Foglight™

Foglight™ for Virtualization, Standard Edition 7.0

User Guide

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User Guide
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Table of Contents

Introduction to this Guide

The *User Guide* provides conceptual information and procedures for how to use the various dashboards and views that are available with Foglight™ for Virtualization, Standard Edition.

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Component	License or Acknowledgment
Apache Ant 1.8.1[1]	Apache 2.0
Apache Batik 1.7	Apache 2.0
Apache Commons Collections 3.2	Apache 2.0
Apache Commons Compress 1.4.1	Apache 2.0
Apache Commons Discovery 0.4[2]	Apache 2.0
Apache Commons IO 2.0.1	Apache 2.0
Apache DBCP 1.4	Apache 2.0
Apache FOP 1.0	Apache 2.0
Apache Log4J 1.2.16	Apache 2.0
Apache Tomcat 7.0	Apache 2.0
Axis 1.4	Apache 2.0
commons-collections 2.1[3]	Apache 1.1[4]
commons-fileupload 1.2.2	Apache 2.0
commons-httpclient 4.2.1	Apache 2.0
commons-lang 2.6	Apache 2.0

Component	License or Acknowledgment
Google Web Toolkit 2.3	Apache 2.0
guava-libraries 11.0.2[5]	Apache 2.0
gwt-sl 1.0	Apache 2.0
Hibernate 3.2.7[6]	LGPL (GNU Lesser General Public License) 2.1
javamail 1.4.1	Common Developer and Distribution License (CDDL) 1.0
JAX-WS 2.2.1	Common Developer and Distribution License (CDDL) 1.0
JFreeChart 1.0.13[7]	LGPL (GNU Lesser General Public License) 2.1
JSch 0.1.36[8]	BSD - JCraft
jTDS SQL Server Driver 1.2[9]	GNU LGPL Version 3, 29 June 2007
opencsv 2.3	Apache 2.0
PostgreSQL 9.2.4	PostgreSQL[10]
PostgreSQL JDBC Driver 9.0-801	PostgreSQL[11]
Quartz Scheduler 1.8.4	Apache 2.0
slf4j - Simple Logging Facade for Java 1.6.0	MIT
spring-framework 3.x	Apache 2.0
Stax-api 1.0.1	Apache 2.0
VMware vCloud SDK for Java 5.1.0[12]	VMware vCloud SDK for Java 5.1.0
wsdl4j-1.6.2.jar 1.6.2	Common Public License 1.0
Xerces 2.11.0	Apache 2.0

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[6] The source code for this component may be found in the *usr/local/hibernate* product installation directory.

[7] The source code for this component may be found in the *usr/local/jfreechart-1.0.13* product installation directory.

[8] Copyright 2008 Atsuhiko Yamanaka, JCraft, Inc. All rights reserved.

[9] The source code for this component may be found in the *usr/local/jtds-1.2.2* product installation directory.

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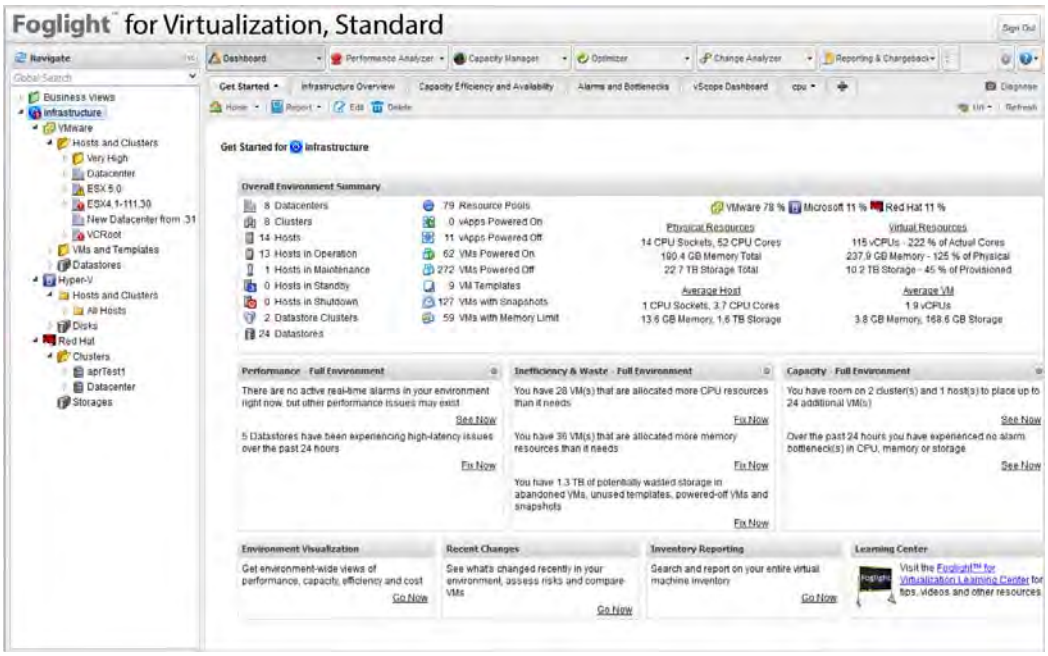
Dashboard

The dashboards shown in this view provide an overall summary of the status of the virtual environment. The Dashboard tab provides five default views:

- Get Started
- Infrastructure Overview
- Capacity Efficiency and Availability
- Alarms and Bottlenecks
- vScope Dashboard



You can also create a custom dashboard either by selecting the information you want to see from a list of reports or by using the Get Started dashboard as a starting point. For further information, see “Creating a Custom Dashboard” on page 13.

Get Started

This view provides an overall environment summary as well as a summary of things to do for the various aspects of the environment. From here you can drill down to see more detailed views.

This view opens by default when you log in to Foglight for Virtualization, Standard Edition.

Note The Get Started view does not react to selections in the navigation tree. It always shows the information for the entire environment.

The Get Started view can be easily customized for your needs. For more information, see “Editing a Dashboard” on page 14.

Infrastructure Overview

This view highlights the historical virtual machine trends. Hover over a bar in any of the graphs to display a dwell with an exact value for the given time period.

Capacity Efficiency and Availability

This view highlights the efficiency of resource utilization and the availability of resources for additional growth.

Double-click on any of the available hosts and clusters to display the Capacity Availability view. For further details, see “Capacity Availability” on page 29.

Alarms and Bottlenecks

This view highlights the performance-related status of the virtual environment.

Drill down from this view to see detailed information about the alarm or bottleneck. For example, double-clicking an alarm in the Top Five Root Cause Alarms tile displays the Root Cause view. See “Root Cause” on page 19 for further details.

vScope Dashboard

vScope provides an environment-wide, cross-hypervisor visualization of the status of your infrastructure from the perspectives of performance, capacity, efficiency and cost. These dashboards excel at providing high-level views of your environment where a list may not give an accurate portrayal of its overall health.

Double-clicking any item on a vScope dashboard takes you to a view with more detailed information on the selected item. Click **Close** to return to the main view.

Note Unlike most views in this product, vScope dashboards cannot be exported as PDF. They can, however, still be exported as CSV/XML.

Creating a Custom Dashboard

You can create a custom dashboard either by adding existing reports to a dashboard or by using the current Get Started dashboard as the initial view.

To create a new dashboard:

1. Click the plus sign tab  to the right of the other dashboard tabs.

   The dashboard is created and opens in editing mode. A **New dashboard** tab appears to the right of the other dashboard tabs.

2. From here, you can either:

   a. Click **Add Report** to add a report to the new dashboard. To do this, follow step 3 to step 6.

   b. Click **Start Page** to use the Get Started dashboard as the starting point for your new dashboard. For more information, see “Using the Get Started Dashboard” on page 14.

3. Select the report you want to add and click **OK**.

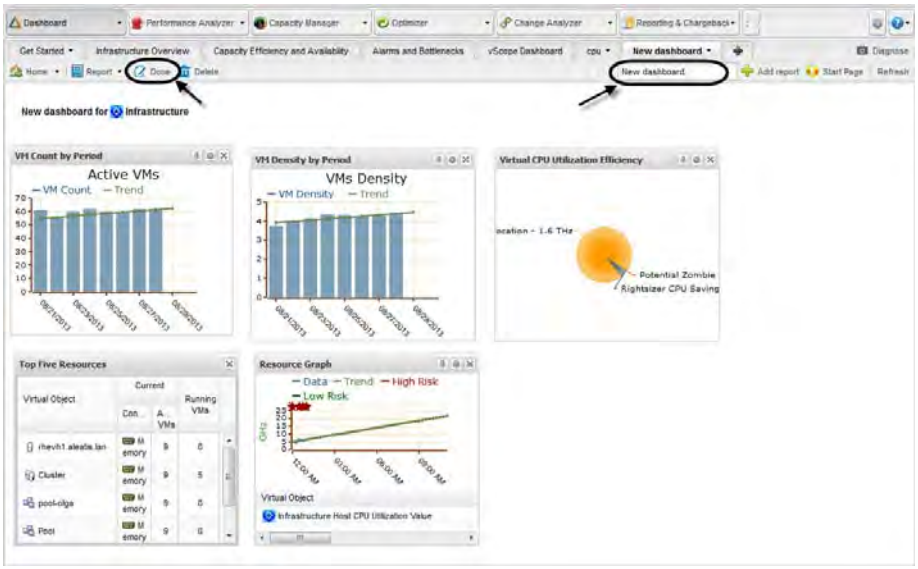
   The report is added. Position and size the report for your particular requirements.

4. Repeat step 2 and step 3 until you have added the necessary reports.

5. When you are finished adding reports, type the name of the dashboard in the **New dashboard** box.

6. Click **Done**.

The dashboard is added to the row of tabs.



Using the Get Started Dashboard

When creating a new dashboard, you may choose to use the most current version of the Get Started dashboard as the initial view and then edit it as required.

To use the Get Started dashboard:

1 Click Start Page .

You are prompted to confirm the replacement of the new dashboard with the latest version of the Get Started dashboard.

2 Click **Yes** to confirm.

The Get Started dashboard is loaded into the current view.

3 You can now edit it as required. For more information, see “Editing a Dashboard” on page 14.

Editing a Dashboard

You can modify a dashboard by editing or moving the tiles on a dashboard to suit your needs. You can also delete a dashboard if you find that you no longer require it.

To modify an existing dashboard:

1 Click **Edit**.

2 The individual tiles on the dashboard are available for modification. From here you can:

a Configure the report display by clicking the **Configure Gear** icon at the top right corner of the specific tile.

Note A view is configurable only if it includes elements than can be edited.

b Delete the tile by clicking the **Close** button in the top-right corner of the tile.

To delete an existing dashboard:

1 Click **Delete.**

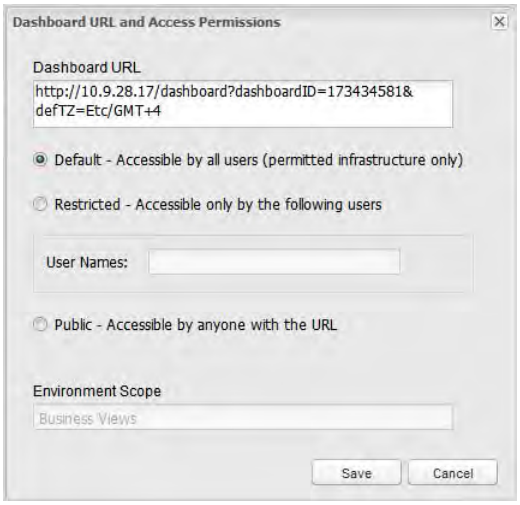
You are prompted to confirm the deletion of the object.

2 Click **Yes**.

The dashboard is removed.

Note You can also reorder dashboard tabs by simply dragging them to the right or left.

If you want to provide access to any configurable dashboard directly, without having to access the rest of the user interface, click **Url > URL and Permissions.** Select the access permissions to control access to the URL. The URL can then be copied and shared as appropriate.



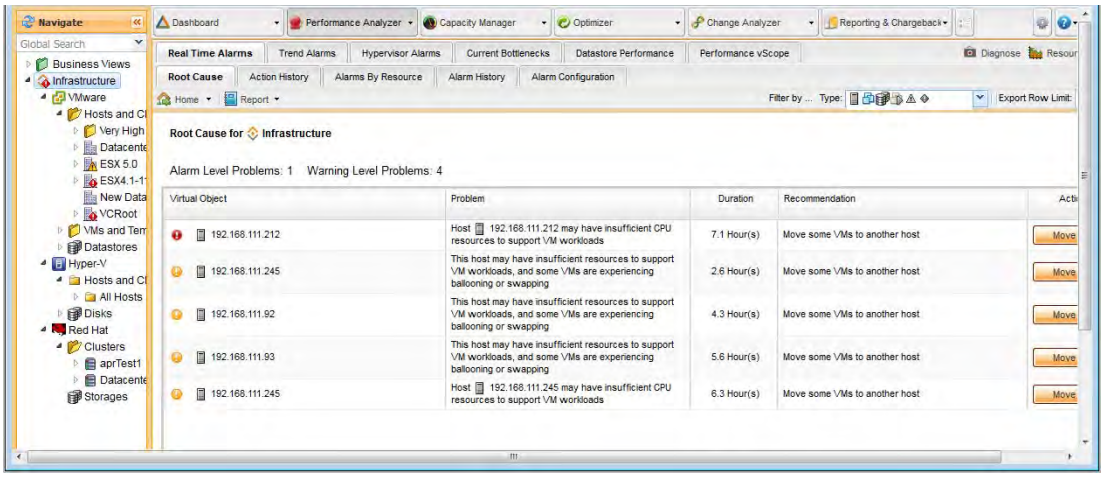
2

Performance Analyzer

Monitor, diagnose, and resolve real-time performance problems using Performance Analyzer. This module analyzes real-time alerts and system metrics to identify root cause, impact, and resolution of real-time performance problems.

The functionality of the Performance Analyzer module is divided into six major areas:

- Real Time Alarms
- Trend Alarms
- Hypervisor Alarms
- Current Bottlenecks
- Datastore Performance
- Performance vScope



Note Each view within the Performance Analyzer includes only the objects selected in the navigation tree.

Real Time Alarms

The Performance Analyzer uses real-time alarms that it sets automatically in vCenter and System Center, together with a rich set of performance metrics, to identify, analyze, and resolve real-time performance problems.

The Real Time Alarms tab includes five different views to provide insight into identified performance issues:

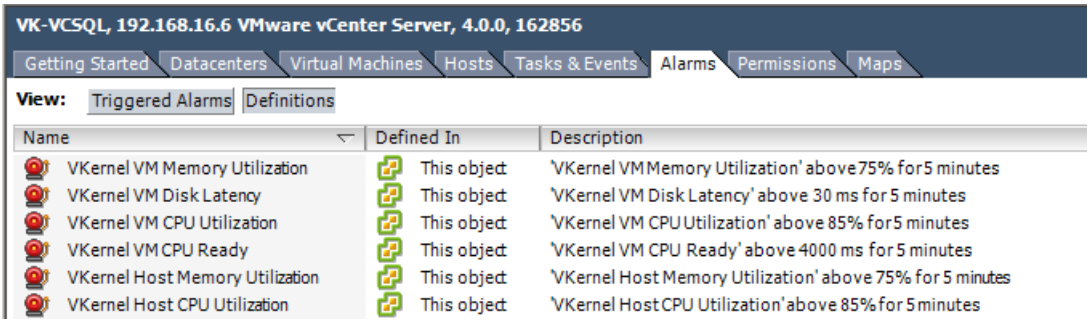
- Root Cause
- Action History
- Alarms By Resource
- Alarm History
- Alarm Configuration

Alarms Set in the VMware vCenter

Performance Analyzer automatically sets the following alarms in each vCenter, based on the VMware-specific threshold settings and duration times defined in Settings > Thresholds:

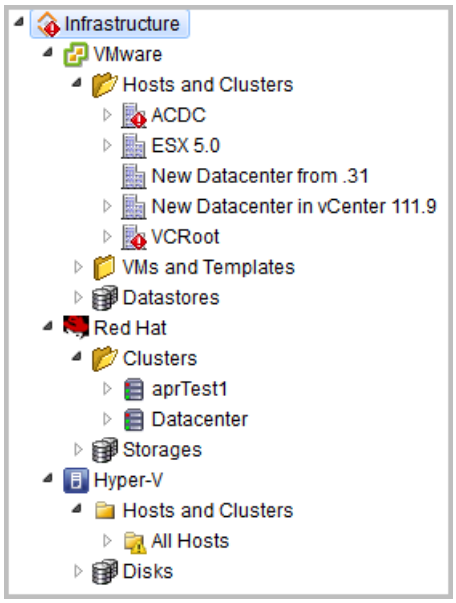
- for hosts:
  - Host CPU Utilization
  - Host Memory Utilization
- for virtual machines:
  - VM CPU Utilization
  - VM CPU Ready
  - VM Disk Latency
  - VM Memory Utilization

These alarms are set at the vCenter root level and apply to all objects in the virtual environment. All alarm names begin with VKernel for easy identification.



These alarms can be acknowledged in the vCenter client. In the Performance Analyzer module, you can click Real Time Alarms > Alarms By Resource tab, right-click the alarm name, and select the **Acknowledge and hide from the table** option. This action clears the selected alarm on the vCenter and hides it from the list of alarms until its state is changed again.

The alarm state of all objects in the virtual environment is clearly indicated in the Foglight for Virtualization, Standard Edition navigation tree. Alarm states roll up from child to parent objects in the tree, so that you are immediately aware of any problems regardless of the state of the navigation tree. In the example below, the  icon indicates that the ACDC and VCRoot objects are triggering alarms. This alarm state rolls up to the Infrastructure object.



Note Some alarms may not be available in older versions of vCenter. If they are not available, they do not appear and are not used in Performance Analyzer analysis.

Disabling these alarms causes some real-time functionality to be lost, but Performance Analyzer continues to use other metrics that it collects to identify and diagnose performance issues.

Alarms Set in the MS System Center

Performance Analyzer automatically sets the following alarms in each SCOM installation:

- for hosts:
  - Host CPU Utilization
  - Host Memory Utilization
- for Hyper-V virtual machines:
  - VM CPU Utilization
  - VM Disk Latency
  - VM Memory Utilization

These alarms are included in the Quest PRO Management Pack. The alarms themselves may not be modified, but the values of the Hyper-V-specific threshold settings and duration times can be overridden as described in Settings > Thresholds.

These alarms can be cleared in the SCOM console.

Disabling these alarms causes some real-time functionality to be lost, but Performance Analyzer continues to use other metrics that it collects, to identify and diagnose performance issues.

Root Cause

The Root Cause view of Real Time Alarms identifies all alarms that require action to resolve a current problem. It does not contain alarms that result from a root cause alarm. The Root Cause view includes alarms set by the VMware vCenter, MS System Center, and performance counters (for details, see “Alarms Set in the VMware vCenter” on page 17, “Alarms Set in the MS System Center” on page 18, and “Performance Counters” on page 19).

Alarms are listed in a table that includes the virtual object, problem, problem duration, and recommendation. Where appropriate, a button in the Action column provides an immediate option to remediate the problem.

Double-click on a particular alarm in the Root Cause view to open the Impact Analysis view for the specific alarm. Click **Close** to close that view.

Performance Counters

If the last performance counter point exceeds the threshold set in the appliance settings, then an alarm or a warning is triggered. These alarms cannot be cleared unless their cause is expired. The Performance Analyzer uses the following counters:

- Memory Active and Memory Swapped for Hyper-V virtual machines.
- Memory Ballooned for VMware virtual machines.
- Bus Resets for VMware virtual machines.
- Commands Aborted for VMware virtual machines.

Impact Analysis

In addition to the problem, problem duration, and recommendation provided by the Root Cause view, the Impact Analysis view provides all of the information necessary to fully understand the problem as well as a possible resolution.

Action History

The Action History view shows all of the Root Cause remediations performed by the user.

Alarms By Resource

The Alarms By Resource view shows all currently open alarms (only predefined VKernel alarms) and the value of the pertinent resource metric for all objects selected in the navigation tree.

Alarm History

All alarms, both current and resolved, are included in the Alarm History view. As with the other views, any of the columns can be sorted. This allows a view of all alarms for a particular object or of a particular type.

Alarm Configuration

This view shows all of the real-time alarms that are currently set. You can add, edit, or delete alarms in this view.

While the real-time alarms set in vCenter and System Center are always present, these alarms can be limited to a specific object type (such as a host or virtual machine).

To edit or delete an alarm:

1. Select the specific alarm in the table.
2. Click either the **Edit Alarm** button or the **Delete Alarm** button in the far-right column.

To add a new alarm.

1. Click the **New Alarm** button.
2. In the New Alarm dialog box, type the name of the alarm.
3. In the **Metric** list, select the metric on which you want to set an alarm.
4. Select the check boxes of those objects you want to monitor.
5. To limit real-time alarms to particular objects, folders, or business views, click the **Scope** tab and set the scope for the particular alarm.
6. Optional. To configure notifications, click the **Notifications** tab.

   Notifications of active real-time alarms can be emailed to selected users, sent as traps to an existing management system, sent as alerts to the System Center Operations Manager / System Center Virtual Machine Manager, or added to a selected RSS Feed.
7. Click **Add**.

Alarms can be enabled or disabled, as necessary, by selecting the alarm in the table and clicking **Enable Alarm** or **Disable Alarm** (the buttons are located on the far-right column), respectively.

Trend Alarms

Trend Alarms are used to pinpoint extraordinary changes in resource utilization. You can set a trend alarm to generate an alarm and notify the user if the utilization of a particular resource increases (or decreases) significantly in a relatively short period of time.

Note Trend Alarms are calculated by the Performance Analysis tool and have no equivalents in a vCenter. These alarms cannot be manually cleared in the vCenter.

Alarm History

This view shows the history of all alarms with resolution dates (if the alarms were resolved).

Alarm Configuration

This view shows all of the trend alarms that are currently set. There are two types of trend alarms: trend alarms for virtual objects and trend alarms for datastores.

You can edit, delete, or add trend alarms in this view.

To edit or delete a trend alarm:

1 Select the specific alarm in the table and click **Edit Alarm** or **Delete Alarm** (the buttons are located on the far-right column), respectively.

To add a new trend alarm:

1 Click **New Alarm**.

The Add Alarm dialog box appears.

2 In the **Alarm Type** tab, define the type of the new alarm.

a Select the trend alarm type that you want to add (**Virtual Objects** or **Datastores**).

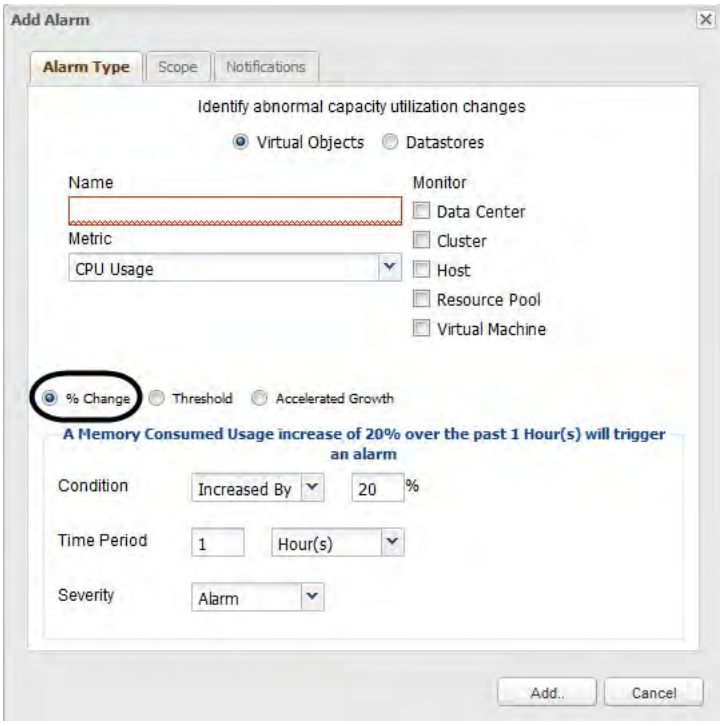
b Type the name of the alarm in the **Name** field.

c From the **Metric** list, select the type of metrics that you want to monitor.

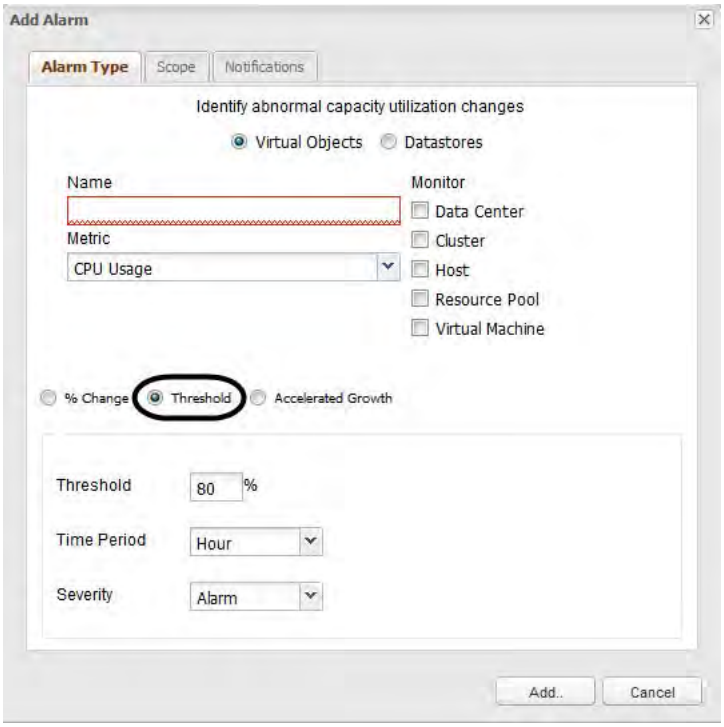
d Virtual Objects only: select the **Monitor** check boxes of those objects for which you want to generate alarms.

e Trend alarms can be configured to alert on a significant change in resource utilization, when resource utilization reaches the warning or alarm threshold, or on an accelerated growth in resource utilization.

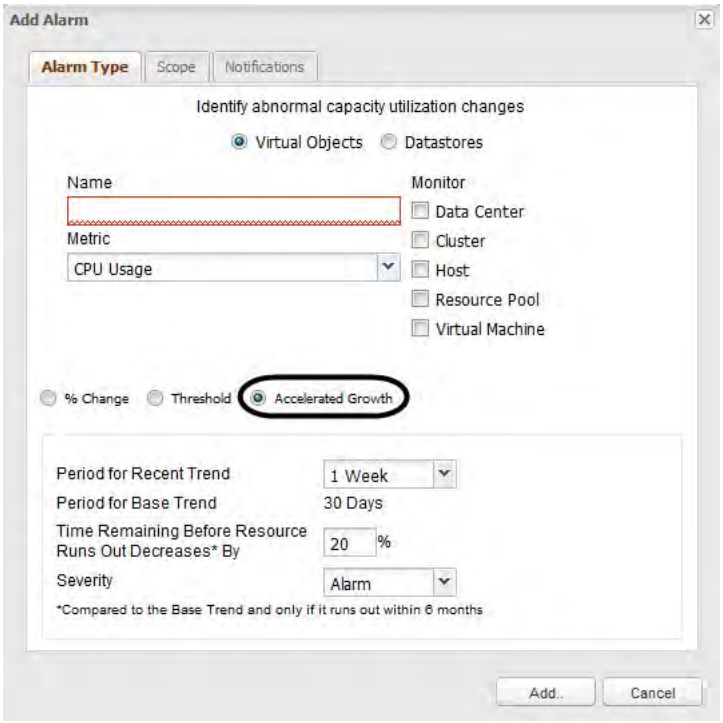
- To set an alarm for a change in resource utilization, select the **% Change** option and set the period within which the change must occur.



- To set an alarm for a resource threshold, select the **Threshold** option. Type the threshold percentage and select the time period during which the average utilization must meet or exceed the threshold.



- To set an alarm for accelerated growth, select the **Accelerated Growth** option, then set the period to use for the recent trend and specify the change in time remaining before the resource is exhausted.



- In addition to trend alarms for virtual objects, you can also set **Threshold** and **Accelerated Growth** trend alarms for datastores.

3 The trend alarms for virtual objects can be limited to particular objects, folders or business views by setting the scope for the particular alarm. The trend alarms for datastores can be limited to particular datastore clusters or datastores. Click the **Scope** tab to set the specific items.

4 Click the **Notifications** tab to set the communications methods. Notifications of the active trend alarms can be emailed to selected users, sent as traps to an existing management system, sent as alerts to a System Center Virtual Machine Manager, or added to a selected RSS Feed.

Use the **First Notification**, **Second Notification**, and **Third Notification** tabs to define one, two, or three notifications for a trend alarm.

Important When defining the second and third notifications, these notifications are sent out only if the alarm trend **continues** over the period of time defined in the Alarm Type tab. For example, if the alarm trend has an accelerated growth defined with a 30-day base trend, the first notification would go out after 30 days, the second notification would go out 30 days after the first notification (if the alarm trend continues during that time period), and the third notification would go out 30 days after the second notification (if the alarm trend continues during that time period).

5 When you finish defining the alarm trend, click **Add.**

Default Trend Alarms

Several trend alarms are pre-set by default when Foglight for Virtualization, Standard Edition is installed. You can delete or modify any of them, as well as add your own. These default alarms are set on VMs or hosts across your entire infrastructure for the following conditions:

- Average CPU utilization doubles over the past week (Host, VM)
- Average memory utilization doubles over the past week (Host, VM)
- Average disk throughput doubles over the past week (Host, VM)
- Average CPU Ready doubles over past day (VM)
- Average memory swapped doubles over the past day (Host, VM)
- Average memory ballooned doubles over the past day (VM)
- Average disk latency doubles over the past day (Host, VM)

Hypervisor Alarms

The Hypervisor Alarms tab shows all monitored vCenter and System Center alarms, not just the ones specifically set by Performance Analyzer.

Note Only the alarms that are installed with the Foglight for Virtualization, Standard Edition are monitored within System Center.

The Hypervisor Alarms tab provides two different views: Current Alarms and Alarm History.

Current Alarms

This view lists the currently active monitored vCenter and System Center alarms.

Alarm History

This view lists all of the monitored vCenter and System Center alarms, both current and resolved.

Current Bottlenecks

The Current Bottlenecks views identify the objects that currently have capacity bottlenecks. You can choose to exclude specific objects from analysis of potential bottlenecks. For further details, see “Excluding Objects from Analysis” on page 26.

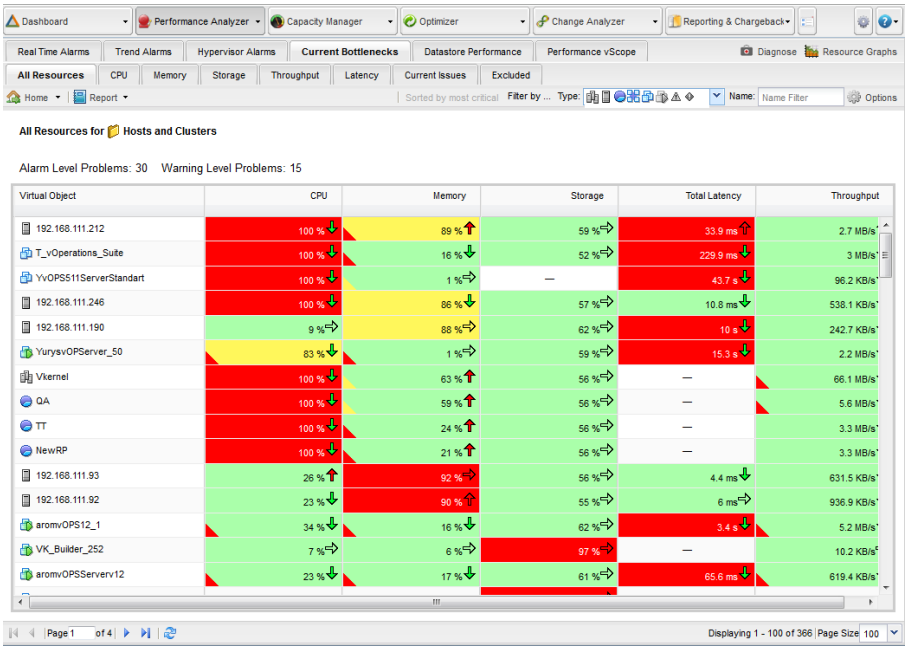
Seven different views are available for analysis and resolution of bottleneck problems:

- All Resources
- CPU
- Memory

- Storage
- Throughput
- Latency
- Current Issues
- Excluded

All Resources

The All Resources view is an overview of the current bottlenecks for all key resources. The average utilization over the evaluation period (typically the last 24 hours) of the key resource metrics is shown. The direction of change of the average utilization is shown by arrow icons (up, down or constant). Other significant metric values (for example, peak, swapping, ballooning) are indicated by a triangle icon, as shown in the following illustration.



Double-click a particular alarm in any of the views to open the Root Cause view for the specific alarm.

Root Cause

This view provides a detailed analysis of the specific bottleneck with specific recommendations and supporting information.

CPU

In addition to the average CPU utilization, the CPU view also displays the other metrics pertinent to CPU analysis.

Note *CPU Peak* is defined as a sustained value for 15 minutes. This timeframe can be changed by the administrator. The *CPU* column is the average over the last 24 hours. The trending is just for the *CPU* reading (the average over the 24 hour period).

Memory

In addition to the average memory utilization, the Memory view also displays the other metrics pertinent to memory analysis.

Storage

In addition to the average storage utilization, the Storage view also displays the average utilization of the individual partitions within the storage.

Throughput

In addition to the average throughput rate, the Throughput view also displays the other metrics pertinent to throughput analysis for each individual datastore on the object.

Latency

In addition to the average latency, the Latency view also displays the other metrics pertinent to latency analysis for each individual datastore on the object.

Current Issues

The Current Issues view displays all resource bottlenecks across all resource categories.

Excluded

The Excluded view displays all the resources currently excluded from the analysis of potential bottlenecks. For details about how to exclude resources, see “Excluding Objects from Analysis” on page 26.

Excluding Objects from Analysis

You may want to exclude an object from analysis of bottleneck issues if, for example, an object is configured or used for a specific purpose (testing, development).

To exclude objects:

1. From the navigation tree, select the object you want to exclude (cluster, VM, or host).
2. Right-click and select **Exclusions > Exclude Children.** You can choose to exclude specific resources or **All** resources.

   The object and the resources you selected are added to the Excluded tab.

If you later decide to include the object, right-click on the object in the navigation tree, and select **Exclusions** > **Include Children**. Choose the resources you want to include.

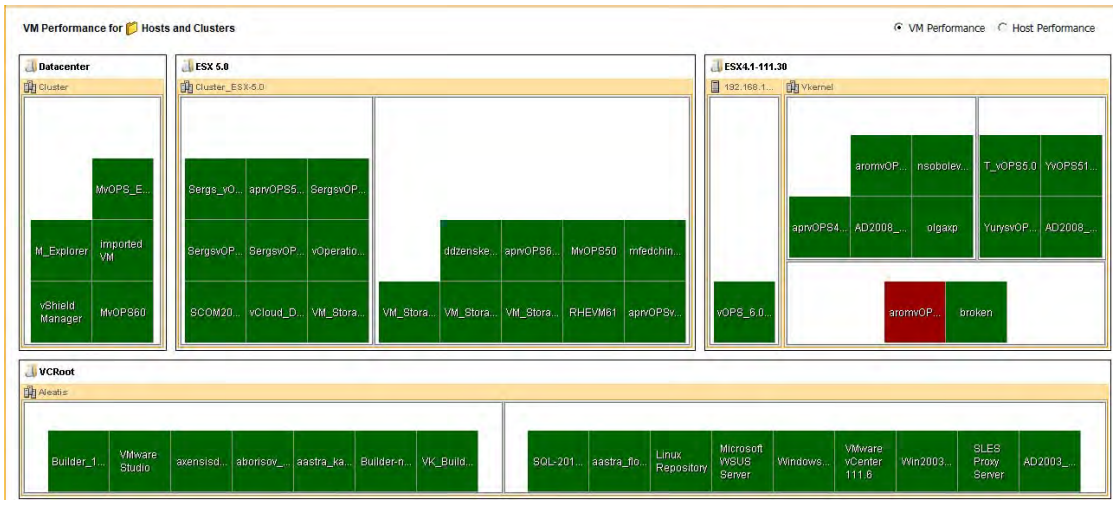
Datastore Performance

The Datastore Performance view provides a summary by storage resource of all of the key VMware datastore and datastore cluster and Hyper-V disk performance metrics.

Performance vScope

vScope provides an environment-wide, cross-hypervisor visualization of the status of your infrastructure. The Performance vScope indicates which VMs or hosts are either experiencing or on the verge of experiencing performance problems. Two different views are provided in the form of heat maps, one from a VM-focused perspective, and one from a host-focused perspective.

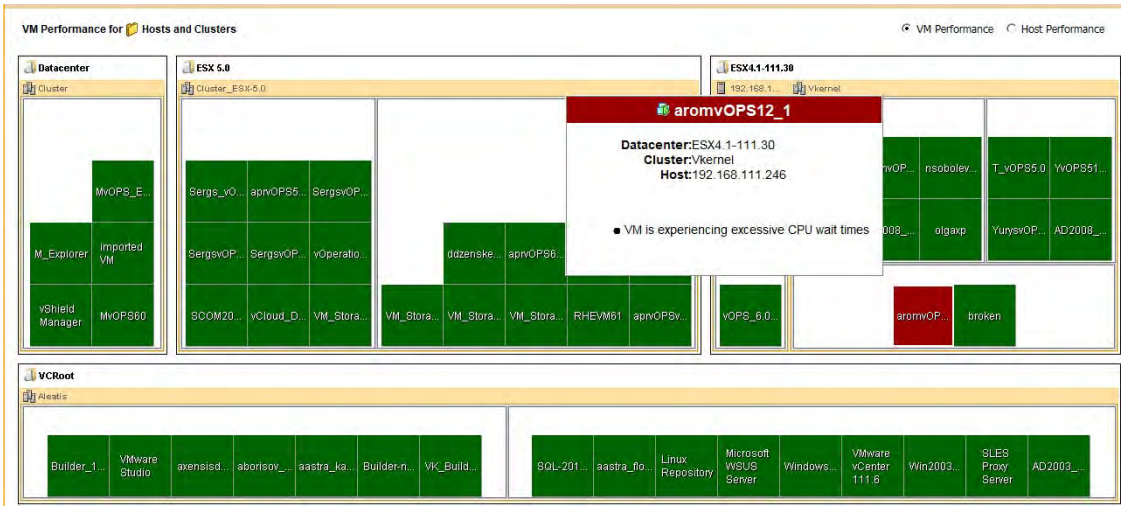
Note To access Performance vScope, you must have a Java plug-in installed for your Web browser.



VM Performance View

In the VM Performance view, each colored box represents a single VM, grouped by host, cluster and data center. The color of each VM indicates the severity of identified performance issues. Red indicates serious performance problems, while yellow indicates less serious or imminent performance issues. VMs with no identified issues are green.

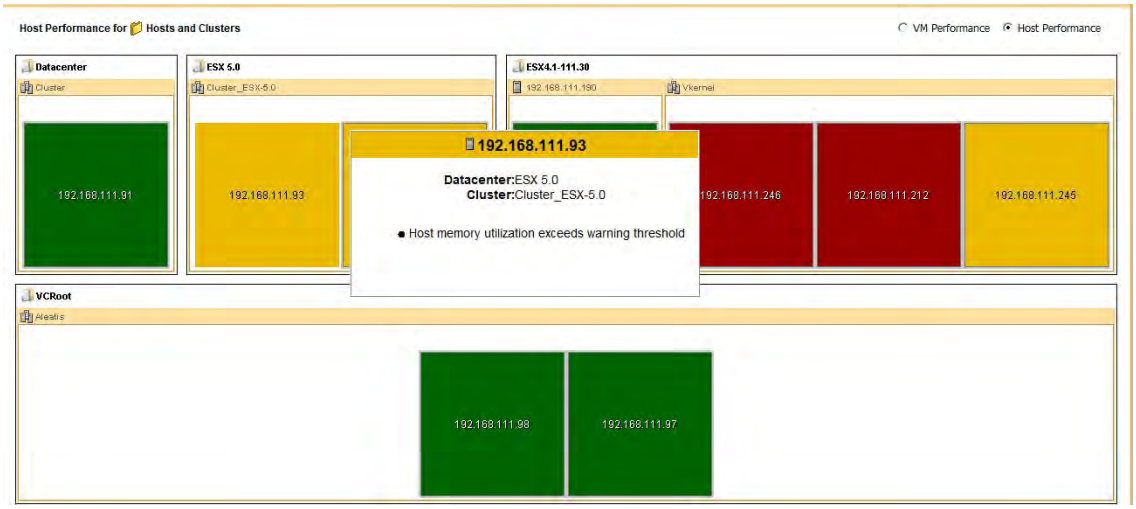
To see what specific issues are impacting the performance health of the VM, hover your cursor over the VM box. A popup opens, listing the details. Double-click on the VM box to drill down to a detailed view for the selected VM.



Host Performance View

In the Host Performance view, each colored box represents a single host, again grouped by cluster and data center. The colors of the host boxes have the same meaning as those of the VMs.

To see what specific issues are impacting the performance health of the host, hover your cursor over the host box. A popup opens, listing the details. Double-click on the host box to drill down to a detailed view for the selected host.



3

Capacity Manager

Forecast and manage virtual environment capacity using Capacity Manager. The module uses predictive analysis of system metrics to identify potential future bottlenecks and models available VM capacity across server and storage resources.

The functionality of the Capacity Manager module is divided into six major areas:

- Availability
- Planning
- Current Bottlenecks
- Future Bottlenecks
- Predictive Alarms
- Capacity vScope

Availability

The Availability dashboard identifies the availability of the key resources of the virtual environment. It also includes the following tabs to provide insight into the identified capacity issues:

- Capacity Availability
- Datastore Statistics
- Top Consumers

Capacity Availability

The Capacity Availability tab displays one of the following views, depending on the selection you make on the **Selectors** pane > **View Content** filter:

- **Capacity Availability**—The Capacity Availability view is displayed, showing the capacity available for the object selected in the navigation tree. For more information, see “Capacity Availability View” on page 30.

- **Planned Changes**—The Planned Changes view is displayed, showing all planned changes for the object selected in the navigation tree. For more information, see “Planned Changes View” on page 32.

Capacity Availability View

The Capacity Availability view highlights the number of additional virtual machines that can be added to the clusters, hosts, and resource pools.

CPU, memory, storage and throughput are each analyzed for available capacity. High availability (HA) and other configuration parameters, as well as reservations are fully considered in the analysis to ensure the accuracy of the result.

If reservations for future virtual machines have been set, the availability calculation takes these reservations into account when calculating the number of additional virtual machines that can be added.

The **Selectors** pane allows you to set the size of the VM to be used in your calculations to determine the number of VMs that will be available considering your current or future capacity.

In addition to the **View Content** filter, the **Selectors** pane includes the following fields:

- **VM Slot Size**—Select the criteria to be used for capacity availability calculation.

  Existing Size—The calculation is based on the current actual utilization of the virtual machines in the infrastructure. Choose one of the following options:

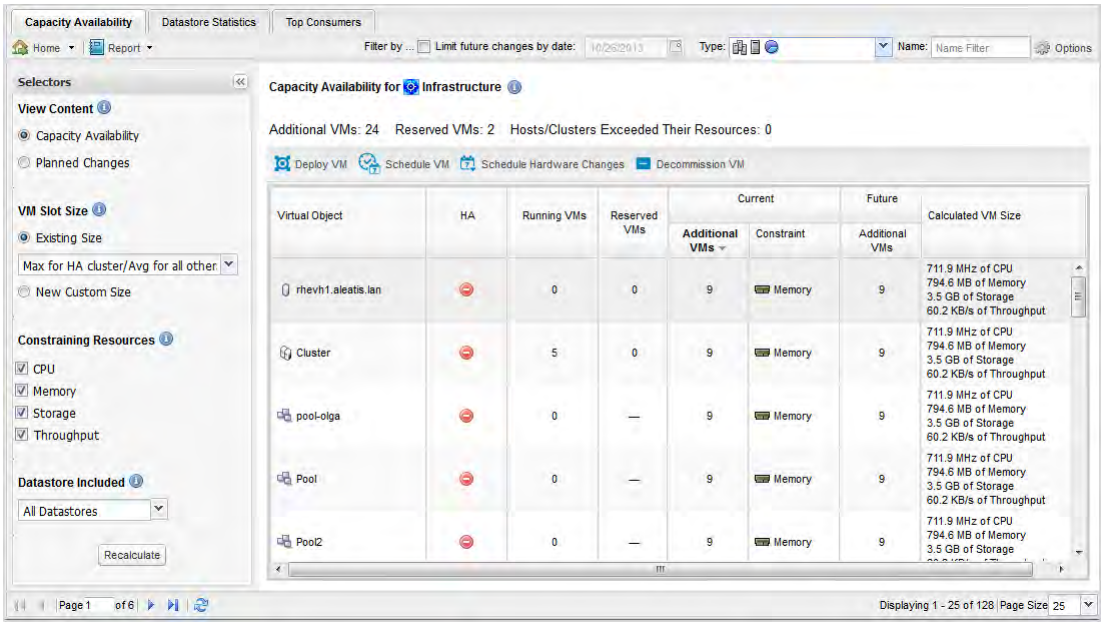
  - **Max for HA cluster/Avg for all others**—The maximum actual utilization of the virtual machines on HA enabled clusters and the average actual utilization of the virtual machines on individual hosts or clusters that do not have HA enabled.
  - **Max for HA cluster/Max for all others**—The maximum actual utilization of all virtual machines, calculated by cluster.
  - **Avg for HA cluster/Avg for all others**—The average actual utilization of all virtual machines, calculated by cluster.
  - **Custom**—A custom virtual machine model with specific values for CPU, memory, storage, and throughput.

  New Custom Size—Select this check box to name and add a new custom size for future use.
- **Constraining Resources**—Constraints used for capacity availability calculation (CPU, Memory, Storage, and Throughput).

  To base the custom model on an actual virtual machine in the infrastructure, click **Reset Utilization Values From Actual VM**.
- **Datastore Included**—Select the datastore to be considered for capacity availability calculation.

When you click **Recalculate**, the capacity availability is re-calculated based on the criteria set on the **Selectors** pane.

The following illustration is an example of the Capacity Availability view.



By default, the data displayed is from the last 24 hours. You can change the analysis period by clicking **Options** on the right side of the toolbar and editing the *Average Analysis Period (days)* field.

Note The appliance needs a period of time to recalculate the predictive analysis values. This period depends on the size of the user's environment.

The level of detail that is provided in this view can be altered by using the filters located on the toolbar (**Limit future changes by date** and **Type**).

The toolbar located above the Capacity Availability table provides the following functionality:

- **Deploy VM**—Allows you to deploy a virtual machine in the infrastructure immediately. Click this button to open the **Place VM Now** dialog box. For more information, see "Deploying a VM" on page 32.

  Important Placing a virtual machine does not actually create a virtual machine in the infrastructure; it simply modifies the results of the availability.

- **Schedule VM**—Allows you to create a reservation for the deployment of a virtual machine. The reservation appears in the Planned Changes view. Click this button to open the **Schedule VM** dialog box. For more information, see "Scheduling a VM" on page 33.

- **Schedule Hardware Changes**—Allows you to schedule one of the following operations: the addition of a cluster, the addition of a host to a cluster, or the addition of a standalone host. Click this button to open the **Schedule Hardware Changes** dialog box. For more information, see "Scheduling Hardware Changes" on page 33.

- **Decommission VM**—Allows you to select the date when you want to decommission a virtual machine. This is the date when the virtual machine will be powered off. The deployment information appears in the Planned Changes view. Click this button to open the

Decommission VM dialog box. For more information, see “Decommissioning a VM” on page 34.

Planned Changes View

The Planned Changes View displays the current machine reservations. The level of detail that is provided in this view can be altered by using the filters located on the toolbar (**Show reservation detail** and **Show overloaded clusters only**).

Click the **Options** button, on the toolbar to set up email notifications of virtual machines that become detached or clusters that become overloaded. You can also be notified of upcoming reserved deployment dates.

The toolbar located above the Planned Changes table provides the following functionality:

- **Schedule VM**—Allows you to create a reservation for the deployment of a virtual machine. The reservation appears in the Planned Changes view. Click this button to open the S**chedule VM** dialog box. For more information, see “Scheduling a VM” on page 33.
- **Schedule Hardware Changes**—Allows you to schedule one of the following operations: the addition of a cluster, the addition of a host to a cluster, or the addition of a standalone host. Click this button to open the **Schedule Hardware Changes** dialog box. For more information, see “Scheduling Hardware Changes” on page 33.
- **Decommission VM**—Allows you to select the date when you want to decommission a virtual machine. This is the date when the virtual machine will be powered off. The deployment information appears in the Planned Changes view. Click this button to open the **Decommission VM** dialog box. For more information, see “Decommissioning a VM” on page 34.
- **Deploy Change**—This button is enabled when a planned deployment is selected in the table. Click this button to open the **Decommission VM** and **Deploy Change** dialog boxes, which allow you to deploy the selected change right away, or schedule it for deployment at a later date. For more information, see “Deploying Planned Changes” on page 34.
- **Edit Change**—Allows you to edit a reservation for the deployment of a virtual machine. Click this button to open the **Decommission VM** and **Edit Change** dialog boxes. For more information, see “Scheduling a VM” on page 33.
- **Delete Change**—Allows you to delete a reservation made for the deployment of a virtual machine. Click this button to delete the selected VM and click **Yes** to confirm the deletion.
- **Match VM**—Click the button to check for deployment of the reserved virtual machine and delete the reservation.

Deploying a VM

The **Place VM Now** dialog box allow you to deploy a virtual machine in the infrastructure immediately. Choose the following settings:

- **VM Name**—Type the name of the virtual machine to be deployed.
- **Container**—Select a container for the VM from the navigation tree.
- **Storage**—Select the Storage resource from the navigation tree.
- **Template**—Select a template from the navigation tree.

- **Allocation**—This information appears after selecting a template. Modify the CPU and Memory allocations as needed.

Click **Deploy** to deploy the VM right away.

Scheduling a VM

The **Schedule VM** dialog box allows you to create a reservation for the deployment of a virtual machine. Choose the following settings:

- **VM Name**—Type the name of the virtual machine to be deployed.
- **Deploy Date**—Select a date for the deployment.
- **In the Reservation tab:**
  - **Reservation ID**—Type an identifier for the deployment.
  - **VM Quantity**—Number of VMs to be deployed.
  - **VM Size**—Select an existing VM size model from the available options, or create a custom VM size model with specific values for CPU, memory, storage, and throughput.
  - **Container**—Select a container for the VM from the navigation tree.
  - **Storage**—Select the Storage resource from the navigation tree.
- **In the Deployment tab:**
  - **Template**—Select a template from the navigation tree.

Click **Save** to schedule the deployment.

Scheduling Hardware Changes

The **Schedule Hardware Changes** dialog box allows you to schedule the following operations, by selecting one of these options from the **Change Type** drop-down list:

- **Add Cluster**—Add a cluster to the list of systems controlled by a vCenter.
- **Add Host To Cluster**—Add a host to a cluster controlled by a vCenter.
- **Add Standalone Host**—Add a standalone host to the list of systems controlled by a vCenter.

The following settings must be defined:

- **Change Date**—Select the date for deploying the hardware changes.
- **Name**—Specify the name of the new planned deployment.
- **Host Count**—For “Add Cluster” only—Type in the number of hosts affected by the hardware changes.
- **Resources**—Select the CPU, Memory, or Storage check boxes, as applicable, and their values.

  Note When adding a cluster, the CPU, Memory, and Storage resources are defined per each host in the cluster. When adding a cluster and when adding a host to a cluster, the Storage resource is considered as a local storage of the host and is not used for capacity calculations.
- **HA policy**—For “Add Cluster” only—Select one of the available HA policy options:
  - Diable the HA policy.

  - Indicate maximum number of hosts the cluster can tolerate.
  - Indicate the percentage of resources to be reserved as failover spare capacity.
- **Container**—Select from the navigation tree a container for the VM to be deployed. The selection is displayed in the **Container** field.
- **Like Cluster**—For "Add Cluster" only—Select a model cluster from the drop-down list.

  Note The average VM capacity and HA policy change depending on the selected model cluster.
- **Like Host**—For "Add Standalone Host" only—Select a model host from the drop-down list.

  Note The average VM capacity changes depending on the selected model host.
- **Avg VM Size**—For "Add Cluster" and "Add Standalone Host" only— Indicate the average capacity of VM resource (CPU, Memory, Storage, and Throughput) to be deployed.

Click **Save** to schedule the hardware change. The hardware deployment details appear in the Planned Changes view.

Decommissioning a VM

The **Decommission VM** dialog box allows you to select the date when you want to decommission a virtual machine. Choose the following settings:

- **Decommission Date**—Select the date for powering off the VM.
- **VM**—Select the VM to be decommissioned.

Click **Save** to schedule the decommissioning. The scheduled change appears in the Planned Changes view.

Deploying Planned Changes

The **Decommission VM** and **Deploy Change** dialog boxes allow you to deploy the selected change right away (when you select **Execute Now**), or schedule it for deployment at a later date (when you select **Schedule** and a date from the calendar). It contains two tabs:

- **Virtual Machines**—Select the VM to be deployed.
- **E-mail Receivers**—Notifications of this planned change can be emailed to selected users, sent as traps to an existing management system, sent as alerts to the System Center, or added to a selected RSS Feed.

Datastore Statistics

The Datastore Statistics tab displays the current allocation and utilization status of all VMware datastores and datastore clusters, and Hyper-V disks.

Top Consumers

The Top Consumers tab displays the individual resource usage of each virtual machine. By sorting on a particular resource, you can identify the virtual machines that are using the greatest (or least) amount of the resource.

Planning

The Planning dashboard allows users to prepare for host server refresh, upgrade, or expansion projects, by finding the optimum configurations and minimum number of new or existing host servers to maximize VM performance, while minimizing server cost, space, and power needs. The Planning dashboard provides four different ways of planning for hardware capacity:

- Host Requirement
- Host Refresh
- Power Minimization
- Resource Requirements

Host Requirement

The Host Requirement view calculates the minimum number of hosts (based on CPU and Memory) required in order to run all of the virtual machines on all clusters (contained within the selected navigational object), without exceeding the warning threshold for either CPU or Memory.

The view shows the future requirements as well as the current requirement. The High Availability settings of each cluster are also used to determine available resources to run the virtual machines.

Note This view always shows the requirement for all clusters in the selected navigation tree object. It does not show the individual clusters in the selected navigation tree object. If there are any standalone hosts in the selected navigation tree object, they are included on a one-for-one basis in the required hosts counts.

Only licensed standalone hosts and fully licensed clusters are included in the analysis. If there are standalone hosts with no licence or clusters that are not fully licensed, then the graph is empty.

The **Selectors** pane includes the following fields:

- **Time Frame**—Timeframe used for analysis. Choose one of the following options: **Next 30 Days**, **Next 60 Days**, **Next 90 Days**, or **Next 180 Days**.
- **Baseline for Forecasting**—Baseline used for analysis. Choose one of the following options:
  - **30 Day Trending**—Uses the past 30 days to predict the future trend.
  - **180 Days Trending**—Uses the past 180 days to predict the future trend.
  - **Planned Changes**—Uses the sum of the current requirements (during the last 24 hours) and all planned deployments of hosts and virtual machines.
- **Hardware Selection**—Hardware used for analysis. Choose one of the following options:
  - **Existing Servers**—Uses the existing hardware for analysis.
  - **New Server**—Allows you to select from previously defined host models. Several Dell host models are provided by default.

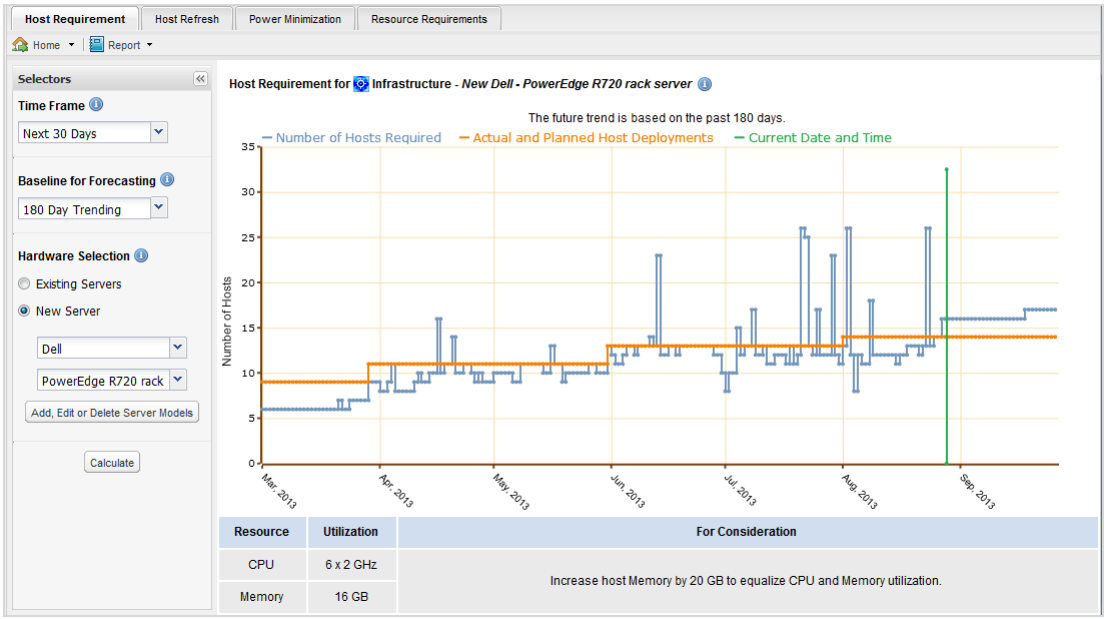
    Note You can modify the selected model by clicking **Add, Edit or Delete Server Models**, which brings you to the Host Refresh view.

The first time you select the Host Requirement view, it displays the message “Please select the timeframe, baseline and hardware, and then press the calculate button.”.

After you choose the selectors and click **Calculate**, the Host Requirement view displays the results in a graph format, followed by recommendations (in a table format).

Note The calculation may require an extended period of time to complete, depending on the object selected from the navigation tree, the state of the environment, and the selectors specified for the analysis. While the calculation is in progress, the completion percentage is shown in the progress bar. A **Cancel** button is also provided, for cases where users want to cancel the calculations that take too much time to complete.

The following illustration is an example of the Host Requirement view when the timeframe is set to **Next 30 Days**, the baseline is set to **180 Day Trending**, and the hardware selection is **New Server** (Dell/ PowerEdge R720 rack).



The view shows the following information:

- The total number of available hosts, both the currently deployed hosts plus any planned deployments of standalone or cluster hosts. If **New Servers** is selected, the planned deployments are all considered to be the new hosts.
- The number of hosts required to support all of the virtual machines for each cluster included in the selected navigation object during the previous 30 or 180 day period (if selected). If **Planned Changes** is selected, the graph starts with the current requirements.
- A vertical line separating the current requirements from the future. This line does not appear when **Planned Changes** is selected.
- A table showing the average CPU and Memory configuration for the existing servers, and the increase or decrease in CPU or Memory required to balance the configuration.

If you change any of the configuration items in the **Selectors** pane, or change the selection in the navigation tree, the **Host Requirement** dialog box appears, asking you to save the current results to a file (XML, PDF, or CSV). If you select one of the options, the view is saved in the appropriate

format, and the report is identical to the one you can generate from the **Report** menu. If you select not to save the view, the view is updated to display the message “Please select the timeframe, baseline and hardware, and then press the Calculate button.”.

Host Refresh

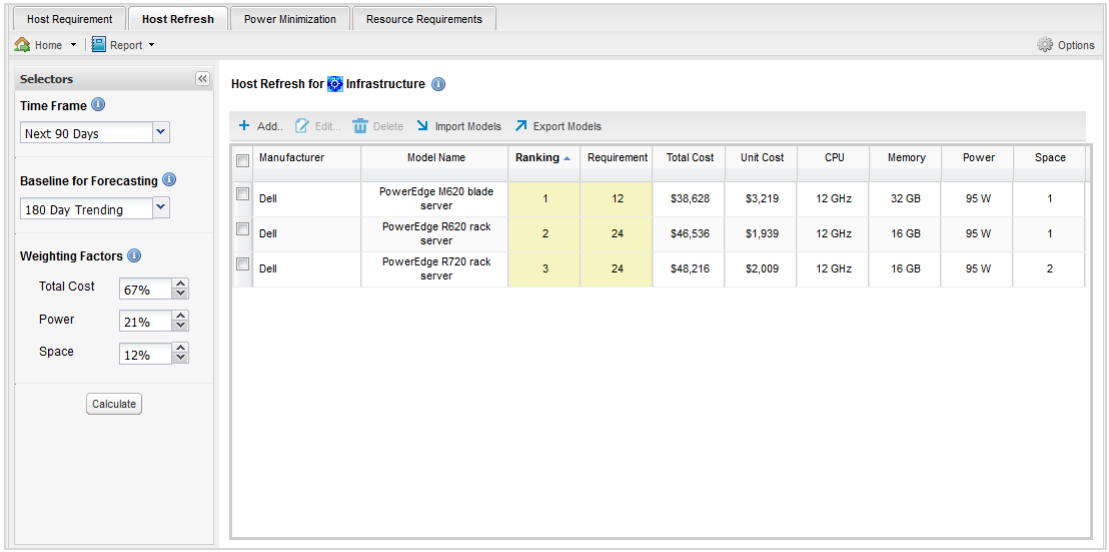
The Host Refresh view allows you to calculate how many hosts you need in a selected timeframe, to satisfy a specific load (up to the warning level defined, for example 80%).

The **Selectors** pane includes the following fields:

- **Time Frame**—Timeframe used for analysis. Choose one of the following options: **Next 30 Days**, **Next 60 Days**, **Next 90 Days**, or **Next 180 Days**.
- **Baseline for Forecasting**—Baseline used for analysis. Choose one of the following options:
  - **30 Day Trending**—Uses the past 30 days to predict the future trend.
  - **180 Days Trending**—Uses the past 180 days to predict the future trend.
- **Weighting Factors**—Primary constraints used for analysis (**Total Cost**, **Power**, and **Space**).

Note The percentage weighting factors change in increments of 10%. If you change a weighting factor such that the total of all three is not equal to 100%, the other two weighting factors are automatically adjusted (proportionally) such that the total becomes 100%.

The first time you select the Host Refresh view, it displays the message “Adjust the Time Frame, Baseline and Weighting Factors and press Calculate to see the Ranking, Requirement and Total Cost”.



The Host Refresh view allows you to:

- Set the weighting of the relative importance of cost, power, and space—by selecting the appropriate percentage for the **Total Cost**, **Power**, and **Space** selectors.

- Have all of the models ranked for hosts contained in the navigation tree selection—when you click **Calculate**, the view determines the total number of hosts of each model required to support the projected requirements at the end of the future period, for a given selection in the navigation tree. The models are then ranked using the weighting factors selected. The total cost for all of the required hosts, as well as, the unit cost, CPU (number of physical CPUs multiplied by CPU speed), Memory, Power, and Space.

  Note Only licensed standalone hosts and fully licensed clusters are included in the calculation. If there are no licensed standalone hosts or fully licensed clusters, then no ranking or host requirement is shown.

  Note The calculation may require an extended period of time to complete, depending on the object selected from the navigation tree, the state of the environment, and the selectors specified for the analysis. While the calculation is in progress, the completion percentage is shown in the progress bar. A **Cancel** button is also provided, for cases where users want to cancel the calculations that take too much time to complete.

- Set the average period used for analysis—by clicking the **Options** button on the view's top-left corner, and specifying the number of days in the *Average Analysis Period (days)* field.
- Add a particular host model, based on your preference—see Adding a Host Model.
- Edit host models to reflect changes in the configuration of the model—see Editing a Host Model.
- Delete host models that are no longer under consideration—see Deleting a Host Model.
- Import new host models from an XML file—see Importing Host Models.
- Export all host models to an XML file—see Exporting Host Models.

If you change any of the configuration items in the **Selectors** pane, or change the selection in the navigation tree, the **Host Refresh** dialog box appears, asking you to save the current results to a file (XML, PDF, or CSV). If you select one of the options, the view is saved in the appropriate format, and the report is identical to the one you can generate from the **Report** menu. If you select not to save the view, the view is updated to display the message "Adjust the Time Frame, Baseline and Weighting Factors and press Calculate to see the Ranking, Requirement and Total Cost".

Adding a Host Model

To add a new host model:

1. Click **Add host model** on the view's menu bar.

   The Add Host Model dialog box appears.

2. Fill in the following specifications for the new model:
   - Manufacturer
   - Model Name
   - Unit Cost ($)
   - Number of CPU Cores
   - Physical CPU Speed
   - Amount of Physical Memory
   - Power Requirement (KW)

- Space Requirement (U-rack)

3 Click **Add**.

The new host model appears in the Host Refresh view.

Editing a Host Model

To edit an existing host model:

1 Select a host model from the list.

2 Click **Edit host model** on the view's menu bar.

The Edit Host Model dialog box appears.

3 Modify the host model specifications, as necessary:

4 Click **OK**.

The host model specifications are updated in the Host Refresh view.

Deleting a Host Model

To delete an existing host model:

1 Select a host model from the list.

2 Click **Delete host model** on the view's menu bar.

A Confirmation dialog box appears.

3 Click **OK** to proceed with the operation.

The host model is deleted from the Host Refresh view.

Importing Host Models

To import host models:

1 Click **Import Models** on the view's menu bar.

2 Select the appropriate CSV file name and directory, and click **Open**.

A Confirmation dialog box appears.

3 Do one of the following:

- To replace the existing host models with the ones being imported, click **Yes**.
- To add the host models being imported to the existing ones, click **No**.

Note In the case of duplicates (same Manufacturer and Model Name), the imported models replace the existing models.

The imported models appear in the Host Refresh view.

Exporting Host Models

To export all existing host models:

1 Click **Export Models** on the view's menu bar.

The Opening <HostModelsName.csv> dialog box appears.

2 Select either to open the CSV file or save it (as a CSV file) to a location of your choice, as necessary:

3 Click **OK**.

Power Minimization

The Power Minimization view allows users to reduce costs by determining the minimum number of host servers needed over time to safely run workloads, and estimating potential cost savings by powering down unneeded servers.

The **Selectors** pane includes the following fields:

- **Time Period**—Baseline used for analysis. Choose one of the following options:
  - **Last 24 Hours**—Uses the last 24 hours to predict the future trend.
  - **Last 7 Days**—Uses the last seven days to predict the future trend.
  - **Last 30 Days**—Uses the last 30 days to predict the future trend.
- **Hardware Selection**—Hardware used for analysis. Choose one of the following options:
  - **Existing Servers**—Uses the existing hardware for analysis.
  - **New Server**—Allows you to select from previously defined host models. Several Dell host models are provided by default.

    Note You can modify the selected model by clicking **Add, Edit or Delete Server Models**, which brings you to the Host Refresh view.

The first time you select the Power Minimization view, it displays the message “Please select the baseline and hardware, and then press the Calculate button.”.

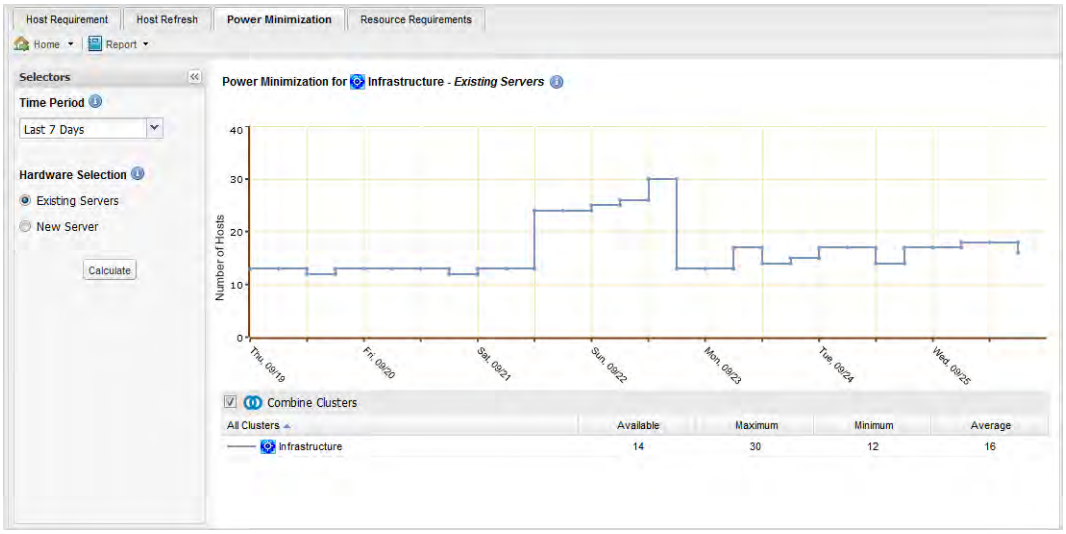
Choose the selectors and click **Calculate** to start the analysis.

Note The calculation may require an extended period of time to complete, depending on the object selected from the navigation tree, the state of the environment, and the selectors specified for the analysis. While the calculation is in progress, the completion percentage is shown in the progress bar. A **Cancel** button is also provided, for cases where users want to cancel the calculations that take too much time to complete.

The view displays either the combined total number of hosts for all clusters (when the “Combine Clusters” check box is selected), or the host totals for each individual cluster (when the “Combine Clusters” check box is cleared).

Note Only licensed standalone hosts and fully licensed clusters are included. If there are no licensed standalone hosts or fully licensed clusters, then the graph and upper table are empty.

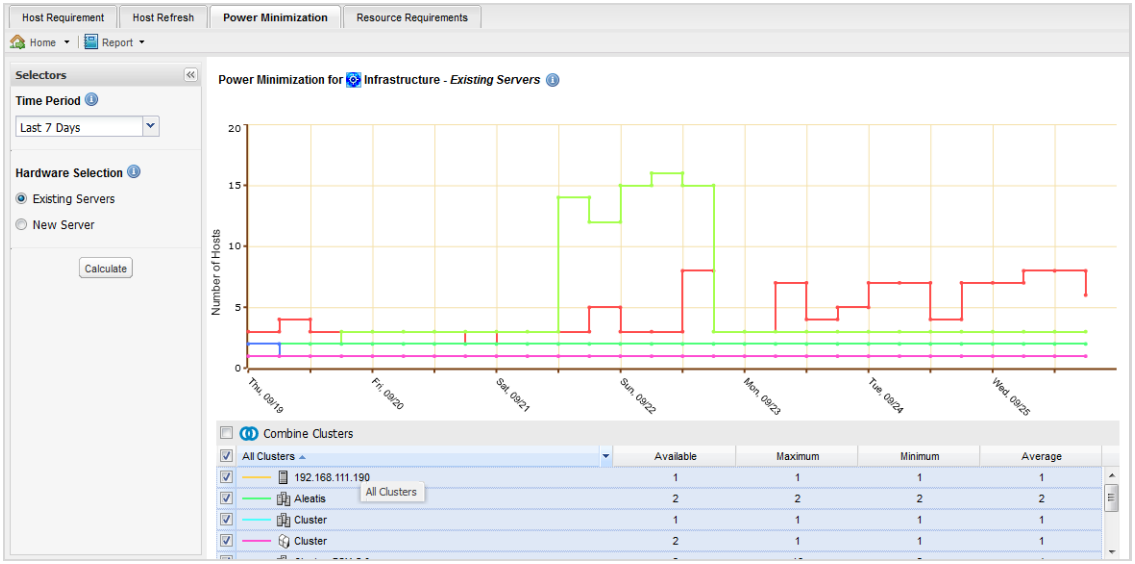
The following is a sample of the view showing the combined total number of hosts for all clusters.



In this case, the graph shows the total number of hosts required to support all virtual machines for all clusters included in the selected navigation object. The minimum and maximum values are based on historical data. The graph is based on peak utilization values.

The table below the graph shows the total number of hosts available in the clusters, the minimum number of hosts required to support the virtual machines during the period, the maximum number of hosts required to support the virtual machines during the period, and the average number of hosts required during the period.

The following is a sample of the view showing the host totals for each individual cluster.



In this case, the graph shows the total number of hosts required to support all virtual machines for each cluster included in the selected navigation object. The minimum and maximum values are based on historical data. The graph is based on peak utilization values.

The table below the graph shows the total number of hosts available in each cluster, the minimum number of hosts required to support the virtual machines during the period, the maximum number of hosts required to support the virtual machines during the period, and the average number of hosts required during the period.

The cluster's table below the graph includes a check box for each row. Specific individual clusters can be selected to be displayed, by selecting their corresponding check box. For example, to see the graph only for one cluster, clear the **All Clusters** check box and then select the check box beside the name of the cluster to be displayed.

If you change any of the configuration items in the **Selectors** pane, or change the selection in the navigation tree, the **Power Minimization** dialog box appears, asking you to save the current results to a file (XML, PDF, or CSV). If you select one of the options, the view is saved in the appropriate format, and the report is identical to the one you can generate from the **Report** menu. If you select not to save the view, the view is updated to display the message "Please select the baseline and hardware, and then press the Calculate button.".

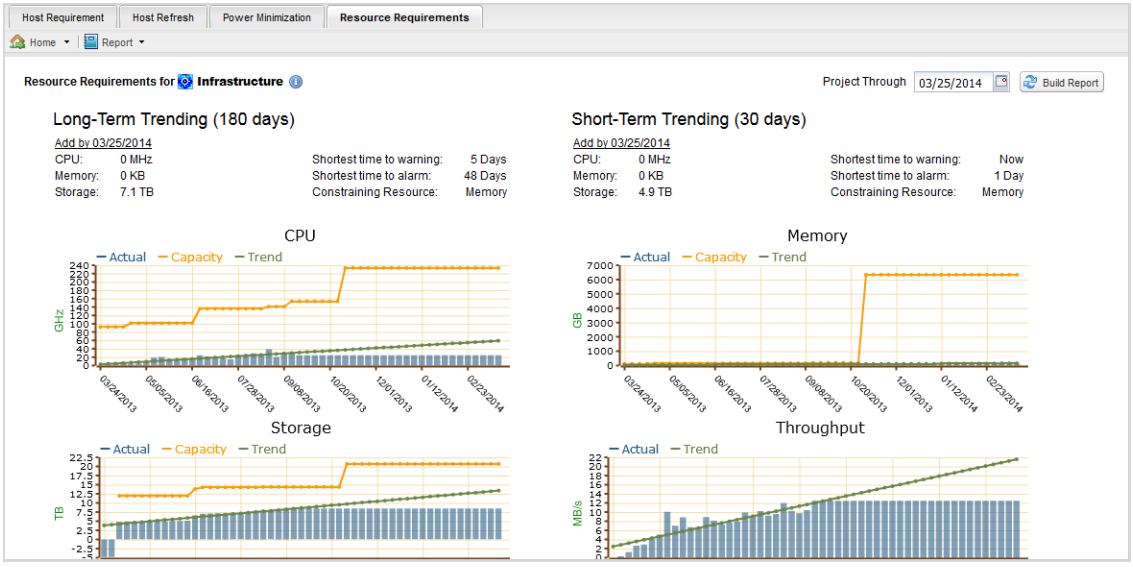
Resource Requirements

The Resource Requirements view uses short-term (30 days) and long-term (180 days) trending analysis to predict resource requirements at a selected future date.

From the **Project Through** drop-down list, select a future date for which resource requirements are needed. There is no limit on how far out the projection can be made. Keep in mind, however, that the accuracy of the prediction degrades with time.

The required resources are computed for the selected date using two different projections, one based on trending usage over the past thirty days, and one based on longer-term (180 days) trending. In addition, for each of the two projections, the report indicates the number of days before capacity utilization of any resource will reach warning or alarm thresholds, and indicates which resource is the primary constraint.

Charts showing usage versus capacity over the past six months are provided to aid in interpreting the projected results.



Current Bottlenecks

The views described in this section help identify the objects that currently have capacity bottlenecks. You can choose to exclude specific objects from analysis. For further details, see “Excluding Objects from Analysis” on page 26.

The Current Bottlenecks dashboard provides six different views for analysis and resolution of bottleneck problems:

- All Resources
- CPU
- Memory
- Storage
- Throughput
- Latency
- Current Issues
- Excluded

All Resources

The All Resources view is an overview of the current bottlenecks for all key resources. The average utilization over the evaluation period (typically the last 24 hours) of the key resource metrics is shown. The direction of change of the average utilization is indicated by arrow icons (up, down or constant). Other significant metric values (for example, peak, swapping, ballooning) are indicated by triangle icons.

Double-click on a particular alarm in any of the views to open the Root Cause view for the specific alarm.

Root Cause

The Root Cause view shows a detailed analysis of the specific bottleneck with specific recommendations and supporting information.

CPU

In addition to the average CPU utilization, the CPU view also displays the other metrics pertinent to CPU analysis.

Memory

In addition to the average memory utilization, the Memory view also displays the other metrics pertinent to memory analysis.

Storage

In addition to the average storage utilization, the Storage view also displays the average utilization of the individual partitions within the storage.

Throughput

In addition to the average throughput rate, the Throughput view also displays the other metrics pertinent to throughput analysis for each individual datastore on the object.

Latency

In addition to the average latency, the Latency view also displays the other metrics pertinent to latency analysis for each individual datastore on the object.

Current Issues

The Current Issues view is an overview of bottlenecks across all resource categories.

Excluded

The Excluded view displays the currently configured exclusions for bottleneck analysis.

Future Bottlenecks

The Future Bottlenecks view analyzes the historical utilization of resources to proactively predict future capacity bottlenecks. The calculations require a minimum of at least seven days of historical data and preferably thirty days. You can choose to exclude specific objects from analysis of future bottlenecks. For further details, see “Excluding Objects from Analysis” on page 26

Summary

The Summary view of Future Bottlenecks identifies which resources will become problematic in the future. Double-click on a CPU or Memory constraint to open the Root Cause view for a particular object.

Root Cause

The Root Cause view provides a detailed analysis of the specific future CPU or memory bottleneck with specific recommendations and supporting information.

Excluded

The Excluded view displays the currently configured exclusions for future bottleneck analysis.

Predictive Alarms

Predictive Alarms are used to identify future resource needs within the virtual environment.

Current Alarms

The Current Alarms view shows all of currently active alarms.

Alarm Configuration

The Alarm Configuration view shows all of the predictive alarms that are currently set.

To edit or delete an alarm, select the specific alarm in the table, and then click the appropriate button.

To add a new alarm:

1. Click **New Alarm**.
2. Click the **Scope** tab if you want to limit a predictive alarm to particular objects, folders or business views.
3. Click the **Notifications** tab to configure the methods you want to use for communication of alarms. Notifications of active predictive alarms can be emailed to selected users, sent as

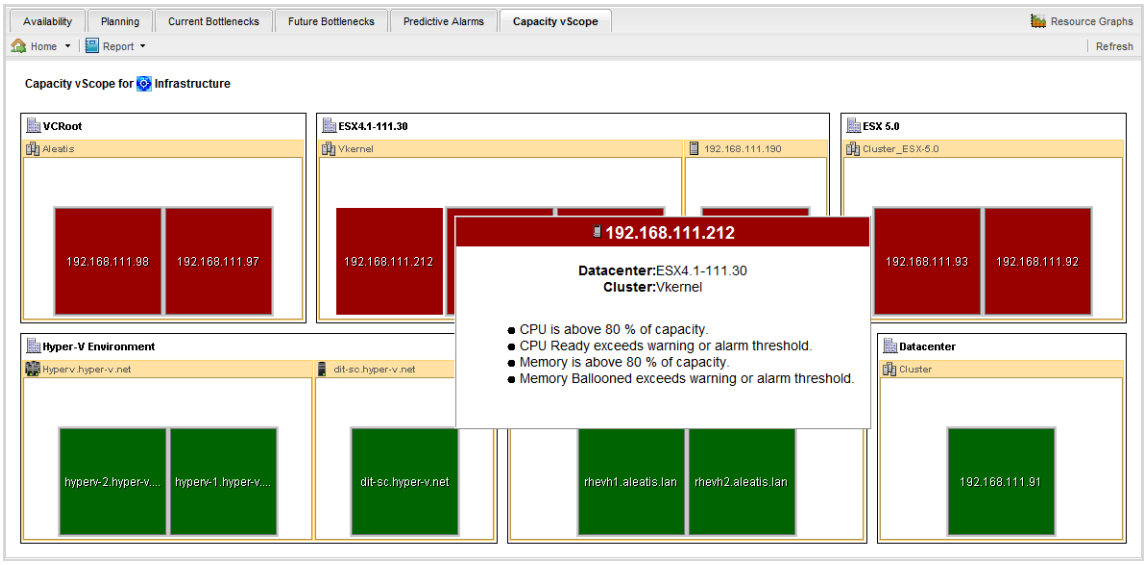
traps to an existing management system, sent as alerts to the System Center, or added to a selected RSS Feed.

Capacity vScope

vScope provides an environment-wide, cross-hypervisor visualization of the status of your infrastructure. The Capacity vScope indicates the capacity state of all hosts and clusters in the form of a heat map. Each colored box represents a single host. Hosts are further grouped by cluster and data center.

The color of each host indicates its capacity-related health. Hosts with no factors negatively impacting their capacity are green, hosts with some minor factors or future/negatively trending factors are yellow, and hosts with significant factors are red.

To see what specific issues are impacting the capacity health of the host, hover your cursor over the host box. A popup lists the details. Double-click on the host box to drill down to a detailed view for the selected host.



4

Optimizer

Optimize resource utilization and eliminate resource waste using the Optimizer. The module analyzes actual utilization and performance metrics to properly size virtual machine allocations and reclaim unused resources.

The functionality of the Optimizer module is divided into three major areas:

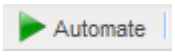
- Rightsizer
- Wastefinder
- Efficiency vScope

Automating Recommendations

Recommendations for improvements in resource utilization can be implemented automatically or scheduled for implementation at a particular time in the future (for example, within a maintenance window).

You can implement recommendations for all resources listed or choose the resources that you want to change.

To implement recommendations for all resources:

1. Click 

to implement the recommendations.
2. Select your implementation timing, resources, and email receivers.
3. Click **Run Now**.

To choose the resources:

1. Select the check boxes of the objects you want to optimize.
2. Click **Execute**.
3. Select your implementation timing, resources, and email receivers.
4. Click **Run Now**.

Rightsizer

The Rightsizer identifies recommended configuration changes for the environment. There are five views from this dashboard:

- Summary
- CPU
- Memory
- Storage
- Rightsizer Constraints
- Guest OS Credentials

You can choose to exclude specific objects from analysis. For further details, see “Excluding Objects from Analysis” on page 26

Setting Options

You can set options for the recommendation calculation as well as for the history retention time period.

To set options:

1. On the toolbar, click **Options.**
2. Modify the settings as required.
3. Click **OK**.

Summary

The Summary view of the Rightsizer is an overall summary of all of the recommended configuration changes for the environment. It includes the value of the resource savings.

CPU

The CPU view displays additional information about the CPU recommendations and allows you to implement the recommendations immediately.

Memory

The Memory view displays additional information about the memory recommendations and allows you to implement the recommendations immediately.

Storage

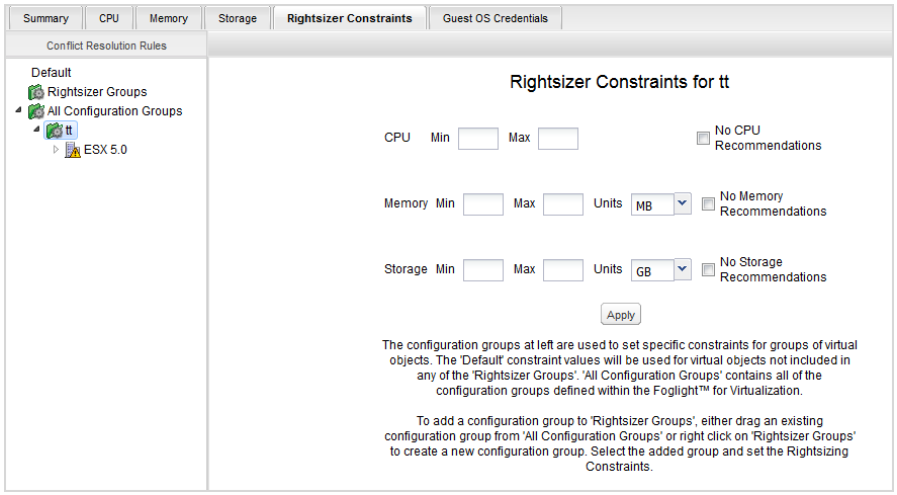
The Storage view displays additional information about the storage recommendations including the recommendations for individual drives within the virtual machine.

Rightsizer Constraints

Rightsizer recommendations are based on actual peak and average utilization values and are designed to set allocations appropriately to the actual needs of the VMs. However, vendor recommendations or IT policies may dictate limitations on minimum or maximum allocations for numbers of vCPUs, or allocated memory or storage. Rightsizer constraints allow you to impose these limitations within Foglight for Virtualization, Standard Edition.

To set Rightsizer constraints, you first need to create a Configuration Group containing the VMs to which the constraints apply. You can create and manage Configuration Groups from the **Settings > Configuration Groups** menu, or you can create them directly within the Rightsizer Constraints view. For more information on the Settings menu, see “Settings > Configuration Groups” on page 89.

Configuration Groups are similar to Business Views. You can create free-form groups and manually add VMs or VM containers (for example, resource pools, clusters, folders, or business views) to them, or you can create smart configuration groups that automatically select VMs and VM containers based on filters that you set. For more information, see “Smart Business Views” on page 81.



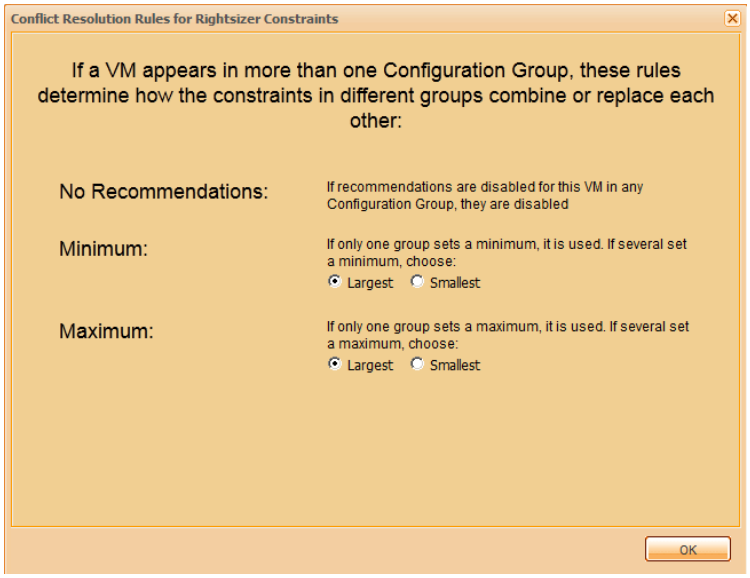
To create a new Configuration Group (in either traditional free-form or smart style):

1. Right-click **All Configuration Groups** and create it in the same way you would a Business View (see “Business Views” on page 81 for details).
2. Drag the configuration group into **Rightsizer Groups** (in the left pane) to edit its constraints.
3. Select the configuration group.
4. Set the minimum or maximum values for each type of resource for which Rightsizer recommendations are generated. You can also turn off recommendations for particular resources entirely.

   For example: if you do not want Rightsizer to recommend reducing memory below 4 GB for any VMs in your SQL cluster, create a Configuration Group containing your SQL cluster and set the Minimum constraint for memory to 4 GB. This causes Rightsizer to modify its recommendations to meet the limitation.

Rightsizer Constraint Conflicts

It is possible for a VM to be a member of more than one configuration group. In this case, constraint resolution rules must be applied to determine the appropriate constraint to apply. If recommendations are disabled for a VM in any configuration group, then recommendations are suppressed. For minimum and maximum constraints, the default behavior is to always take the largest value found. This can be changed by clicking **Conflict Resolution Rules** at the top left (below the Summary tab) and changing the default behavior.



Guest OS Credentials

The Guest OS Credentials view is used for setting credentials to log into the VM guest OS. The Optimizer needs this information to resize VM virtual disks.

To create a credential group:

1. Right-click the Guest OS Credentials Group and select one of the following options:
   - Add Free Form Guest OS Credentials Group
   - Add Smart Guest OS Credentials Group

   The User Profile Settings dialog box appears.
2. Fill in the required information, then click **Next**.

Wastefinder

The Wastefinder identifies wasted resources within the environment. These include:

- Abandoned VM Images
- Powered Off VMs

- Unused Template Images
- Snapshots
- Potential Zombie VMs

Some items, such as Abandoned VM Images and Snapshots, can be deleted automatically.

You can set the criteria to use for identifying those objects that are wasted resources. For details on how to do this, refer to “Setting Options” on page 48. You can also choose to exclude specific objects from analysis. For further details, see “Excluding Objects from Analysis” on page 26

Abandoned VM Images

The Abandoned VM Images view of Wastefinder shows the virtual machine images in storage that are not part of the virtual environment inventory. This typically occurs when a virtual machine that is no longer needed is removed from inventory instead of being deleted.

Powered Off VMs

Virtual machines that have been powered off for an extended period of time are highlighted in the Powered Off VMs view.

Unused Template Images

The Unused Template Images view highlights templates that have not been accessed in an extended period of time.

Note Identification of unused templates is supported only for VMware environments. Hyper-V support for this feature will be available in the next Foglight for Virtualization, Standard Edition release.

Snapshots

The Snapshots view provides a glimpse at the virtual machine snapshot files that have not been modified for an extended period of time.

Remove the unnecessary files by selecting the required check boxes and clicking **Execute.**

Potential Zombie VMs

Potential Zombie VMs are virtual machines that are powered on but appear to be unused. These virtual machines are identified by analyzing CPU, memory, network, and disk throughput for very consistent usage over an extended period of time.

Efficiency vScope

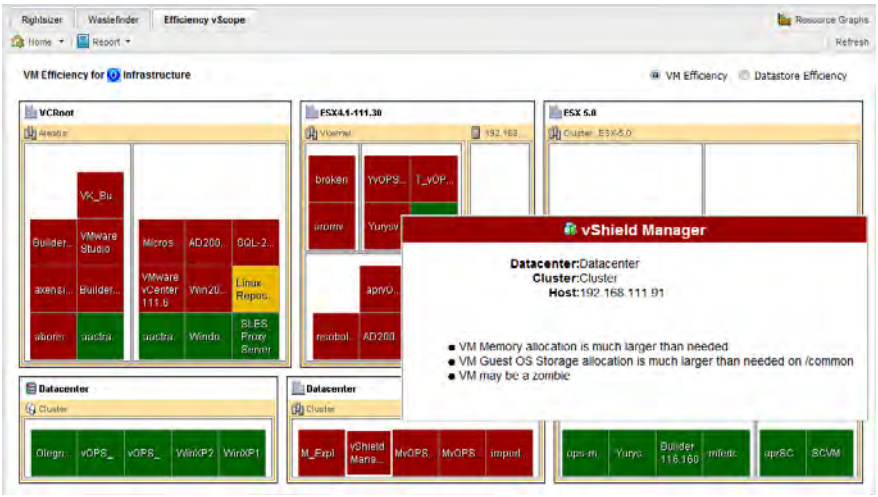
vScope provides an environment-wide, cross-hypervisor visualization of the status of your infrastructure. The Efficiency vScope indicates the efficiency of resource allocation or usage from either a VM-focused perspective or a datastore-focused perspective in the form of a heat map.

Double-click on any item on the heat map to open a more detailed drill-down view for that item.

VM Efficiency View

In the VM Efficiency view, each colored box represents a single VM, grouped by host, cluster, and data center. The color of each VM indicates the degree to which it inefficiently uses resources. Severely oversized VMs are red, moderately oversized VMs, and suspected zombies are yellow. VMs with no identified issues are green.

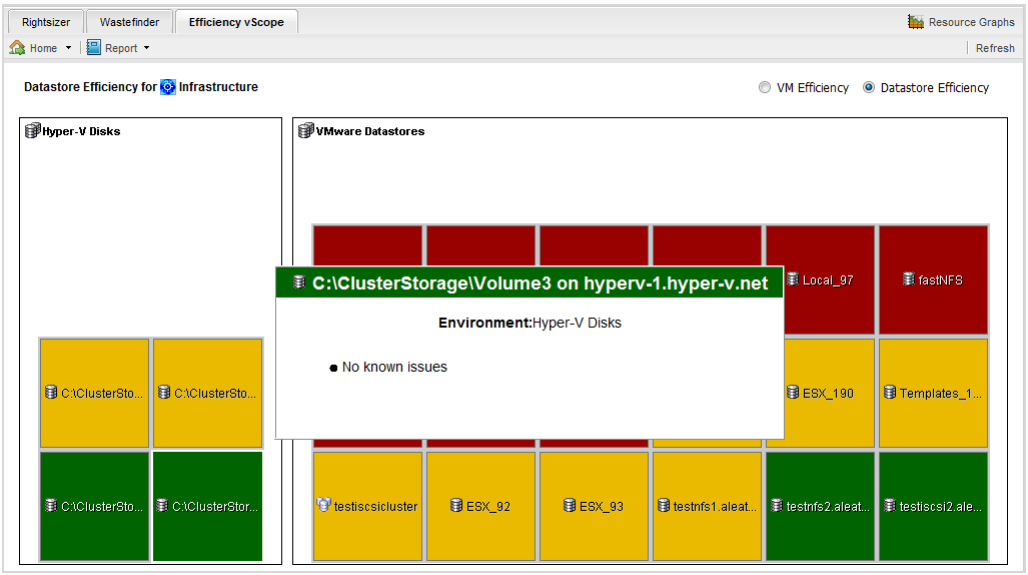
To see what specific issues are impacting the efficiency health of the VM, hover your cursor over the VM box to open a popup with detailed information. Double-click the VM box to open a drill-down detailed view for the selected VM.



Datastore Efficiency View

In the Datastore Efficiency view, each colored box represents a single datastore, grouped by hypervisor environment. The color of each datastore indicates the extent of wasted storage identified, where red means very extensive waste, yellow is moderate waste, and green identifies datastores with little or no wasted storage.

To see what specific issues are impacting the efficiency health of the host, hover your cursor over the host box to open a popup with detailed information. Double-click the host box to open a drill-down detailed view for the selected host.


Rightsizer
Wastefinder
Efficiency vScope
Resource Graphs
Home
Report
Refresh
Datastore Efficiency for Infrastructure
VM Efficiency
Datastore Efficiency
Hyper-V Disks
VMware Datastores
C:\ClusterStorage\Volume3 on hyperv-1.hyper-v.net
Environment:Hyper-V Disks
No known issues
Local_97
fastNFS
ESX_190
Templates_1...
C:\ClusterSto...
C:\ClusterSto...
C:\ClusterSto...
C:\ClusterStor...
testiscsicluster
ESX_92
ESX_93
testnfs1.aleat...
testnfs2.aleat...
testiscsi2.ale...

5

Change Analyzer

Track changes in your virtual environment and understand their potential impact on performance and capacity using the Change Analyzer. This module captures and reports on changes to VMs, hosts, clusters, datastores, and disks, and assesses the potential impact on your environment. Change Analyzer also lets you compare VMs to a “gold standard” VM or template and alerts you when changes cause their configurations to drift from the standard.

The functionality of the Change Analyzer module is divided into seven major areas:

- Change Summary
- Infrastructure History
- VM Comparison
- Change Assessment
- Automation History
- Change Alarms
- Comparison Alarms
- Object & Permissions

Each view within the Change Analyzer includes only the objects selected in the navigation tree.

Common Features in Change Analyzer

Risk Definitions

Common to all the Change Analyzer functions is an assessment of the potential risk that a change in the environment or a deviation from a standard configuration might impact the performance of VMs or potentially create or worsen performance bottlenecks.

The risk assessment is based on the type of change or deviation and, in certain cases, on the direction of the change. For example, creating a new datacenter may be an interesting event, but it should not show up as high-risk. On the other hand, setting any sort of memory limit on a VM potentially creates severe performance issues and therefore the impact risk is set to high. Allocating more memory to a VM is low-risk, but decreasing the memory allocation can potentially cause performance problems and therefore defaults to medium-risk.

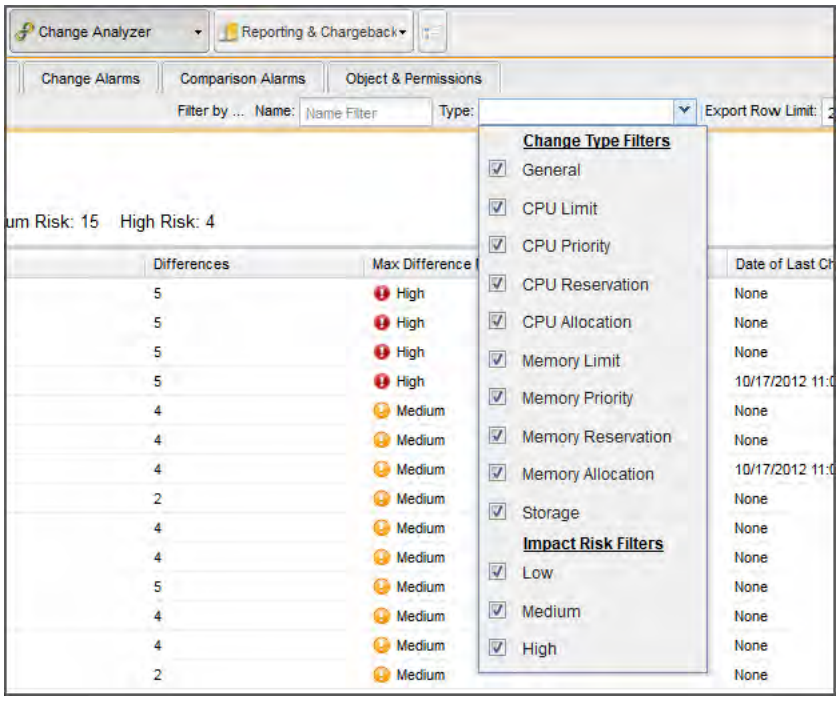
Click **Risk Definitions** on any Change Analyzer view to see the current settings. In some cases corporate policy or your own experience with your environment may dictate different risk impact settings for certain events other than the default. You can change these settings in the Risk Settings dialog box.

Filters

Every report in Change Analyzer can be sorted by clicking on the appropriate column header, or filtered using the standard filter mechanisms in the report-level toolbar just above the report.

There are three common filters:

- Name — type a name to filter the report by the name of the VM or object.
- User — type a user name to filter the report by the name of the user who made the change.
- Type — this filter offers a set of check boxes that let you select the change or deviation types to display. You can filter by the type of object on which the change occurred, the type of change, or the impact risk level.



Change Summary

The Change Summary view shows net changes that occurred to VMs, hosts, clusters, and resource pools within the selected environment over a specified period of time. The time period is set at the top right area of the report. You can specify a standard reporting period, such as the last week or month, or a custom period. To use a custom period, select **Custom Period** from the Report Period list, and then either type the Start and End Dates or use the Calendar popup to choose the dates.

Each row of the report shows the VM, the total number of differences in the configuration of that VM between the beginning and end of the period, the total number of changes that occurred to cause those changes, the highest impact risk of any change that occurred to that VM over the specified period, and the date when the last change occurred. Entries are ordered by the Max Impact Risk column by default.

Each row of the report can be expanded to display the specific differences and the degree of change.

Note that the number of differences may not be the same as the number of changes.

To see a detailed list of all the changes that make up the net difference reported here, right-click on the report row to go directly to the Infrastructure History report for the selected object.

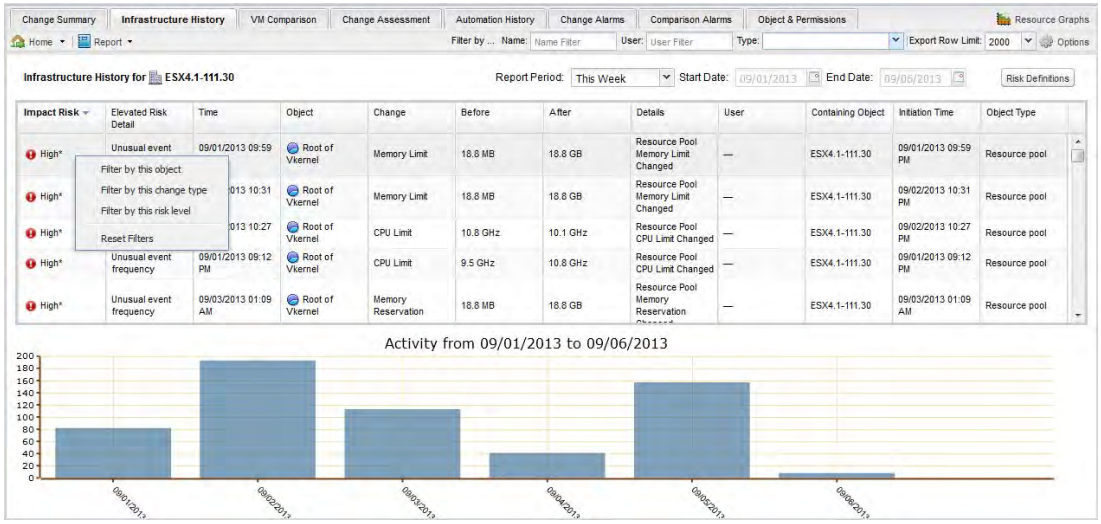
Infrastructure History

The Infrastructure History view lists all changes that occurred to VMs, resource pools, hosts, clusters, disks, datastores, and data centers within the selected environment over a specified period of time. The time period is set at the top right area of the report. You can select a standard period such, as the last week or month, or a custom period.

Each row of the report shows the potential risk of performance impact, the time of the change, the object on which the change occurred, the change type and brief description, before and after values when available, the user who made the change, and the full path to the changed object. Entries are ordered by the time the change occurred by default.

At the bottom of the screen a graph shows the numbers of changes that occurred within each sub-period of the selected time interval, allowing easy identification of periods in which unusual numbers of changes occurred. Hovering your cursor over a bar in the chart causes a tooltip to appear showing the total counts of changes at each risk level.

Right-click on any row of the report to access additional actions.



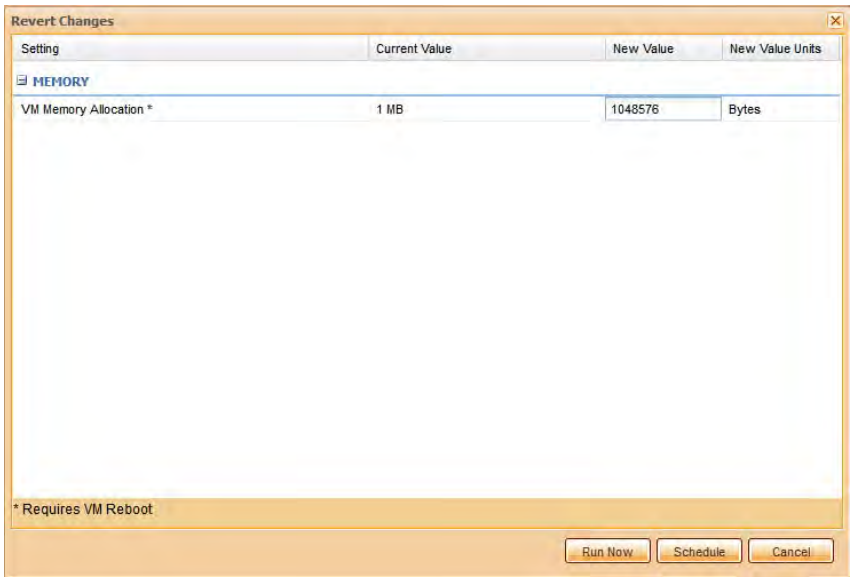
You can quickly pivot to other relevant reports within the same time period, such as:

- All changes to the same object
- All changes of the same change type
- All changes made by this user
- All changes with the same impact risk
- Reverting Changes (when available)

You can also pivot to resource graphs (when this option is available). For more information, see “Resource Graphs” on page 83.

Reverting Changes

You can revert certain changes that may be automated via hypervisor infrastructure APIs. Right-click on a row in the Infrastructure History to access this option (when available).



Type the desired New Value and revert either immediately, or on a scheduled basis.

Note This action is not available for all changes and reversion of specific change types may not be available for all hypervisors.

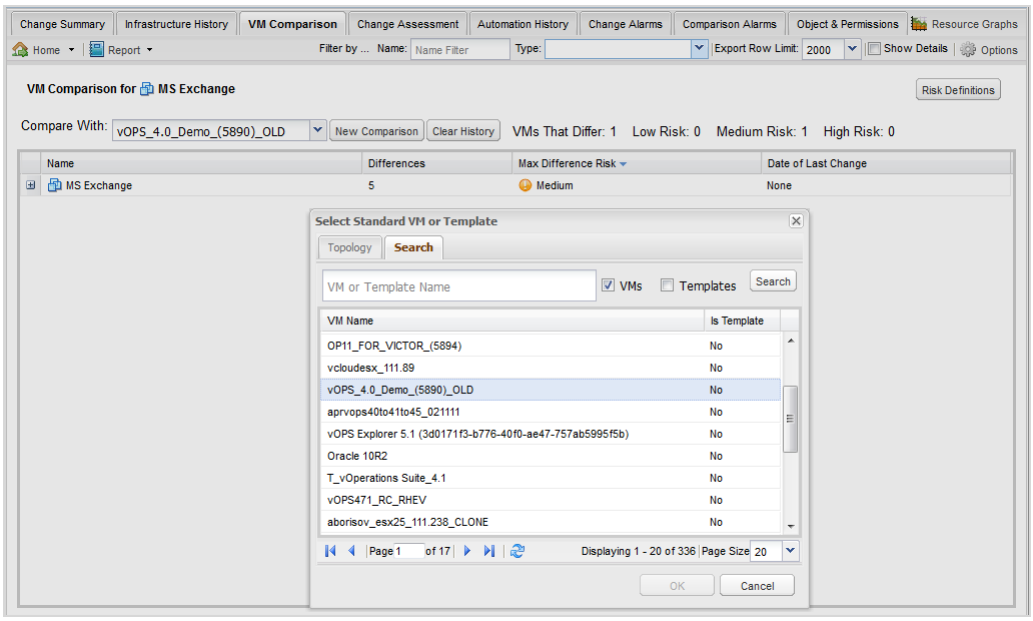
VM Comparison

As the size and complexity of virtual environments continues to grow, standardization becomes increasingly important. As a simple example, after testing and tuning of a specific database server type has been carried out, in order to understand the configuration which guarantees optimal performance it is important to ensure that all instances of this type of server follow this standard.

The VM Comparison view enables you to compare all VMs within the selected environment to a specific “gold standard” or reference VM or template and, if any do differ, to see a detailed list of the configuration differences.

To select a reference VM or template:

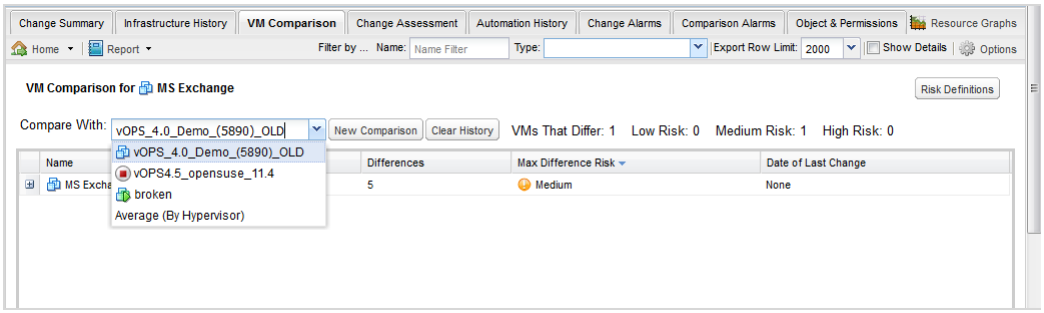
1 Click **New Comparison** to select a reference VM or template.



2 Search by name or browse the virtual topology tree to locate the desired template.

3 Click **OK**.

The selection appears at the top of the **Compare With** list.



A history of selected templates is maintained in the **Compare With** list so that you can easily switch between frequently used templates.

To compare against the typical configurations used in your environment, select **Average (By Hypervisor)** from the **Compare With** list. This option is selected by default the first time you open the VM Comparison view.

Each row of the report shows the name of the VM that deviates from the standard, the number of differences found, the maximum impact risk of all the deviations, and the date that the VM was last changed.

Note Clicking the “+” sign to the left of the VM provides a list of configuration items and their relative differences to the selected reference VM. Only configuration items with differences to the reference VM are shown. The list can include:

- VM CPU allocation
- VM CPU limit

- VM CPU priority
- VM memory allocation
- VM memory reservation
- VM memory limit
- VM memory priority

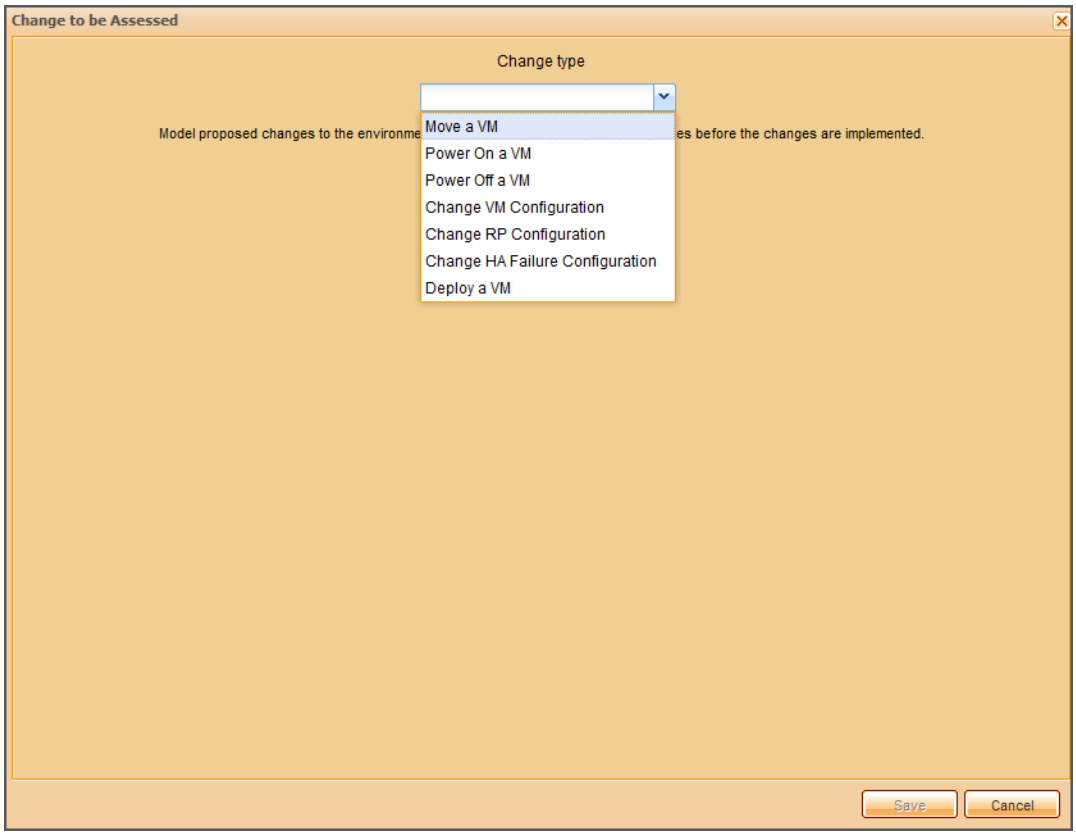
To see a detailed list of recent changes that have occurred on a selected VM, right-click on the report row to go directly to the Infrastructure History report for the selected object.

Change Assessment

The Change Assessment view allows you to define a sequence of changes, see what impact those changes have on performance and capacity, and then allows you to trigger the execution of these changes immediately or schedule these changes within Foglight for Virtualization, Standard Edition. The entire environment is displayed in this view. Change assessments made are executed in the order displayed in the table. Review the impact of a change to all elements in the environment from this view.

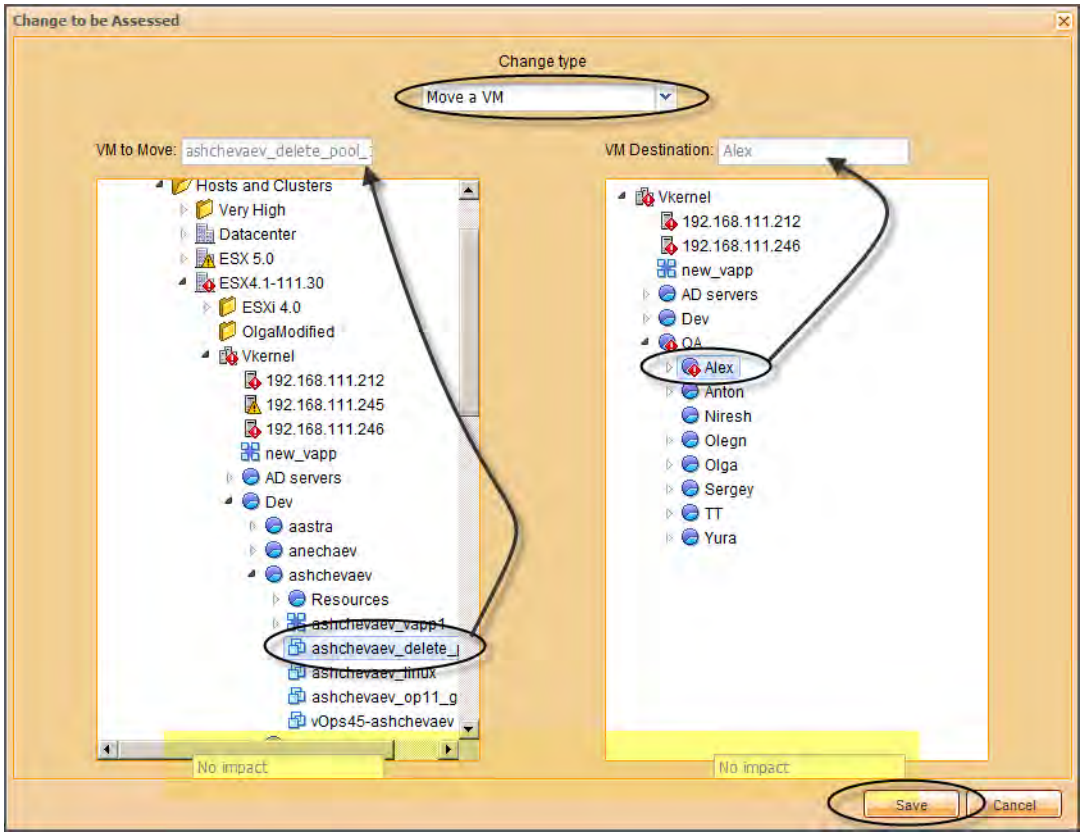
To model proposed changes:

1. On the left-hand side of the view, click **Model a Change.**
2. Select the type of change from the **Change type** drop-down list.



The workflows for each of the change types are described below.

3 **Optional**—select **Move a VM.**



a Expand the navigation tree displayed on the left, select a VM.

The name of this VM is displayed in the VM to Move box.

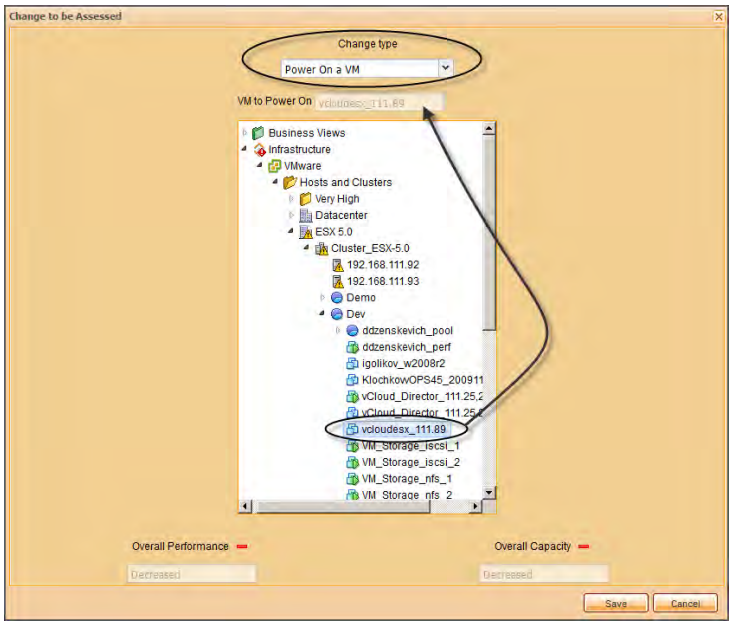
b Expand the navigation tree displayed on the right, under VM Destination, and select a destination.

The name of this destination is displayed in the VM Destination box.

c Click **Save**.

The change is added to the Change Assessment view.

4 **Optional**—select **Power On a VM** or **Power Off an VM**.



a Expand the navigation tree and select the VM.

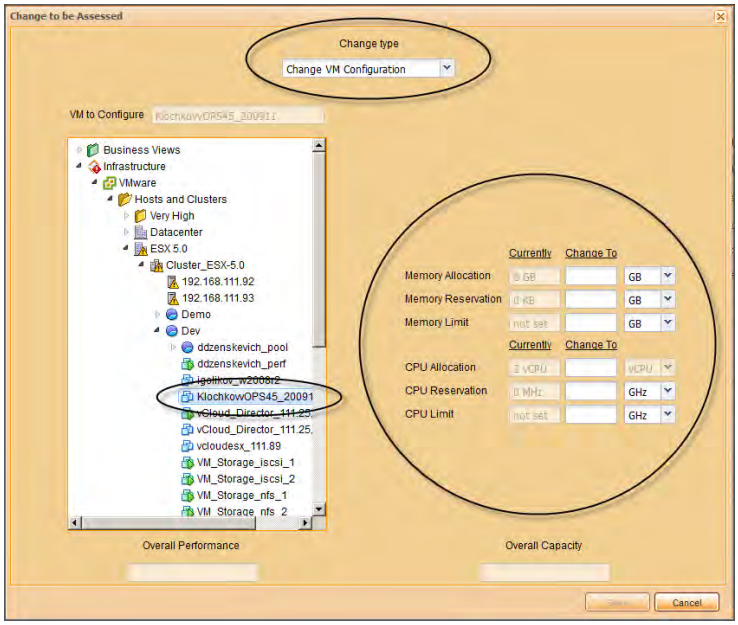
In this example, the name of the VM is displayed in the VM to Power On box.

The **Overall Performance** and **Overall Capacity** impact for this change is displayed at the bottom of the Change to be Assessed dialog box.

b Click **Save**.

The change is added to the Change Assessment view.

5 **Optional**—select **Change VM Configuration**.



a Expand the navigation tree and select the VM.

The name of the VM is displayed in the VM to Configure box.

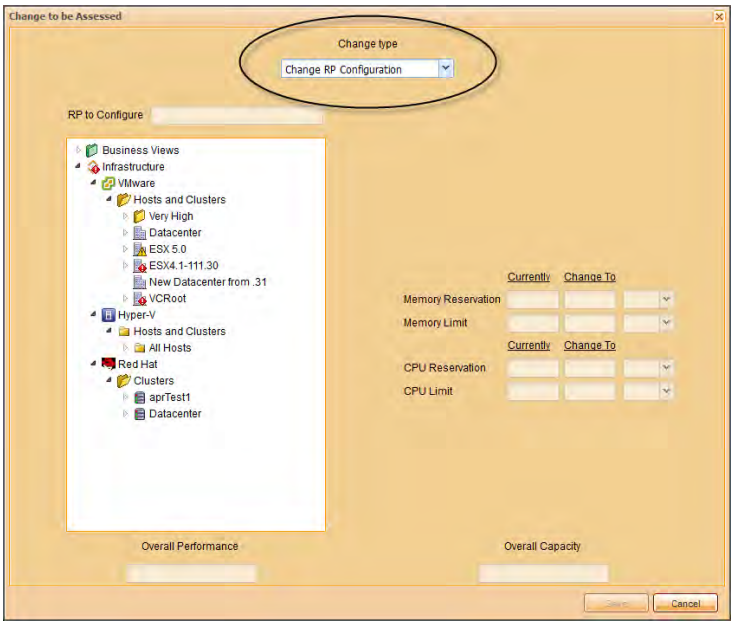
A list of the current configurations appears.

b In the **Change To** boxes, enter a new value and select the unit type.

c Click **Save**.

The change is added to the Change Assessment view.

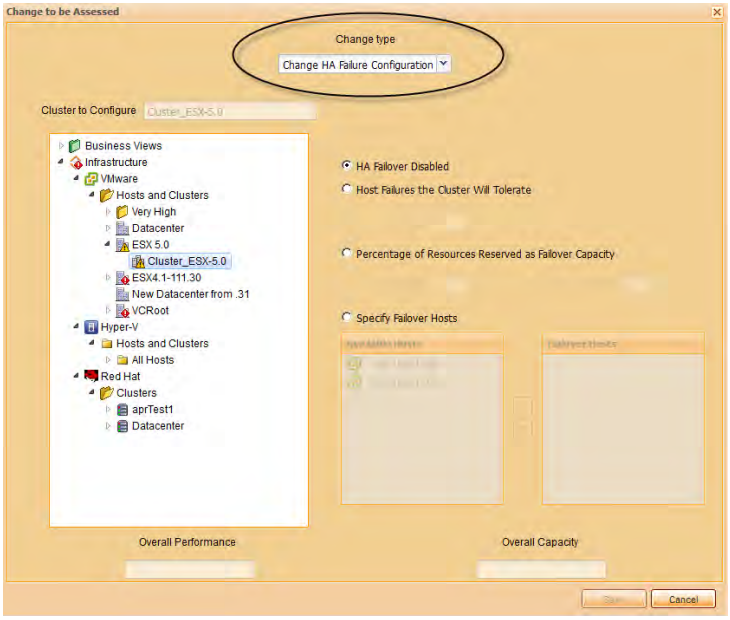
6 **Optional**—select **Change RP Configuration**.



- Repeat step a to step c of step 5.

7 **Optional**—select **Change HA Failure Configuration**.

Note This option is only available for VMware objects.



a Expand the navigation tree and select a cluster to configure.

b Select one of the following options:

- **HA Failover Disabled**—default value.
- **Host Failures the Cluster Will Tolerate**—specify the count.
- **Percentage of Resources Reserved as Failover Capacity**—specify the CPU % and Memory % values.
- **Specify Failover Hosts**—select an available host and click the arrow  to move the host to the Failover Hosts list.

8 Click **Save**.

Automation History

The Automation History view shows a listing of the changes that have been implemented in the various Foglight for Virtualization, Standard Edition modules, the time and date of the changes, the object that was affected, and the result. These changes can include removal of a virtual machine limit, the decrease of virtual CPU allocation, or an increase in allocation.

You may want to use this view to see the change sets that have occurred within a specific period of time.

Change Alarms

The Change Analyzer module also provides alarm mechanisms that can proactively alert you to changes occurring in your environment that pose performance or security risks. Use of the alarms is similar to all other alarms used in Foglight for Virtualization, Standard Edition.

Change alarms are related to the Infrastructure History tab. They allow you to receive proactive notifications of any changes that exceed a specified impact risk level.

The Change Alarms dashboard includes the following views:

- Alarm History view—Provides the full history of all change alarms that have occurred.
- Alarms Configuration view—Displays all change alarms and provides the functionality for configuring change alarms.

To create a Change Alarm:

1 Click the **Alarms Configuration** tab.

2 Click **New Alarm**.

3 Type the name of the alarm and the type of object as well as the risk level.

4 Click the **Scope** tab to limit the change alarm to particular objects, folders, or business views.

5 Click the **Notifications** tab to set the notification methods. Notifications of any change alarms that occur can be emailed to selected users, sent as traps to an existing management system, sent as an alert to the System Center Virtual Machine Manager or added to a selected RSS feed.

6 Click **Add.**

Comparison Alarms

The Change Analyzer module also provides alarm mechanisms that can proactively alert you to changes occurring in your environment that pose performance or security risks. Use of the alarms is similar to all other alarms used in Foglight for Virtualization, Standard Edition.

Comparison alarms are related to the VM Comparison tab. They allow you to receive proactive notifications of any deviation of a VM from a specified gold standard VM or template.

The Change Analyzer dashboard includes the following views:

- Alarm History view—Provides the full history of all comparison alarms that have occurred.
- Alarms Configuration view—Displays all comparison alarms and provides the functionality for configuring comparison alarms.

To create a Comparison Alarm:

1. Click the **Alarms Configuration** tab.
2. Click **New Alarm**.
3. You can choose to receive notifications only for certain types of changes. As in the VM Comparison view, you must select a specific VM or template to use for comparison.

   The **Use most recent configuration of the comparison VM or template** check box controls whether the alarm measures deviations from an unchanging standard defined by the configuration of the comparison VM or template at the time the alarm was created (the default), or whether it uses a dynamic standard. In the latter case, any change to a VM within the scope of the alarm triggers a comparison to the current configuration of the gold standard VM or template.

   Note The comparison VM or template must continue to exist, otherwise an error notification is sent.
4. Click the **Scope** tab to limit the comparison alarm to particular objects, folders, or business views.
5. Click the **Notifications** tab to set the notification methods. Notifications of any comparison alarms that occur can be emailed to selected users, sent as traps to an existing management system, sent as an alert to System Center Virtual Machine Manager or added to a selected RSS Feed.
6. Click **Add**.

Object & Permissions

The Object & Permissions view displays the user/group, role, and the privileges the role has, for the object that is selected in the navigation tree. It also identifies where the permissions are defined.

The level of detail that is provided in this view can be altered by using the filters located on the toolbar.

6

Reporting and Chargeback

Generate virtual environment trend, configuration and chargeback reports using the Reporting and Chargeback module. The functionality of the Reporting and Chargeback module is broken into four major areas:

- Summary Reports
- Inventory
- Chargeback
- Cost Index vScope

Summary Reports

Generate custom reports of infrastructure history, trends, and status for the entire virtual environment or for select areas of the environment.

Note All summary reports can be used in configurable dashboards. For more information, see "Creating a Custom Dashboard" on page 13.

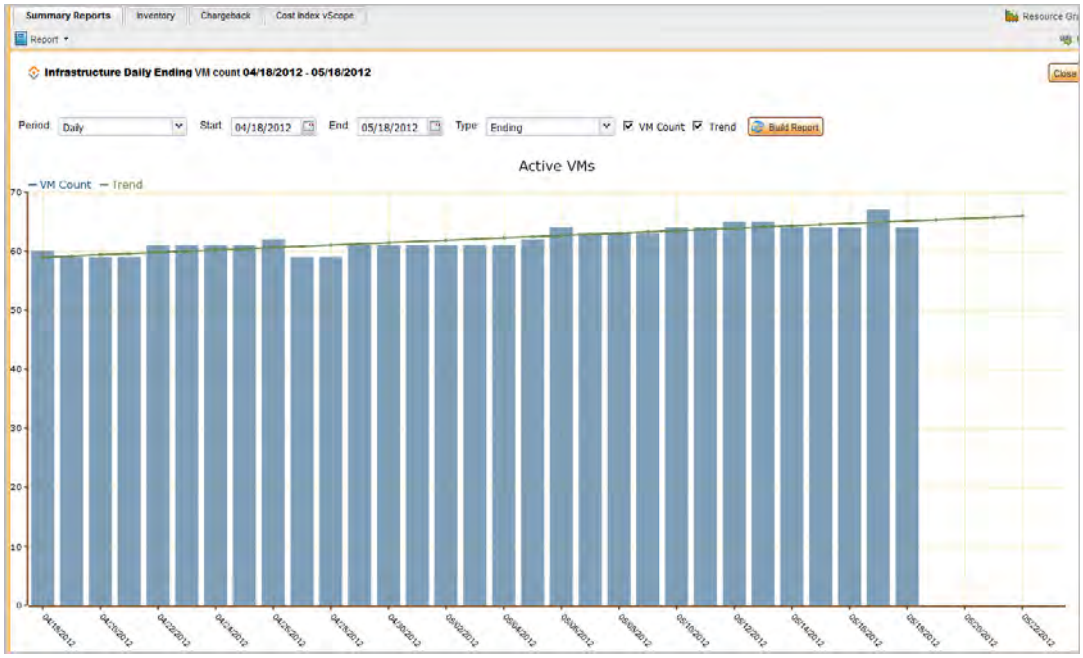
There are five types of reports available:

- Standard Capacity
- Standard Efficiency
- Standard Performance
- Efficiency Trend
- Overall Environment

To select a report type:

1. In the **Chart Folders** list, select the specific type of report. To see all possible reports, select **All Reports**.
2. To view a report, click the button  to the left of the report that you want to see.

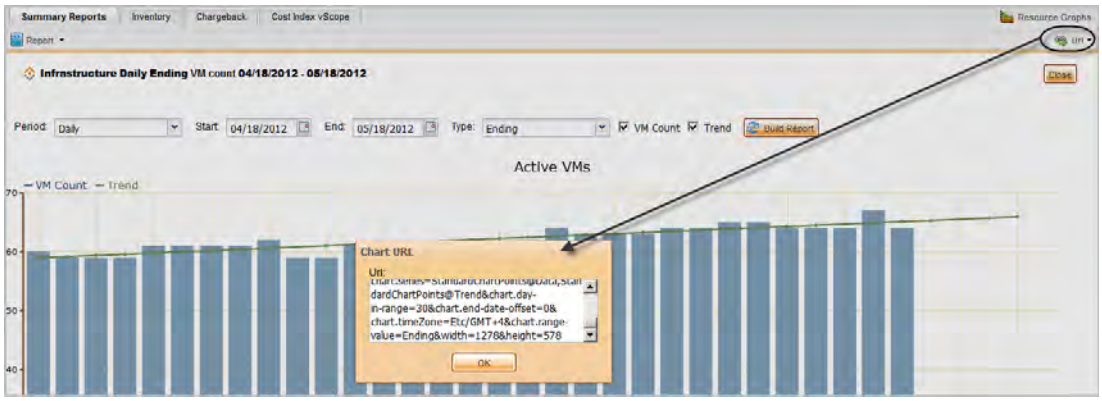
   A graphical representation of the report appears.



3 To view reports on a specific date, set the date and options. Click **Build Report** to refresh the view.

4 To view reports by period, specify the start date, end date, type and content. Click **Build Report** to refresh the view.

All of the summary reports can be accessed from any web browser using the link provided by the URL Copy menu.



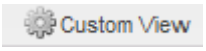
Inventory

Create custom reports of virtual machine configuration, utilization, and status, or a complete inventory of all virtual machines from the Inventory view.

List View

Use the List view of Inventory to create custom reports by selecting the items to be included and filtering the information for desired content.

To create a custom report:

1 On the top right corner, click 

to select the items to include in the view.

The Inventory Custom View dialog box appears.

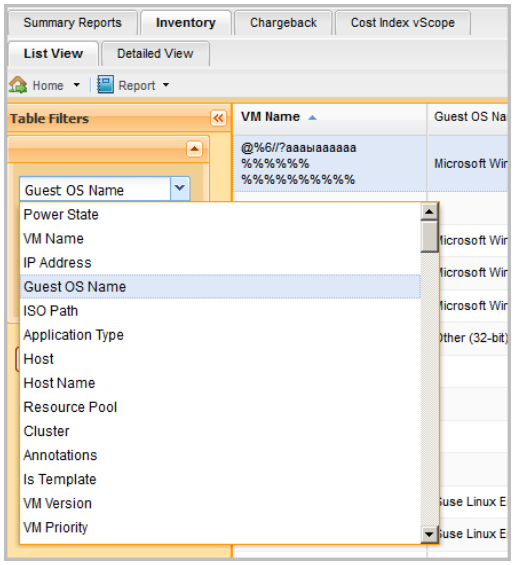
2 From here you can:

a Select the **Table** check boxes for the items you want to include.

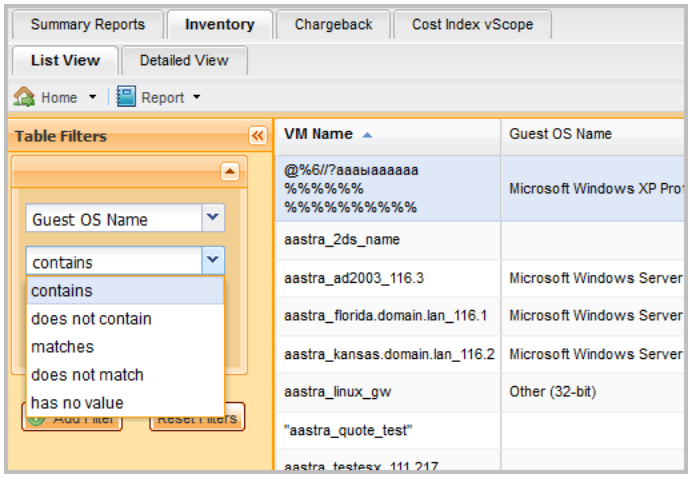
b Select the **Tool-Tip** check boxes for the items you want to see in the tooltips.

c Click **OK** when finished.

3 To filter for specific values of each item, select the item in the **Table Filters** list.



4 Select the filter item, then select the filter criteria from the second list.



5 Type the value for the specific item and criteria in the box. The filter is applied automatically and only items that match the specific criteria are included in the table.

You can use multiple filters to pinpoint specific conditions.

6 Click **Add Filter** to add the filter item, criteria, and value.

Detailed View

The Detailed View of Inventory contains detailed information about each virtual machine. The information can be used for reference or to archive virtual environment information at regular intervals.

Note Because Hyper-V and VMware make different detailed information available on individual VMs, the specific information listed in the detailed view may differ.

Chargeback

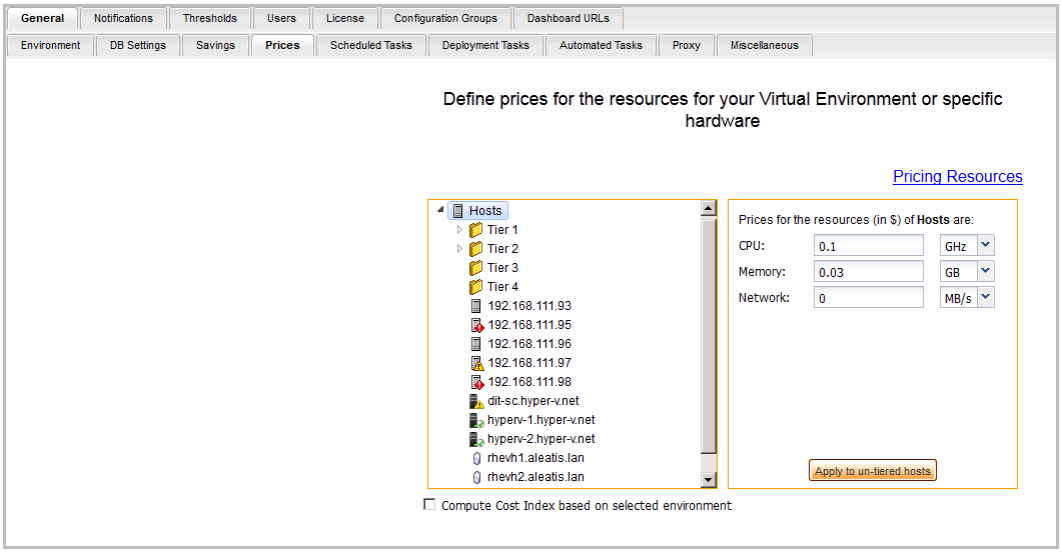
Chargeback allows you to create detailed cost analysis reports for individual groups, organizations or customers. Reports include both allocation costs based on the virtual machine configuration and utilization costs based on the actual utilization of the resources.

Base prices must be defined for the hardware resources (CPU, memory, network and storage) that are used by the customers. These base prices can be overridden for specific business views, as described in “Creating Customized Pricing Models” on page 72.

To configure chargeback:

1 Click the **Configure Gear** icon .

2 Navigate to **General** > **Prices**.



The prices can be set individually for each host, or the hosts can be dragged and dropped into one of the tiers and the pricing set for the tier. The tiers can be renamed or new tiers added. Once the hosts are organized appropriately, enter the prices per daily unit.

Note You can organize datastores and disks and set their prices in the same way.

3 Next you must create the customers. To add a customer, right-click on **Customers** in the navigation tree and select **Add Customer**.

4 Type the customer name and click **Add**.

Business Views are used to organize the resources that belong to a customer. Create one or more business views with the appropriate virtual objects (folders, clusters, hosts, resource pools or virtual machines). The business view can then be dragged and dropped into the specific customer folder.

5 On the navigation pane, select the customer.

The chargeback report is generated.

6 To change the reporting period, use the drop-down lists along the top of the page.

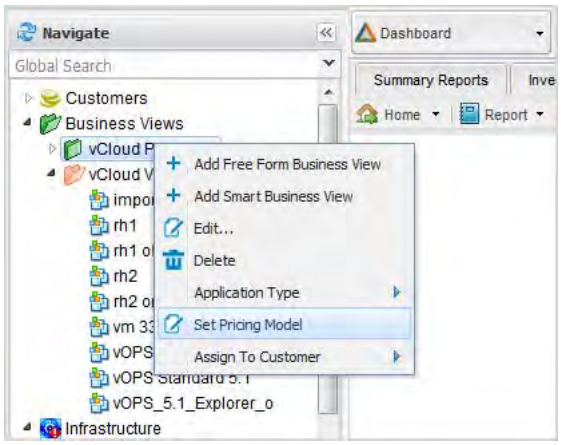
7 To modify the settings, click **Custom View**.

Creating Customized Pricing Models

The default pricing model defined in Settings > General > Prices can be overridden within individual business views, and additional fixed costs can also be defined.

To override prices and add fixed costs:

1 Right-click on a business view in the navigation tree and select **Set Pricing Model**.



2 The Set Pricing Model dialog has two tabs: **Fixed Costs** and **Override Resource Prices**. On the **Fixed Costs** tab, you can add fixed per day costs (power, cooling, licensing) to the business view by clicking **Add**.

   a Right-click on the business view and select **Set Fixed Costs**.

   b Click **Add** and then type the name of the fixed cost and the amount to add daily.

3 The second tab, **Override Resource Prices**, allows a new price to be set on individual resources that overrides the base price. You can set different prices for allocation and for utilization. The base price is the price set for that resource either in a containing business view or in Settings > General > Prices**.**

   Within per-business-view price settings, you have three possible ways to determine the price to be used for utilization or allocation on a specific resource:

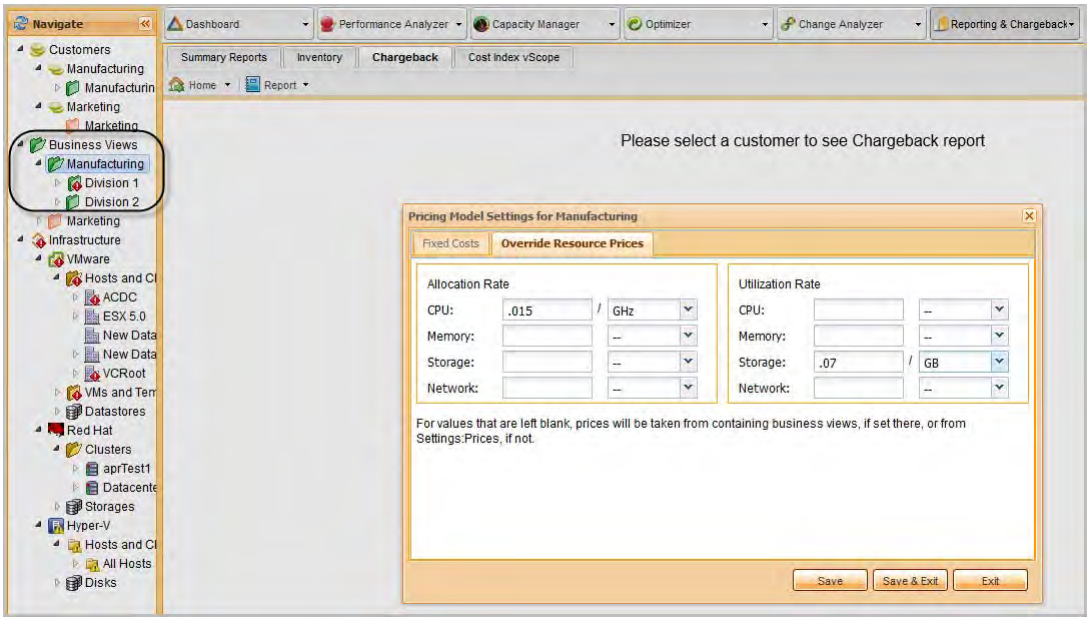
   - Set a specific price by selecting appropriate units and entering a value. This price overrides any other price.
   - Set a multiplier by selecting **X Base Price** and entering a value. This causes the base price to be multiplied by the value specified. This can be used to provide a discount or tax on particular resources for particular products or customers.
   - Leave the field blank. The base price is used.

To understand how this works and how the base price is determined, consider the following example.

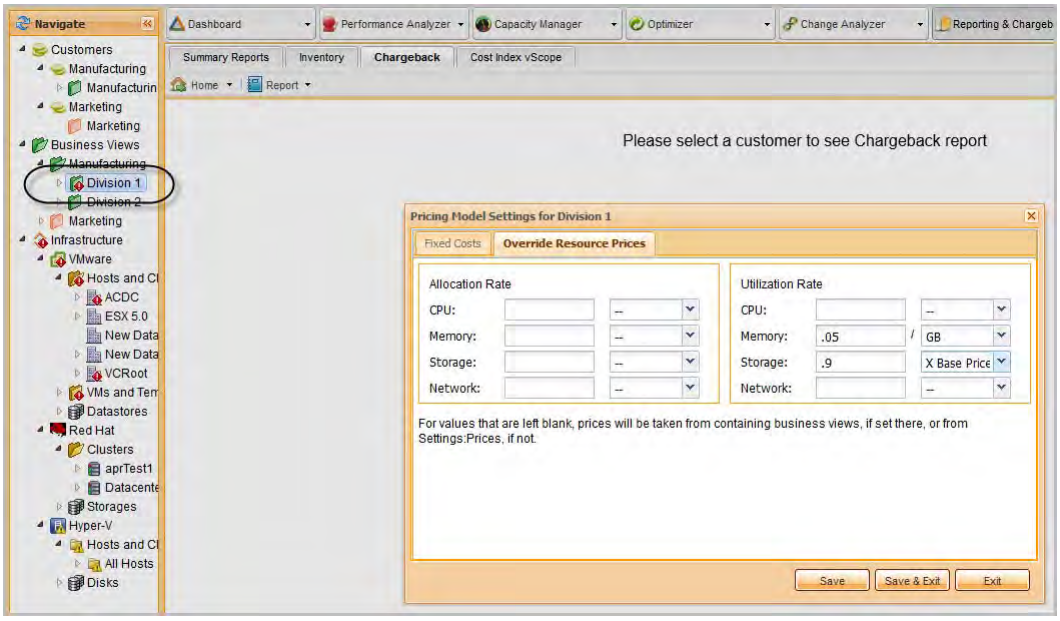
Example

The Manufacturing business view contains two sub-views, Division 1 and Division 2, as shown in the image below. If no pricing model has been created, then any VMs in any of these business views will use the prices set in Settings > General > Prices.

Create a pricing model on *Manufacturing* that changes the storage utilization and CPU allocation prices as shown. If we stop here, then all Manufacturing VMs are charged the default prices for memory, network, storage allocation, and CPU utilization, but the new prices for storage utilization and CPU allocation are used.



Next, create a new pricing model in *Division 1*, as shown in the image below. Here we have changed the memory utilization price and added a multiplier of 0.9 to the storage utilization price. The result is that VMs in Division 1 are charged the default prices for network, memory allocation, storage allocation, and CPU utilization. They are charged the same price as other Manufacturing VMs for CPU allocation, but now have a different special price for memory utilization. Finally, VMs in Division 1 receive a 10% discount on the manufacturing price for storage utilization.



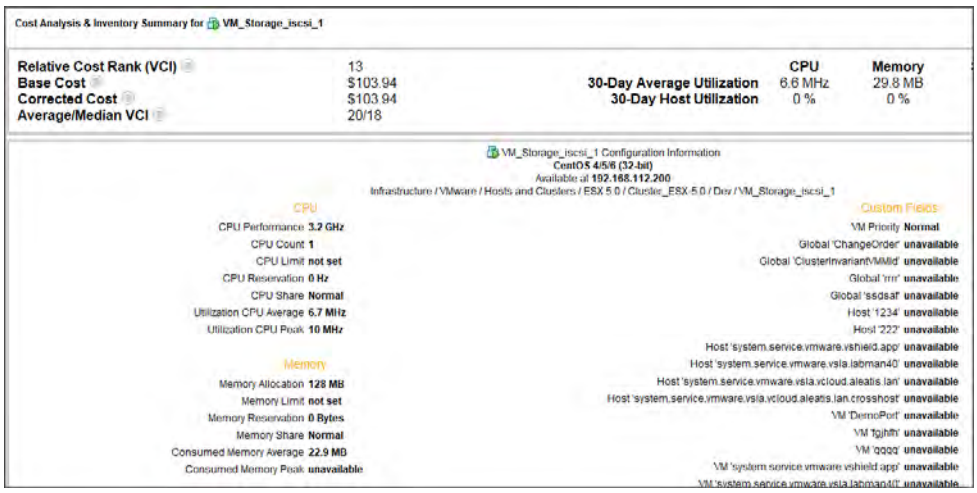
Fixed costs can also be overridden. If a fixed cost with the same name appears in both a parent business view and a child one, VMs in the child business view are charged the price set there, while VMs in the parent and other child business views are charged the price set in the parent.

Cost Index vScope

vScope provides an environment-wide, cross-hypervisor visualization of the status of your infrastructure. The Cost Index vScope indicates the relative costs of all VMs in the form of a heat map. Each colored box represents a single host, and hosts are further grouped by cluster and data center.

The color of each host reflects its Virtualization cost index (VCI), a measure of its cost relative to all other VMs in the environment. For more information, see “The Virtualization Cost Index (VCI)” on page 76. The map employs a cold (blue for low-cost) to hot (red for high-cost) color scale. You can use the color slider at the bottom of the view to change the transition from blue to red.

Double-click a VM box to drill down to a detailed view for the selected VM.



The Virtualization Cost Index (VCI)

A VCI represents its relative cost rank compared to all other VMs in the environment. The VCI ranges from a minimum value of 1 (the least expensive VM) to a maximum value of 100 (the most expensive VM).

To derive the cost index of a VM, Foglight for Virtualization, Standard Edition computes a base cost from the actual usage of CPU, memory, storage and network and the prices established in Settings > General > Prices. Then it computes a corrected cost that factors in the utilization of the host the VM runs on. The reason for this is that IT must bear the full cost of host resources even if they are not fully utilized and the cost attributed to the VM should account for this.

Finally, Foglight for Virtualization, Standard Edition derives the relative cost rank of the VM by mapping the corrected costs of all VMs to a range between 1 and 100, preserving their relative values. Therefore, if one VM is twice as expensive as another, its cost index will also be twice as large.

The VCI drill-down provides detailed information for the selected VM on the VCI, base cost and corrected cost, as well as details about the VM and its resource utilization.

7

Common Features

Features that are common to all modules include:

- Diagnose
- Global Search
- Help
- Home
- Navigation Tree
- Product Navigation
- Reports
- Resource Graphs
- Settings
- Tab Customization

Diagnose

Click **Diagnose** to review the status of a virtual machine, host, or datastore. From this view you can quickly see if anything is wrong, what it is, and what to do about it.

To view diagnose information for a VM:

1. Click the **Performance Analyzer** tab.
2. Click **Diagnose** located on the top right-hand side of the view.
3. Type the beginning of the VM name, host name, or datastore.

   A list of the objects is displayed in the drill down list.

Tip Limit the search scope by selecting the environment of interest in the navigation tree at the left. For more information, see "Navigation Tree" on page 79.

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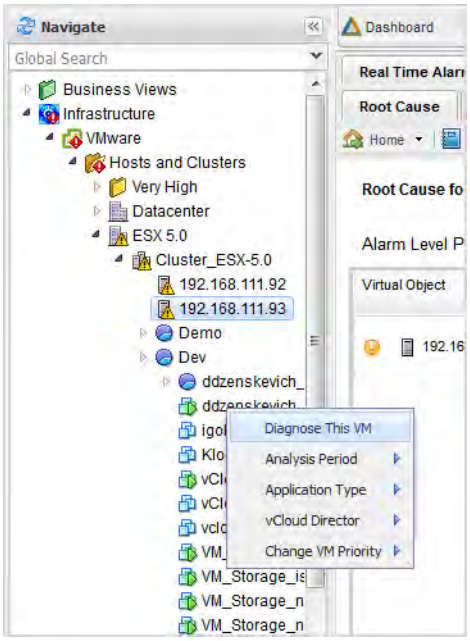
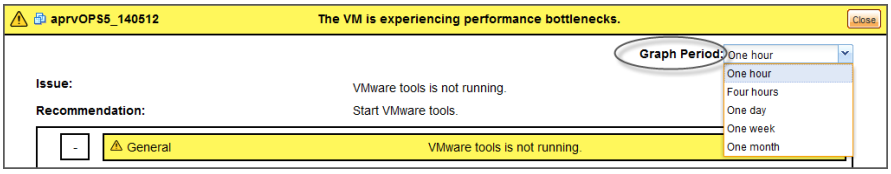
4. Select the object to review the diagnostic information.

   Alternatively, you can select an object on the navigation tree and right-click to select **Diagnose**.

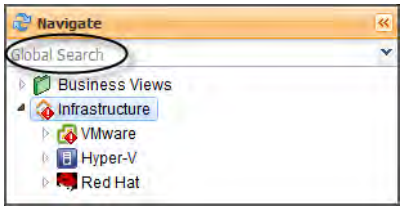


5 **Optional**—click **Graph Period** and select an option. By selecting another Graph Period, you can quickly see the history for this virtual machine.



Global Search

From the navigation tree, use the **Global Search** to quickly locate any VM, host, cluster, datastore, or datacenter.



Help

A number of online resources are available, should further information or support be required.

Click the Help  icon to display the following options:

- **Online Manual**—to access the *Foglight for Virtualization, Standard Edition User Guide*.
- **Support Link**—to access the Quest Support Portal *https://support.quest.com/Default.aspx*
- **About**—find the version and build number of the release you are currently using. Review the list of 3rd-party components included in this release.

Home

You can choose any page and make it your personal home page.

To set your personal Home page:

1. Navigate to the view that you want to make your home page.
2. Click **Home** > S**et Current Screen as Home**.

If you later choose another page as your home page, it replaces the previous one.

Navigation Tree

The Navigation Tree is common to the Dashboard and all modules. It consists of two parts: the Infrastructure Node gathered from vCenter and System Center and Business Views.

Infrastructure Node

In a multi-hypervisor environment, the tree displays an Infrastructure node, followed by a VMware sub-tree, a Hyper-V sub-tree, and a Red Hat sub-tree.

Infrastructure node structure:

- **VMware**
  - **Host and Clusters** is kept synchronized with the vCenters connected to Foglight for Virtualization, Standard Edition. It contains the same objects and structures as seen in vCenter.
  - **VMs and Templates** is kept synchronized with the vCenters connected to Foglight for Virtualization, Standard Edition. It also contains the same objects and structures as seen in vCenter.
  - **Datastores** contains all of the datastores and datastore clusters used in the virtual environment.
- **Hyper-V**

  - **Host and Clusters** is kept synchronized with SCVMM. It contains the same objects and structures as seen in SCVMM.
  - **Disks** contains all of the virtual disks used in the virtual environment.
- **Red Hat**
  - **Clusters** is kept synchronized with the Red Hat clusters connected to Foglight for Virtualization, Standard Edition. It contains the same objects and structures as seen in vCenter.
  - **Storages** contains all the data storage locations used in the virtual environment.

In a single-hypervisor environment, the Infrastructure and VMware or Hyper-V nodes do not appear.

Organizing your VMs

There are three main tagging methods provided to assist you in organizing your VMs within Foglight for Virtualization, Standard Edition:

- Analysis Period
- Application Types
- vCloud Director

Right-click on an individual VM or container object (such as a resource pool) in the navigation tree to access these methods.

Analysis Period

Analysis Period is a method of tagging the VMs in your environment with specified exclude times.

The Analysis Period options are:

- **Use Parent Settings**—no exclude times set.
- **Override Parent Settings**—set the analysis period for a virtual machine to exclude specific times.

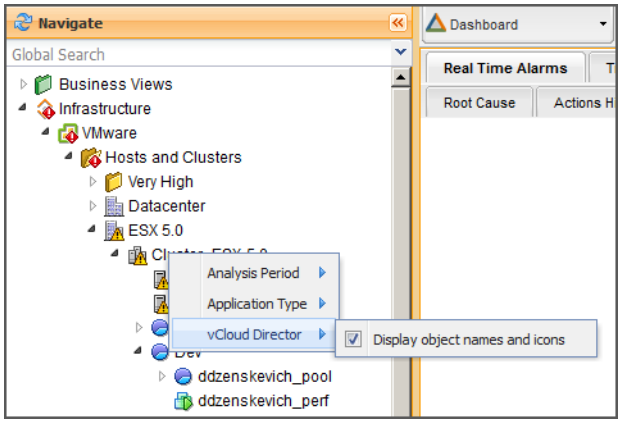
Application Types

Application types are a method of tagging the VMs in your environment with the application that runs on them. This allows for more efficient organization of your VMs within Foglight for Virtualization, Standard Edition. Application types can be used in smart business view and configuration group filters using the **Application Type** characteristic.

The application type is applied to all VMs in the hierarchy below the current object. You can select either which application type to associate with these VMs or you can manage the application types themselves under the Manage Application Types tab.

vCloud Director

By default, icons for vApps, catalogs, and virtual machines are displayed in the navigation tree. To disable, right click on an icon in the navigation tree, and click **vCloud Director**. Clear the check box **Display object names and icons**.



Business Views

Business Views allow the organization of the infrastructure based on organization use or application deployment. Business views are hierarchical and can contain other business views, vCenter folders or individual objects. The same object can appear in more than one business view, allowing multiple perspectives on the infrastructure to be maintained.

There are two types of Business Views: Free-Form and Smart.

Note The functionality of business views is shared by Configuration Groups, as described in “Settings” on page 84.

Free-Form Business Views

To add a free-form business view:

1. Right-click either Business Views or a previously created business view in the navigation tree and select **Add Free-Form Business View**.

   The Add a Free Form Business View dialog box appears.

2. Type a name and description for the business view.
3. Select the inventory objects to be included in the business view and move them to the pane on the right.
4. Click **Add** to create the business view containing the selected objects.

Tip You can also select objects in the navigation tree and drag and drop them into an existing business view.

Smart Business Views

Smart business views work differently from free-form business views in that they are dynamically populated based on a series of rules instead of by adding specific objects.

To add a smart business view:

1. Right-click on Business Views or a previously created business view in the navigation tree and select **Add Smart Business View**.
2. Type the name and description of the business view.
3. Click **New Rule** to add a new rule set. Multiple rule sets can be applied to each smart business view.

   Each rule set can contain multiple rules. For example, a rule set containing *VM name contains SQL* and *Cluster contains prod* creates a business view that contains all VMs within the *prod* cluster that also have *SQL* in their name. If a new VM that matches this criteria is added to the environment it also shows up within this business view.

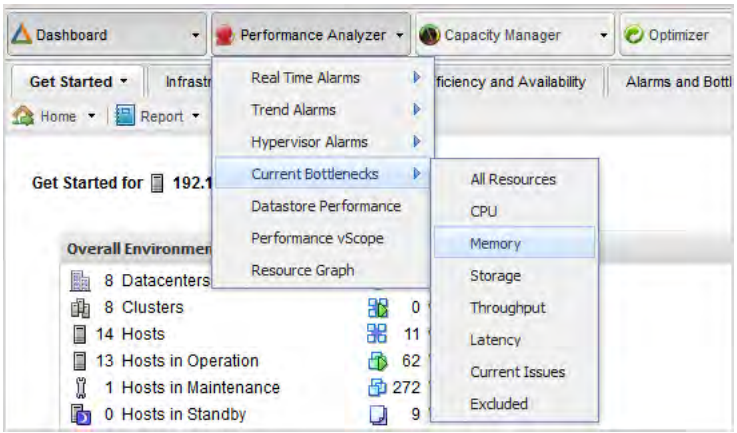
   Each rule consists of several elements: the type of object to which it applies (such as VM or host), the property of that object for which the condition is set (for example, name, application type, or OS), and the condition itself.

   Note When creating a smart business view, if you select Virtual Machine as the Object Type, one of the characteristics is Annotations. These correspond to the annotations set in vCenter.
4. Click **Save** to finalize the rule sets and create the new smart business view.

Tip To learn more about how to create Business Views to organize VMs and other objects, watch our learning video. Visit *http://www.vkernel.com/support/learn.*

Product Navigation

You can navigate directly from any part of the appliance to any other part of the appliance by using the drop-down functionality on the buttons at the top of the user interface. These menus reproduce the entire tab structure, so you do not need to wait for each tab to load to navigate around the user interface.



Reports

All of the views within each module can be saved as an XML, PDF, or CSV file, can be emailed, or scheduled to be emailed on a regular basis.

Table Reports

Table reports are used throughout this product (for example, Current Bottlenecks or Datastore Performance). The columns shown in these reports can be customized.

To add or remove columns from a given table:

1. Click the drop-down arrow in the column header.

   Tip The arrow may not be visible until you hover your cursor over the column header.

2. Click **Columns**.
3. Select or clear items from the menu as desired.

Scheduled reports use the columns that are selected at the time the report is configured, allowing you to customize reports sent to different audiences.

Saving Reports

Click **XML**, **PDF**, or **CSV** to immediately save the current view.

Emailing Reports

Click **E-mail** to specify the type of report and one or more email addresses to immediately send the report to.

Scheduling Reports

Click **Schedule** to specify how often the report will be sent, the type of the report, and one or more email addresses to send the report to.

Resource Graphs

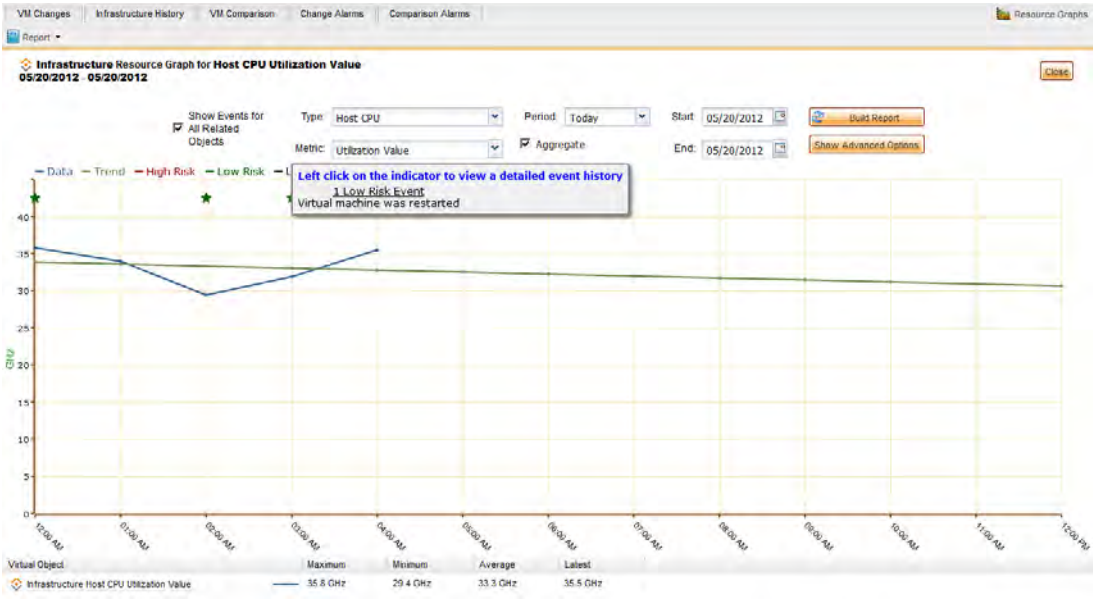
Resource Graphs allow you to chart the raw data points collected by Foglight for Virtualization, Standard Edition for the various objects (such as hosts and VMs) in your environment.

Resource Graphs are available throughout the product by clicking **Resource Graphs**, which is found at the top right of most views. They can also be added to any custom dashboard. They can be configured to display host (or VM) CPU, memory, storage, and networking data along with datastore and guest partition data.

Resource graphs include an overlay showing what changes occurred during the interval that is being charted. A green, yellow, or red star appears along the top of the chart whenever there are

events that occurred during that time period. The color of the star reflects the maximum impact risk level of the changes that occurred. The color definitions are provided at the top of the graph.

Hovering over the star brings up a summary of all the changes, with detailed listings of the riskiest changes along with counts for the complete set, as shown in the image below. Clicking on the summary closes the resource graph and opens a listing of the change events in the Infrastructure History view of the Change Analyzer.



Settings

The settings described in this section apply to all of the modules.

To access the settings, click the **Configure Gear** icon located at the top-right corner of all views.

Settings > General > Environment

Configure the connections to the VMware vCenter(s) or ESX host(s).

Systems Center connections appear here once properly configured, but cannot be added here directly. Follow the detailed instructions in the *Foglight for Virtualization, Standard Edition Installation Guide* to add SCOM connections.

By default, the **Display object names and icons as they appear in the vCloud Director** check box is selected. Added support for vCloud Director, a VMware software, enables the consolidation of virtual infrastructure across multiple clusters, the encapsulation of application services as

portable vApps, and the deployment of those services on-demand with isolation and control. With this option enabled, the naming convention used by the vCloud Director is captured.

Note	All vCenters that the vCloud Director uses must have added VMware and set credentials.

Settings > General > DB Settings

Foglight for Virtualization, Standard Edition requires a database for storage of the information it uses to analyze the virtual environment. The database may be either an embedded PostgreSQL database or an external Microsoft SQL or Oracle database. Approximately 30 MB of database storage is required for each virtual machine. The PostgreSQL database is automatically configured during installation.

To use an external database:

1. Click **Change Database**.
2. Select either MS SQL or Oracle.

MS SQL

To configure a Microsoft SQL 2005 or later database:

1. Select the MS SQL option.
2. Type either the server name or IP address of the MS SQL database server.
3. Type the database credentials.

   If the database does not already exist, the credentials must have permissions that allow database creation.

   If the database already exists, the credentials need only have database owner permissions.

   These credentials are used to create the database (if it does not already exist), the tables, and the stored procedures. Either Windows authentication or SQL authentication can be selected.
4. Click **Check Settings** to verify database connectivity.
5. Click **Set Database** to finish.

Oracle

To configure an Oracle 10g or later database:

1. Select the Oracle option.
2. Type the server host and the service name of the Oracle database server.
3. Type the database credentials.

   If the database does not already exist, the credentials must have permissions that allow database creation.

   If the database already exists, the credentials need only have database owner permissions.

These credentials are used to create the database (if it does not already exist), the tables, and the stored procedures. Either Windows authentication or SQL authentication can be selected.

4 Click **Check Settings** to verify database connectivity.

5 Click **Set Database** to finish.

Settings > General > Savings

Set the costs used in estimating potential savings through reconfiguration or elimination of waste.

Settings > General > Prices

Set the hardware prices used to determine resource allocation and utilization costs.

Settings > General > Scheduled Tasks

Review, edit, or delete the scheduled reports.

Settings > General > Deployment Tasks

Review, edit, or delete the scheduled virtual object deployment changes.

Settings > General > Automated Tasks

Review, edit, or delete the scheduled virtual object configuration changes.

Settings > General > Proxy

Set the proxy connection to the Internet.

Settings > General > Miscellaneous

Modify the current logo that appears on reports or adjust other general settings. From this tab, you can also save debug information in a *.zip* file and email the files to Support. Click **Debug Information** to perform this activity.

Settings > Notifications > Alerts

Set general conditions for triggering Trend and Predictive alarm notifications:

- Check for Condition Every: defines how often to check whether the conditions for triggering an alarm are met.
- Change Notification Recipients Group Every: defines when to send Second and Third notifications.

Settings > Notifications > System

Set general system notifications.

Settings > Notifications > Address Book

Review, add, edit, or delete address book entries used for notifications and alarms.

Settings > Notifications > Email

Set the credentials used to send email.

Settings > Thresholds

Thresholds are a set of configurable values that many components in the module use. Capacity Availability, for example, does not make any capacity recommendations that would violate a threshold. The alarms in Performance Analyzer are configured to use these thresholds as a basis for their trigger values. Current Bottlenecks and Future Bottlenecks also use these values as a basis for identifying current and trending resource bottlenecks.

There are separate tabs for VMware environments and Hyper-V environments due to the differing metrics between the two hypervisors.

- The Peak Analysis Period is the amount of time for which a value has to be sustained before it is considered a peak. For example, if CPU goes up to 90% for 10 minutes and drops back down, given a 15 minute peak analysis period, it won't be labeled as a peak. It needs to last for as long as this value indicates.
- The Threshold For Merging Peaks provides the flexibility to turn two separate peaks into one. For example, if you have a 15 minute, 80% peak followed immediately by a separate 15 minute 82% peak, they are really the same peak. Therefore, if the values are within the threshold percentage, they are merged into one large peak.
- The Real-time Warning/Alarm Durations set the duration on the alerts that go into Virtual Center. In order for Virtual Center to generate an alert, the warning or alarm value has to be sustained for the full duration.

Settings > Thresholds > Cluster

Review or edit the thresholds used to analyze cluster performance. There are separate tabs for VMware, Red Hat, and Hyper-V clusters.

Settings > Thresholds > Host

Review or edit the thresholds used to analyze host performance. There are separate tabs for VMware, Red Hat, and Hyper-V clusters.

Settings > Thresholds > Resource Pool

Review or edit the thresholds used to analyze resource pool performance.

Settings > Thresholds > VMware vApp

Review or edit the thresholds used to analyze VMware vApp performance.

Settings > Thresholds > Virtual Machine

Review or edit the thresholds used to analyze virtual machine performance. Note that there are separate tabs for VMware VMs and Hyper-V VMs.

Settings > Users

In User Management you can enable or disable the use of Active Directory (AD) authentication.

When configuring Active Directory, you must specify the following items:

- AD Server: Specify the FQDN or IP of a domain controller that manages Active Directory.
- DNS Domain: Specify the DNS domain for Active Directory, such as vkernel.com.
- AD Admin Group: You may specify any group in Active Directory here. You may create a new group or use an existing one. Any user that resides within this group or any of its nested sub-groups will be given full administrative rights within Foglight for Virtualization, Standard Edition.

  Note You may specify other groups with which to grant specific permissions levels later on in the configuration (such as giving business users read-only rights on a specific cluster), this is only for administrators.
- AD Service Account: Specify a service account with which the appliance can authenticate against LDAP.
- Password: The password for the AD Service account.

Important You cannot use local users and Active Directory users at the same time. Enabling Active Directory disables local users (including the default `vkernel` account).

If you choose not to use Active Directory, right-click on **Users** to add a new user. After the username and password have been specified, they appear in the list. The new user does not have any permissions by default. You must modify the permissions to suit your preference. Any user

granted the **Add, edit and delete users** permission is added to the **User Administrators** list at the top of the User Management tree.

When using Active Directory, users logging in receive, by default, access rights according to their permissions in vCenter in a VMware environment. By default, in a Hyper-V environment, they have no access permissions. Administrators can choose to add permissions directly in order to override the default permissions.

Note Overriding the permissions in Foglight for Virtualization, Standard Edition does not modify any permissions in vCenter.

Another feature of Active Directory is the use of AD User Groups. Right-click on this item in the menu on the left of the User Management screen and add a new AD user group. Specify any group within Active Directory. You can then set permissions for this group as a whole. These rights propagate to every user that is a member of this group. This allows you to grant an entire group of non-administrative Foglight for Virtualization, Standard Edition users specific permissions without having to grant them on an individual basis.

Settings > License

Request, change, install, migrate, review, or assign socket licenses to the hosts.

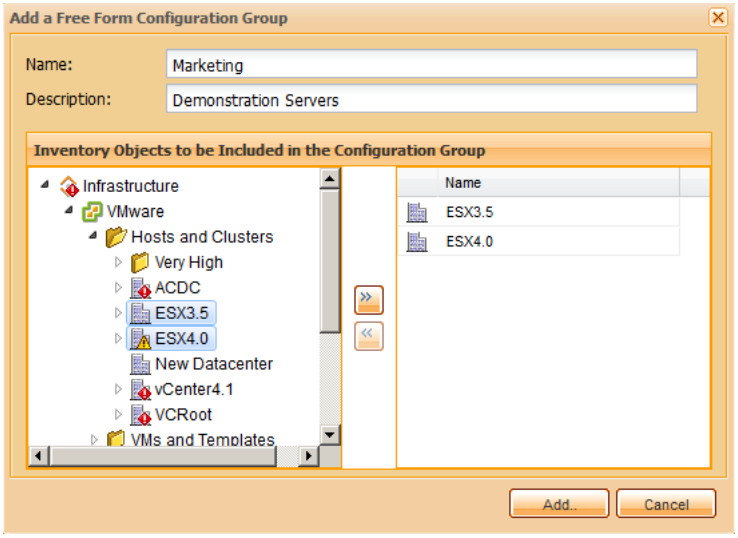
For more information, see the *Foglight for Virtualization, Standard Edition Installation Guide.*

Settings > Configuration Groups

Configuration Groups are used to customize different settings in different parts of the environment. They function similarly to Business Views (both free-form and smart), but are used for configuration rather than reporting.

Configuration Groups are designed to be used across multiple types of settings, but currently are used only within Rightsizer. For more information, see “Rightsizer Constraints” on page 49.

To create a new Configuration Group (either free-form or smart), right-click **All Configuration Groups** and create them in the same way you do a Business Views. With free-form groups, you can drag any item from the inventory tree at the bottom into the group. The contents of smart configuration groups are determined by the filters used to create them, just as with smart business views.



For information on how to use Configuration Groups to create constraints on Rightsizer recommendations, see “Rightsizer Constraints” on page 49.

Settings > Dashboard URLs

Delete custom created dashboards from the list of URLs.

Tab Customization

Customize the tabs that are displayed by selecting or de-selecting those that you do not want to see.

To customize the tab display:

1. Click the  icon to the right of the **Reporting & Chargeback** tab.

   A list of available tabs appears.
2. Select only the check boxes for the tabs that you to be displayed in each module. Clear the check boxes for the tabs that you do not use and should be hidden on the interface.

Index

O

P

R

S

T

U

V

W