use the Admin Page to configure HP vPV.

Note: Make sure Tomcat is configured with HTTPS for secure communication. For more information on configuring secure communication, see *Configuring Secure Communication with Tomcat Server* section in *HP Virtualization Performance Viewer Installation Guide*.

The following table lists the tasks you can perform as an administrator of HP vPV.

Configuration tasks	Action
Add or Remove Data Sources	<p>Use the Data Sources tab to add or remove data sources.</p> <p>By default, this tab is selected when you launch HP vPV and launch the Admin page for the first time. For more information, see "Adding a Data Source" on page 23.</p> <p>You can share your queries or feedback about the product at the HP Software Community. To access the Community portal, click the HP Software Community link on the Data Sources tab of the Admin page.</p>
Monitor Data Management	<p>The Data Management tab displays the data collection and retention information for HP vPV. For more information, see "Data Management" on page 31.</p>
Configure HP vPV Integrations	<p>Use the Integrations tab to integrate and use HP vPV with other HP products - HP Business Service Management, HP Performance Manager, and HP Cloud Service Automation. For more information, see "Integrating HP vPV with Other HP Products".</p>
Manage HP vPV Licenses	<p>Use the License Management tab to manage your HP vPV licenses. You can also activate your evaluation license and import permanent licenses using this tab. For more information, see "License Management" on page 32.</p>

Note: The Virtual Appliance Management Interface (VAMI) is provided by VMware and hence is not available in the localized languages.

Navigation

To access the feature, select **Admin**. The Admin page opens.

Note: Only a user with Administrator privileges can add or remove data sources in the Admin page. The system checks for the user privileges while you log on and if you do not have the sufficient privileges, the Admin page is available only in the Read-only mode. In the Read-only mode you cannot add or remove data sources.

Data Sources

Using the **Data Sources** tab you can select a domain, add a data source to be monitored, remove any added data source, and also see the list of data sources that are monitored by HP vPV. After adding a data source, the status and details of the data source appear in the Connections List at the bottom of the page.

The following table lists the elements available in the Connections List.

Name	Description
IP/Host Name	Lists the IP addresses or host names of all the data sources added to HP vPV for monitoring.
Domain	Domain of the data source added for monitoring.
User Name	User name corresponding to the added data source.
Instance Count	Number of instances associated with each monitored data source. Total instance count is the total number of VMs and Hosts being monitored.
Status	Shows the current status of each connection. For the list of available status messages, see "Data Collection Status Messages" on page 143
Last Collection Time	Shows the date and client time zone against each data source, when data was last collected. Note: This field does not show any value till the first data collection is complete.

Note:

- HP vPV data source collection works only when sum of instances from all data sources is less than or equal to the maximum instance capacity of the license. If the sum of the instances exceeds the maximum instance capacity of the license, then connection for all the data sources fails. For example, if you have installed a permanent license for 100 instances and try to connect two hosts with 60 instances each, then the collection for both the hosts fails.
- You can configure the Collection Interval for all the domains except for Hyper-V. Set the collection interval to 15 minutes for domains where collection takes more than 5 minutes to complete. By default, the collection interval is 5 minutes.

Following are the tasks that can be performed from the Data Sources tab:

- ["Adding a Data Source" on the next page](#)
- ["Removing a Data Source" on page 30](#)

Adding a Data Source

To start monitoring the utilization of resources in your virtualized environment, you must add data sources to HP vPV. When you add the data source to be monitored, HP vPV starts monitoring the resources and displays the relevant data in the Treemap, graphs, and reports. Using this data, you can troubleshoot performance issues in your environment. Based on this data, you can plan your resource utilization properly.

Note: At times, when you add a data source, one more row gets created in the Connections list. This does not impact the data collection.

Using HP vPV you can add and monitor the following data sources:

- [VMware vCenter](#)
- [Hyper-V](#)
- [KVM/Xen](#)
- [HP aPaaS](#)
- [OpenStack](#)

Adding vSphere Data Source

HP vPV supports the VMware vCenter Server versions 5.0, 5.1, and 5.5.

To add a vSphere data source, follow these steps:

1. Click **Data Sources** tab in the Admin page.

If you are opening the Admin page for the first time after starting HP vPV, the Data Sources tab is selected by default.

2. Select **vSphere** from the **Domain** drop-down list.
3. Type the IP address or host name of the data source in the **vCenter IP/Host Name** field.

Note: If you add a VMware vCenter Server twice (with FQDN¹ and without FQDN), HP vPV does not validate the VMware vCenter Server and adds it again.

4. Type the user name corresponding to the specified data source in the **User Name** field.

¹Fully Qualified Domain Name

5. Type the password corresponding to the specified data source in the **Password** field.
6. Click **Test Connection**, if you want to validate the credentials provided.

The system validates the credentials and displays a message stating whether the credentials are valid or not. The system also validates if the connection is successful or not.

7. Click **Add**.

The Connections list displays the added data sources.

Note: To add a vSphere as a data source in HP vPV, the user must have the following roles in addition to the Read-only role:

- Set the **Browse Datastore** role available under **Datastore**.
- Set the **Validate session** role available under **Sessions**.

Also, you must **Enable Statistics** on the VMware vCenter server. For more information, see the *VMware documentation*.

Adding Hyper-V Data Source

Prerequisites

- Microsoft .NET Framework 4
- Port used for accessing HP vPV (8081/8444) should be open in the firewall.
- Microsoft Hyper-V 2008 R2 SP1
- **(Optional)** Microsoft System Center Virtual Machine Manager (SCVMM) 2012 R2
- SCVMM admin console must be installed on the proxy host, if the target is set to SCVMM.

Note: You must have read-only privileges in SCVMM to run the scripts.

If the password for the administrator user with read-only access used for starting the collector is changed, restart **HP vPV Collection Service** to ensure continuous collection.

To add a Hyper-V data source, follow these steps:

1. Click **Data Sources** tab in the Admin page.

If you are opening the Admin page for the first time after starting HP vPV, the Data Sources tab is selected by default.

2. Select **HYPERV** from the **Domain** drop-down list.
3. Click **Download Collector** link to download the `vPWinVirtCollector.zip` file. Extract the `vPWinVirtCollector.zip` file on the target proxy host.

The **vPWinVirtCollector.zip** package contains the collector (**vPWinVirtCollector.exe**), configuration file (**vPWinVirtCollector.properties**), batch file (**Install.bat**), and dlls (**system.management.automation.dll**, **JsonSharp.dll**) with configurable parameters to install the collection service.

The downloaded package is pre-configured with IP of the vPV Instance, to which the collected data is reported.

```
For Example: vPVURL=http://<vPV host name or IP
address>:383/pvcd.pvc.nrListener.JSONRemoteRequestHandler
```

4. Run the `Install.bat` as a domain user to start the collection. A pop-up window appears.

You must have read access to Windows Management Instrumentation (WMI) and appropriate access to the Performance Data from Targets. For more information on Proxy and Remote WMI Configuration, see ["Proxy and Remote WMI Configuration" on the next page](#)

5. Enter the domain user name and password in the window. The Installer installs the HP vPV Collector Service and starts the collection service for targets mentioned in the properties file.
6. Open the `vPWinVirtCollector.properties` file. Update the value for `Targets`. The value for target can be a list of **HYPERV** or **SCVMM** servers to be monitored separated by `;`. For Example:

```
Targets=SCVMM;HYPERV1;HYPERV2;
```

You can also edit the value for `CollectionIntervalInSeconds` based on your requirement. The default value is set to 300 seconds. For example:

```
CollectionIntervalInSeconds=300
```

Save and close the file.

7. Restart the HP vPV Collector Service either by service management console or run the following command from command prompt:

```
SC start HP vPV Collector Service
```

8. To uninstall the installer, run the following command:

```
Uninstall.bat
```

Proxy and Remote WMI Configuration

To provide WMI access on Proxy Side (Win2k12), follow these steps:

1. Go to **Server Manager -> Local Server -> Tools -> Computer Management -> Local User and Groups.**
2. Add the domain user to **Administrators** and **WinRemoteWMIUsers_ groups.**

For information about providing DCOM remote access permissions, see [Set Computer-wide Launch and Activation Permissions.](#)

Note: Domain user must be added to domain admin or local admin privileges due to Windows permissions. HP vPV Collector service does not make any changes to the domain or Hyper-V environment. It makes read-only requests for the system information.

Adding KVM/XEN Data Sources

Prerequisites

- Install **Libvirt** and all its dependencies on the HP vPV server.

Libvirt is an open source management tool to manage virtualized platforms such as Linux, KVM, Xen, and so on. The following table lists the versions of the different Linux flavors on which you can install Libvirt.

For KVM:

Linux Types	OS Versions
CentOS	6.2 and 6.3
RHEL	6.2 and 6.3
Ubuntu	12.04

For XEN:

Linux Types	OS Versions
Ubuntu	12.04
SLES	11 Service Pack 2

- Install **Expect** and all its dependencies on the HP vPV server.

Expect is a tool that communicates with interactive programs, such as, `ssh`. If Expect is not installed on the system, make the following changes:

- a. Open the `parm` file from the location `/var/opt/perf`.
- b. In the `parm` file, set the `ls_collection` parameter to `native`.
- c. Save the file and exit.
- d. Open the `automate_ssh.exp` script from `\opt\OV\bin\`.
- e. Run the following commands from the script:

```
ssh-keygen -t rsa  
  
ssh-copy-id
```

Note: The CPU and memory statistics are not available for Xen host remotely. You can view them on the **Dom0** guest instance.

To add a KVM/XEN data source, follow these steps:

1. Click **Data Sources** tab in the Admin page.

If you are opening the Admin page for the first time after starting HP vPV, the Data Sources tab is selected by default.

2. Select **KVM** from the **Domain** drop-down list.
3. Type the IP address or host name of the data source in the **IP/Host Name** field.
4. Type the user name corresponding to the specified data source in the **User Name** field.
5. Click **Test Connection**, if you want to validate the credentials provided.

The system validates the credentials and displays a message stating whether the credentials are valid or not. The system also validates if the connection is successful or not.

6. Click **Add**.

The Connections list displays the added data source.

Note: The CPU, memory, and network statistics are not available for KVM host remotely.

Adding HP Application Platform as a Service (aPaaS) Data Sources

HP vPV supports the HP aPaaS version 2.10.

Note: The username or password of HP aPaaS must not contain any of the following special characters -/, \, %, and ?.

Prerequisites

Before adding HP aPaaS data sources, you must configure the `collectd` component of HP aPaaS.

Note: HP vPV does not show any collection errors if `collectd` is not configured or it is not running. But there will be no HP aPaaS node data collected.

To configure the `collectd` component of HP aPaaS:

1. Log on to the HP aPaaS host as root user.
2. Open `collectd.conf` from `/etc/collectd`.
3. In `collectd.conf`, search for the `<Plugin write_http>` tag.
4. Remove `#` before the `<Plugin write_http>` tag.
5. Add the following contents to the `<Plugin write_http>` tag:

```
<Plugin write_http>

<URL "http://<IPaddress/server_name>:<port_
number>/PV/collectdListener?target=<aPaaS_target_url>">

Format "JSON"

</URL>

</Plugin>
```

where,

- `<IPaddress/server_name>` is the IP address and server name of the HP vPV server respectively.
- `<port_number>` is the port which HP vPV uses. The default port number is 8081.
- `<aPaaS_target_url>` is the URL of the HP aPaaS target.

For example

```
<Plugin write_http>
```

```
<URL "http://12.220.15.90:8081/PV/collectDListener?target=example.apaas-abc1.local">
```

```
Format "JSON"
```

```
</URL>
```

```
</Plugin>
```

- Restart collectd service using the following command:

```
service collectd restart
```

To add a HP aPaaS data source, follow these steps:

- Click **Data Sources** tab in the Admin page.

If you are opening the Admin page for the first time after starting HP vPV, the Data Sources tab is selected by default.

- Select **HP aPaaS** from the **Domain** drop-down list in the **Data Source** tab.
- In the **HP aPaaS URL** field, type the URL of the machine where HP aPaaS is installed. For example: `https://example.apaas-abc1.local`.
- Type the email corresponding to the specified data source in the **Email** field.
- Type the password corresponding to the specified user name in the **Password** field.
- Click **Test Connection**, if you want to validate the credentials provided.

The system validates the credentials and displays a message stating whether the credentials are valid or not. The system also validates if the connection is successful or not.

- Click **Add**.

The Connections list displays the added data source.

Adding OpenStack Data Sources

Prerequisite

Healthnmon must be installed on the cloud controller before you start adding OpenStack data sources. Healthnmon collects utilization metrics which are then collected by HP vPV. To install Healthnmon, go to the following website: <https://github.com/stackforge/healthnmon>

To add an OpenStack data source, follow these steps:

1. Click **Data Sources** tab in the Admin page.

If you are opening the Admin page for the first time after starting HP vPV, the Data Sources tab is selected by default.

2. Select **OpenStack** from the **Domain** drop-down list in the **Data Source** tab.
3. Type the IP address or host name of the target data source in the **Target IP/Host Name** field.
4. The **Port** field displays the default port number for OpenStack.
5. Type the user name corresponding to the specified data source in the **User Name** field.
6. Type the password corresponding to the specified user name in the **Password** field.
7. Type the authentication token that you receive after the installing the OpenStack on the host in the **Auth Token** field.

To locate the authentication token:

- a. On the OpenStack system, go to **etc\keystone**.
 - b. Open the **keystone.conf** file.
 - c. The authentication token is located in the **admin_token** field in the **keystone.conf** file.
8. Click **Test Connection**, if you want to validate the credentials provided.

The system validates the credentials and displays a message stating whether the credentials are valid or not. The system also validates if the connection is successful or not.

9. Click **Add**.

The Connections list displays the added data source.

Note: If a data source is down, HP vPV does not collect data for that data source.

Removing a Data Source

When you want to stop monitoring a data source in your virtualized environment, you can remove the data source from HP vPV. After removing the data source, HP vPV stops monitoring that data source and does not display any data corresponding to it.

Note: To remove remote collectors such as Hyper-V, run the following command:

```
pvconfig -dt HYPERV <target name>
```

To remove a data source from the list of monitored connections, follow these steps:

1. Select the data source you want to remove from the list of added connections.

You can select multiple connections by pressing the `Ctrl` key and clicking the required connections. The **Remove** button is enabled.

2. Click **Remove**.

The system displays a dialog box asking for confirmation to remove the data source.

3. Click **OK** to remove the data source.

The system displays a confirmation message and no longer monitors the removed data source. The data source is also removed from the Connections list.

Note: When you remove a data source from HP vPV, Treemap and Workbench might display data corresponding to the deleted VMs for the next 2 data collection cycles (10 minutes).

Restarting Collection

To restart the data source collection:

1. Click **Data Sources** tab in the Admin page.

If you are opening the Admin page for the first time after accessing HP vPV, the Data Sources tab is selected by default.

2. Select the data source that you want to restart.
3. Click **Restart Collection**.

Note: To restart Hyper-V, run the following command on the proxy system:

```
restart HP vPV collector service
```

Data Management

The Data Management tab provides you information about the data retention by HP vPV. The tab also provides you detailed information about the duration for which the data is retained in the database. The data collected is summarized and rollup is done to show the consolidated data. The data retention period varies, based on the license applied. For more information on the different license types, see the *Installation Guide*.

Apart from the data retention information, the tab also displays the following information:

- Current database size
- Available free space

License Management

The License Management tab provides information about your HP vPV licenses. You can also use this tab to start using your Evaluation License as well as import a HP vPV license. To purchase the respective license, click on **You have Evaluation/Community license. Click to buy license** link. The link navigates to the **Buy License** page. Enter your details in the **Contact Me** tab and click **Submit**. Make sure email client is configured in your browser.

For more information on the difference between the licenses and the features available, see *HP Virtualization Performance Viewer Installation Guide*.

The following table lists the sections available in the License Management tab.

Section	Description
License Status	Displays information regarding the installed licenses. The two tables available are: <ul style="list-style-type: none"> • Active License Features • Installed Licenses
Manage License	To import permanent licenses.

License Status

The **Active License Details** table lists the following information about your current HP vPV License:

- Capacity or number of instances available corresponding to each license.
- Number of instances that can be monitored, based on the installed license
- Data Retention

The **Installed Licenses** table lists the following information regarding the active and all installed licenses for HP vPV:

- Type of license installed
- Date of license expiry

Manage License

You can enter the permanent license key and click **Import License**.

Follow these steps:

1. Go to the **License Management** tab in Admin page.
2. Type your license key in the **License Key** field of the Manage License section.
3. Click **Import License**. The License Status section refreshes to display the details of the license imported.

To clear the license key typed in, click **Reset**.

Time Zones

If the time zone settings on HP vPV server are different from those on the data source, the settings on HP vPV are used. The time zone settings on HP vPV server are used to display data, if HP vPV server and data source are in different time zones. The default time on the HP vPV server is the Coordinated Universal Time (UTC). You can change it to the time zone of your browser.

Configuring HP vPV

The following list specifies the tasks you can perform as an Administrator to get optimum results from HP vPV:

Note: The following tasks are not applicable for the Archive Extractor version of the product.

- ["Integrating with Microsoft Active Directory and OpenLDAP" on page 35](#)
- ["Configuring Session Timeout Interval" on page 39](#)
- ["Configuring Secure Client Connect Timeout Interval" on page 40](#)
- ["Configuring Java Virtual Machine Memory" on page 40](#)
- ["Configuring HP vPV to use Public Key Infrastructure Authentication" on page 42](#)

Conventions Used

The following conventions are used in the sections when referring to the location of files on the HP vPV server system.

Directory	Description
<install_dir>	The directory where HP vPV is installed. The default location is <i>/opt/OV</i> . For Archive Extractor version of the product, the directory is where the file is extracted.
<data_dir>	The common data directory where data files and logs related to HP Software products are stored. The default location is <i>/var/opt/OV</i> . For Archive Extractor version of the product, the location is <i>/data</i> .

Directory	Description
<bin_dir>	The directory where the binaries reside. The default location is <code>/opt/OV/bin</code> . For Archive Extractor version of the product, the location is same as the <code><install_dir></code> location.
<systemname>	The name of the system on which the HP vPV server is running. When accessing HP vPV through a web browser, you must replace this variable with the actual system name or IP address of the system.

OVPConfig.ini Parameters

The following table lists the parameters, which must be specified in the `OVPConfig.ini` file to configure HP vPV.

Parameter	Description
TRACELEVEL	You can use this parameter to turn on or turn off tracing. When you set this parameter to 1 , tracing is turned on and the trace log files are generated. Setting this to 0 turns off tracing. It is recommended to turn on or turn off tracing by using the trace on or trace off commands.
GRAPH_AUTOREFRESH_RATE	You can use this parameter to specify the interval at which HP vPV refreshes the graphs automatically. The value you specify for this parameter is in seconds. For example, if you specify the value as 120, the graph will be refreshed every two minutes.
DAILY_MAINTENANCE_TIME	You can use this parameter to schedule the maintenance task at a time. The value you specify here is in HH:MM format. For more information, see "Daily Maintenance" on page 41 .
DIAGVIEW_TABLE_ROWCOUNT	You can use this parameter to configure the number of rows in a drill-down table in the Workbench page. The default value is 10000.
SHOW_MOUSE_HOVER_DEFAULT	When you move the mouse on the graph area of a drawn graph from the HP vPV user interface, a pop-up displaying the actual value of the data point and the time interval of the selected data appears. You can configure this parameter to enable or disable the mouse-hover option. The default value is TRUE/YES and the pop-up displaying the details of the data appears when you move the mouse on the selected data on the graph. If you set this value to FALSE/NO , the pop-up displaying the value and time of the data point does not appear when you move the mouse over the graph. Note: The value selected from the user interface menu option overrides the setting specified for this parameter.

Parameter	Description
SECURE_CLIENT_CONNECT_TIMEOUT	You can use this parameter to specify the timeout period for which secure communication HTTPS protocol is used for connecting to the HP vPV server. The default timeout period is one second. For more information, see "Configuring Secure Client Connect Timeout Interval" on page 40.
RTV_GRAPH_DATAPOINTS	You can use this parameter to configure the maximum number of data points in the graphs drawn using Workbench.

Integrating with Microsoft Active Directory and OpenLDAP

HP vPV supports authentication using Microsoft Active Directory and OpenLDAP. To configure HP vPV to use the Microsoft Active Directory server or OpenLDAP, perform the following steps:

1. Open the `OVPMconfig.ini` file available in the `<data_dir>/conf/perf` directory.
2. Add the information in the `[LDAP]` section of the `OVPMconfig.ini` file by removing the comment marks `" ; "`, from the example lines and replacing information with the values that match your installation.

Example for Microsoft Active Directory

PVGROUP=<User group for PV> which is Active Directory user group.

PVADMIN=<A user account present in Active Directory and will be used as PV Administrator, example PV_Admin. This user will have the Administrator privileges for HP vPV and can be a part of the PVGROUP>.

Note: You can add multiple admins and groups separated by comma (,) in the PVADMIN and PVGROUP parameters

LDAPHOST=<IP/FQDN of Active Directory Server, example Sample.abc.com>

SEARCHBASE=<The server root under which HP vPV will search for users>. For example, if the domain name is abc.def.com then SEARCHBASE will be DC=<abc>,DC=<def>,DC=<com>

USERSEARCHQUERY=(&(objectclass=user)(SAMAccountName=\$USERID\$))

DOMAIN=<abc.def.com>

SSL_KEYSTORE=<Absolute path of keystore file>, if enabled.

USE_SSL=true/false. This is to switch the SSL ON or OFF for the authentication of the

users. This is only in the HP vPV context. For CSA users, using SSL for LDAP authentication is based on the CSA configuration for LDAP.

Example for OpenLDAP simple configuration

In this scenario, all HP vPV users are under the same organization (OU).

PVADMIN=<A user account used as PV Administrator, example *PV_Manager*. This user will have the Administrator privileges for HP vPV>.

LDAPHOST=<IP/FQDN of OpenLDAP Server, example *Sample.abc.com*>

SEARCHBASE=<The server root under which HP vPV will search for users>. For example, if the domain name is *my-domain.com* then

SEARCHBASE=*OU=MyOrganization,DC=my-domain,DC=com*. *MyOrganization* is an organization created in OpenLDAP.

USERSEARCHQUERY=*CN=\$USERID\$*. This field is to specify the attribute to identify the user. For example if "CN" is the attribute, then

USERSEARCHQUERY=*CN=\$USEERID\$*. If this is UID then

USERSEARCHQUERY=*UID=\$USERID\$*

DOMAIN=<*my-domain.com*>

LDAPTYPE=*OpenLDAP*. The default value is *AD*.

SSL_KEYSTORE=<Absolute path of keystore file>, if enabled.

USE_SSL=*true/false*. This is to switch the SSL ON or OFF for the authentication of the users

Example for OpenLDAP Group configuration

In this scenario, HP vPV users are part of different organizations in LDAP.

PVGROUP=<User group for PV> which is OpenLDAP user group.

PVADMIN=<A user account used as PV Administrator, example *PV_Manager*. This user must be a part of *PVGROUP* and will have the Administrator privileges for HP vPV>.

Note: You can add multiple admins and groups separated by comma (,) in the *PVADMIN* and *PVGROUP* parameters

LDAPHOST=<IP/FQDN of OpenLDAP Server, example *Sample.abc.com*>

SEARCHBASE=<The server root under which HP vPV will search for users>. For

example, if the domain name is my-domain.com then SEARCHBASE=DC=my-domain,DC=com

USERSEARCHQUERY=CN=\$USERID\$. This field is to specify the attribute to identify the user. For example if "CN" is the attribute, then

USERSEARCHQUERY=CN=\$USEERID\$. If this is UID then

USERSEARCHQUERY=UID=\$USERID\$

DOMAIN=<my-domain.com>

LDAPTYPE=OpenLDAP. The default value is AD.

BIND_DN=CN=user1, OU=test,DC=my-domain,DC=com. This user must have read access to the SERACHBASE,PVGROUP and attributes.

BIND_DN_PASSWORD=Encrypted password of above DN (Note: Use XPL to obtain the encrypted password).

SSL_KEYSTORE=<Absolute path of keystore file>, if enabled.

USE_SSL=true/false. This is to switch the SSL ON or OFF for the authentication of the users.

Note: To generate the encrypted password:

1. Use the command `#/opt/OV/bin/pvconfig`

Syntax: `/opt/OV/bin/pvconfig -en <Any password>`

Example: `# /opt/OV/bin/pvconfig -en password`

An example of encrypted password - `dAGZEfcZEPiQxXNilr85Cxc81jsomV8v`

2. Copy the password as `BIND_DN_PASSWORD` in

`/var/opt/OV/conf/perf/OVPMconfig.ini` under `[LDAP]` name space.

3. Restart ovtomcatB using the command `# /opt/OV/bin/ovc -restart ovtomcatB.`

Note: You can add multiple admins and groups separated by comma (,) in the `PVADMIN` and `PVGROUP` parameters

For Example:

`PVADMIN= Administrator,Admin x,Admin y`

`PVGROUP= Group 1, Group 2, Group 3`

Configuring LDAP Connection over SSL

You can configure LDAP connection with SSL if you want a secure connection between the HP vPV server and the LDAP server.

To configure LDAP connection over SSL (LDAPS), perform the following steps:

1. Open the `OVPMconfig.ini` file available in the `<data_dir>/conf/perf` directory.
2. Add the information in the `[LDAP]` section of the `OVPMconfig.ini` file by removing the comment marks “;”, and replacing information with the values that match your installation.

SSL_KEYSTORE=<data_dir>\conf\perf\jssecacerts. This is the location of keystore that stores the LDAP server certificate.

Set `USE_SSL=true`

This enables the communication between LDAP and HP vPV through LDAPS. Otherwise, the communication takes place through LDAP.

3. Restart HP vPV using the following command:

```
pv restart
```

Obtaining the Server Certificate

You must add the Microsoft Active Directory server SSL certificate to the list of accepted certificates used by the HP vPV server. To add the certificate, export the certificate by running the following command on the Microsoft Active Directory server:

`certutil -ca.cert <sample.crt>`, where `sample.crt` is the name of the SSL certificate that you want to export to the HP vPV server.

Importing the Server Certificate

You must import the Microsoft Active Directory server certificate into the keystore for SSL enabled communication between the HP vPV and Microsoft Active Directory.

The keystore file, for example, `jssecacerts` is located in the `<data_dir>/conf/perf` directory.

Note: The `keytool` command creates the keystore file if it is not present in the directory.

To import the server certificate, perform the following steps:

1. Go to the `<data_dir>/conf/perf` directory.
2. Copy the exported Microsoft Active Directory server SSL certificate and paste the certificate in

the directory.

3. Run the following command:

```
/opt/OV/nonOV/jre/b/bin/keytool -importcert -keystore jssecacerts -file
/root/cacert.pem.
```

The keytool prompts you for a password. The default password is *changeit*.

4. Select **yes** to confirm the key import when prompted with Trust this Certificate?[no]:
yes

Accessing HP vPV User Interface

To launch the Microsoft Active Directory enabled HP vPV, you can use the following URL:

http://<system>:<port>/PV or **https://<system>:<port>/PV**

If you launch the Microsoft Active Directory enabled HP vPV using the URL

http://<system>:<port>/PV, the system re-directs you to the login page using the URL

https://<system>:<port>/PV.

Type the user name and password on the login page. For example, **PV_Admin** and **password**.

The request to validate the user name and password is sent to the Microsoft Active Directory server. The HP Virtualization Performance Viewer Home Page is displayed and the URL returns to **http://<system>:<port>/PV**, if the validation is successful. The protocol is redirected from HTTP to HTTPS to send the credentials to HP vPV server over SSL. However, if you initiate HP vPV using the URL: **https://<system>:<port>/PV**, HP vPV continues to run in the secured mode.

Configuring Session Timeout Interval

You can set the expiry time or timeout interval for a user session. If a user session is inactive for the interval you specified, the session expires and the system logs out the user. The default timeout interval for all user sessions is set to one hour.

To modify the default timeout interval, perform the following steps:

1. Open the `OVPMconfig.ini` file available in the `<data_dir>/conf/perfdirectory`.
2. Specify an interval for the `SESSION_TIMEOUT` parameter in minutes. For example, set it to 30 minutes.
3. Save the file.
4. Restart HP vPV.

Configuring Secure Client Connect Timeout Interval

As a HP vPV administrator, you can set the expiration time or timeout interval at which HP vPV can connect to the server through HTTPS communication protocol. When HP vPV users use secure communication HTTPS protocol to connect to the server, the specified time-out interval on the secure channel is initially tried. The default timeout interval is set to one second.

To modify the default timeout interval, perform the following steps:

1. Open the `OVPMconfig.ini` file available in `<data_dir>/conf/perf` directory.
2. Specify an interval for the `SECURE_CLIENT_CONNECT_TIMEOUT` parameter in seconds, depending on the speed of your network connection.

For example, set it to 10 seconds.

3. Save the file.
4. Restart HP vPV.

Note: When HP vPV users use regular communication protocol (HTTP) to connect to the server, the secure channel through HTTPS is initially tried for the specified time-out interval and then HTTP is used.

Configuring Java Virtual Machine Memory

To avoid out of memory exceptions caused due to insufficient memory in the Java Virtual Machine (JVM), you can configure HP vPV to stop accepting requests by using the `JVM_MIN_MEMORY` parameter. By setting this parameter to a specific value, HP vPV does not accept requests, if the available memory is less than the value specified and displays the error message:

This request cannot be processed, because the HP vPV server has run out of memory.

If the request is for XML graphs, HP vPV displays an XML file with the **Out of Memory Error** message. As this parameter is not set by default, you must specify the parameter in the `OVPMconfig.ini` file.

To specify `JVM_MIN_MEMORY`, perform the following steps:

1. Open the `OVPMconfig.ini` file available in the `<data_dir>/conf/perf` directory.
2. Enter the `JVM_MIN_MEMORY` parameter and specify a value, for example 5.

The value you enter here are in MBs (MegaBytes). For example, if you define the memory value as 5 MB and the Java heap size is less than 5 MB, HP vPV does not accept requests until the available memory for the Java heap size is greater than the value specified for the `JVM_MIN_MEMORY` parameter.

3. Save the file.
4. Restart HP vPV.

The default value for maximum JVM heap size is 512 MB. If you anticipate a higher load, set the heap size to a higher value.

Daily Maintenance

HP vPV performs maintenance tasks on a daily basis for the following:

- To reclaim disk space for files and directories that are no longer needed
- To close any data sources that are not accessed in the last 24 hours
- To perform some basic maintenance tasks on the database

The maintenance is scheduled to run on a nightly basis at 03:00 AM local time. To configure the maintenance schedule, perform the following steps:

1. Open the *OVPMconfig.ini* file available in the `<data_dir>/conf/perf` directory.
2. Specify the hour and minutes at which you want to schedule the maintenance task, for the **DAILY_MAINTENANCE_TIME** parameter, in the 24-hour format. The default value for this parameter is 03:00.
3. Save the file.
4. Restart HP vPV.

The disk space cleanup is also done for customers and users that are no longer configured. For each customer and user, there are directories that contain the customer or user graphs. The files specific to the customer logons can be located in the following directories:

- For each customer, there is a configuration directory `<data_dir>/conf/perf/VPI_CUST_<customername>`
- For a blank customer, the user directories are in `<data_dir>/conf/perf/VPI_USER_<username>`
- For users for a specific customer, the user directories are in `<data_dir>/conf/perf/VPI_CUST_<customername>/VPI_USER_<username>`.

The directories along with the files that are saved are automatically removed, if the customer or user is no longer configured. To preserve these files after deleting a customer or user, you can save it to an alternate location on your local system.

Configuring HP vPV to use Public Key Infrastructure Authentication

The Public Key Infrastructure (PKI) is used for the implementation of Common Access Cards (CAC) given to employees of an institution. PKI is used to create, manage, and revoke certificates. CAC enhances the security and access to hardware and software with the inclusion of the digital signature and data encryption technologies used. HP vPV supports the use of CAC and enables you to map client certificates to user accounts (administrator, customers, and users) and use the Public Key Infrastructure (PKI) for user authentication.

After configuring HP vPV to use the client certificates, users can log on to HP vPV with the X.509 certificates without having to manually type in user names and passwords.

Note: When you log out of HP vPV while PKI authentication is enabled, it is recommended to close all the browser windows to successfully log in into HP vPV again. If some windows are open, the session will not be cleared and you may face issues while logging into HP vPV.

The prerequisites for using HP vPV with CAC are as follows:

- Server root certificate
- Client certificates
- Proxy info (if any)

To configure HP vPV to use PKI authentication, follow these steps:

1. Import the trusted CA certificate to the `tomcat_trust.store` file by following these steps:
 - a. Log on to HP vPV as root or administrator.
 - b. Run the following command:

```
<install_dir>/nonOV/jre/b/bin/keytool -import -alias serverkey -
file <CA_certificate> -keystore "/opt/OV/nonOV/tomcat/b/ tomcat_
trust.keystore"
```

In this instance, `<CA_certificate>` is the name (complete path) of the trusted CA certificate file on HP vPV.

In the command line console, a prompt to provide password appears.

- c. Type a password, and press **Enter**.

If you do not want to set a password, press Enter without typing anything.

- d. Run the following command:

```
<install_dir>/bin/ovconfchg -edit
```

A text file opens.

- e. Type the following under the **NONOV.TomcatB** section:

```
TruststoreFile=/opt/OV/nonOV/tomcat/b/tomcat_trust.keystore
```

- f. If you typed a password in step c, type the following under **TruststoreFile**:

```
TruststorePass=<password>
```

In this instance, <password> is the password of the keystore file created in step c.

Skip this step if you did not type a password in step c.

- g. Save the file.
2. Enable checking of the validity of client certificates.

Note: If you do not perform this step, HP vPV does not restrict access of users with expired or corrupt certificates, which might lead to unauthorized access.

- a. Run the following command:

```
<install_dir>/bin/ovconfchg -edit
```

A text file opens.

- b. Type the following under the **NONOV.TomcatB** section:

```
OPTS_JavaOpts=-Dsun.security.ssl.allowUnsafeRenegotiation=true
-Dcom.sun.security.enableCRLDP=true
-Dcom.sun.net.ssl.checkRevocation=true -Djava.security.debug=certpath
-Dhttp.proxyHost=<Proxy_Server_IP>
-Dhttp.proxyPort=<Proxy_Server_Port>
-Dhttps.proxyHost=<Proxy_Server_IP>
-Dhttps.proxyPort=<Proxy_Server_Port>
```

Note: Make sure that the above content is typed in a single line.

In this instance, <Proxy_Server_IP> is the IP address of the proxy server for HP vPV and <Proxy_Server_Port> is the port used by the proxy server for the HTTP or HTTPS communication.

- c. Save the file.
- d. Run the following command:

```
pv enablecac true
```

HP vPV is now enabled to use the PKI authentication.

Disabling Certificate-based Authentication

To disable the certificate-based authentication, run the following command at the command prompt:

```
pv enablecac false
```

Chapter 6: Monitoring and Analyzing Environment using Treemap

The Treemap is a visual representation of the entities in your environment. Treemap displays the hierarchical data as a set of nested rectangles. The color and size dimensions used for the leaf nodes often get visually correlated to spot interesting patterns.

You can use the Treemap for a quick analysis of the performance of the entities and take corrective actions. To view data in the Treemap, add the data sources to be monitored and then wait for the first data collection to complete.

You can do the following tasks from the Treemap.

- Identify whether the problem can be isolated to a particular type.
- Identify patterns of problems across elements of similar type.
- Drill down from the Treemap to find the reason and status of the resource allocation and usage and to take further actions. See,
- Displays the resource utilization of the resource type you selected in the Resources pane.

For more information on adding a data source, see "[Adding a Data Source](#)".

Navigation

To access the feature, select **Dashboard**. From the drop-down, select **Treemap**.

Treemap View

The following table lists the view details of the Treemap Overview page and the corresponding functions:

User Interface Feature	Description
Resources Pane	Displays the resources based on which you can view data in the Treemap. For more information, see " Resources Pane ".
Options Pane	Contains the fields and filter based on which you can view data in the Treemap. It also contains the Micro charts feature.

Note: The minimum screen resolution required for viewing the HP vPV Treemap is 1280x768.

Using Treemap View

The Treemap view provides a visual representation of the performance of resources monitored.

You can perform the following tasks on the Treemap:

Use	Description
Viewing data from the Treemap	You can view the data specific to a resource by right-clicking the entity.
Viewing resource information	You can view information corresponding to the specific resources in a pop-up window.
Drill down	Navigate to display the resource utilization specific to the resources further down in the hierarchy.
Viewing Microcharts	Quickly analyze and compare the performance or utilization of your monitored resources. To view the detailed graphs for different attributes, you can use the Workbench page.
Searching the Resources	There are various ways that are available to search the resources in the environment.

You can use the different options in the **Options** pane to filter your view in the Treemap:

- Group the resources displayed
- Set attributes based on which the Treemap is colored
- Filter data shown in the Treemap
- View data up to the past five summarization intervals
- List up to five most and least utilized resources
- Highlight up to five most and least utilized resources

Viewing data from the Treemap

From the Treemap, right-click the specific resource to view the data. The context-sensitive menu includes the following options:

- **Utilization Trends:** Displays the default graphs for the selected resource.
- **Show Status:** Displays the Status Report for the selected resource by default. You can select and view other corresponding reports also.
- **Real Time Guest OS Drilldown:** For more information, see "[Real Time Guest OS Drilldown for Advance Troubleshooting](#)" on page 58.
- **Capacity Usage Trends:** Displays the overview of the resources optimization.
- **Sizing Recommendation:** Displays the sizing data for the resource.

- **Forecast:** Displays the forecast data for the resource.
- **Drill Down:** Displays data corresponding to the hosts and VMs for the selected resource.

Note:

- The **Drill Down** option is available only when you are viewing the Treemap data corresponding to certain resources in your data source.
- If you want to view the VMs corresponding to a host, right-click the host and select **Show Status**. The Status Report opens and you can view the VMs corresponding to the host.
- The Treemap does not show those resources for which no data is available.

- **Highlight Element:** Highlights the selected element(s) in the Treemap. To highlight multiple elements, right-click the element and select the option.
- **Highlight Group:** Highlights the group in which the selected element(s) is grouped. You can use this option only when you use the **Group By** feature.

Note: If a resource does not belong to any group, then it will be listed under a custom group called **Ungrouped**.

- **Remove Highlights:** Removes the highlighting for the element(s) or group.
- **Launch Workbench:** Launches the Workbench (Performance Graphing) page.
- **Launch Workbench (Highlights):** Launches the Workbench page for the highlighted element (s) or group.

Note: In HP aPaaS, if an application belongs to a group, but is not a part of any user, then the application is not displayed in HP vPV.

Resource Information in Treemap

When you move the pointer over resources in the Treemap, you can view information corresponding to the specific resources. This window displays the following data:

- Name of the resource
- Value corresponding to the attribute selected in the **Color by** field in the **Options** pane.
- Value corresponding to the **Size by** attribute of the resource, specified in the **Options** pane.

Note: If a single HP aPaaS user belongs to multiple groups, HP vPV displays the user information in only one of the groups.

For example, if user U1 belongs to groups G1 and G2, then HP vPV displays U1 as part of either G1 or G2 but not both the groups.

Related Topics:

- ["Use Case: Viewing Data in the Treemap" on page 56](#)

Resources Pane

The Resources Pane on the top of the HP vPV home page displays the resources for which you can view the utilization. The pane also displays the total number of resources available for each type and the corresponding micro charts also. The attributes for each of the resources, based on which you want to view the Treemap can also be selected by clicking the corresponding icons.

Group by and Color by

After selecting a resource, you can further view specific data in the Treemap by selecting the attributes available in the **Group by** and **Color by** fields. Alternatively, you can also select the icons corresponding to each resource in the Resources pane.

The following table lists the **Group by** and **Color by** attributes corresponding to the resources for the different data sources.

Domain	Resource	Group By	Color By
vSphere	Datacenters	None	<ul style="list-style-type: none"> VMs Offline CPU Usage Memory Usage
	Cluster	Data Center	<ul style="list-style-type: none"> CPU Usage Memory Usage
	ESX/ESXi Hosts	<ul style="list-style-type: none"> Data Center Cluster 	<ul style="list-style-type: none"> CPU Usage Memory Usage
	Resource Pools	<ul style="list-style-type: none"> Data Center Cluster 	<ul style="list-style-type: none"> CPU Usage Memory Usage
	VMs (Compute)	<ul style="list-style-type: none"> Data Center Cluster Resource Pool 	<ul style="list-style-type: none"> CPU Usage Memory Usage CPU Ready
	Datastores	Data Center	Usage
	VMs (Storage)	<ul style="list-style-type: none"> Data Center Storage 	Latency
Hyper-V	Host Groups	None	<ul style="list-style-type: none"> CPU Usage Memory Usage
	Host Clusters	Host Group	
	Hosts	<ul style="list-style-type: none"> Host Group Host Cluster 	
	VMs	<ul style="list-style-type: none"> Host Group Host Cluster Host 	
KVM	Hosts	None	CPU Usage
	Virtual Machines	Hosts	
Xen	Hosts	None	CPU Usage
	Virtual Machines	Hosts	

Domain	Resource	Group By	Color By
OpenStack	Cloud	None	<ul style="list-style-type: none"> • CPU Usage • Memory Usage
	Tenants	Cloud	<ul style="list-style-type: none"> • CPU Usage • Disk Usage
	Virtual Machines	Tenants	<ul style="list-style-type: none"> • CPU Usage • Memory Usage • Disk Usage
	Hosts	Cloud	<ul style="list-style-type: none"> • CPU Usage • Memory Usage
HP aPaaS	Target	None	<ul style="list-style-type: none"> • CPU Usage • Memory Usage
	Nodes	None	<ul style="list-style-type: none"> • CPU Percent • Memory Percent
	User Groups	None	Memory Usage
	Users	User Groups	Memory Usage
	Applications	<ul style="list-style-type: none"> • Group • User 	<ul style="list-style-type: none"> • CPU Usage • Memory Usage • Disk Usage

Note:

In the HP vPV Treemap, after you drill down from a resource, change the color by value for a resource using the Color By drop-down list in the Options pane. If you change the color by value using the resource name in the Resources pane, the drill down and drill up features won't work in the Treemap.

For example, in the vSphere domain:

1. Drill down from the Cluster level to the host level with Color By value as **CPU Usage**.
2. Now, if you change the color by value to **Mem Usage** using the resources name in the Resources pane, you cannot drill down or drill up to any other resources.

Hence, to drill down to the VMs view from the hosts view, use the Color By drop-down list in the Options pane to change the color by value.

Using the Options Pane

The Option pane provides you the fields and values based on which you can view and interpret data in the Treemap. You can use the different options in the **Options** pane to filter your view in the Treemap:

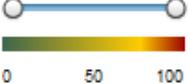
- Group the resources displayed
- Set attributes based on which the Treemap is colored
- Filter data shown in the Treemap
- View data up to the past five summarization intervals
- List up to five most and least utilized resources
- Highlight up to five most and least utilized resources

Options Pane Details

The following table explains the fields available in the Options Pane.

Field	Description
Search	Use the text box to search for resources within the Treemap. The Treemap view shows the searched resources highlighted. For more information, see "Searching Resources" .
Remove Highlights ()	Clears the text box corresponding to the Search feature and also clears the Treemap highlighting resulting from the previous search.
Export as PDF ()	Click to export all the data in the page, including the Treemap, as a PDF document.
Help ()	Click to open the context-sensitive help for the page.
Domain	Select the domain based on which you want to view data in the Treemap.
Group by	Groups data in the Treemap based on the value selected from the list. The values in the drop-down list change based on the domain and resource selected on the Resources pane. For more information, see "Resources Pane" .

Field	Description
Data as of	Displays the date and time corresponding to the data collected and displayed in the Treemap. Use the slider to set the required time and the Treemap displays the corresponding data. You can view data up to the past 5 summarization intervals.
Summarized Every	Displays the time interval configured for collecting data. The time interval varies depending on the data source domain monitored.
 (Information)	<p>Displays additional information about your resources and other attributes. To view the information, move the pointer over the icon.</p> <p>In the Resources pane, moving the pointer over the icon shows you the status and count of the resource selected. To view the icon for the resource pools, click Resource Pools on the pane.</p>
Size by	The attribute based on which the sizes of the boxes in the Treemap are drawn. The attribute changes based on the value selected in the Color by field.
Color by	Colors data in the Treemap based on the attribute selected from the list. The attributes in the list vary based on the resource selected on the Resource pane.
Filter	Filters the displayed data based on the range set between the end points on the slider. For more information, see " Filtering Data ".

Field	Description
<p>Spectrum Transition Value</p>	<p>Spectrum Transition Value is the value set on the Green-Yellow-Red color spectrum which defines the optimum performance area for a resource.</p> <p>The area surrounding the Spectrum Transition Value is Yellow. This indicates that any resource having performance parameters within the Yellow range is performing optimally. The resources having optimal performance parameters are colored yellow in the Treemap.</p> <div data-bbox="467 575 915 1003" style="border: 1px solid #ccc; padding: 5px; margin: 10px 0;"> <p>Data as of 4/26/13 11:25</p> <p>Summarized every 5 minutes</p> <hr/> <p>Size by Available GBs ⓘ</p> <p>Color by Usage ⓘ</p> <p>Filter </p> <p>Spectrum Transition Value 75 🎨</p> <hr/> <p>Hide labels <input type="checkbox"/></p> </div> <p>For example, in the above figure, the Spectrum Transition Value is set to 75. Hence, when you view VMs in vSphere by CPU Usage, then all the VMs having CPU utilization in the Yellow range will be optimally used VMs.</p>
<p>Hide Labels</p>	<p>Select this check box to hide the labels of the resources displayed in the Treemap. To view the labels, clear the check box.</p>
<p>Top</p>	<p>Select the radio button to view the top 5 utilized resources, based on the Color by attribute, in the current Treemap view. The pane shows the resource names and the corresponding graphs.</p>
<p>Bottom</p>	<p>Select the radio button to view the least 5 utilized resources, based on the Color by attribute, in the current Treemap view. The pane shows the resource names and the corresponding graphs.</p>
<p>Highlight</p>	<p>Highlights the Top or Bottom listed resources in the Treemap. This helps you to locate the resource easily in the Treemap.</p>
<p>Collapse Expand</p>	<p>Click  in the top right corner of the Options pane to collapse the Options pane and make more space for the treemap.</p> <p>Click  (Expand) to expand the Options Pane again.</p>

Drill Down to Resources

The Drill Down feature helps navigate to further available levels and view the resource utilization. When you select **Drill Down** from the context-sensitive menu in the Treemap or double-click a resource, the Treemap refreshes to display the resource utilization specific to the resources further down in the hierarchy. The Drill Down option is available only when you are viewing specific resources in the Treemap.

For example, for a monitored VMware vCenter Server, from the Treemap view for a cluster or resource pool, if you click **Drill Down**, the Treemap refreshes to display the resource utilization of the corresponding vSphere hosts. To view the Treemap data corresponding to the VMs in the particular cluster or resource pool, you can click **VM (Compute)** in the Resources pane. Alternatively, you can also switch the views by selecting the required value from the drop-down list that appears at the top of the Treemap once you drill down.

From the Treemap view for a data store, if you click **Drill Down**, the Treemap refreshes to display the resource utilization of the VMs corresponding to the selected data store.

Click  (Drill Up) to go back to the cluster, resource pool, or data store view. Alternatively, you can also right-click the Treemap, and select **Drill Up**.

Note: Double-clicking a resource shows you the corresponding drilled-down data. If there are further levels to be drilled-down, double-clicking again shows that data. When you reach the last level of the drill-down and again double-click a resource, it drills up.

Nested Resource Pools

If you double-click a resource pool having a nested resource pool in it, the Treemap refreshes to display the nested resource pool. Double-clicking the nested resource pool, further displays the corresponding VMs. To view the VMs corresponding to the first level of drill-down, select **VMs** from the drop-down list that appears at the top of the Treemap once you drill down.

Searching Resources

You can search for a resource available in the Treemap, using the **Search** box in the **Options** pane. Type the name of the resource or a regular search expression in the text box. The resources matching the search criteria are highlighted in the Treemap.

Note: The search feature does not highlight resources in the Treemap if you have already selected the highlight option to view the top or bottom resources in the Treemap.

You can search for a resource by typing the first alphabet of the resource name or any of the characters of the node name. The text you type in the text box is not case sensitive.

Example: Following are a few examples:

- To search for the resources having *Virtual* in the resource name, type `virtual` in the text box.
- To search for all resources having the resource name starting with *Virtual*, type `^virtual` in the text box.
- To search for all resources having the words *Virtual* and *app* in the resource name, type `virtual.*app` in the text box.

You can use the regular search expressions to search for resources in the Treemap.

The Treemap appears grayed out, if the resource you are searching for is not available in the Treemap.

The Search state remains saved when you click other resources in the Resources pane. For example, if you use a search criteria while clusters is selected, and then click datastores, the resources corresponding to the search appear highlighted in the Treemap view for datastores.

To clear the search criteria typed in the text box, click  (**Remove Highlights**). The highlighting resulting from the previous search is removed from the Treemap.

Filtering Data

Filtering enables you to filter the already shown data in the Treemap. You can set a range, between which you want to display the data in the Treemap.

To filter data in the Treemap, follow these steps:

1. Select the required resource from the Resources pane.
2. Select the value based on which the data must be grouped in the tree map in the **Group By** field.
3. Select the value based on which the data must be displayed in the **Color By** field.
4. Click and drag the end points of the Filter slider and set it to a required range.

The Treemap refreshes to display the data based on the set filter.

Micro Charts

The micro charts in HP vPV help the user to quickly view trends of the resources being monitored. These micro charts are graphs and correspond to selected resources and set attributes. Using these micro charts you can quickly analyze and compare the performance or utilization of your monitored resources. To view the detailed graphs for different attributes, you can use the Workbench page.

Viewing Micro Charts

The micro charts always appear in accordance with the top or bottom resources, based on your selections in the **Options** pane. For every Treemap view, the HP vPV interface lists the top or bottom resources. When you select **Top** or **Bottom**, HP vPV lists the corresponding resources from the Treemap view and the associated graph.

The value selected for the **Color by** field in the Options pane is the attribute based on which the graph is drawn. For more information on the values in the **Color by** field, see ["Group by and Color by" on page 48](#)

Use Case: Viewing Data in the Treemap

This section shows you how you can use the features provided by the Treemap to view the required data.

Scenario

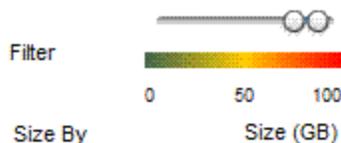
John is a VMware Administrator in an organization. He wants to view the top three datastores that are utilizing 80% to 90% of their storage space and view the storage virtual machines associated with these three datastores.

The tasks that John must perform as an Administrator to accomplish his objectives are as follows:

1. Log on to the HP Virtualization Performance Viewer home page.
2. In the Resources Pane, click **Data Stores**. The Treemap refreshes to show all the datastores corresponding to the added VMware vCenter servers.

The **Usage** attribute decides the coloring in the Treemap.

3. Move the end point values on the filter slider to 80 and 90.



The Treemap refreshes to display the datastores that have the storage usage between 80% and 90%.

4. Select the **Top** option. The names and graphs corresponding to the top five datastores that have storage usage in 80% to 90% range are listed.
5. Select **Highlight**. The Treemap highlights the top five utilized datastores in the selected range.
6. Move the pointer over the highlighted datastores to view the exact percentage utilization of the top three datastores.

7. To view the storage VM corresponding to each data store, right-click the data store and select **Drill Down**. The Treemap refreshes to display the storage VMs associated with the selected data store.
8. To go back to the data store view, click  (Drill Up) icon.

Chapter 7: Real Time Guest OS Drilldown for Advance Troubleshooting

You can drill down in a Virtual Machine (VM) to troubleshoot the factors affecting the performance and health of the VM. This is the advance troubleshooting available with HP vPV.

Real Time Guest OS drill down tool (HP ComputeSensor) is a light-weight performance viewer tool that provides a quick overview of the workloads and applications that are available and running on the VM.

The tool provides you the following:

- Overview about the system resource utilization such as CPU, file systems, disks, and network utilization
- Overview about the general health of the system and reasons for any available bottlenecks
- List of processes and the resources that are being used
- System events generated in last 24 hours

You can determine if the system utilization is optimal or the health of the system by checking the graphs available. You can further drill down to detect the processes where the memory or CPU utilization is exceeding the limit by checking the processes that are consuming more CPU or memory.

To check the real time example, see [Using Guest OS Drill Down to Troubleshoot the Resource Utilization in your Environment](#).

Navigation

From the Treemap view, click **VM (Compute)** from the top pane. Select the VM and click **Guest OS Drill Down**, the Treemap refreshes to open the view to display resource utilization of the VMs.

Note: When you select a VM and navigate for advance troubleshooting and Real Time Guest OS Drilldown is not available, you can download the tool from the message available on the screen. Follow the instructions available. For more information, see HP Compute Sensor user guide.

Guest OS DrillDown User Interface

The following table lists the features on the Guest OS Drilldown page and the corresponding functions.

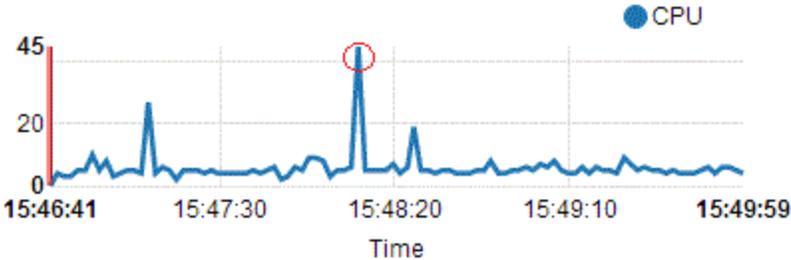
User Interface Details	Description
Graphs	Displays the graphs to check the resource utilization.
Tabs	Displays the details about the processes that are running, CPU usage, free disk space, swap memory, Filesystem, and Network usage running on VM.
Options	Contains the settings available on the Guest OS Drilldown page.

Graphs

The Real Time Guest OS drill down provides you the graphical overview of the health of the VM. The real time value is defined as the data collected in the interval of 1 -10 seconds. The default value is 2 seconds. The graphs get updated every 2 seconds as the collection interval is real time. You can change the interval from the available settings. For more information, see Options.

You can use the graphs to check the utilization and analyze if the resources are adequately being used. You can derive the %utilization in the x interval. Here, x is the time in seconds.

The following graphs are available:

Graph Name	Description
CPU Utilization	<p>Shows the real time CPU utilization.</p>  <p>Here, the utilization reached around 45% at 15.48.20.</p> <p>You can derive the following:</p> <p>CPU usage is high at the given point so you would want to check the details from the processes tab and gather the reason for the spike in CPU utilization.</p>
Memory Utilization	Shows the real time Memory utilization.
File system	Shows the real time File system utilization.

Graph Name	Description
Process	Shows all the processes running on the VM in the specific time period. The report shows the comparative analysis of the live processes that are running and the processes that are in queue when the CPU is busy.
Disk	Shows the real time disk utilization.
Network	Shows the real time Network utilization of the specific VM. You can get the incoming and outgoing bytes or packets for the selected interface.

Tabs

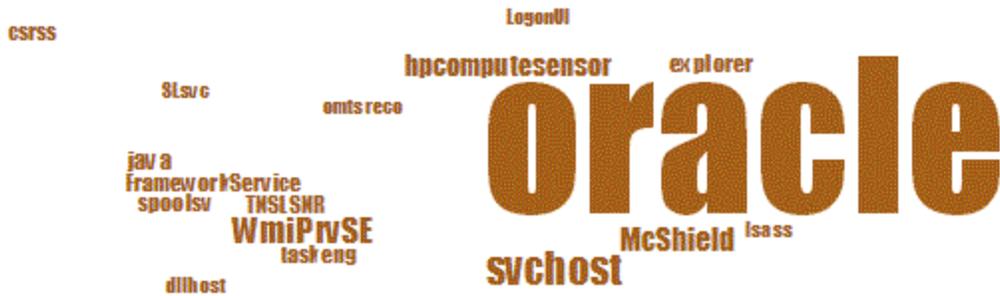
The tabs are as follows:

Process Cloud - Shows the significant processes running on the VM based on the workload the VM. The process that are using more resources are depicted in the larger fonts. You can troubleshoot and check the reason of high utilization. As an administrator or capacity planner, you can find out the most significant processes running on the system.

You can click the **Options**  to enable the process cloud settings.

The settings available are:

Field	Description
Process Cloud Settings	<p>Contains the option to enable the settings in the process cloud tab.</p> <ul style="list-style-type: none"> • Size By Resource - Select the checkbox (CPU, memory or both) to view the processes where CPU, Memory or both utilization are high. • Visible Processes - Set the option to view the n processes. Example, if you want to view only 10 processes, then move the bar from left to right. • Auto Refresh - By default, the checkbox is selected. The process cloud automatically gets refreshed. You can stop the refresh by de- selecting the checkbox. The process cloud will not change. You can get the updated



Here, the resource utilization is more for the process Oracle. You can also view the other processes that are using the resources but the significant usage is by Oracle. You can further drill down to check the processes usage and the process tab opens.

You can also view only n number of processes by using Process Cloud Settings option available.

Processes - Shows the parameters that are available with the processes running on the selected VM. Each process is provided with unique ID and name. You can view the CPU utilization and memory used in all the available processes. This helps in finding the processes where the resource utilization is high.

Parameters of the processes tab

Name of the	Description
Process ID	Unique identifier for the process.
Process Name	Name of the process.
Process Arguments	The full command line with which the process was initiated.
%Total CPU Utilization	The total CPU utilized.
Memory Used (MB)	The total memory utilized.
User	On Linux, the user is the name of a process or the login account (from /etc/passwd) of a process.

CPU - Shows the details of all the available CPU for the selected VM. The parameters provide additional information of the usage of real time CPU utilization of the specific VM. You can view the total CPU utilization, user CPU utilization and system utilization. Each CPU is provided with unique ID.

Parameters of the CPU tab.

Name of the	Description
CPU ID	Unique identifier of the CPU.
CPU Utilization	The CPU usage of the selected VM.
Total Time (seconds)	The total time in user and system mode.
User Time (seconds)	The time that this CPU (or logical processor) was in user mode.
System Time (seconds)	The time that this CPU (or logical processor) was in system mode.
Interrupts	The number of device interrupts for this CPU during the interval.
CPU Clock (MHz)	The clock speed of the CPU in the current slot.

Disk - Shows the details of all the disks available on the specific VM. You can view the disk utilization such as disk physical read or write. Each disk is provided with unique ID and disk name.

Parameters of the Disk tab.

Name	Description
Disk ID	Unique identifier of the disk.
Disk Name	Name of the process.
Physical Reads	The number of disk read is disk device during the interval.
Physical Writes	The number of disk writes per second during the interval.
Physical I/Os	The number of operations for this disk device during the interval.
Physical Read	The data transferred from this disk device during the interval.
Physical Write (KBs)	The data transferred to this disk device during the interval
Physical (KBs) Usage	The number of bytes transferred to or from this disk device during the interval.
Disk Time (Seconds)	The time, in seconds, that this disk device was busy transferring data during the interval.

File System - Shows all the File System available on the system. The parameters available will provide additional information of the usage of real time file system utilization of the specific VM. You can view the File System utilization such as space utilization, space reserved.

Parameters of the File System tab

Name of the	Description
Device Number	Unique identifier of the device.
Device Name	Name of the process.
File System Directory	The directory defined for the file system.
%Space Utilization	The space utilized in percentage by the file system.
Space Used (GBs)	The space utilized by the file system.
Space Reserved (KBs)	The space reserved by the file system.

Network - Shows all the available network interfaces (physical or virtual) on the system. You can get the incoming and outgoing bytes or packets for the selected interface.

Parameters of the Network view.

Name of the	Description
Network ID	Unique identifier for the network.
Network Interface Name	Name of the interface.
Network In	The total number of bytes received on the network interface.
Network Out	The total number of bytes transmitted on the network interface
Input Packets	The total number of packets received on the network interface.
Output Packets	The total number of packets transmitted on the network interface.
%Network Utilization	The throughput of the network, in %.
Errors	The total number errors during transmission or while receiving the bytes or packets.

Application - Shows all the processes running on the system that are grouped or aggregated into applications. The processes listed are active and alive processes. You can view the CPU and memory utilization of each application.

Parameters of the Application Tab.

Name of the	Description
Application ID	Unique identifier for the application.

Name of the	Description
Application Name	Name of the application.
Visible Processes	The number of processes that are available.
Alive Processes	The number of live processes that are in use.
% Memory Utilization	The percentage of memory utilization.
%CPU Utilization	The percentage of CPU utilization.
I/O Rate (KB per Second)	The number of characters (in KB) per second transferred for processes in this group to all devices during the interval. This includes IO to disk, terminal, tape and printers

System events- Shows all the processes running on the system that are grouped or aggregated into applications. The processes listed are active and alive processes. You can view the CPU and memory utilization of each application.

Parameters of the System Events

Name of the	Description
Event ID	Unique identifier for the event.
Severity	The list for UNIX is: Alert, Emergency, Error, Warning, Information, or Verbose
Time Stamp	The time when the event was generated
Description	Details of the event

The following options are available in the tabs:

Sorting

Shows the values in decreasing or increasing sequence. You can view the results as per the requirement. You can find out the process where the CPU utilization is highest. This option is available in all the tabs and in each column. Click  (Clear Sorting) to remove the sort.

Search 

The page contains a search box to filter data based on your requirement.

Options

The **Options**  icon provides you the way to enable settings in the page. You can change the settings available on the page.

Field	Description
Real Time Settings	Contains the option to control the rate at which the graphs will refresh on the page. You can select the rate from the interval 1-10 seconds.
Refresh 	Click  to restart the graphs. This clears the previous results and you can view the current graphs.
Play	Click  to start the real time graphs. By default, the real time graphs are available.
Pause	Click  to freeze the page for sometime. You must click play to restart the real time graphs.
Stop	Click  to halt the refresh of the real time graphs. You can analyze the reason of the utilization by using this icon as the graphs will not get refreshed.
Print	Click  to print the real time graphs.

You can drill down to check the details about the processes that are running, CPU usage, free disk space, swap memory, filesystem, Network usage, and Application running on VM. You can sort and view the results by each column in the available tabs. Additionally, you can search for the specific process ID or process name.

Use Case: Using Guest OS Drilldown to Troubleshoot the Resource Utilization in your Environment

The following section shows you a scenario where you can troubleshoot and find out the reason for the unexpected performance of the selected VM.

Scenario

Linda is a VMware Administrator and is monitoring the performance of all the Virtual Machines from the Treemap view. She observes that one of the VMs is red. To troubleshoot the reason of VM becoming red, she uses HP vPV Guest OS drill down tool to troubleshoot the reason for the same.

The steps include the following:

1. Log on to HP Virtualization Performance Viewer user interface.
2. Go to the **Treemap view >VM Compute** to view the performance of all the Virtual Machines from the Treemap view.
3. Select the VM that is showing red or yellow color. Right-click on the selected VM and select Guest OS Drilldown option. The Guest OS page opens. You can view the resource utilization

graphs. From the graphs, you can derive if the system is significantly using the memory or CPU.

You can additionally troubleshoot the cause of the performance by checking the following:

- View the **Processcloud** tab to check which processes are using high CPU or memory.
- Go to the **Processes** tab to derive the resource utilization by the processes that are significantly highlighted in the **Processcloud** tab.
- From the **CPU** tab, you can view the resource utilization for a particular CPU.
- Use the Disk, File System, Network, and Application tabs to view the utilization.

Chapter 8: Integrating HP vPV with Other HP Products

You can use the integration tab to integrate HP vPV and use it with products such as HP Performance Manager (PM), HP Business Service Management (BSM), HP Cloud Service Automation (CSA), HP Operations Manager (HPOM), and Real Time Guest OS Drill Down.

Note: If you are not able to view all elements on the Integrations tab, maximize the tab.

The Integrations feature is available only with the Evaluation and Permanent licensed versions of HP vPV.

Navigation

To access the feature, select **Admin** and click the **Integrations** tab.

The following section provides information about HP vPV with other HP Software Products.

Use	Integration
Consolidates the events using HP Operations Bridge (HP OpsBridge) and displays it on the vPV interface.	Integrating HP vPV with BSM
Check the graphs and reports from Performance Manager to detect and drill down to the performance issues.	Integrating HP vPV with PM
Monitor the performance and analyze the capacity, usage, and forecast trends of the virtualized infrastructure that are custom views for the CSA user.	Integrating HP vPV with CSA
View the Alert messages on HPOM console to take quick actions.	Integrating HP vPV with HPOM
Drill down to check the health of the VMs. Get the process details which are consuming more resources (CPU or memory)	Integrating HP vPV with Real Time OS Drill Down

Integrating HP vPV with HP Cloud Service Automation (HP CSA)

Integrating HP vPV with HP CSA enables the CSA user to monitor the performance and analyze the capacity, usage, and forecast trends of the virtualized infrastructure that are custom views for the CSA user. As an administrator, you must add the credentials of the CSA user from HP vPV administrator tab. The CSA user (operator) can launch the custom views after logging into the system.

As a CSA user, you can perform the following tasks on the available custom views:

- Monitor the aggregated resource utilization of the available VMs
- Overview about resource utilization of all the VMs.
- Evaluate the capacity utilization based on the current trends
- Get recommendations to fine tune resource allocation (CPU, memory) for optimal virtual machine performance
- Drill down to see forecast for each virtual machine for CPU, memory and storage utilization for 30, 60 and 90 days

As an administrator, complete the following tasks in order:

Tasks	Description
Add CSA user	Adding the CSA user from vPV administrator tab
Access to CSA user to avoid multiple log on	Configuring CSA for HP vPV Single Sign-On Utility

After completing these tasks, you can log on as a CSA user. For more information, see "[Monitoring the Infrastructure as a Cloud Service Automation \(CSA\) user](#)".

Adding new CSA user from HP vPV Console

Follow the steps:

1. Log on as an administrator.
2. Add the vCenters to HP vPV which is used as a provider by CSA to deploy the virtual machines.
3. Enable LDAP. For more information, see "[Integrating with Microsoft Active Directory and OpenLDAP](#)" on page 35
4. Type the URL for the integration in the **CSA URL** field.

For example: `https://<CSA Hostname or IP address>:8444`

5. Type the user name in the **User Name** field.
6. Type the password in the **Password** field.
7. Click **Save** and log out from HP vPV. You will get a message stating CSA information saved successfully.

Note: After the configuration, a new CSA user is created. The CSA user can check the performance of the VMs by logging on as CSA user.

Monitoring the Infrastructure as a Cloud Service Automation (CSA) user

As an administrator, you can complete the configuration steps to create a CSA user. For more information, see the steps in ["Integrating HP vPV with Other HP Products" on page 67](#).

Follow the steps to log on as CSA user:

1. Browse to the CSA login page.
2. Type the CSA user name in the **Username** field.
3. Type the password in the **Password** field.
4. Select **CSA** from the Context field.
5. Select the required organization from the **Organization** field.
6. Click **Login**.

When a CSA user log on to HP vPV, the user needs to select the context as CSA and also the corresponding organization. HP vPV would then launch a context-sensitive view of capacity usage and forecast trend details for infrastructure owned by the CSA consumer.

Configuring CSA for HP vPV Single Sign-On Utility

As a CSA user you can configure HP vPV for Single Sign-On (SSO) thereby eliminating the process of multiple sign-in.

Follow these steps:

1. Log on as a root user.
2. Go to `lwssofmconf.xml` file at the following location:

```
/opt/OV/www/webapps/PV/WEB-INF/classes/
```

3. Edit the values of `<domain>` and `<initString>` in the `lwssofmconf.xml` file.

For Example:

```
<validation>
<in-ui-lwssso>
<lwssValidation id="ID000001">
<domain><hp.com></domain>
```

```

<crypto cipherType="symmetricBlockCipher"
engineName="AES" paddingModeName="CBC" keySize="256"
encodingMode="Base64Url"
initString=<mention the init string here></crypto>
</lwsssoValidation>
</in-ui-lwssso>
</validation>

```

Make sure the <domain> and <initString> is the same as mentioned in the HP SSO configuration.

4. Run the following command to restart tomcat:

```
/opt/OV/bin/ovc -retstart ovtomcatB
```

5. **Optional:** Login to CSA user page and give the following path in a new tab:

```
http://<FQDN>:8081/PV/?CTX=CSA&CSA_ORG=<ID_Of_The_Organisation>
```

Here, <FQDN> is the domain mentioned in /opt/OV/www/webapps/PV/WEB-INF/classes/lwssofmconf.xml file and <ID of the organization> is the ID of the organization and not the name of the organization.

Integrating HP vPV with Performance Manager

When you integrate HP vPV with PM, you can launch the PM graphs against VMs from the Treemap

You can draw URL based graphs for VMs with HP Operations agent installed on them for the vCenter data sources.

For the vCenter data sources, the VMware tools must be installed and running on the VMs and the IP of the VM must be pingable from the PM server. The integration does not work properly if authentication is enabled on PM. If authentication is enabled, you must pass the username and password in the URL during the integration. You can launch only one graph at a time using the PM integration.

To integrate a PM system and draw graphs against VMs, follow these steps:

1. Type a name for the integration in the **Name** field.
2. Type the URL for the PM integration in the **URL** field.
3. Click **Add/Update**. The integration is added to the Integrations list.

Note: To remove an added PM integration URL, select the URL and click **Remove**. The system displays a confirmation message, click **Yes**. To remove multiple URLs, press the CTRL key and select the URLs.

Integrating BSM with HP vPV

To integrate BSM with HP vPV, follow these steps:

1. Obtain the **BSM Token Creation Key** from the BSM user interface. The key can be accessed from **Admin > Platform > Users and Permissions > Authentication Management** from the BSM user interface.
2. Type the key in the BSM Token Creation Key field.

Note: Use the token only if authentication is enabled in HP vPV

3. Click **Save**.
4. Follow the instructions that appear in the dialog box.

Integrating HP vPV with HP Operations Manager

You can integrate HP vPV with HPOM to view the alerts on HPOM console.

Follow the steps for integration:

Note: You can start the integration of HP vPV and HPOM only after you have completed the installation of HP vPV on a node.

On vPV machine:

1. Log on as an administrator.
2. From the HP vPV home page, select **Admin > Integrations**.
3. Download the following packages are available on the location:
 - Windows - **VPV-OMW-Integration.zip**
 - UNIX - **VPV-OMx-Integration.tar**

Note: Make sure to transfer the integration packages to HPOM management server.

4. Go to ["On HPOM Management Server" on the next page](#) and follow the instructions.

5. Install HP Operations agent 11.13 or above on HP vPV machine. You can install HP Operations agent manually on the node or remotely from HPOM management server. For more information, see *HP Operations agent Installation guide*.
6. Run the command to ensure the certificate is set between the management server and vPV machine.
 - a. Run the command: `/opt/OV/bin/OpC/install/opcactivate -srv <hostname> -cert_srv <hostname>`

In this instance, <hostname> is the hostname of the management server.
 - b. Go to HPOM management server and grant the certificate.
7. Deploy the following policies from HPOM server:

Policy	Description
vPV-DiscoverNodes	Discovers the available nodes.
vPV-TopologyDiscovery	Discovers the available infrastructure.
vPV-EventMonitor	Monitors events or alarms from vCenter server.

8. After all the nodes are discovered, then only deploy the following policies:

vPV-OMIntegration	Forwards alerts to HPOM server
vPVAlertThreshold-MediumSensitive	Alert forwarding sensitivity. By default, the medium sensitivity is deployed. Note: You can configure disable sensitivity only from vPV machine. For more information, see Sensitivity .

On HPOM Management Server

Follow the steps:

Note: Make sure that you have installed all the available patches and hotfixes for HPOM:

- HP Operations Manager for UNIX - 09.10; Patch IDs - OML_00071 + OML_00072 + OML_00073
- HP Operations Manager for Windows - 9.10; Patch IDs - OMW_00178

1. Extract the contents of **VPVIntegration.zip** or **VPV-OMX-Integration.tar** folder. Copy the Integration package to the respective folder:

On Windows: c:\temp

On Unix: /tmp

Note: No special settings are required for HPOM for UNIX.

Make sure that you check the following settings for HPOM for Windows:

- RAM - 16 GB
- Java Heap - (Go to the location:
HKLM\SYSTEM\CurrentControlSet\services\OvAutoDiscovery
Server\JavaOptions and set the Xmx value to 8192)

2. Run the following commands to install or remove the vPV integration packages:
 - a. Installing the packages:
 - On Windows: `cscript install-integration-pack.vbs -install`
 - On Unix: `./install-integration-pack.sh -install`
 - b. Removing the packages:
 - On Windows: `cscript install-integration-pack.vbs -remove`
 - On Unix: `./install-integration-pack.sh -remove`

Note: Before you remove the packages from the management server, make sure you remove the HP vPV policies deployed on the HP vPV nodes.

3. After the installation is complete, you can check the log file (install.log). This is available in the same location where the integration installation packages are available.

During the installation of the integration package on **HPOM for Solaris**, the following error appears:

```
"/etc/opt/OV/share/conf/OpC/mgmt_sv/integration/cfgupld/post/cvp_upload.sh:
[: not found"
```

You can ignore the error. The installation on HPOM for Solaris is successfully completed.

4. Add the vPV machine to the **Nodes** folder on HPOM management server. For more details, see HPOM for Windows and UNIX online help.
5. Go to vPV machine and perform [Step 5](#) to complete the steps.

Chapter 9: Performance

HP vPV collects data from the added data sources and provides the performance-related information of the resources. You can use this performance data to perform the following actions:

- To identify and troubleshoot problems in your environment
- Plan and allocate your resources better
- Get an overview of resource utilization
- Compare performance of resources across domains and time periods

The HP vPV features using which you can view the performance data are as follows:

- **Treemap** - Provides you a visual representation on the performance of the resources.
- **Performance Graphs** - Provides graphs drawn based on the data collected from the data sources.
- **Reports** - Provides data in the form of reports.
- **Alerts** - View the alert messages in the environment.

Accessing

To access the feature, from the HP vPV home page, select **Performance**. From the drop-down, select **Overview** or **Workbench**.

Performance Graphs

Navigation

To access the feature, from the HP vPV home page, select **Performance > Workbench**.

The Workbench page helps you to draw graphs for resources you are monitoring.

The preformatted and custom graphs help you perform the following:

- Evaluate the performance of monitored entities (such as applications, system, and network)
- Analyze usage trends
- Correlate usage
- Compare performance of different resources

You can also compare multiple instances of a resource on one or more Configuration Items (CIs). CIs are the objects that you are monitoring in your virtualized environment.

Graphs Overview

A graph family tree organizes the Performance Graphing and consists of the following:

- **Family**

Refers to the group that organizes the graphs.

- **Category**

Refers to the sub-groups of graphs that are logically grouped within the family.

- **Name**

Uniquely identifies a graph definition.

Default Graphs

A default graph in a graph family contains metrics to measure the performance of any resource or application. You can map graph families or categories to a CI. When you launch a graph for a CI that has a graph family or category associated, the system draws the default graph from the graph family or category. A graph family can have one or more default graphs. If a graph family does not have a default graph, the system selects the first graph in the family or category.

Icon Glossary

The following table lists the icons used to represent resources in the **Configuration Items** tree in the Workbench page.

Icon	Name of Resource
	Datacenter
	Cluster
	Guest and BYVM_Storage
	Resource Pool
	<ul style="list-style-type: none"> • Host (VMware vCenter, HyperV, KVM, Xen, and OpenStack) • Node (HP aPaaS)
	Host in maintenance mode
	Storage

Icon	Name of Resource
	Host Group
	<ul style="list-style-type: none"> • Cloud (OpenStack) • Target (HP aPaaS)
	<ul style="list-style-type: none"> • Tenants (OpenStack) • User Groups (HP aPaaS)
	User
	Application

Note: If an icon appears grayed-out, it indicates that the resource is in the Powered Off/Shutdown/Shutoff/Stopped state.

Workbench Page

The Workbench page provides the Performance Graphing functionality for HP vPV.

Configuration Items

The Configuration Items tree displays the available list of CIs. You can select the required CI for which you want to draw the graph. The following table lists the functions available from the Configuration Items tree.

Icon/Field	Description
	Click to collapse the Configuration Items pane.
	Click to expand the Configuration Items pane. This button is available only when you collapse the pane.
Refresh 	Click to refresh the CIs available in the Configurations Items tree.
Filter By 	<p>Click to filter the CIs in the Configuration Items tree. The drop-down list contains values that are based on the type of CIs monitored.</p> <p>Click  (Remove Filter) to remove a set filter.</p>
Search	Type a value in this field to search for resources available in the Configuration Items tree. The Search field only appears if you have filtered the CIs.

Icon/Field	Description
Clear ()	Clears the text box corresponding to the Search feature and also clears the Configuration Items tree highlighting resulting from the previous search.

Favorites

The Favorites pane lists the graphs you have saved as a favorite to be accessed later. The following table lists the functions available in the Favorites pane.

Icon	Description
Refresh 	Click to refresh the list of favorites in the pane.
Delete Favorites ()	Click to delete the saved favorite graphs. This option appears only when there are saved favorites in the pane.

For more information on adding favorites, see ["Saving as Favorite" on page 87](#).

Performance Pane

The Performance pane enables you to draw and view performance graphs for a selected CI. You can draw a pre-defined graph for a CI or draw a graph from the list of available metrics.

The following tables lists the tabs available in the Performance pane.

Tab	Description
Metrics	<p>Displays the following information:</p> <ul style="list-style-type: none"> • Metric Classes - lists the metric classes available. This data is not displayed, if there is only one metric class. • Instances - lists the instances available for the selected multi-instance metric class. • Metrics - lists the metrics available for the selected metric class <p>You can use the Refresh () icon available in the Metrics tab to refresh the available metric classes, instances (if any), and metrics.</p>
Graphs	Displays a list of graph templates based on the CI selected from the Configuration Items pane.

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Tab	Description
Reports	Displays the list of reports for the selected CI. For more information, see "Reports Overview" on page 89

Options for Drawn Graphs

This section provides information to interpret the contents of graphs and use the available features and functionality to change the content.

Graph Selection Icons

The **Graphs** tab displays a list of graphs, graph families, and categories associated with the selected CI. By default, the tab selects default graphs in the graph families or categories and the CIs used.

The following table lists the functions available in the Graphs tab.

Icon	Description
 (Draw Graphs)	Draws graphs for the selected CI.
 (Clear Selections)	Clears the selections in the tab.
 (Refresh)	Refreshes the Graphs list.

Drawn Graphs Window

The following table lists the elements available in the title bar of the Performance Pane.

Icon	Description
Collapse (<<)	Click to collapse the Graphs and Metrics tabs.
Expand (>>)	Click to show the Graphs and Metrics tabs. This icon appears after you collapse the tabs.
Options ()	Displays the menu options for the drawn graphs. For more information, see the "Options Menu" on the next page table below.
Export as PDF ()	Click to export all the drawn graphs into a PDF document. This icon appears after you draws graphs on the Performance pane.
Save as Favorite ()	Click to save drawn graphs as a Favorite and access later. This icon appears after you draws graphs on the Performance pane.

Options Menu

The following table lists the options available in the **Options** menu on the title bar of the Performance Pane.

Option	Description
Tooltips	Select this option if you want to enable tooltips for the drawn graphs. When selected, moving the pointer on the graph area of a drawn graph opens a text box displaying the actual value of the data point and the time interval of the selected data. No pop-up window is displayed when this option is disabled.
Date Range Panel	Select this option to open the Date Range Panel. Using the Date Range Panel, you can quickly change the duration for which the graph is drawn. Use this option to drag a metric and draw a reference graph. The reference graph helps you understand the correlation between different metrics. You can also customize the graph to view granular data for a selected unit of time.
Navigation Panel	Select this option to display the navigation panel in the graph window. This option is available only for graphs that display near-real time data.
Close All Graphs	Select this option to close all open graph windows simultaneously.

Graph Window Options

The following table lists the options available in the Graph window.

Option/Icon	Description
Metric Legend	Click the Metric Legend icons to show or hide the corresponding graphs of the metric. To remove a metric from a graph, right-click the Metric Legend icon and select Remove . HP vPV removes the corresponding graph and the legend from the graph window.
(Auto Refresh On/Off) 	If you enable the Auto Refresh option, the data in graphs are refreshed at a specific interval.
(Prev/Next)	Performance Graphing provides the Prev and Next buttons to navigate to adjacent time intervals.
<< >> (Prepend/Append)	Performance Graphing provides the Append and Prepend buttons to append or prepend data for adjoining time intervals.
Options > View as Table	Select this option to view data in a tabular format.
Options > Export	Select this option to export graphs to formats such as .tsv, .csv, .xls, and .xml. For more information, see " Graph Export Dialog Box " on page 83.

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Option/Icon	Description
Options > Navigate	Select this option to select the start and end date from the Time Settings dialog box. The graph data refreshes to display the data for the selected period. If you select the Apply to all graphs check box, data in all the graphs refresh.

Zoom-In Data in Drawn Graph

After you draw a graph, you can zoom-in to view data points for a smaller time period and zoom-out to reset and view the original graph. Zooming-in or zooming-out enables you to adjust the summarization levels.

- To zoom-in, click and drag the pointer on the graph from left to right.
- To zoom-out, click and drag the pointer on the graph from right to left. When you zoom-out a graph, the graph resets to the previous state.

You can zoom-in to multiple levels. Every zoom-out reverts the graph to the state before the zoom-in operation.

Table Graph Window

A table graph helps you to view granular data in numeric format. This section describes in detail the information displayed in the Table Graph window. To view the graph as a table, draw a graph and select **Options > View as Table** from the graph window.

The Table Graph window displays the following elements.

Icon/Option	Description
Lock Column	<p>Select this option to lock one or more columns in the table graph. This option helps you to view the locked columns as you navigate across columns using the horizontal scroll bar.</p> <p>When you select the Lock Column check box, by default, the system locks the first column for viewing. To add another column, drag an unlocked column before the thick column border that separates locked and unlocked columns. The thick column border indicates the range of columns that are locked.</p>
 (Table Highlights)	Click this icon to open the Table Highlights dialog box. You can set the attributes based on which rows in the table must be highlighted. For more information, see "Using Table Highlights" on the next page .
 (Table Filters)	Click this icon to open the Table Filters dialog box. You can set the attributes based on which rows in the table must appear. For more information, see "Using Table Filters" on page 82

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Icon/Option	Description
 (Export)	Use this option to export the data from tabular format to .csv, .tsv, Excel, or .xml formats.
 (Auto Refresh On/Off)	If you enable the Auto Refresh option, the data is refreshes at a specific interval.
< > (Prev/Next)	Virtualization Performance Viewer provides the Prev and Next buttons to navigate within the table.
  (Sort Metric Columns)	Use this option to sort the data in the metric columns in the ascending or descending order. For more information, see Specifying the Order of Metric Columns below.

Specifying the Order of Metric Columns

You can specify the order of the metric columns, based on which data in the columns must be sorted. To specify the order, perform the following steps:

1. Select the metric based on which the data must be sorted, in the Table graph window.

The value **1** appears corresponding to the metric specifying the order.

2. Move the cursor to the next metric that must be considered while sorting data and click on the  or  (Sort Metric Columns) icon to set the order.

Note: This option appears only when there are two or more metrics.

3. Repeat step 2 till you sort all the required metrics in order.

The number corresponding to each metric represents the order specified.

Note: To reset the order to **1**, click any metric name. You can specify the order again.

4. Click  or  (Sort Metric Columns) icon corresponding to the metric that is assigned the order **1** to view the data in the ascending or descending order.

Using Table Highlights

You can highlight cells in the table by specifying conditions based on the metric value. To highlight cells, perform the following steps:

1. Click () **Table Highlights** icon. The Table Highlights dialog box opens.
2. Select the required value based on which the cells must be highlighted, from the drop down list.
3. Select the required comparison symbol from the list of symbols available. For more information on the comparison symbols, see "[Comparison Symbols](#)" below
4. Type the value to be compared in the text box.
5. Select a color from the color palette to highlight the cells.
6. Click **Add**. The highlight condition is added to the Conditions table.

To remove any added condition, select the condition and click **Remove**.

To remove all the added conditions, click **Remove All**.

7. Click **OK**. The Table Highlights dialog box closes.

The values matching the condition set is highlighted in the table.

Comparison Symbols

The following table lists the comparison symbols available in the Table Highlights dialog box.

Comparison Symbol	Description
<=	Less or Equal
>=	Greater or Equal
!=	Not Equal
!~	Not Like (text with leading or trailing ".*" expressions)
=	Equal
~	Like (text with leading or trailing ".*" expressions)
<	Less
>	Greater

Using Table Filters

You can use the Table Filters in the table to filter and view data in the table. To filter rows, perform the following steps:

1. Click () **Table Filters** icon. The Table Filters dialog box opens.
2. Select the required value based on which the cells must be filtered, from the drop down list.
3. Select the required comparison symbol from the list of symbols available. For more information on the comparison symbols, see "[Comparison Symbols](#)" on the previous page
4. Type the value to be compared in the text box.
5. Select either **AND** or **OR** to apply multiple conditions.
 - **AND** - filters the rows that satisfy the first condition you set and the row that satisfies the following conditions as well.
 - **OR** - filters the rows that satisfy either the preceding or the following conditions.
6. Click **Add**. The filter condition is added to the Conditions table.
7. Click **OK**. The Table Filters dialog box closes.

The table displays only the rows matching the set filter conditions.

Updating Filter Conditions

To update a filter condition in the Table Filters dialog box, perform the following steps:

1. Click () **Table Filters** icon. The Table Filters dialog box opens.
2. Select the filter condition to update from the list of conditions in the table. The filter values are updated in the preceding fields.
3. Update the values as required.
4. Click **Update**. The filter condition is updated in the table.

To remove any added condition, select the condition and click **Remove**.

To remove all the added conditions, click **Remove All**.

Graph Export Dialog Box

You can export drawn graphs to one of the following formats: .tsv, .csv, .xls, and .xml. To export graphs, draw a graph and select **Options > Export** from the graph window. The Export from a Graph window opens.

The Graph Export dialog box includes the following elements:

UI Elements	Description
Cancel	Click Cancel to close the dialog box and return to the drawn graph page.
OK	Click OK to export the data in the selected format.
Type	Select the format in which you want to export the graph.

Note:

The exported data has the same time as that of the HP vPV server.

Date Range Panel

The Date Range Panel option helps you to view data for specific periods of time.

To access the Date Range Panel:

- Select **Options > Date Range Panel** from the Performance Pane.
- You can also view the panel by clicking  (**Show Date Range Panel**) in the Performance pane.

The following table lists all the options available to customize a graph.

Note: When you access the Date Range Panel, the panel displays the Start Time and End Time. This denotes the start and end time on the date range slider and not the start and end time of the data in the graphs. As you move the slider, the values for the Start Time and End Time are updated

Icon/Option	Description
Show Date Range Panel ()	Click to view the Date Range Panel.

Icon/Option	Description
Last <Unit of time>	<p>Select a unit of time from the list to view granular data for that period of time. The options available are as follows:</p> <ul style="list-style-type: none"> • Hour • Day • Week • Month <p>For example, if you select the value Hour, Performance Graphing draws the graphs for the last one hour.</p>
Range	<p>Select the time range from the list. The options available are as follows:</p> <ul style="list-style-type: none"> • Months in Year • Weeks in Month • Days in Week • Hours in Day <p>By default, a Range value is based on the selected unit of time.</p> <p>For example, if you select last hour from the list, the Range list displays hours in a day.</p>
 (Choose a time frame)	<p>Select a start date and end date from the Time Settings dialog box to view data for that period. The start date and end date values range between the earliest and the latest time stamps available in the data source.</p>
 (Previous)	<p>Select Previous to view the data for the adjacent unit of time. For example, if you select last hour from the list, you can use the Previous Hour option to view data for that period.</p> <p>In the same way, you can view adjacent data for any unit of time.</p>
 (Next)	<p>Select Next to view the data for the adjacent unit of time. For example, if you select last hour from the list you can use the Next Hour option to view data for that period.</p> <p>In the same way, you can view adjacent data for any unit of time.</p>
 (Adjust to a unit of time)	<p>Use this option to move the slider to a unit of time you select from the Unit of time list. For example, if you select an hour from the list, you can use adjust to an hour and the slider moves to show data for an hour</p>

Icon/Option	Description
All	Select this option to apply the changes made within the date range panel to all the drawn graphs. If you do not select this option, the changes apply only to the selected graph and the selected graph appears highlighted.
Hide Date Range Panel ()	Click this icon to hide the Date Range Panel.

Drawing Graphs

You can launch graphs from predefined graph templates or create custom graphs by selecting the required metrics for a selected CI. You can draw a graph from the Workbench page in one of the following ways.

To draw graphs from Graph templates:

1. From the **Configuration Items** tree, select the CI for which you want to draw graphs.
2. From the Performance pane, select **Graphs** tab. This tab displays a list of predefined graphs based on the CI that you select.
3. Select a graph or graphs from the list of Graphs. You can select more than one graph from the list by pressing the **CTRL** key while selecting the graphs.
4. Click **Draw Graphs**  .

The Performance pane displays the graphs drawn.

To draw custom graphs:

1. From the **Configuration Items** tree, select the CI, for which you want to draw graphs. The **Metrics** tab on the Performance pane displays the following:
 - **Metric Classes** - Displays the list of available metric classes. This list is available only if there is more than one metric class.
 - **Instances** - Displays all the available instances for a metric class. This list is available only when you select a multi-instance metric class.
 - **Metrics** - Metrics pane displays the list of metrics corresponding to the selected or available metric class.

For more information regarding the vCenter metrics and different logging levels, see the *VMware documentation*.

2. Select the required metric class. The Metrics box displays the list of numeric metrics belonging to that class.
3. Drag one or more metrics from the metric list onto the Performance pane. The graph is drawn for the selected metrics.

You can drag any number of metrics and draw graphs.

To modify your selection of graph for a selected CI:

1. Select a graph type from the list of Graphs.
2. Click **Draw Graphs** . HP vPV draws the selected graph.
3. Click **Clear Selections** , to cancel all the previous selections.

Saving as Favorite

To save drawn graphs as a favorite, follow these steps:

1. Draw the required graphs. For more information, see ["Drawing Graphs" on the previous page](#).
2. Click  (**Save as Favorite**) in the Performance pane. The Save as Favorite dialog box opens.
3. Type the name of the group in the **Enter Favorite Name** field.

Note: If you are adding new graphs to an existing favorite list, select the required Favorite from the drop-down list.

4. Click **Save** to save the favorite list.

Click **Cancel** if you do not want to save the graphs to any lists.

Deleting a Favorite

To delete a saved favorite, follow these steps:

1. Click  (**Delete Favorites**) from the Favorites pane. The Delete Favorites dialog box opens.
2. Select the favorite to be deleted from the list of favorites available in the **Select Favorites Name(s)** box.

To select multiple favorites, press the **CTRL** key and select the required favorites.

3. Click **Delete**. The system displays a confirmation message asking to delete the selected favorites.
4. Click **Yes** to confirm.

The Favorites pane does not show the removed favorites.

Drawn Graphs Functions

Performance Pane shows the drawn graphs. Following are the functions you can perform in the graph windows:

Compare Metrics from Different CIs

1. Select a CI. The available metrics and predefined graphs for the chosen CI appears. Drag a metric from the Metrics pane. Performance Pane shows the drawn graph.
2. Select the second CI with which you want to compare the data for the first CI. Select the same metric from the metrics pane. Drag the metric to the previously drawn graph to compare the data across CIs.

Remove metric

Right-click the metric name from the legend and select **Remove**. The line representing the removed metric does not appear in the graph and the metric name does not appear in the legend.

Add metric

Drag a metric into a drawn graph window. The new metric appears in the graph and is listed in the legend.

Note: When you add or remove a metric for a default graph, the name of the graph changes as it is no longer a default graph and becomes a custom graph.

Hide metric

Click the metric name from the legend in the graph window. The metric legend is hidden and the graph of the metric does not appear in the graph window.

Show metric

Click the disabled metric from the legend. The window shows the metric legend and the graph of the metric appears on the window.

Copy metrics from one graph to another

You can drag a metric from one graph and add it to another graph. The target graph displays the newly added metric.

Pull out metric from a graph

You can drag a metric from one graph to the empty space in Performance pane. Workbench draws a new graph for the metric selected.

Move graphs

Click the top bar of the graph and drag to move or rearrange the order of the graphs drawn.

Resize graphs

Place the cursor at the bottom right corner of the drawn graph window and click and drag to resize the window.

Reports Overview

In the Reports tab, you can view the reports generated for the resources being monitored. The Reports pane displays the report for a selected CI and you can view the reports for a day, a week, or a month. For more information on viewing reports, see "[Viewing Reports](#)" below.

Note: Reports are available only when you install the Evaluation or Permanent License for HP vPV.

Click  to refresh the list of reports available for the selected CI.

The following table explains the functions available in the Reports tab.

Option	Description
Day	Shows the report for the last one day.
Week	Shows the consolidated report for the last one week.
Month	Shows the consolidated report for the last one month.
HTML	Shows the report in HTML format.
PDF	Shows the report in PDF format. You can save this report and use it later.
 (Open in a new window)	Opens the report, in the specified HTML or PDF format, in a new browser window. This option is useful when you need to compare multiple reports online.

Viewing Reports

You can view the reports corresponding to a resource in the Reports pane. To view a report, follow these steps:

1. Select the required CI from the Configuration Items tree.

If you want to filter based on the type of resource and then select, click  **(Filter)** and then select the required value from the list. The Configuration Items tree refreshes to display only the resources corresponding to the value set in the filter.

Note: The order of elements in the Filter By list, in the Configuration Items tree of Workbench page, is not consistent. The order changes when launching the filter list each time.

A search in the Configuration Items tree for elements starting with numbers may fail.

If a Configuration Item (CI) is renamed or a VM is moved to a different cluster, historical data for the CI is lost.

The Reports tab displays the list of available reports for the selected CI.

2. Select the required report type.

The Reports pane displays the report for the selected resource. By default, the pane displays the report generated for a day.

3. Select **Week** or **Month** to view the consolidated reports for a week or a month.
4. Select **HTML** or **PDF** to view the report in the required format. HTML is the default value.

Note: Some PDF reports in the Russian environment contain text with irregular spacing. This issue is only visible if you open the reports in Internet Explorer 8 in the Microsoft Windows Server 2008 R2 operating system.

5. Click the required type of report to view from the list of reports in the **Available Reports** pane.
6. Click  (**Open in a new window**) to open the report in a new window.

Note: Some localized reports contain texts that are not localized.

vApps and folders are not available in the Treemap and Configuration Items tree, but the corresponding VMs are added to the parent in the hierarchy.

Types of Reports

HP vPV provides different reports to help you analyze the performance of your virtualization environment elements. There are specific reports available for different CIs. The **Reports** tab lists the reports available for a selected CI in the element hierarchy. Some of the reports are as follows:

- **Performance Reports:** Shows the performance data.
- **Status Reports:** Shows the status summary.
- **Configuration Reports:** Shows the set up and configuration details.

- **Cross Tabulation Reports:** Shows two-dimensional data for two or more attributes and also provides a side-by-side comparison of data of your data centers.
- **Distribution Chart Reports:** Show the utilization of different resources.
- **Consolidated Reports:** Show the consolidated details for different resources.
- **Summary Table Reports:** Show a summary of the Operating Systems used in a data center.
- **Uptime Reports:** Show the uptime of the resources for the specified time period.
- **Top Instance Reports:** Show the top 10 resources in a CI.
- **Host Distribution Reports:** Show the host details for the hosts present in the cloud.
- **Usage Hours Report:** Show the usage hours for each CI.

Note: This report is available only for OpenStack.

Note: For some reports, notes are available at the end of the reports to help you interpret the reports easily.

For data to appear in the Guest Consolidated Reports, there must be data collected for at least two hours.

Chapter 10: Managing Alerts

In the Virtualization environment, as an administrator, you may observe the following conditions:

- Sudden capacity violations and performance problems
- Rapid growth or drop in trends of resource usage
- Reduction in capacity of your IT infrastructure in the perspective of business services, applications, and clusters

These situations can result into poor performance and must be avoided. Avoid this situation by receiving the smart detailed alerts much before the conditions occur in the virtualized environment.

Alerts¹ enable you to quickly identify and troubleshoot the problems in the virtualized environment.

Alerts allow you to perform the following tasks:

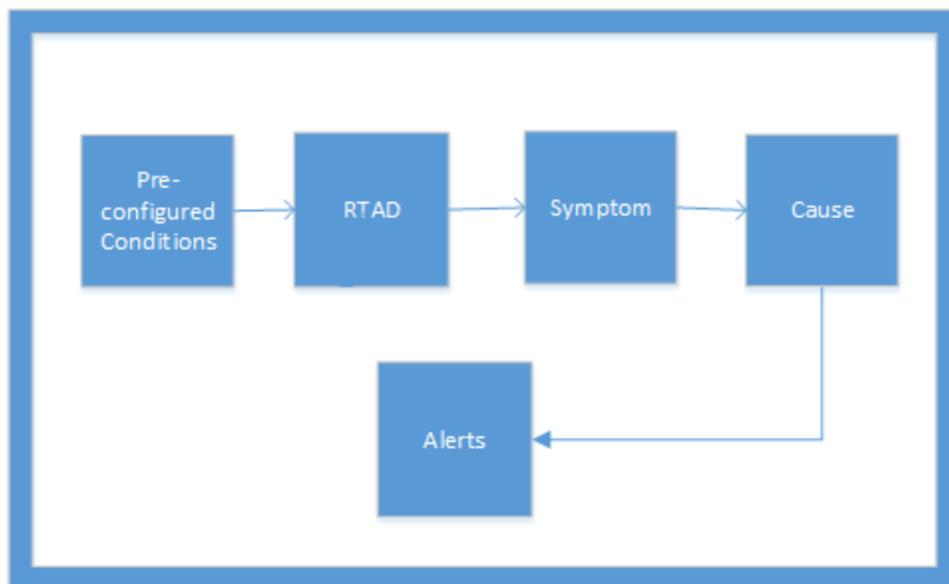
- Detect the symptom in the virtualized environment
- Find the cause of symptom
- Evaluate the root cause based on the pre-defined conditions

The content- rich alerts help you fix the problem before it occurs.

Whenever there is a sudden change detected in the environment, the **Real Time Alert Detection (RTAD)** works on the pre-configured conditions available to find the symptom. A symptom is a message generated to notify the occurrence of abnormal behavior in the environment. Analysis is done based on the default settings available to find the cause of the symptom. Further drill down is done for the cause to find the actual root cause that triggered the symptom. If the cause persists for a certain time period in the environment, an alert is generated. Only when the cause and root cause is detected, then the smart alert with detailed description about the problem is available on the HP vPV console.

Working of Smart Alert Framework (SAF)

¹Messages that provide structured information about the problem.



You can assess the health of the environment by checking the HP vPV console to identify areas that require your attention.

Example:

In a Virtualization environment, you can use dynamic methods to maintain an optimal balance between the demand and utilization of resources, thus avoiding over-utilization of resources. Also, you would need proper notification if there is a problem in the environment.

Scenario: Host shows low CPU availability

In a virtualized environment, CPU utilization can be high for a particular period of time but this condition may get resolved and hence does not qualify to become a symptom. There can be various reasons for this condition.

If the issue persists for some time then a symptom is generated. To find the cause, check if the host is saturated because VMs are misconfigured or the workload is high. We can drill down further and conclude the root cause of the issue.

When the root cause is detected for the symptom, a smart alert is generated. You can view the alert from the Alert Visualizer on the HP vPV console.

Using Alert Messages

Navigation

To access the feature, from the HP vPV home page, select **Performance > Alerts**. The Alert Messages page opens.

Alternatively, you can also access the page from Dashboard. Clicking the top pane listing the **Critical** and **Major** alerts. The Alert Messages page opens.

The following table lists the tasks you can perform from the Alert Visualizer.

Tasks	Description
View Capacity Data	Select an alert in the alert table. From the tools menu, select  to go to the entity Summary page to view the capacity and usage data of the particular entity. For more information, see "Using Capacity" on page 102 .
View Cause of the Alert	Select the alert description to view the root cause of the problem. You can view the hosts affected and view the reports.
Performance Graphs Overview	View or draw graphs for the performance data of the particular entity.
Filter Alerts based on the requirement	View alert(s) based on the specific entity, description, Domain, and Entity Type.
View Alerts for a specific time	View alert(s) generated in the specific time period.

Alert View

The following table provides information on the user interface elements on the page:

Element	Description
Entity	Name of the Entity. You can sort the entities in the ascending or descending order by clicking the Entity field.
Severity	Lists the severity of the message. The values for Severity are Critical, Major, Minor, Warning, and All.
Time	Displays the time and date when the alert was generated.
Description	Displays the root cause of the alert.
Domain	Displays the domain to which the entity is part of.
Entity Type	Represents the type of entity.
 ▼ (Sort the columns)	Use this option to sort the data in the columns in the ascending or descending order.
Search <input type="text"/>	Type a value in this field to search for specific events based on Entity, Severity, Description, Domain, and Entity Type.

Element	Description
Refresh 	Refreshes the list of entities and alerts displayed on the page.
Filter 	Displays the alerts specific to the Entity, Severity, Time, Description, Domain, and Entity Type. For Example: Apply Filter on Domain and type VCENTER to view all the alerts belonging to the VCENTER domain.
Select Time Range <div style="border: 1px solid #ccc; padding: 2px; display: flex; gap: 5px;"> 1 Hour 6 Hours 12 Hours 1 Day </div>	Displays the alerts generated during that time range. The options available are as follows: <ul style="list-style-type: none"> • Last Hour • Last 6 Hours • Last 12 Hours • Last One Day

Conditions Used to Generate the Alert Messages

You can assess the health of the environment by checking the HP vPV console to identify areas that require your attention. Alerting framework monitors the virtualized environment for the following conditions

For CPU:

Definition	Condition	Possible causes
Host CPU is saturated	CpuReadyUtil > Threshold, and CpuDemand > Capacity - HeadRoom	Multiple VMs with High CPU workload demand running on this Host.
Host CPU is contended	CpuReadyUtil > Threshold, and there is no significant CpuDemand from a large number of Virtual Machines running on the Host.	Multiple VMs running on this Host.
Virtual Machine (s)CPU is saturated	CpuReadyUtil > Threshold, and CpuDemand > CPUEntlMax (Where CPU Entitled = CPUEntlMax (if specified) or CPUEntl)	VMs has CPU Limit set to CPUEntlMax [1600]

Definition	Condition	Possible causes
Virtual Machine CPU is Saturated	CpuReadyUtil > Threshold, and CpuUtil > 100 – HeadRoom	VM needs more CPU than currently allocated.
Virtual Machine CPU parameters are not configured properly	CpuReadyUtil > Threshold, VM CPUUtil < HeadRoom %	VMs is configured with more number of vCPU (s) and there is a possibility that other VMs on the host are causing CPU contention.
CPU related configurations are not optimal for a machine. (<DisplayName>)	CpuReadyUtil > Threshold, CpuCoStopTime > Threshold, CpuDemand < 100-Headroom –Or –CpuCoStopTime > Threshold And NumberofSnapshot > 1	VM is configured with more number of vCPU (s) than required.
Large number of snapshot disks for the VM (<DisplayName>) is causing CPU contention.	CpuReadyUtil > Threshold, CpuCoStopTime > Threshold, VM CpuDemand > (100 – HeadRoom%)CPUEntl And NumberofSnapshot > 1	VM is having large number of Snapshots. Snapshots introduce complexity to storage I/O. Every read operation must traverse every snapshot disk and then the base disk in order to verify the appropriate disk block to return.
Cluster CPU is saturated	All Hosts in the cluster are saturated	<ul style="list-style-type: none"> • VMs are actively running on all the hosts • Multiple VMs (where CPU utilization is high) are running on the Hosts at the same time

For Memory:

Definition	Condition	Possible causes
Host memory is saturated.	MemoryBallooned > 0, MemActive > (Capacity – HeadRoom %) and MemActive has Increasing trend	<ul style="list-style-type: none"> Multiple VM with High memory workload are running on the Host. Guest tool status on Virtual machines is not in one of the recommended states. The not recommended states are: Not Installed, Not Running, Out Of Data, or Unknown. Large number of VM(s) configured with Memory reservations. Too many memory reservations may result in Memory saturation.
Abnormal high memory usage on Host detected.	MemUtil > Threshold	<ul style="list-style-type: none"> Multiple VMs with High memory demand are running on the Host. Abnormal increase in Memory usage may be due to additions of Virtual machines due to manual or DRS initiated vMotions.
VM memory configuration is not set for optimal usage of Host resource.	Memory Reservation is set And MemActive < 50% of Memory Reservation	NA
VM memory allocation is in surplus	MemBallooned > 0 And MemActive < MemHeadRoom(20)% of MemConfigured on VM	NA
VM memory is saturated	Memory Limit is set Memory Balloon > 0 or Swap Swapped > 0 MemActive > 95% of Memory Limit	Memory usage limit is set on the VM is causing huge performance impact on the behavior.
VM memory is saturated	VM Memory Utilization > VMMemoryUtilizationThreshold	VM is running memory intensive workload

Definition	Condition	Possible causes
Cluster memory is saturated	All Hosts in the cluster are saturated by Memory resource.	<ul style="list-style-type: none"> • Multiple VMs are running memory intensive workload on the cluster. • Each Host in the cluster has reserved memory capacity because of VM memory reservations, and hence memory reclamation techniques (ballooning) cannot be applied to reclaim un-used memory. • Cluster is out of Memory capacity to support the memory demand of all Virtual machines running at a given point in time. <p>Memory saturation at the cluster may result in multiple vMotions if DRS is enabled.</p>
Abnormal high number of vMotions.	vMotions > VMotionsThreshold (Baselined)	<ul style="list-style-type: none"> • The DRS Cluster may have large number of Virtual machines that are contending for CPU or Memory resource and all the hosts in the Cluster is in resource saturated condition. • DRS mode is set to Aggressive and/or Auto. • A host in a DRS cluster is put in maintenance mode causing all the high available VMs to migrate to other Host in the same cluster. • Hosts in the cluster is not running balanced CPU and Memory workload due to affinity rules applied at each Virtual machine level which is causing other VMs to vMotion.

For Datastore:

Definition	Condition	Possible Causes
Low free space on Datastore	Free Space < HeadRoom	<ul style="list-style-type: none"> • Large number of VMs with thick provision disks on this Datastore. • Too many aged snapshots. • Large number of VMs deleted from vCenter inventory but VMDK(s) and Snapshot files retained in the datastore for those VMs. • Large number of idle VMs on the datastore.
Virtual machine is observing abnormal IO activity	Disk I/O Rate is abnormal and Disk I/O Rate > 500 Kilobytes per second (kpbs)	<ul style="list-style-type: none"> • The workload on the VM is sending too many IO requests to the Disks. For example, a software backup or antivirus on-demand scan is running during this time. • Applications that can utilize system memory to cache data and avoid disk access can also result in high IO(s) when memory usage on the VM is at peak. • VM is swapping to their swap disks which is causing High I/O on the disks. • Large number of snapshot disks for a VM could also result in high disk IO activity.
High Disk IO Latency has been observed	Disk Kernel Latency > KernelLatencyThreshold	VMs on the host are trying to send more throughput to the storage system than the configuration support.

Monitoring Alerts on the HPOM Console

HP vPV integration with HPOM helps you to monitor the abnormalities available in the virtual infrastructure from an HP Operations Manager (HPOM) console. You may monitor the performance, capacity, utilization and resource consumption of the host machines and virtual machines from the HP vPV console. HP vPV provides the capability of analyzing and generating the smart alerts for abnormalities available in the environment. HP vPV forwards the alerts to HPOM console. You can view the smart alerts on the HP vPV console and HPOM console.

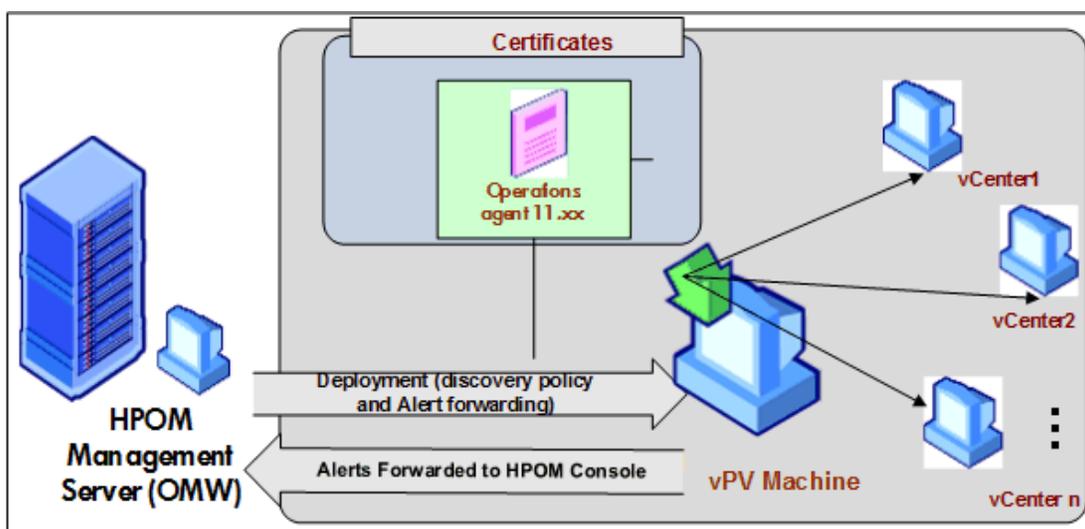
Additional benefits for integrating with HPOM:

- Easy discovery and monitoring of VMware data center topology
- Quick view of the smart alerts on HPOM console

Integration with HPOM

To integrate HP vPV with HPOM, you must install HP Operations agent. The HP Operations agent installed on a HP vPV machine can monitor the environment by collecting the performance data from individual ESXi hosts. This type of monitoring requires you to install and configure the HP Operations agent on the HP vPV machine. Deploy the HP vPV Integration policies to forward the HP vPV alerts to HPOM server.

The following illustration shows HP vPV integration with HPOM:



To integrate HP vPV integration with HPOM, follow the [steps](#). To view the details about alerts, see [Managing Alerts](#).

Sensitivity

In a virtualized environment, you must get a notification when an issue occurs in the environment. To get these notifications, you may have to evaluate the available conditions that may exist in the environment and then set the threshold values. As an administrator, with this approach, you may need additional time and resources to complete the task.

Sensitivity is based on the set of rules where the threshold range and values are defined for all the available resources. The generic set of rules are defined for CPU, memory, and data sources that contain the pre-defined threshold values. An alert is generated based on the type of sensitivity deployed. The type of sensitivity deployed defines the time to react to a given situation and issue an alert.

The sensitivity is categorized as follows:

- Low - This type sends the alert when the alert type situation persists for more than 20 minutes.
- Medium -This type sends the alert when the alert type situation persists for more than 10 minutes.
- High- This type sends the alert immediately as there is no wait time.
- Disable - This option is available to stop the alerts.

The default sensitivity deployed is medium. You can configure the sensitivity based on the requirement.

Configuring Sensitivity

To change the sensitivity, follow the steps:

1. Log on as an administrator.
2. Run the script: `/opt/OV/sbin/PV/ChangeAlertSensitivity.py`.
3. You can enter the type of sensitivity as per your requirement.

```
Please enter any of the below option.  
1.Low  
2.Medium  
3.High  
4.Disable  
Enter the option: █
```

Note: Select `Disable` option to disable the alerting feature.

Example: If you change the sensitivity to High, then when the symptom occurs, the alert will be generated immediately.

Chapter 11: Capacity

Capacity feature helps you to tune your virtualized infrastructure to maximize efficiency and resource utilization. Using Capacity, you can view the following:

- General overview of the virtualization infrastructure- You can identify the over-utilized and under-utilized resources, idle VMs, and resolve incorrect VM sizing problems.
- Sizing recommendation- Based on the historical resource usage and demand trends and available capacity, HP vPV recommends ways to optimize your current resources without impacting the service levels or performance of the product.
- Usage overview of entities- You can view the usage summary pages for each entity in the virtualization environment.

Personas

Typical users of this feature are:

- Capacity Planner
- IT Administrator

Navigation

To access the features, select **Capacity**. From the drop-down, select **Overview**, **Forecast**, **Modeler**, or **Placement**.

Using Capacity

You can use the Capacity page to perform the following tasks:

Task	Feature
<ul style="list-style-type: none">• Analyze the capacity, usage and allocation trends for various resources in the virtualized environment.• Draw reports based on the utilization and consumption of the resources and focus primarily on reclaiming and adding the resources.• Tune your infrastructure for maximum efficiency and reclaiming unused resources.	Optimization
<ul style="list-style-type: none">• Obtain recommendations to uphold the health of the hosts and datastores.• Obtain right-sizing recommendations to resolve incorrect VM sizing problems and achieve better VM performance	Placement

Task	Feature
<ul style="list-style-type: none"> • Projection for 30, 60, 90 days and including days to capacity information. • Determine the use of underutilized resources. 	Forecast
<ul style="list-style-type: none"> • Plan the allocation of resources in your environment. • Determine the impact of adding resources. 	Modeler

Overview

The Overview feature provides a cohesive view of the resource capacity, usage, allocation, remaining capacity, and opportunity to use the resources more effectively.

Navigation

To access the feature, from the HP vPV home page, select **Capacity > Overview**. The Optimization Overview page opens.

The following section provides information on the user interface elements on the page.

Graphical Representation

You can view the data represented graphically as Horizontal Bar charts and Pie charts.

Horizontal Bar charts

The horizontal bar charts on the page show the allocation, usage, and capacity details corresponding to the CPU, Memory, and Storage of the resources. For more conceptual information, see "[Appendix](#)" on page 155.

The charts available are as follows:

- **CPU (GHz)**- Shows the overall CPU allocation, usage, and capacity of the resources.
- **Memory (GB)**- Shows the overall Memory allocation, usage, and capacity of the resources.
- **Datastore (GB)**- Shows the overall Storage allocation, usage, and capacity of the resources.

Note: When you hover the mouse over a bar, a pop up shows the actual allocation, usage, or capacity, as applicable.

Pie charts

The pie charts show the VM Activity and sizing data for the VM CPUs and VM Memory.

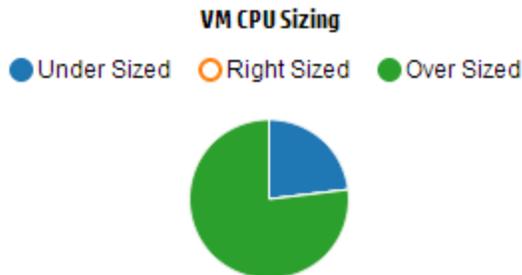
- **VM CPU Sizing** - Shows the sizing data for the VM CPUs in the datacenter. You can use the legend to identify the number of VMs that are undersized, right sized, and oversized by CPU resources. When you hover the mouse over an area, a pop up shows the number of VMs belonging to the particular sizing category.

- **VM Memory Sizing** - Shows the sizing data for the VM Memory. You can use the legend to identify the number of VMs that are undersized, right-sized, and oversized by memory resources. When you hover the mouse over an area, a pop up shows the number of VMs belonging to the particular sizing category.

You can use the pie chart legend to view the sizing data for the VMs. Click on the legend items - **Under Sized**, **Right Sized**, and **Over Sized** to generate the chart based on your requirement. When you click a legend item, the colored circle turns hollow indicating that the item is not selected and corresponding data is removed from the chart. The chart refreshes to display only the solid colored legend items.

Example Scenario: You want to generate and view a chart showing only the undersized and oversized VM CPU data.

Click **Right Sized**. The solid colored circle changes to hollow. The chart refreshes to display only the undersized and oversized VM CPU sizing data.



- **VM Activity** - Shows the data corresponding to the idle and active VMs in the domain. You can use the legend to identify the number of VMs that are idle and active. When you hover the mouse over an area, a pop up shows the number of VMs belonging to the particular category.

Domain Information

You can view the domain information from the table on the right side of the page. The table displays the following information:

- Virtualization Domain: Domain for which the data is shown. For example, vSphere.
- Name of the vCenter.
- Number of powered on VMs in the domain.
- Actions: You can view the forecast or CPU and memory reservations for the particular VM.

Note: When you drill down and view the **Summary** page for Clusters, Hosts, and VMs, the table also displays the name of the resource(s) up in the hierarchy.

Resources Information Table

The table at the bottom of the page shows the detailed data corresponding to the resources in the domain. The different tabs available are as follows:

- Datacenters
- Clusters
- Hosts
- DataStores

Note: The availability of the tabs differ based on the drill down level. For example, if you are viewing the **Summary** page for Cluster, the Datacenters tab is not available.

When you click a tab, the table refreshes to show the data corresponding to the selected resource. You can click on the resource attribute name to view the data in ascending or descending order.

Filtering Data

You can use the search box provided at the top right corner of the table to search for resources quickly. You can type the required search item and the table refreshes showing the filtered data. For example, if you want to view data corresponding to the clusters, containing the name **Tower**, click **Clusters** and type **Tower** in the search box. The table refreshes to show data corresponding to only the clusters with names containing **Tower**.

The following table provides information about the items shown in the table.

Attribute	Description
Resource Name	Shows the name of the resources in the selected category. For example, if you select Clusters from the tab, this column shows the names of the clusters in the domain. When you click a resource name, the page refreshes to show the summary page for the selected resource.
Remaining Capacity	Number of VMs that can be added or created in the Datacenter or Cluster, in addition to the existing ones. The datastores with high I/O latency are not considered while calculating the Reference VMs. View the " Summary for Datastore " page to view the details of the datastore.

Attribute	Description
CPU Available for Allocation (GHz)	Shows the total CPU available, in GHz, corresponding to the resource. The value is calculated based on the following formula: $\text{Total Available} = \{((\text{Current Allocation}) * \{(100 - \text{Head Room}\%^{1}) - \text{Current Util}\%^{2}\}) / \text{Current Util}\% \}$
CPU Usage (GHz)	Shows the CPU usage, in GHz, corresponding to the resource.
CPU Reclaimable (GHz)	Shows the amount of CPU that can be reclaimed, in GHz, corresponding to the resource. When you click the attribute value, the page refreshes to display the CPU Sizing page for the particular resource. For more information, see CPU Sizing.
Memory Available for Allocation (GB)	Shows the total Memory available, in GB, corresponding to the resource. The value is calculated based on the following formula: $\text{Total Available} = \{((\text{Current Allocation}) * \{(100 - \text{Head Room}\%^{3}) - \text{Current Util}\%^{4}\}) / \text{Current Util}\% \}$
Memory Usage (GB)	Shows the Memory usage, in GB, corresponding to the resource.
Memory Reclaimable (GB)	Shows the amount of memory that can be reclaimed, in GB, corresponding to the resource. When you click the attribute value, the page refreshes to display the Memory Sizing page. For more information, see Memory Sizing.

Summary for Datacenter

Summary for Datacenter page shows an overview of the health and performance of a datacenter in the environment. You can also drill down and view data for the next level of resources in the datacenter. Using the data on this page, you can view the current utilization and plan and allocate your resources better.

Navigation

To view the summary data for a particular datacenter, from the Treemap, right click the datacenter and select **Capacity Usage Trends**. The Summary for Datacenter page opens.

¹By default, this value is considered as 20%. This means that HP vPV considers 80% of CPU Util% as healthy.

²CPUCyclesTotalUsed/TotalCPU

³By default, this value is considered as 20%. This means that HP vPV considers 80% of Memory Util% as healthy.

⁴MemPhysUtil/TotalMem

Alternatively, you can also access the page from the Optimization **Overview** page. Click the **Datacenters** tab from the table at the bottom of the page, and select the required datacenter name. The Summary for Datacenter page opens.

Note: To view the summary of all the datacenters, go to the Overview page.

The bar charts provide information on the allocation, usage, and capacity of the CPU, Memory, and DataStore corresponding to the datacenter. The pie charts represent the VM CPU and VM Memory Sizing information and the status of the VMs. For more information, see "[Graphical Representation](#)" on page 103.

The tabular data on the right side of the page displays the domain and a count of the clusters, hosts, powered on VMs, and datastores in the particular datacenter. To view more information on each of these resources, you can view the tabular data at the bottom of the page. The resources are grouped and available in tabs. For more information on the table, see "[Resources Information Table](#)" on page 105.

The Resource Information table displays data corresponding to clusters, hosts, and datastores for the particular datacenter. You can click on the resource names and drill down to view the next level of detailed data.

Summary for Cluster

The Summary for Cluster page shows an overview of data corresponding to a cluster in the environment.

Navigation

To view the summary data for a particular cluster, from the Treemap, right click the cluster and select **Capacity Usage Trends**. The Summary page opens.

Alternatively, you can also access the page from the Optimization **Overview** page. Click the **Clusters** tab from the table at the bottom of the page, and select the required cluster name. The page refreshes to display the Summary for Cluster page.

In this page, you can view the overall health and performance of the cluster. The bar charts provide information on the allocation, usage, and capacity of the CPU, Memory, and Storage corresponding to the cluster resources. The pie charts represent the VM CPU and VM Memory Sizing information and the status of the VMs. For more information, see "[Graphical Representation](#)" on page 103.

The tabular data on the right side of the page displays the domain name, datacenter name, and a count of the hosts, VMs, and datastores in the particular datacenter. The table also displays if the cluster is High Availability (HA) enabled and Distributed Resource Scheduler (DRS) enabled. Click on the datacenter name to navigate to the "[Summary for Datacenter](#)" on the previous page.

To view more information on each of these resources, you can view the tabular data at the bottom of the page. The resources are grouped and available in tabs. For more information on the table, see "[Resources Information Table](#)" on page 105.

Summary for Host

The Summary for Host page shows an overview of data corresponding to a host in the environment.

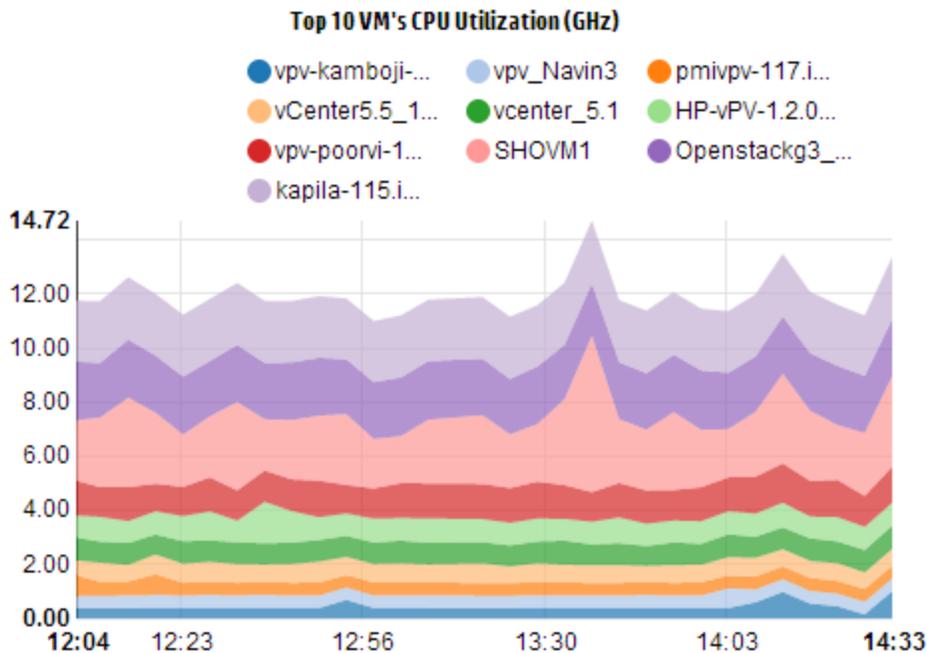
Navigation

To view the summary data for a particular host, from the Treemap, right click the host and select **Capacity Usage Trends**. The Summary page opens.

Alternatively, you can also access the page from the Optimization **Overview** page. Click the **Hosts** tab from the table at the bottom of the page, and select the required cluster name. The page refreshes to display the Summary for Cluster page.

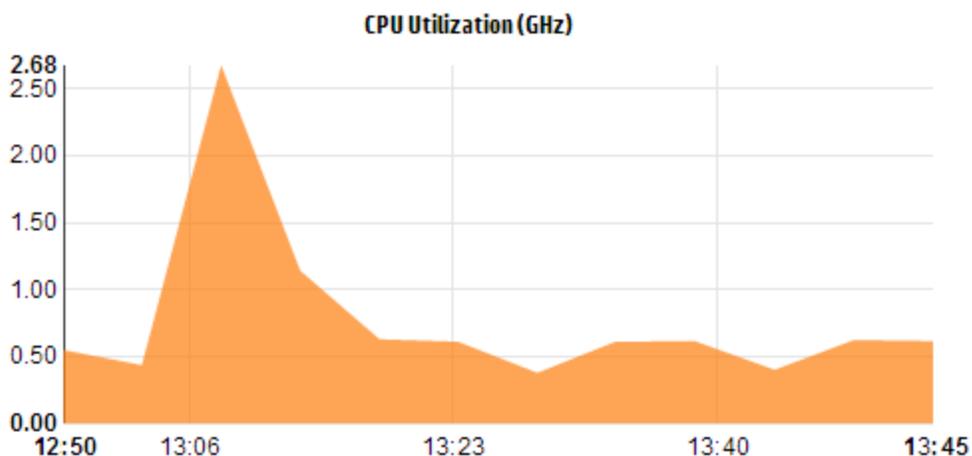
Graphical Representation

In this page, you can view the overall health and performance of the host. The bar charts provide information on the allocation, usage, and capacity of the CPU, Memory, and datastore corresponding to the VMs of the host. The **CPU Utilization** and **Memory Utilization** graphs provide data on the CPU and Memory utilization of the VMs on the host. The legend at the top of the graphs show the VM name and the corresponding color with which it is represented in the graph.



In the preceding example, CPU Utilization graph, the horizontal (X axis) shows the time and the vertical (Y axis) shows the CPU Utilization in GHz, for the host.

When you hover the mouse over a colored area, a pop up appears showing the VM name and CPU utilization, in GHz, specific to the VM. To view more information on the VM, click the corresponding colored area. The graph refreshes to display data for the particular VM. The following figure shows the CPU Utilization graph for a particular VM on the host.



In the preceding figure, the graph shows the CPU utilization for the selected VM. The vertical axis shows the utilization specific to the VM in GHz.

To go back and view the previous graph for the host, click on the graph area.

Domain Information

The domain information table on the right side of the page displays more details about the host. The following table lists the details.

Item Name	Description
Virtualization Domain	The virtualization domain to which the host belongs.
Cluster Name	Name of the cluster to which the host belongs. Click on the cluster name to view the "Summary for Cluster" on page 107 .
Datacenter Name	Name of the datacenter, of which, the host is a part. Click on the datacenter name to view "Summary for Datacenter" on page 106 .
vCenter Name	Displays the name of the vCenter to which the host belongs.
Powered On VMs	Displays the count of VMs on the host, that are in the powered on state.
Logical CPUs	Displays the number of logical CPUs the VM has.
CPU Reservation (GHz) (VM Kernel)	Indicates the CPU Reservation for the host. Processes and services running on the host make CPU Reservation requests to ensure a minimum guaranteed execution rate. CPU reservations are usually in the form of x units of time out of every y units for a process.

Item Name	Description
CPU Shares Priority	Displays the CPU shares percentage of the VM. CPU share is a portion of the CPU resources of the system, that is allocated for a process. When creating a VM, a CPU share priority and a number of CPU cores is allocated.
CPU Clock Speed (GHz)	Shows the clock speed of the CPU, in GHz. Clock is a microchip regulating the timing and speed of system functions. To execute an instruction, the CPU requires a particular number of clock cycles. A system performs faster when the CPU speed is also faster.
Memory Reservation (GB) (VM Kernel)	Displays the memory reserved for the activities running on the host.

Resource Information Table

The table lists the VMs and datastores for the host under the **VMs** and **DataStores** tabs, respectively. The following table lists the details available under the **VMs** tab.

Note: The VMs tab is available only when you are viewing the Summary for Host page.

Item Name	Description
VM Name	Name of the VM.
Recommended Logical CPUs Number	Number of logical CPUs that are recommended for the VM to perform better.
CPU Reclaimable (GHz)	Shows the amount of CPU that can be reclaimed.
Recommended Memory (GB)	Recommended memory that must be allocated to programs and services on the VM, for the VM to perform better.
Memory Reclaimable (GB)	Shows the amount of memory that can be reclaimed.

Summary for VM

The Summary for VM page shows an overview of data corresponding to a VM in the environment.

Navigation

To view the summary data for a particular VM, from the Treemap, right click the VM and select **Capacity Usage Trends**. The Summary page opens.

Alternatively, you can also access the page from the Optimization **Overview** page. Click **Hosts** tab and select the host to which the particular VM belongs. The Summary for Host page appears. Click

VMs tab, and select the required VM from the table at the bottom of the page, and select the required VM name. The page refreshes to display the Summary for VM page.

The page provides a detailed overview of the utilization and performance of the VM.

Configured

Shows the configured values for the following attributes of the VM:

- Logical CPUs
- Memory Configuration (GB)
- Memory Reservation (GB)
- CPU Reservation (GHz)

Recommended

Shows the recommended values for the following attributes of the VM:

- Logical CPUs
- Memory Configuration (GB)
- Memory Reservation (GB)
- CPU Reservation (GHz)

Remarks

Provides information on the overall status of the CPU and Memory of the VM.

Graphical Representation

Shows the performance of the VM graphically. The graph legends help you identify the colors associated with each item in the graph. To view data corresponding to a particular property of the VM, you can click the legend items and the graph refreshes.

The graphs available are as follows:

- **CPU and Memory Utilization** - Shows the CPU Utilization and Memory Utilization of the VM.
- **SecondChartHeader** - Shows the following data:
 - CPU Co-Stop Time (in milliseconds)
 - CPU Ready Time (in milliseconds)
 - CPU Demand (in MHz)
- **Physical CPU and Memory Utilization** - Shows the following data:
 - VM Physical Memory Utilization
 - VM Physical CPU Utilization

- **Latency** - Shows the following data:
 - Disk Read Latency
 - Disk Write Latency

Domain Information Table

The table lists the following information.

Item	Description
Virtualization Domain	Name of the virtualization domain to which the VM belongs.
IP Address	IP Address of the VM.
VM Hosted On	Name of the host to which the VM belongs. Click the host name to navigate to the "Summary for Host" on page 107 .
Cluster Name	Name of the cluster, of which, the VM is a part. Click the cluster name to navigate to the "Summary for Cluster" on page 107 .
Datacenter Name	Name of the datacenter to which the VM belongs. Click the datacenter name to navigate to the "Summary for Datacenter" on page 106 .
vCenter Name	Name of the vCenter to which the VM belongs.
First Data point	Shows the time interval when the data was logged first.
Last Data Point	Shows the time interval when the data was logged last.
CPU Cycles Used (GHz)	Shows the CPU cycles used to process the instructions. Clock is a microchip regulating the timing and speed of system functions. Each clock tick is a clock cycles. To execute an instruction, the CPU requires a particular number of clock cycles.
CPU Clock Speed (GHz)	Shows the clock speed of the CPU, in GHz. A system performs faster when the CPU speed is also faster. CPU speed determines how many instructions it can perform in a second.
CPU Limit (GHz)	Shows the limit to which the CPU can be used for the VM activities. CPU limits are set to limit the CPU consumption from going high on VMs. Setting CPU limits help in managing contention issues that may arise in your environment.

Item	Description
CPU Reclaimable (GHz)	Shows the amount of CPU that can be reclaimed.
Memory Shares	Displays the memory shares of the VM. Memory share is a portion of the memory of the system, that is allocated for a process. When creating a VM, memory shares are also allocated.
Mem Used (GB)	Shows the memory used by the VM activities.
Memory Reclaimable (GB)	Shows the amount of memory that can be reclaimed.
Datastore Usage (GB)	Lists the datastores corresponding to the VM. Click the datastore names to navigate to the "Summary for Datastore" below .

Summary for Datastore

The Summary for Datastore page shows an overview of data corresponding to a datastore in the environment.

Navigation

To view the summary data for a particular datastore, from the Treemap, right click the datastore and select **Capacity Usage Trends**. The Summary page opens.

Alternatively, you can also access the page from the Optimization **Overview** page. Click the **DataStores** tab from the table at the bottom of the page. The page refreshes to display the Summary for Datastore page.

Graphical Representation

The bar chart shows the Storage allocation, usage, and capacity of the datastore.

The pie charts available are as follows:

- Utilization by File Types (GB)
- Top 5 VM's Disk Usage (GB)
- Activity Status for VMs

Remarks

Provides information on the overall space and health of the datastore.

Domain Information

The table lists the following information:

- Virtualization Domain
- vCenter Name
- Datacenter Name
- Datastore Type
- VMs Avg. Disk Read Latency (ms)
- VMs Avg. Disk Write Latency(ms)
- I/O Size Analysis
- Usage for Active VMs(GB)

Resource Information Table

The table lists the following information:

- VM Name
- Activity state of the VM
- Space Provisioned in GB - This value is calculated based on only the Active VMs.
- Disk Usage in GB - This value is an aggregate of the disk usage of all the VMs corresponding to the resource.
- Disk Write Latency
- Disk Read Latency

CPU Sizing

The CPU Sizing page shows the CPU sizing data for the VMs, based on the historical resource usage. You can view the sizing data for all the VMs corresponding to a resource. The pie chart on the page graphically represents the number of the VMs that are Right sized, Over sized, and Under sized. Hovering the mouse over the shaded area shows the number of VMs in the particular category.

The page also contains a search box to filter data based on your requirement. For more information, see "[Filtering Data](#)" on page 105

Navigation

You can access the CPU Sizing page from the following:

- Resource Information table available on the **Overview** and Summary pages - When you click the

CPU Reclaimable value corresponding to a resource, the page refreshes to show the CPU sizing data of the VMs for the resource. The following table lists the tabs in the Resource Information table from which you can access the CPU Sizing page.

Tab Name	Page
Datacenter	CPU Sizing for Datacenter
Cluster	CPU Sizing for Cluster
Host	CPU Sizing for Host

- Toolbar - Click **Reports** from the Toolbar on top of the page, and select **VMs CPU Sizing** from the drop down.

Resource Information Table

The table contains the following four tabs:

- **All** - Lists all the VMs corresponding to the resource.
- **Right Sized** - Lists the VMs that are Right sized.
- **Over Sized** - Lists the VMs that are Over sized.
- **Under Sized** - Lists the VMs that are Under sized.

All the tabs contain the following data corresponding to the VMs:

- **VM Name** - Name of the VM. You can click on the VM name to navigate to the ["Summary for VM" on page 110](#).
- **VM Sizing** - Shows whether the VM is Right sized, Under sized, or Over sized.
- **Current CPU** - Shows the current CPU allocated for the VM.
- **Recommended CPU** - Shows the CPU that must be assigned to the VM to make it Right sized.

For the VMs listed under the Right Sized tab, the value of Current CPU and Recommended CPU is the same.

- **Actions** - Following actions can be taken for the particular VM:
 - **Capacity Usage Trends:** Manage the resource utilization in your environment.
 - **Workbench:** Draw graphs and generate reports for performance data.
 - **VM Forecast:** View forecast of the resources utilized for a particular VM.

With the help of CPU sizing details, you can plan to consume the Right sized, Over sized, and Under sized resources effectively. You can use the Modeler feature to analyze and allocate the

Over sized and Under sized resources based on the workloads. Using this feature, HP vPV gives you an overview of the CPU, Memory, and Storage Utilization of the resources in your environment.

Memory Sizing

The Memory Sizing page shows the Memory sizing data for the VMs. You can view the sizing data for all the VMs corresponding to a resource. The pie chart on the page graphically represents the number of the VMs that are Right sized, Over sized, and Under sized. Hovering the mouse over the shaded area shows the number of VMs in the particular category.

The page also contains a search box to filter data based on your requirement. For more information, see ["Filtering Data" on page 105](#)

Navigation

You can access the Memory Sizing page from the following:

- Resource Information table available on the **Overview** and Summary pages - When you click the Memory Reclaimable value corresponding to a resource, the page refreshes to show the Memory sizing data of the VMs for the resource. The following table lists the tabs in the Resource Information table of the **Overview** page, from which you can access the Memory Sizing page.

Tab Name	Page
Datacenter	Memory Sizing for Datacenter
Cluster	Memory Sizing for Cluster
Host	Memory Sizing for Host

- Toolbar - Click **Reports** from the Toolbar on top of the page, and select **VMs Memory Sizing** from the drop down.

Resource Information Table

The table contains the following four tabs:

- **All** - Lists all the VMs corresponding to the resource.
- **Right Sized** - Lists the VMs that are Right sized.
- **Over Sized** - Lists the VMs that are Over sized.
- **Under Sized** - Lists the VMs that are Under sized.

All the tabs contain the following data corresponding to the VMs:

- **VM Name** - Name of the VM. You can click on the VM name to navigate to the ["Summary for VM" on page 110](#).

- **VM Sizing** - Shows whether the VM is Right sized, Under sized, or Over sized.
- **Current Memory** - Shows the current Memory allocated to the VM.
- **Recommended Memory** - Shows the Memory that must be assigned to the VM to make it Right sized.

For the VMs listed under the Right Sized tab, the value of Current Memory and Recommended Memory is the same.

- **Actions** - Following actions can be taken for the particular VM:
 - **Capacity Usage Trends:** Manage the resource utilization in your environment.
 - **Workbench:** Draw graphs and generate reports for performance data.
 - **VM Forecast:** View forecast of the resources utilized for a particular VM.

With the help of Memory sizing details, you can plan to consume the Right sized, Over sized, and Under sized resources effectively. You can use the Modeler feature to analyze and allocate the Over sized and Under sized resources based on the workloads. Using this feature, HP vPV gives you an overview of the CPU, Memory, and Storage Utilization of the resources in your environment.

VM Activity

The VM Activity page shows the data for the VMs in idle state. You can view the memory and CPU utilization for all the idle VMs. The pie chart on the page graphically represents the number of VMs that are idle and active. Hovering the mouse over the shaded area shows the number of VMs in the particular category.

The page also contains a search box to filter data based on your requirement. For more information, see ["Filtering Data" on page 105](#)

Navigation

To access the feature, select **Capacity -> Overview**. The Overview Page opens. From the **VM Activity**, you can access the **View Idle VMs** page.

Resource Information Table

The table contains the following data corresponding to the VMs.

- **VM Name** - Name of the VM. You can click on the VM name to navigate to ["Summary for VM" on page 110](#).
- **VM CPU Util %** - Shows the current CPU allocated to the VM in percentage.
- **VM Memory Util %** - Shows the current memory allocated to the VM. in percentage
- **Actions** - Following actions can be taken for the particular VM:
 - **Capacity Usage Trends:** Manage the resource utilization in your environment.
 - **Workbench:** Draw graphs and generate reports for performance data.

- **VM Forecast:** View forecast of the resources utilized for a particular VM.

With the help of Idle VM details, you can plan to consume the underutilized resources effectively. You can use the Modeler feature to analyze and allocate the idle resources based on increasing the workloads. Using this feature, HP vPV gives you an overview of the CPU, Memory, and Storage Utilization of the resources in your environment.

CPU and Memory Reservation

This page provides an overview of the CPU and Memory reservations corresponding to VMs in the environment.

Memory Reservation is the process by which a certain amount of memory is set to be always accessible for the VM. The value is shown in GB.

CPU Reservation is the process by which a certain amount of the CPU process is set to be always accessible for the VM processes. The value is shown in GHz.

You can also navigate to the corresponding Summary pages of the VMs from here. A search box is provided to filter and view data, based on your requirement. For more information, see ["Filtering Data" on page 105](#).

Navigation

You can navigate to this page from the toolbar on top of the page. Click **Reports** and select **VMs sorted by Reservation**.

Resource Information Table

The table lists the following data:

- **Name** - Name of the VM. You can click on the VM name to navigate to the ["Summary for VM" on page 110](#).
- **Cluster Name** - Name of the cluster to which the VM belongs.
- **DC Name** - Name of the Datacenter to which the VM belongs.
- **CPU Reservation** - Shows the CPU reserved for the VM activities, in GHz.
- **Memory Reservation** - Shows the memory reserved for the VM activities, in GB.

Use Case: Using Capacity Usage Trends and Optimization Option to Manage the Resource Utilization in your Environment

The following section shows you a scenario where you can find out the reason for the resource utilization, check the capacity usage trend, and then allocate the resources accordingly.

Scenario

John is a VMware Administrator and is monitoring the performance of all the entities in the Virtualization environment. He wants to use the resources optimally, thereby ensuring reliable performance at an optimal cost.

He observes that the usage of one of the Datacenter is close to 70% and wants to add more resources to this datacenter. He wants to check the utilization and optimize the environment. Also, wants to analyze where he can reclaim the under utilized resources or add the resources as required.

The steps include the following:

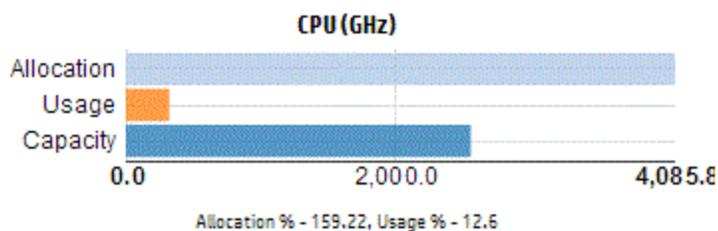
1. Log on to HP Virtualization Performance Viewer user interface.
2. Go to the **Treemap view >Datacenter** to view the overall usage.
3. Select the Datacenter that is showing red or orange color. Right-click on the selected Datacenter and select **Capacity Trends** option. The **Overview** page opens. Alternatively, you can click  from the HP vPV home page to open the **Overview** page which contains the details of the datacenter, cluster, hosts, and datastores.

Points that you can gather from the Overview page are:

Overall view of the Datacenter. Check the number of cluster, hosts, and powered on VMs available for the selected Datacenter.

Virtualization Domain	vSphere
vCenter Name	nmcvc.ind.hp.com
Clusters	2
Hosts	12
Powered On VMs	102
DataStores	38

Additionally, you can view the overall CPU, Memory and Storage Utilization from the Overview page. Here, for example, you can view that the CPU allocation is much higher than the capacity. The usage of CPU utilization is very less. When the usage will increase and become close to the capacity, then you may want to add more resources or check for the reclaimable resources.



From the pie charts, you can derive if the resources are undersized, oversized or right sized. For more information, see ["Graphical Representation" on page 103](#).

You can navigate to get additional details about Cluster, Hosts and Datastore from the Overview page. The attributes available help you to drill down to check the CPU and Memory availability, based on the allocation, usage, Memory and CPU reclaimable.

CPU Attributes for the selected Cluster (NMC_490G&-A)

Cluster Name	CPU Available for Allocation(GHz)	CPU Usage(GHz)	CPU Reclaimable (GHz)
NMC-490G7-B	443.46	44.63	210.74
NMC-490G7-A	7006.11	35.63	530.53

If you view that CPU Reclaimable for one of the Cluster is 530.53 GHz, then you can navigate to check the right sized, under sized, and over sized CPU utilization. Click the **CPU reclaimable** value and the **CPU Sizing** page opens. You can view the VM name, sizing, allocated CPU and recommended CPU. The pie charts show the over sized, under sized, and right sized VMs. For more information, see ["Graphical Representation" on page 103](#).

You can drill down and check the undersized VM. HP provides some suggestions such as the Recommended CPU and so on. You can follow the suggestions and allocate more CPUs to this undersized VM.

Under Sized VM Details

All	Right Sized	Over Sized	Under Sized								
<table border="1"> <thead> <tr> <th>VM Name</th> <th>VM Sizing</th> <th>Current CPU</th> <th>Recommended CPU</th> </tr> </thead> <tbody> <tr> <td>RHEL6.2_x64_NMC_pravekum_nmcvm121</td> <td>Under Sized</td> <td>1</td> <td>2</td> </tr> </tbody> </table>				VM Name	VM Sizing	Current CPU	Recommended CPU	RHEL6.2_x64_NMC_pravekum_nmcvm121	Under Sized	1	2
VM Name	VM Sizing	Current CPU	Recommended CPU								
RHEL6.2_x64_NMC_pravekum_nmcvm121	Under Sized	1	2								

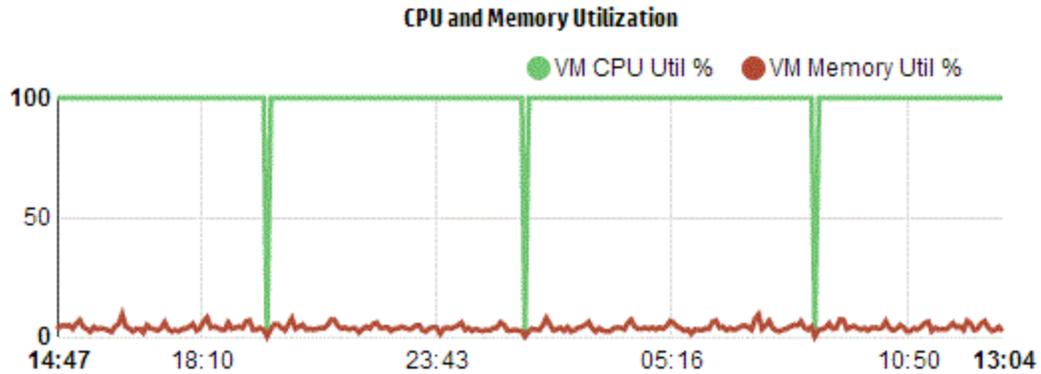
To find additional information about the VM that is undersized, you can click the VM and can check the VM utilization. The VM Summary page opens.

Points that you can gather from the VM Summary page are:

View the overview about the VM on the right panel. You get the details of the VM such as where the VM is hosted, which data center it belongs to and so on. Suggestions about the resource usage for the selected VM is available in the VM Summary page.

You can get the resource usage trend of a VM and check the following graphs for more details:

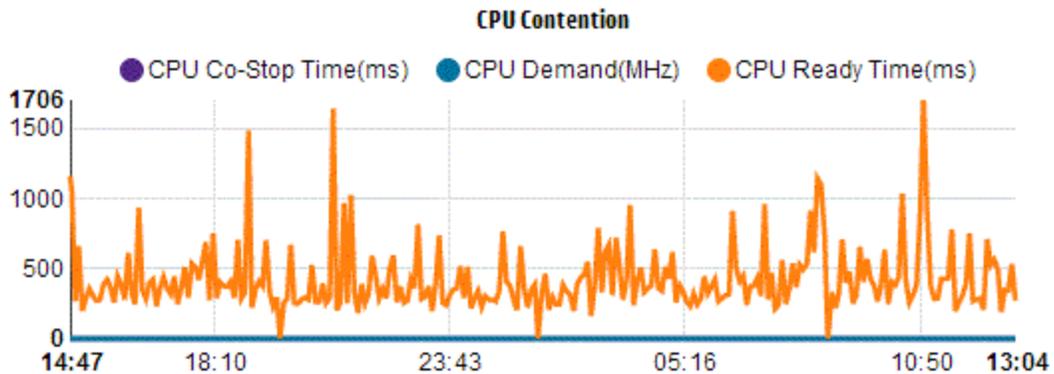
View the CPU and Memory Utilization graph to derive and conclude the Allocation versus Usage. You can also validate the recommendation that HP provides by categorizing the VMs as under sized or over sized.



Conclusions from the Graph:

- Current CPU utilization is high and if you add more resources then the CPU utilization will be optimal.
- Memory utilization is low and you can safely reclaim the allocated memory.

View the CPU and Memory Contention.



You can conclude the following from this example:

- Analyze the resource allocation based on the bar graphs and pie charts.
- Find the all VMs that are available in the Datacenters, Clusters, or Hosts.
- Drill down to the VM where HP suggestions are available for the selected VM and use the recommendation accordingly.
- Check the resource usage. You can optimize the environment by allocating the resources based on the current capacity trends.

Using Placement

You can use the Placement feature to properly plan and allocate your resources in the virtualized environment. The feature provides you the recommendations on the resources where you can allocate the new VMs.

Navigation

To access the feature, from the HP vPV home page, select **Capacity > Placement**. The **New VM Placement** page opens.

Allocate new VMs

To view the recommendation on where to allocate new VMs in your environment, follow these steps:

1. Select **Placement** from the **Capacity** drop-down list in the HP vPV home page.

The **New VM Placement** window opens.

2. Type the number of VMs you want to add, in the **Number of Virtual Machines** field.
3. Type the CPU size of the VMs in the **VM Number of vCPU** field.
4. Type the Memory size of the VMs in the **VM Memory Size (GB)** field.
5. Type the Disk size of the VMs in the **VM Disk Size (GB)** field.
6. Select the virtualization domain from the **Domain** drop-down list.
7. Select **Include Optimization Reclaimable** check-box, if you want to use the recommendation provided by HP vPV for allocating the VMs.
8. Click **Add new VM(s)**.

The VM information appears in the **Placement Request List** table.

9. Click **Find Placement**.

The **Placement Recommendation** for the VMs appears on the page.

Placement Recommendation

After providing the details of the VMs that you intend to add to your environment, HP vPV provides you the placement recommendation for the new VMs.

The feature lists the following:

- Hosts to which you can add the VMs
- Corresponding Cluster and Datacenter to which the host belongs
- Number of VMs that you can add to each host

When you click on the datacenter name, cluster name, or host name, you can navigate to the specific Summary page.

Forecast

Based on historical usage trends, HP vPV can forecast the resource utilization of entities in your environment. You can use this data to plan for future resource requirements and allocations. HP vPV uses forecasting techniques to predict the resource utilization based on current allocation.

The Forecast window opens showing the data for the resources. After installing HP vPV, based on the usage trends of resources, HP vPV starts forecasting the resource utilization.

You can view and drill down to the forecast data for the following entities:

- Aggregated Datacenter
- Aggregated Cluster
- Host
- VMs

You can drill down to the entities in the datacenter and view the forecast data corresponding to each of the entities. Click on the entity names to view the forecast data corresponding to each. The table at the bottom of the page displays the entities to which you can drill down. The value of the resource utilization corresponding to the capacity and days to capacity for all the entities at 30 days, 60 days, and 90 days, respectively appears in the graph.

Note: The minimum requirement to get accurate graphs for forecast is that the data should be collected atleast for two cycles. If you have sufficient data available in database, you get better graphs. Once data is available, the tool shows the derived data for a period of 90 days.

Navigation

To access the feature, from the HP vPV home page, select **Capacity > Forecast**. The Forecast page opens up.

HP vPV can forecast the following:

- CPU Utilization
- Memory Utilization
- Storage Utilization

Note: Storage Utilization data is not available for KVM VMs and Hosts.

When the number of VMs for any Host or User is increasing over time, even if the resource usage of each of the VMs are flat, the resource usage trend for the Host or User shows an

increasing trend. In this case, the aggregated graphs for the Host or User shows increasing trends and may show a smaller value for Days To Capacity for the Host or User compared to the value for the individual VMs shown on the page. This is applicable for other aggregate graphs for Datacenter and Cluster.

Data Representation

The forecast data is represented in the form of graphs for ease of use. The data is plotted against dates and usage. The graph shows the Forecast and Metric.

- **Forecast** - Shows the forecast data of the resource utilization for the next 90 days.
- **Actual**-Shows the actual resource utilization data for the last 90 days. The actual usage is the six hourly summarization. This means that every 6 hours, one aggregated (averaged) data point gets added. The forecast calculation happens using every data sample in database and not on 6 hourly aggregates.

Tabular Representation

- **Capacity** - Shows the maximum value for the resource capacity. For example, for Disk Usage graph, it shows the maximum storage capacity of the entity.
- **Days to Capacity** - Shows the number of days in which the entity reaches the maximum capacity.

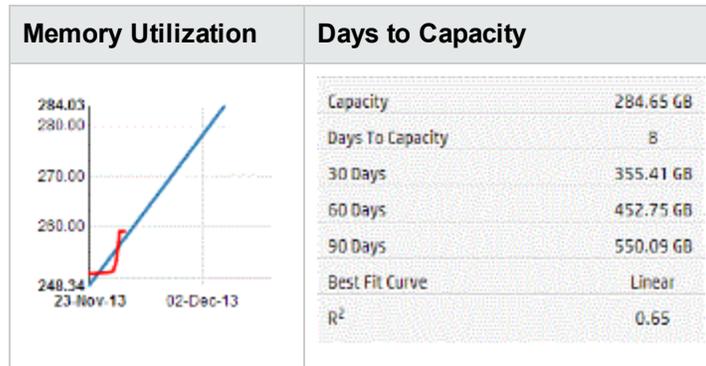
Note: Sometimes the forecast calculation shows that the capacity is already reached, but it has not reached capacity in reality. This situation arises if the usage was increasing steadily earlier and suddenly usage growth reduced. In such a case, the Days to Capacity shows as **0** days. If the usage continues to be steady, or if it declines, the forecast calculation gets corrected in due course of time.

- **30 Days, 60 Days, 90 Days** - Shows the resource utilization value at 30 days, 60 days, and 90 days, respectively.
- **Best Fit Curve** - Shows the type of curve the graph represents. The best fit curve for each of CPU, Memory, and Storage of each entity is chosen based on the value of R2. The curve with the highest R2 is chosen by HP vPV as the best fit curve. The values can be Linear, Exponential, Logarithmic, or Power.
- **R²** - This is the Coefficient of Determination. The value for this indicates how well the data points fit on a line or curve. The value ranges between 0 to 1. The forecast is more correct when the value is closer to 1. When historic data is very less, based on which forecasting is done, the value is close to 0.

Example:

The aggregated cluster forecast report contains data from the available Hosts and VMs.

Check the following forecast report for the memory utilization:



When you view from the aggregated view that the **Days to Capacity** is 8 days, then check the capacity of the hosts in the specific cluster.

Hosts		DataStores			
Host Names	CPU		Memory		
	Days To Capacity	Capacity(GHz)	Days To Capacity	Capacity(GB)	
nnmw231.ind.hp.com	20	27.19	5	142.33	
nnmw232.ind.hp.com	> 90	27.19	> 90	142.33	

One of the host shows days to capacity as 5 days.

Conclusion: Here, the cluster is the container and the entities belonging to this container are the 2 hosts.

Forecast data at the aggregated level (cluster level) is calculated based on the utilization of the current resources for the entities (host1 and host 2) available in the container. The forecast data (days to capacity) for the host1 and host 2 will not be taken into consideration while calculating the forecast data (days to capacity) of the cluster.

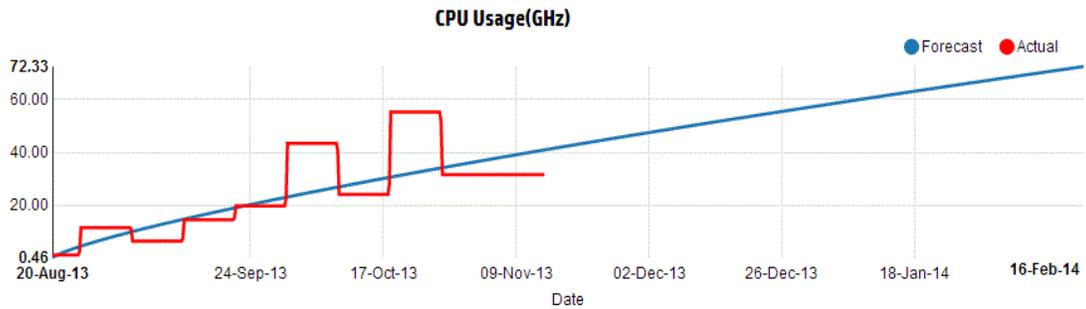
Therefore, forecast data available at the aggregated level is independent of the forecast data available for the entities belonging to the same container.

Forecasting CPU Utilization

The CPU Usage graph displays the CPU utilization forecast for the entities in your environment. When you drill down to the next level entities, you can view the graphs corresponding to each entity in the environment.

Understanding CPU Usage Forecast

The following figure shows a sample CPU Usage forecast graph.



Derivation

Following are the derivations from the preceding figure:

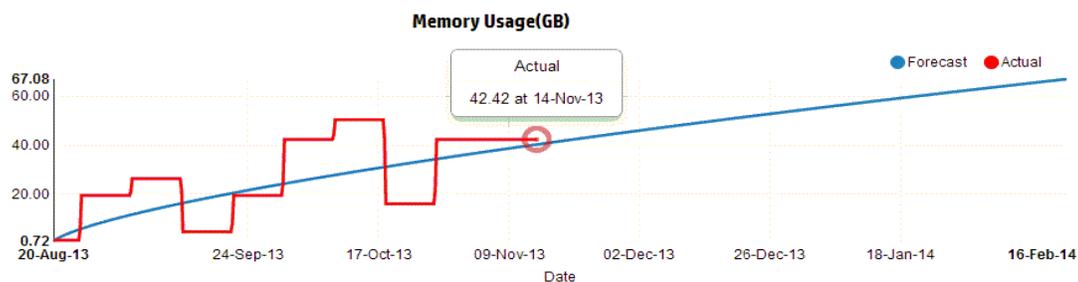
- Blue line shows the forecast data and CPU usage would reach 72.33 GHz after 90 days.
- Red line shows the actual CPU usage of the entity.
- When you hover the mouse over an area, a pop up shows the forecast CPU usage at that date. The x-axis shows the xx.xx value and the y axis shows the dates. If the plotting in x axis starts from xx.xxx to xx.xxy, then the value gets truncated and is only displayed as xx.xx to xx.xx. Ignore the values displayed in the x axis. Only check the plotted graph.

Forecasting Memory Utilization

The Memory Usage graph displays the Memory utilization forecast for the entities in your environment. When you drill down to the next level entities, you can view the graphs corresponding to each entity in the environment.

Understanding Memory Usage Forecast

The following figure shows a sample Memory Usage forecast graph.



Derivation

Following are the derivations from the preceding figure:

- Blue line shows the forecast data and Memory usage would reach 67.08 GB after 90 days.
- Red line shows the actual Memory usage of the entity.
- When you hover the mouse over an area, a pop up shows the forecast Memory usage at that

date. The x-axis shows the xx.xx value and the y axis shows the dates. If the plotting in x axis starts from xx.xxx to xx.xxy, then the value gets truncated and is only displayed as xx.xx to xx.xx. Ignore the values displayed in the x axis. Only check the plotted graph.

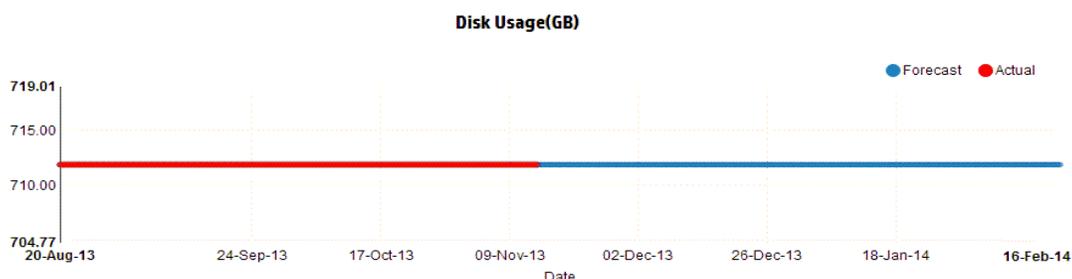
Forecasting Disk Utilization

The Disk Usage graph displays the disk utilization forecast for the entities in your environment. When you drill down to the next level entities, you can view the graphs corresponding to each entity in the environment.

Note: You must set the **Browse Datastore** role available under **Datastore** in VMware vCenter to view the Disk Utilization forecast data for VMs.

Understanding Disk Usage Forecast

The following figure shows a sample Disk Usage forecast graph.



Derivation

Following are the derivations from the preceding figure:

- Blue line shows the forecast Disk Usage data.
- Red line shows the actual Disk usage of the entity.
- When you hover the mouse over an area, a pop up shows the forecast Disk usage at that date. The x-axis shows the xx.xx value and the y axis shows the dates. If the plotting in x axis starts from xx.xxx to xx.xxy, then the value gets truncated and is only displayed as xx.xx to xx.xx. Ignore the values displayed in the x axis. Only check the plotted graph.

Using Forecast to plan for resources

This section shows how you can use the Forecast feature to plan for resources.

Scenario

Mark is a VMware Administrator in an organization. He wants to know the current disk usage of the datacenter and plan for any hardware requirements that may arise. He uses the Forecast feature for this purpose.

The tasks that Mark performs are as follows:

1. Log in to HP vPV.
2. Right click the required datacenter, from the Treemap, and select **Forecast**.
3. View the graphs and tabular data appearing on the Forecast page.

After analyzing the graphs and tabular data, Mark arrives at the conclusion that the disk usage will reach its maximum capacity in a month.

Actions

Mark performs the following actions based on the forecast data:

- Plans to increase the disk capacity for the datacenter
- Uses the Optimization feature to check the datastore allocation for the entities in the datacenter and reclaim any wasted resources. For more information, see "[Capacity](#)" on page 102

Modeler

In a virtualization environment, there always arises a need to increase resources, based on increasing workloads and other requirements. As an Administrator, before adding resources and entities, you may want to analyze how the allocation of resources impacts your environment. It is important to get accurate results from the analysis. Based on the analysis, you can plan and allocate the resources effectively.

You can use the Modeler feature in HP vPV to do an analysis of how your environment performs after allocating the resources. After you provide the details of the entities to be added or removed, HP vPV gives you an overview of how the CPU, Memory, and Storage Utilization is impacted based on the plan. You can use the results from the analysis to determine if you are allocating the resources effectively or need to re-plan the resource allocation to suit your environment needs.

For example, if you want to add 50 more VMs in your environment, based on a new project requirement, you can use Modeler in HP vPV and provide the details of the VMs to be added. After the analysis, HP vPV returns you the information on how the CPU, Memory, and Storage Utilization of your environment is impacted after adding the 50 VMs. If any of these resources are impacted, you can try allocating the VMs across datacenters and clusters and analyze the performance for each allocation. Once you find a suitable allocation you can go ahead and add the resource in your environment.

Navigation

To access the feature, from the HP vPV home page, select **Capacity > Modeler**.

Using the Modeler Page

The screenshot shows the HP Virtualization Performance Viewer interface. At the top, there are navigation tabs: Dashboard, Performance, Capacity, and Admin. A dropdown menu is open under 'Capacity', showing options: Overview, Forecast, Modeler (highlighted), and Placement. A search bar on the left contains 'vSphere', 'IBTVz', and 'IBT_Infra'. The main area is titled 'Capacity Modeler' and contains a 'Select Action' form with fields for No. of VMs (1), No. of vCPUs (2), Physical RAM(GB) (4), Disk(GB) (20), Start Date (2014-05-15), End Date, CPU Demand(GHz) (2.4), and Memory Used(GB) (2). To the right is a summary table for 'Datacenter/Clusters - IBTVz Name' showing metrics like Remaining Capacity (13), No. of Hosts (2), No. of VMs (49), CPU Capacity (GHz) (126.37), Mem Capacity (GB) (191.93), and Datastore Capacity (GB) (5943.25). Below this is a 'Scenario Workflow' table with one entry: 'Add new VM(s)' with 1 entity, starting on 5/19/14, with 2 vCPUs, 4 GB RAM, and 20 GB disk. Three status cards for CPU, Memory, and Storage are shown, all indicating 'Good for 11 Days' or better. A results table shows the action 'Add new VM(s)' passed on 5/19/14. At the bottom, three line graphs show 'Forecast of DATACENTER - IBTVz' for CPU (GHz), Memory (GB), and Storage (GB) over 90 days, comparing 'Forecast Before' and 'Forecast After' scenarios. The 'Forecast After' scenarios show significantly reduced growth and no shortfalls.

Legend	Description
1. Select Feature	Provides the HP vPV features.
2. Browse using the Navigation panel	Search the VMs belonging to the Host, Cluster, Guest, Datacenter, and Datastore.

Legend	Description
3. Add Action	Provide the attributes of the resources for a datacenter or cluster to increase the workload of your environment.
4. Run Scenario	Check the availability of the resources for a specified date. If the resources are available you can allocate the resources else re-plan the allocation.
5. Show Forecast	Determine the value of CPU, Memory, or Storage utilization after 30, 60, and 90 days of adding the resources.
6. View the Forecast Graphs	Determine the maximum shortfall for CPU, Memory, or Storage utilization.

You can provide data of the resources using the Modeler Input and analyze the impact of resource allocation using the Modeler Output. For more information, see [Using the Modeler Input](#) and [Using the Modeler Output](#).

Modeler Input

To use the Modeler Input functionality, you must have the number and attributes of the entities to be added or removed from the environment. The tabular data on the right side of the page displays the total count of the hosts, VMs, remaining capacity, Memory and CPU capacity and datastores in the particular datacenter or cluster. With the help of this information it is easier to allocate the resources in your environment.

Using the Modeler Input you can:

- [Add New VMs](#)
- [Add Cloned VMs](#)
- [Delete Host](#)

Once you add the required details of the VM for a particular datacenter or cluster you can add the actions to the table and validate the details. After validating the details, you can analyze the impact of adding or removing the VM using the Modeler Output functionality.

Modeler Output

After you input all the required details, HP vPV provides you the forecast information for  CPU,  Memory, and  Storage utilization of the environment. You can check if the resources allocated for a specific date is available or not. Based on the result, you can either allocate or re-allocate your resources for a particular datacenter or cluster.

You can use the tabular and graphical information to analyze how the environment performs after increasing the workload. The tables give you the following information corresponding to the CPU, Memory, and Storage of the environment:

- Days to Capacity - The number of days in which the CPU, Memory, or Storage of the environment reaches capacity or maximum value.

- **Maximum Short Fall** - The maximum difference between capacity and usage of CPU, Memory, or Storage in the environment over time.

The graphs represent the utilization after increasing the workload. You can use the graphs to assess the trend of the utilization. If you see steep rises or drop, it indicates that the performance your environment is impacted by adding the workload with the provided allocation.

Actions

Based on the information provided by the tables and graphs, you can determine whether increasing the workload with the current allocation is good for your environment or not. If the tables and graphs show that it impacts your environment, you can try a different allocation and see the results again.

Scenarios

Different capacity modeling scenarios are supported in HP vPV. You can choose the required scenario, provide the entity details, and view the output.

Add New VMs

To increase your workload you may want to add more VMs to your environment. The VM attributes can vary based on the requirement. You can use the Modeler to provide the VM details and view the output. You can add multiple scenarios by varying the attributes of the requirement and then perform the analysis.

Add Cloned VMs

You may want to add VMs to your environment, which have same or similar attributes of existing VMs in the environment. For this, you can use the Add Cloned VMs scenario. You can also specify any attributes that need to be different from the existing VMs.

Delete Host

You may want to delete a particular host to distribute or decrease the workload of your environment. If the load on a host is low, you can re-allocate the VMs and analyze the impact on the environment. During the maintenance period, you can add, move or remove the host for a particular time period to check the impact on the environment. Using the Modeler functionality, you can perform analysis by excluding the host for a certain period and checking the capacity of the datacenter.

Adding New/Cloned VMs or Deleting a Host

To add a new/cloned VM, or to delete a host, follow these steps:

1. Select the Datacenter or Cluster from the **Environment** tree on the left pane.
2. Select **Add new VM(s)/ Add cloned VM(s)/ Delete Host** scenario from the **Select Action** drop-down list.
3. Based on the scenario selected, add the following values:

For Add new VM(s): **No. of VMs**, **Start Date**, **No. of vCPUs**, **End Date**, **Physical RAM(GB)**, **CPU Demand(GHz)**, **Disk(GB)**, and **Memory Used(GB)** fields.

For Add Cloned VM(s): **No. of VMs, Start Date, End Date, No. of vCPUs, and Physical RAM(GB)**

For Delete Host: **Start Date and End Date**

4. Click **Add Action** after verifying the data provided.

Note: Click **Set Defaults** to reset the default values.

The VM information appears in the **Scenario Workflow** table. From the Scenario Workflow table, you can click , to delete the entry in the table

5. Click **Run Scenario**. The CPU, Memory, and Storage utilization of the VM is displayed.

A table appears displaying the availability of the resources for the given date. If the resources can be utilized it passes the test else it fails the test.

6. Click **Show Forecast**. The forecast graphs for CPU, Memory, and Storage utilization for the particular datacenter is displayed.

A table appears on the right side of the graph displaying **Days to Capacity** and **Maximum Short Fall**.

Chapter 12: Configuring Capacity Head Room Settings

Capacity Head Room is defined as the buffer or reserved capacity that is set aside to avoid the capacity challenges in the environment.

Monitored Capacity = Total Capacity - Capacity Head Room

Configuring Capacity Head Room will affect the following features:

- Capacity Overview
- Capacity Modeler
- Alerts

You can configure the head room settings by any *one* of the following methods:

- [Updating the Head room levels in pvcd.P0 namespace](#)
- [Using the command line](#)

Configure the Head Room Values in pvcd.P0 namespace

Follow the steps:

1. Log on to the machine as root.
2. Run the command:

```
/opt/OV/bin/ovconfchg -edit
```

3. Open the pvcd.P0 namespace and update the following values:

```
RIGHTSIZE_CPU_HEADROOM=<Value>
```

```
RIGHTSIZE_MEM_HEADROOM=<Value>
```

```
RIGHTSIZE_DISK_HEADROOM=<Value>
```

In this instance,

the *Value* is the head room value for CPU, memory, and disk.

By default, the head room value for CPU and memory is 20, disk is 10.

Using the Command Line

Follow the steps:

1. Log on to the machine as root.
2. Run the following command to update the head room values for CPU and Memory:

```
/opt/OV/bin/ovconfchg -ns pvcd.PO -set RIGHTSIZE_CPU_HEADROOM=<Value>
```

```
/opt/OV/bin/ovconfchg -ns pvcd.PO -set RIGHTSIZE_MEM_HEADROOM=<Value>
```

```
/opt/OV/bin/ovconfchg -ns pvcd.PO -set RIGHTSIZE_DISK_HEADROOM=<Value>
```

In this instance,

the *Value* is the head room value for CPU, memory, and disk.

By default, the head room value for CPU and memory is 20, disk is 10.

Chapter 13: Troubleshooting HP vPV

The following section details how to troubleshoot HP vPV:

Unable to scroll to bottom of browser window

Symptom	When accessing HP vPV user interface, you are unable to scroll to the bottom of the browser window.
Cause	This happens when your screen resolution is not set to an appropriate value.
Resolution	Set your screen resolution to a higher value. The recommended screen resolution for viewing the HP vPV interface is 1280x768 and the browser must be in the full screen mode.

Unable to log on to the HP vPV interface after logging out

Symptom	When you log out and try to log on to the HP vPV user interface again, the page refreshes to display the Login page again.
Resolution	Provide your credentials and try to log on again. The HP vPV user interface page appears.

Unable to View Graph in Certain Formats (XLS/TSV)

Symptom	After drawing a performance graph, you are not able to view it in formats like .xls and .tsv.
Cause	Option to download files in the Microsoft Excel and .tsv format may not be enabled in the browser security settings.

Resolution	<p>To check the browser settings, perform the following steps:</p> <ol style="list-style-type: none"> 1. Select Internet Options from the Tools menu of IE browser. The Internet Options window opens. 2. Click the Security tab. Check if the security level in your browser settings is set to High. 3. Make sure the Internet icon is selected and click Custom Level. The Security Settings window opens. 4. Scroll down to the Downloads section and select the Enable option under File Download. 5. Click OK and close the Internet Options window. 6. Open the Control Panel and double-click Folder Options. 7. Click the File Types tab to display the registered file types. 8. Select XLS file format and TSV file format from the Registered file types list, and then click Advanced. The Edit File Type window opens. 9. Click to clear the Confirm Open After Download check box. 10. Click OK.
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Unable to connect to VMware vCenter Server

Symptom	After installing HP vPV, you are not able to access HP vPV from VMware vCenter Server.
Cause	There may be a firewall between HP vPV server and VMware vCenter Server.
Resolution	Configure the firewall to allow communication between HP vPV server and the VMware vCenter Server. The ports that must be opened are 80 and 443.

Unable to access HP vPV in BSM when it is accessed using HTTPS

Symptom	When HP vPV is accessed in MyBSM using HTTPS, the browser displays a security warning: 'Do you want to view only the webpage content that was delivered securely?' . Upon clicking Yes , the webpage displays the message: 'Navigation to the webpage was canceled.'
Cause	The security settings of the browser are set such that the mixed content warnings are enabled.

Resolution	<p>To disable the mixed content warning:</p> <ol style="list-style-type: none"> 1. In the Internet Explorer, go to Tools > Internet Options > Security. 2. Select the Internet icon. 3. Under Security levels for this zone, click Custom Level. 4. In the Security Settings window, go to Miscellaneous > Display mixed content. 5. Click the Disable radio button. 6. Click OK. <p>The mixed content warnings are disabled.</p>
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Collection is not working in KVM/Xen

Symptom	Data is not collected for one or more data sources.
Cause	<ul style="list-style-type: none"> • ssh is not automated • The trace logs in ovpmtrace.0.txt are not logged properly. • There are 2 opsagt processes running on the HP vPV virtual appliance and one opsagt process is the child of another.

Resolution	<p>To check whether collection is not working:</p> <ul style="list-style-type: none"> • Check whether ssh is automated. <p>To check whether ssh is automated:</p> <ol style="list-style-type: none"> a. Run the command: <pre>ssh <username>@<KVM/Xen hostname></pre> <p>where, <i><username></i> is the username of the KVM/Xen user and <i><KVM/Xen hostname></i> is the hostname of the KVM/Xen host.</p> b. If you are prompted for a password, then the collection is not working. <ul style="list-style-type: none"> • Run the command: <pre>For KVM: virsh -c qemu+ssh://root@<hostname>/system</pre> <pre>For Xen: virsh -c xen+ssh://root@<hostname>/</pre> <p>Where, <i><hostname></i> is the host name of the KVM/Xen server.</p> <p>If you are prompted for a password, then the collection is not working.</p> • Check for trace logs in ovpmtrace.0.txt located at /var/opt/OV/log/. <p>Solution 1</p> <p>To restart the collection:</p> <ol style="list-style-type: none"> 1. Click  on the Options pane. The Admin page opens. 2. On the Data Sources tab, click Restart Collection. <p>Solution 2</p> <p>If there are 2 pvcd processes running on the HP vPV virtual appliance and one pvcd process is the child of another:</p> <ol style="list-style-type: none"> 1. Stop all the pvcd processes that are running, using the following command: <pre>ovc -stop pvcd</pre> 2. It is recommended that you update the libvirt library to the latest version on the HP vPV machine. 3. Restart collection using the following command: <pre>ovc -start pvcore</pre>
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Unable to launch Real Time Guest OS Drilldown, port is not available

Symptom	When accessing HP vPV user interface, you are unable to connect and open the Guest OS Drill down page as the default port is not free.
Cause	This happens when the port is already in use.
Resolution	<p>To configure the port number:</p> <ol style="list-style-type: none"> 1. Log on to the node as administrator. 2. Go to the directory: <ul style="list-style-type: none"> ■ On Linux or Linux Debian node - /opt/ OV/ hpcs 3. Open the hpcs.conf file and edit the default port number and collection interval in the hpcs.runtime namespace. 4. Modify the default port number as port=<Value>. By default, nodes deployed with Real Time Guest OS Drilldown component use the port 381 for communication. In this instance, <Value> is the port number that is used by Real Time Guest OS Drilldown component. 5. Restart Real Time Guest OS Drilldown component.

Collection is not working in HP aPaaS

Symptom	Data fails for HP aPaaS data sources.
Cause	HP aPaaS target is not accessible from the HP vPV host.

Resolution	<p>To check whether HP aPaaS target is accessible:</p> <ul style="list-style-type: none"> Try pinging the HP aPaaS target from the HP vPV host: <pre>ping api.abcd-azd7.local</pre> <p>If there is no response from the target, then the collection is not working.</p> <p>To enable collection from the host:</p> <ol style="list-style-type: none"> Open the hosts file from <code>\etc\</code> directory. Add the appropriate host information in the hosts file. <pre><host IP address><HP aPaaS target URL></pre> <p>where,</p> <p><code><host IP address></code> is the host IP address and,</p> <p><code><HP aPaaS target URL></code> is the host URL.</p> <p>For example:</p> <pre>12.345.67.890 api.abcd-azd7.local</pre> <ol style="list-style-type: none"> Ping the HP aPaaS target again to see if connection is working.
------------	---

Metrics are missing when a graph is viewed as a table.

Symptom	<p>In the workbench window:</p> <ol style="list-style-type: none"> Go to the Graphs tab, and generate a graph using multiple metrics. From the Options menu in any graph, select the View as Table option. <p>The table view for the graph does not display all the metrics selected to generate the graph.</p>
Cause	<p>The metrics are available in the table, but they are not visible because the horizontal scroll bar for the table is hidden.</p>
Resolution	<p>To view all the metrics:</p> <ol style="list-style-type: none"> Scroll down the table using the vertical scroll bar. A second horizontal scroll bar - in addition to the scroll bar already visible - appears. <p>Scroll across the table using this scroll bar.</p>

Data does not display for graphs in Capacity Usage Trends

Symptom	<ol style="list-style-type: none"> 1. CPU usage and Memory Usage values for Cluster displays as 0 in the Resource information table on the Capacity Usage Trends page. 2. Storage Allocation graph does not show any data in the Overview page. 3. The Utilization by File Types graph does not display any data in the Summary for Data Stores page.
Cause	HP vPV server time and vCenter time may not be in sync.
Resolution	Check if the HP vPV server time and data source time are in sync. HP vPV collects time bound data from the vCenter. So time must be synchronized across the HP vPV virtual appliance and the vCenter appliance or server.

Not able to access HP vPV user interface when PKI authentication is enabled

Symptom	When trying to access HP vPV while PKI authentication is enabled, browser displays the message "Page cannot be displayed"
Cause	The CAC certificate might have expired or is revoked.
Resolution	Check if the certificate is expired or revoked.

Tooltip not appearing adjacent to the graph

Symptom	When accessing HP vPV in Firefox, the tooltips for the graphs are not appearing close to the cursor.
Cause	The offset value for HTML elements in different browsers are different.
Resolution	Access HP vPV using Google Chrome.

Graphs show less than 12 data points (based on 5 minute data collection) for an hour

Symptom	<p>Based on 5 minute data collection, graphs must show 12 data points for an hour. But graphs are showing less than 12 data points.</p> <p>OR</p> <p>Data summarization slider in the Options pane of the Treemap does not display uniform data points for 5 minutes.</p> <p>OR</p> <p>Treemap shows data only for Hosts and VMs.</p>
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Cause	<p>The reason can be one of the following:</p> <ul style="list-style-type: none"> HP vPV renders graphs based on summarized values, with a 5-minute interval. The data collector may not complete the collections on exact 5 minutes always. So 2 data points might get averaged out during summarization. <p>OR</p> <ul style="list-style-type: none"> In large vSphere environments with high number of instances (more than 3000), data collection and logging in HP vPV might get delayed. As a result, you may experience data gaps. Performance data collection for large number of instances is a resource and time intensive job for the vCenter server and HP vPV. The huge volume of data, might result in the delay in data logging due to indexing and co-relation between entities.
Resolution	<p>If data gaps persist for long or you see data points are missing for more than 3 intervals, check the vCenter configuration, user permissions, and deployment environment of HP vPV.</p>

PV Collection Daemon does not start after rebooting

Symptom	<p>PV Collection Daemon does not start after reboot. The <code>ovc -status</code> shows <i>pvcd</i> in aborted state, after rebooting.</p> <p>OR</p> <p>Vertica Database does not start after rebooting.</p>
Cause	<p>If the HP vPV Virtual Appliance is shutdown abruptly, sometimes the database does not start. Due to this, <i>pvcd</i> exits on rebooting.</p>
Resolution	<p>Restart the <i>pv</i> process (<i>pvcd</i>, Tomcat, and Vertica) after rebooting the machine. Run the command, pv restart from the HP vPV console.</p>

Tracing for Advanced Troubleshooting

Component	Description	Location
<p><i>pvcd</i> (PV Collection Daemon)</p>	<p><i>pvcd</i> daemon uses XPL tracing mechanism. A default <i>pvcdXPL.itc</i> (trace configuration) is available in <code>/opt/OV/support</code> directory.</p> <p>To start the tracing, run</p> <pre>/opt/OV/support/ovtrccfg -cf /opt/OV/newconfig/conf/xpl/trc/pvcdXPL.tcf</pre> <p>The XPL trace files are present at <code>/tmp/pvcd_*.trc</code>.</p> <p>To stop tracing, run <code>/opt/OV/support/ovtrccfg -app pvcd -off</code></p>	<p>If tracing is enabled, <code>/tmp/</code> directory contains the trace files (use <code>ls /tmp/pvcd_*.trc</code>)</p>

Component	Description	Location
HP vPV Web Server	To start tracing – pv trace on	/var/opt/0V/lo g
	To stop tracing – pv trace off	/var/opt/0V/lo g

Data Collection Status Messages

In HP vPV, when data collection does not happen properly, the system displays some error messages. The following table lists the error messages, scenarios when these messages can appear, and resolution, wherever applicable.

Error Message /Status Message	Scenario	Resolution
Connecting...	HP vPV is establishing connection with the data source.	No resolution required.
Connected	Collection is completed successfully and waiting for the next collection to start.	No resolution required.
Data Collection in Progress...	Collecting data and storing it in the database.	No resolution required.

Error Message /Status Message	Scenario	Resolution
<p>Total number of instances exceed the maximum limit of the free license instance count (<maximum count>). Install a permanent license with sufficient capacity or enable the evaluation license from the Admin page.</p>	<p>Instance count exceeds the specified limit of the free license.</p>	<p>Perform one of the following actions:</p> <ul style="list-style-type: none"> • Wait for the next data collection to complete. • Remove a data source to adjust the instance count. For more information on removing data sources, see "Removing a Data Source" on page 30. • Install a permanent license with sufficient capacity or enable the evaluation license from the Admin page.
<p>Total number of instances exceed the maximum limit of the license instance count (<maximum count>). Use a data source or data source credentials with fewer instances associated.</p>	<p>Instance count exceeds the specified limit of the free license.</p>	<p>Perform one of the following actions:</p> <ul style="list-style-type: none"> • Use a data source or data source credentials with fewer instances associated. • Remove a data source to adjust the instance count. For more information on removing data sources, see "Removing a Data Source" on page 30.
<p>Total number of instances exceeds the maximum limit of the license instance count (<maximum count = 25>). Wait for the next data collection to complete or restart using the 'Restart Collection' button.</p>	<p>Instance count exceeds the specified limit of the free license.</p>	<p>Perform one of the following actions:</p> <ul style="list-style-type: none"> • Wait for the next data collection complete. • Restart using the 'Restart Collection' button on the Admin page.

Error Message /Status Message	Scenario	Resolution
Total number of Hosts and VMs exceeds the maximum count 25. Use vCenter credentials with fewer Hosts and VMs associated.	Instance count exceeds the specified limit.	Perform one of the following actions: <ul style="list-style-type: none"> • Remove a data source to adjust the instance count. For more information on removing data sources, see "Removing a Data Source" on page 30. • Limit the number of instances associated with a data source.
Data Collection failed. Check if Libvirt services are running on the HP vPV server.	The Libvirt services are not running on the HP vPV server.	The Libvirt services must be running on the HP vPV server.
Invalid username or password	Credentials provided are wrong.	Provide the correct credentials.
Connection Timeout	Connection request to the data source has timed-out.	Wait for the next data collection.
Unable to connect to vCenter server	This can be due to any of the following scenarios: <ul style="list-style-type: none"> • Unable to connect to data source • Invalid data source name • System is not on the network. 	Actions: <ul style="list-style-type: none"> • Check if the data source is running. • Provide the correct data source name. • Ensure that the data source is accessible from HP vPV.

Error Message /Status Message	Scenario	Resolution
Unable to collect performance data from the vCenter	No performance data is coming from the data source.	Make sure that the data source services are up and running and historical data collection is happening.
Unable to connect to the Database	Database connection fails.	Try restarting HP vPV.
Unable to start collection: Error occurred while connecting to the Database	Database is not running or HP vPV is not able to connect to the database.	Try restarting HP vPV.
Unable to start collection: MetricList is empty	Metric list in the integration XML is empty.	Contact Support.
Unable to start collection: Error occurred while reading Database configuration	Error occurred while reading the database configuration file.	Contact Support.
Unable to start collection: Model generation failed	Database model generation fails.	Contact Support.
Not Connected	Collection threads fail to get created or are yet to be created.	Contact Support.
Connection Error	Generic message shown when there is an unknown exception.	Check <i>logs/trace</i> .

Unable to install the collector service on Windows 2012 R2

Symptom	<p>After downloading the Hyper-V proxy collector (vPVWinVirtCollector.zip) on Windows 2012 R2, you get the following error while installing the Install.bat collector.</p> <p>The system cannot find the path specified.</p> <p>"Installing the vPV Collection Service"</p> <p>Microsoft (R) .NET Framework Installation utility Version 4.0.30319.33440</p> <p>Copyright (C) Microsoft Corporation. All rights reserved.</p> <p>Exception occurred while initializing the installation:</p> <p>System.IO.FileLoadException: Could not load file or assembly 'file:///C:\New folder\vPVWinVirtCollector.exe' or one of its dependencies. Operation is not supported. (Exception from HRESULT: 0x80131515).</p> <p>"Starting the vPV Collection Service"</p> <p>The service name is invalid.</p> <p>More help is available by typing NET HELPMSG 2185.</p>
Cause	<p>While installing Install.bat collector, you get an error due to the group security policy.</p>
Resolution	<p>To remove the group security policy, follow these steps:</p> <ol style="list-style-type: none"> 1. Go to the directory where you have extracted the vPVWinVirtCollector.zip package. 2. Right-click the vPVWinVirtCollector.exe, system.management.automation.dll, and JsonSharp.dll respectively and go to Properties. 3. In the General tab, go to Security field and click Unblock. 4. Run the Install.bat as a domain user with administrative privileges to start the collection.

HP vPV loses connection to vCenter

Symptom	Data collection stops for vCenter.
Cause	HP vPV loses connection to vCenter target.
Resolution	<p>Run the following command to restart the collection:</p> <pre>ovc -restart pvcd</pre>

Chapter 14: Frequently Asked Questions

All Data Sources

- Why do some graphs show a message "No data found for the duration with points every 5 minutes...." when I click on the Show Performance context-menu in the Treemap?

For some metrics, the data does not get collected during the initial collection but is collected later. For the graphs using these metrics, you may not see data after the initial collection. But data will be available after a few collections. These metrics and graphs are as listed in the following table.

Class	Graph	Metric
Host	Disk Usage	disk_read_average_kiloBytesPerSecond
		disk_write_average_kiloBytesPerSecond
	Memory Savings	mem_sharedcommon_average_kiloBytes
		mem_shared_average_kiloBytes
Guest	Disk Usage	DiskPhysIOByteRate
		DiskPhysReadByteRate
		DiskPhysWriteByteRate

- Why does data collection always show as In progress and HP vPV utilize too much CPU to run?

By default, HP vPV collects data from the data sources every 5 minutes. If a data source response is slow or HP vPV is configured to monitor too many instances, the data collection may take more than 5 minutes.

- Why is data not available for some metrics?

For the following metrics there is no data collected from vCenter 4.1:

- **Guest:**

- Cpu_system_summation_milliseconds
- CPUUsedTime
- CPUWaitTime
- NetInPacket
- NetOutPacket

- **Host :**

- Cpu_used_summation_milliseconds
- Cpu_idle_summation_milliseconds
- NetInPacket
- NetOutPacket

Note: Data store metrics are collected only from vCenter 5.0 and above versions.

- Why am I not able to see folders in **HP vPV**?

Folders are not available in the Treemap and Configuration Items tree, but the corresponding VMs are added to the parent in the hierarchy.

- Some resources display the name of their immediate parents while other resources don't.

If multiple data sources of the same type contains instances with same name, then the HP vPV Treemap displays the immediate parent name of the instances alongside the instance name. The instance name and parent name will be written as: *<instance_name (parent_name)>*.

For example:

Scenario 1

In the vCenter domain, if a VM (VM1) belongs to two different vCenters, then, in the Treemap, the host name (Host1) of the VM is displayed alongside the VM name. The VM and host names are displayed as *VM1 (Host1)*.

Scenario 2

In the vCenter domain, if a Host (Host1) belongs to two different vCenters, then, in the Treemap, the cluster name (C1) of the host is displayed alongside the host name. The host and cluster names are displayed as *Host1 (C1)*.

However, if Host1 does not belong to any cluster, then the datacenter name of the host is displayed: *Host1 (Datacenter)*.

Note: Similar nomenclature is used if the resources are grouped using the **Group By** option in the **Options** pane.

- Why is memory utilization always 100 % for KVM, Xen, and OpenStack?

The memory utilization is always 100 % for KVM, Xen, and OpenStack because currently the total memory capacity is used to denote the memory utilization in Libvirt. This is so because the current versions of Libvirt do not display the memory utilization.

- How do I check the status of the database in **HP vPV**?

To check the status of the database:

- a. Run the following commands on the HP vPV server:

```
su pv_vertica

/opt/vertrica/bin/adminTools
```

- b. The administration UI for the Vertica database opens.

You can check the status of the Vertica database in the administration UI.

- There is a mismatch between the instance count of a data source displayed in the Treemap and the instance count of the same data source displayed on the Licensing and Data Management tabs in the Admin page.

When a data source goes in an error state, the instances from that data source are not considered while calculating the instance count displayed in the Admin page.

However, the instances from the erroneous data source will still be considered while calculating the instance count displayed in the HP vPV Treemap as long as the data source is not deleted from the HP vPV Admin page.

This is because the data from the Treemap is used to plot the graphs and reports in the workbench. Hence, it is necessary to have the information of all the data sources added in HP vPV.

- The **HP vPV** Treemap shows data for a data source even if the data source is in an error state. The HP vPV Treemap shows the data for a data source in error state for one hour after the last collection time.

- The HP vPV title bar hides the performance graphs' title bar if the performance graphs are dragged to the HP vPV title bar. This prevents me from closing the performance graphs. Refresh the browser to close the performance graphs.

- If I select the Highlight option from the Options pane, there is a mismatch between the VM count shown on the Treemap and the VM count shown on the Workbench.

The maximum valid Get URL length is 2000 characters. If the VM count in the highlighted resources is high, the overall Get URL length may exceed 2000 characters.

If the length of the VMs' Get URL exceeds 2000 characters, some of the URLs will be truncated. Hence, VMs with truncated URLs will not be visible on the Workbench.

- Why do I not see data for datastores in the Summary pages of the Optimization feature after starting HP vPV?

If you do not see data for datastores, wait for one hour and then check the data again.

- What are the log files available with HP vPV?

The following table lists the log files available with HP vPV:

Component	Description	Location
pvcd (PV Collection Daemon) and pvconfig	pvcd and pvconfig tools log messages in System.txt.	/var/opt/OV/log/System.txt
Collectors	vCenter and OpenStack collector status log file /var/opt/OV/log/status.virtserver	/var/opt/OV/log/status.virtserver
	KVM collector status log file	/var/opt/OV/log/status.kvm
	XEN collector status log file	/var/opt/OV/log/tmp/status.xen
Database Transaction	Vertica catalog file to view database transactions	/var/opt/OV/databases/pv/catalog/pv/v_pv_node0001_catalog/vertica.log
HP vPV Web Server	HP vPV Web Server component logs messages in ovpm.0.log	/var/opt/OV/log/ovpm.0.log

VMware vCenter Server

- How can I set upper and lower threshold values for the Treemap colors so that I can see the color variation only for the range of my interest?
 - Open the file
OVINSTALLDIR/newconfig/OVPM/smepack/VCENTER/integration/VCENTER_GC_Integration.xml.
 - Locate the corresponding **CI_VIEW** tag (for example, VM (Compute)) and **METRIC** tab (for example, guestMemPercent) for which you want to set the thresholds.
 - Add the additional tags- **COLOR_METRIC_MAX_VAL** for upper threshold value and **COLOR_METRIC_MIN_VAL** for lower threshold value.

For example,

```
<METRIC Name="MemEntlUtil" ColorCaption="UsagePercent" SizeCaption="AvailGBs">
<COLOR_CLASS>GUEST</COLOR_CLASS>
<COLOR_METRIC>MemEntlUtil</COLOR_METRIC>
<COLOR_METRIC_MIN_VAL>50</COLOR_METRIC_MIN_VAL>
```

```

<COLOR_METRIC_MAX_VAL>80</COLOR_METRIC_MAX_VAL>

<SIZE_CLASS>GUEST_CONFIG</SIZE_CLASS>

<SIZE_METRIC>MemEntl/1024</SIZE_METRIC>

</METRIC>

```

According to the preceding example, any VM with **MemEntlUtil** ≤ 50 appears green and with **MemEntlUtil** ≥ 80 appears red. The color from green to red is distributed among VMs with value > 50 and < 80 for **MemEntlUtil**, giving more color options for that range.

Note: It is strongly recommended that you do not modify the XML. And if you modify, maintain the XML structure properly. The changes are not retained during an upgrade. You may have to repeat the steps after upgrade.

- In VMware vCenter, first time data collection takes a long time

The initial collection time for VMware vCenter depends on:

- The number of instances from which data is collected.
- The response time of the VMware vCenter.

If the number of instances or the response time is high, then the initial collection will take long time to complete. The subsequent collections will take place quickly.

- After adding a new VMware vCenter Server to HP vPV, why do I see a lot of items missing or no performance data items in the Treemap?

When you add a VMware vCenter Server, it takes some time for the entire data to get collected. Till the first data collection is complete, you may not see data in the Treemap, but the resource count in the Resource pane is updated. You must wait for the first data collection to complete (last collection time gets updated in the **Data Sources** tab of the **Admin** page) to see the resources of the VMware vCenter Server in the Treemap.

- Why does not Datastore metric appear in HP vPV?

This can happen when your VMware vCenter Server version is 4.x. Data store metrics are not available for version 4.x. Log on into VMware vCenter Server using the VI client and select the first element available in the tree in VI Client. The VMware vCenter Server details along with the version appear on the right pane.

- Why do I not see any micro charts for datastores?

You may not see micro charts for datastores if the VMware vCenter Server is just added. Storage metrics are collected every 30 minutes, so there is no data to display initially. You need to wait for two or more data collection cycles to complete.

- Why does not data store show up in Treemap?

Data store does not appear in the Treemap if performance data is not being collected for

datastores at the VMware vCenter Server. Log on to the VMware vCenter Server using the VI client and check whether the **Performance** tab displays data for any of the datastores.

- Why do the default graphs for datastores not show any data?
Change the duration for the graph and check if data is shown in the graph.
- Why are resources available in the VI Client not visible in **HP vPV**?
This may happen when historical data is not available. Make sure that historical data is available from the VI Client.
- I see data in Treemap even after removing all the VMware vCenter Servers.
The Treemap will get updated when the next data collection (for any VMware vCenter Server) added happens.
- Why do I not see Storage IO metrics in **HP vPV**?
Storage IO metrics are not available for VMware vCenter Server version 4.x.
- What are the Logging levels required on a VMware vCenter Server?
The Logging levels 1 and 2 must be enabled on a VMware vCenter Server. Logging level 2 enables the VMware vCenter Server to collect data for the following Storage IO metrics:
 - NumDiskReads
 - NumDiskWrites
- When multiple VMware vCenter are deleted from the Data Source tab, the Data Sources tab still displays a few of the deleted VMware vCenters.
Close the Internet browser and open it again.
- Why do Reports and Capacity Usage Trends show mismatch in the allocation and utilization values of resources?
This is because the resource usage for hypervisor is also considered to calculate the utilization values. When the resource usage is closer to or has reached capacity, the usage values displayed exceed the allocation value as hypervisor usage is also included.

KVM/Xen

- In KVM and Xen domains, the memory and CPU metrics are not visible in the Metrics and Graphs tabs of the workbench.
The current version of Libvirt (0.10.2) does not support the memory and CPU metrics for Xen hosts. Hence, these metrics are not visible in the Metrics and Graphs tabs of the workbench. You can view these metrics using Domain-0 instance.

Also, for Xen hosts, the CPU utilization graph is not visible if the CPU utilization is less than one percent.

- Xen graphs do not show any data during the first five minutes.
HP vPV does not collect the utilization and performance metrics for hosts and guests (VMs) during the first collection interval. Hence, the Xen graphs are not populated during the first collection interval.
- If any KVM/Xen host:
 1. Is disconnected by changing its IP address.
 2. And the same KVM/Xen host is reconnected again after some time.All the guests in that data source display CPU utilization as 100%
The guests will show the correct CPU utilization after 2 collection cycles.

HP aPaaS

- The  icon for Users displays incorrect details about the Users.
In the HP aPaaS domain, if there are no applications available, then the  icon for Users in the Treemap displays incorrect details about the Users.
- Despite adding multiple HP aPaaS targets to HP vPV, the Treemap displays only one node.
HP vPV takes at least 5 minutes to display all the nodes if you add multiple HP aPaaS targets.
- When multiple HP aPaaS hosts are deleted, the Data Sources tab still displays a few of the deleted hosts.
Close the Internet browser and open it again.

Appendix

- **CPU Allocation** - Process by which CPU is allocated to run programs and services. The chart shows the amount of CPU allocated for the resources in the domain, in GHz.
- **Memory Allocation** - Process by which virtual memory is allocated to programs and services to access when running. The chart shows the amount of memory allocated to the resources in the domain, in GB.
- **Storage Allocation** - Process by which particular amount of storage space is assigned for specific programs and services. The chart shows the amount of storage allocated for resources in the domain, in GB.
- **CPU Usage** - Indicates the amount of CPU used by the programs and services in the domain, in GHz.
- **Memory Usage** - Indicates the amount of memory used by the programs and services in the domain, in GB.
- **Storage Usage** - Indicates the amount of storage space used by resources in the domain, in GB.
- **CPU Capacity** - Indicates the total CPU, in GHz.
- **Memory Capacity** - Indicates the total memory capacity, in GB.
- **Storage Capacity** - Indicates the total storage capacity, in GB.

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