Quest™

Foglight® for VMware 6.0.0

User and Reference Guide

© 2021 Quest Software Inc.

ALL RIGHTS RESERVED.

This guide contains proprietary information protected by copyright. The software described in this guide is furnished under a software license or nondisclosure agreement. This software may be used or copied only in accordance with the terms of the applicable agreement. No part of this guide may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's personal use without the written permission of Quest Software Inc.

The information in this document is provided in connection with Quest Software products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Quest Software products. EXCEPT AS SET FORTH IN THE TERMS AND CONDITIONS AS SPECIFIED IN THE LICENSE AGREEMENT FOR THIS PRODUCT, QUEST SOFTWARE ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL QUEST SOFTWARE BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF QUEST SOFTWARE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Quest Software makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Quest Software does not make any commitment to update the information contained in this document.

If you have any questions regarding your potential use of this material, contact:

Quest Software Inc.
Attn: LEGAL Dept.
4 Polaris Way
Aliso Viejo, CA 92656

Refer to our website (https://www.quest.com) for regional and international office information.

Patents

Quest Software is proud of our advanced technology. Patents and pending patents may apply to this product. For the most current information about applicable patents for this product, please visit our website at https://www.quest.com/legal.

Trademarks

Quest, the Quest logo, and Where next meets now are trademarks and registered trademarks of Quest Software Inc. For a complete list of Quest marks, visit https://www.quest.com/legal/trademark-information.aspx. "Apache HTTP Server", Apache, "Apache Tomcat" and "Tomcat" are trademarks of the Apache Software Foundation. Google is a registered trademark of Google Inc. Android, Chrome, Google Play, and Nexus are trademarks of Google Inc. Red Hat, JBoss, the JBoss logo, and Red Hat Enterprise Linux are registered trademarks of Red Hat, Inc. in the U.S. and other countries. CentOS is a trademark of Red Hat, Inc. in the U.S. and other countries. Fedora and the Infinity design logo are trademarks of Red Hat, Inc. Microsoft, .NET, Active Directory, Internet Explorer, Hyper-V, Office 365, SharePoint, Silverlight, SQL Server, Visual Basic, Windows, Windows Vista and Windows Server are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. AIX, IBM, PowerPC, PowerVM, and WebSphere are trademarks of International Business Machines Corporation, registered in many jurisdictions worldwide. Java, Oracle, Oracle Solaris, PeopleSoft, Siebel, Sun, WebLogic, and ZFS are trademarks or registered trademarks of Oracle and/or its affiliates in the United States and other countries. SPARC is a registered trademark of SPARC International, Inc. in the United States and other countries. Products bearing the SPARC trademarks are based on an architecture developed by Oracle Corporation. OpenLDAP is a registered trademark of the OpenLDAP Foundation. HP is a registered trademark that belongs to Hewlett-Packard Development Company, L.P. Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both. MySQL is a registered trademark of MySQL AB in the United States, the European Union and other countries. Novell and eDirectory are registered trademarks of Novell, Inc., in the United States and other countries. VMware, ESX, ESXi, vSphere, vCenter, vMotion, and vCloud Director are registered trademarks or trademarks of VMware, Inc. in the United States and/or other jurisdictions. Sybase is a registered trademark of Sybase, Inc. The X Window System and UNIX are registered trademarks of The Open Group. Mozilla and Firefox are registered trademarks of the Mozilla Foundation. "Eclipse", "Eclipse Foundation Member", "EclipseCon", "Eclipse Summit", "Built on Eclipse", "Eclipse Ready" "Eclipse Incubation", and "Eclipse Proposals" are trademarks of Eclipse Foundation, Inc. IOS is a registered trademark or trademark of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries. Apple, iPad, iPhone, Mac OS, Safari, Swift, and Xcode are trademarks of Apple Inc., registered in the U.S. and other countries. Ubuntu is a registered trademark of Canonical Ltd. Symantec and Veritas are trademarks or registered trademarks of Symantec Corporation or its affiliates in the U.S. and other countries. OpenSUSE, SUSE, and YAST are registered trademarks of SUSE LCC in the United States and other countries. Citrix, AppFlow, NetScaler, XenApp, and XenDesktop are trademarks of Citrix Systems, Inc. and/or one or more of its subsidiaries, and may be registered in the United States Patent and Trademark Office and in other countries. AlertSite and DéjàClick are either trademarks or registered trademarks of Boca Internet Technologies, Inc. Samsung, Galaxy S, and Galaxy Note are registered trademarks of Samsung Electronics America, Inc. and/or its related entities. MOTOROLA is a registered trademarks of Motorola Trademark Holdings, LLC. The Trademark BlackBerry Bold is owned by Research In Motion Limited and is registered in the United States and may be pending or registered in other countries. Quest is not endorsed, sponsored, affiliated with or otherwise authorized by Research In Motion Limited. Ixia and the Ixia four-petal logo are registered trademarks or trademarks of Ixia. Opera, Opera Mini, and the O logo are trademarks of Opera Software ASA. Tevron, the Tevron logo, and CitraTest are registered trademarks of Tevron, LLC. PostgreSQL is a registered trademark of the PostgreSQL Global Development Group. MariaDB is a trademark or registered trademark of MariaDB Corporation Ab in the European Union and United States of America and/or other countries. Vormetric is a registered trademark of Vormetric, Inc. Intel, Itanium, Pentium, and Xeon are trademarks of Intel Corporation in the U.S. and/or other countries. Debian is a registered trademark of Software in the Public Interest, Inc. OpenStack is a trademark of the OpenStack Foundation. Amazon Web Services, the "Powered by Amazon Web Services" logo, and "Amazon RDS" are trademarks of Amazon.com, Inc. or its affiliates in the United States and/or other countries. Infobright, Infobright Community Edition and Infobright Enterprise Edition are trademarks of Infobright Inc. POLYCOM®, RealPresence® Collaboration Server, and RMX® are registered trademarks of Polycom, Inc. All other trademarks and registered trademarks are property of

their respective owners.

Legend

WARNING: **A WARNING icon indicates a potential for property damage, personal injury, or death.**

CAUTION: **A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.**

IMPORTANT NOTE, **NOTE**, **TIP**, **MOBILE**, or **VIDEO:** An information icon indicates supporting information.

Foglight for VMware User and Reference Guide
Updated - May 2021
Software Version - 6.0.0

Contents

Using Foglight for VMware 6
Introducing the virtual infrastructure 6
Object roles 7
Navigation basics 11
Foglight for VMware browser interface elements 11
Breadcrumbs 13
Time Range 13
Sortable lists 13
Alarms and their status indicators 14
Mouse-over actions 14
Interacting with Foglight for VMware 14
About VMware roles 15
Exploring administrative tasks 15
Configuring monitoring agents for data collection 20
Managing certificates 24
Viewing the overall system status 25
Exploring your VMware environment 26
Investigating performance metrics 29
Exploring VMware alarms 39
Setting the alarm sensitivity level 41
Administering monitored ESX hosts and virtual machines 42
Additional features 54
VMware Performance Agent configuration 64
VMware Performance Agent and Agent Manager configuration 64
Configuring agent properties 66
Setting the Configuration properties 68
Setting the FileCollector properties 69
Setting the vSwitchCollector properties 69
Setting the Duplicate VM List properties 70
Setting the Black List properties 70
Setting the Data Collection Scheduler properties 72

Reference 74
Views 74
VMware Alarms views 74
VMware Explorer views 77
VMware Modeler views 156
VMware VirtualCenter views 157
VMware Environment views 158
Other views 252
Rules 253
Agent Rules 254
Cluster Rules 255
Datacenter Rules 259

Datastore Rules 262
Resource Pool Rules 263
ESX Server Rules 265
VirtualCenter Rules 273
Virtual Machine Rules 277
VMW Stale Data Management Rule 284
Virtual Switch Rules 284

Appendix: Alarm Messages 289

Appendix: Metrics 294
Virtual machine metrics 294
ESXi host metrics 298
Datastore metrics 302
Datastore cluster metrics 303
Resource pool metrics 304
vApp metrics 305
Cluster metrics 307
Datacenter metrics 309
vCenter metrics 310
DvSwitch metrics 312

About Us 313
Technical support resources 313

1

Using Foglight for VMware

This chapter introduces you to the VMware® virtual infrastructure and provides you with essential foundational information.

For more detailed information about VMware virtualization products and solutions, consult the appropriate VMware documentation.

- Introducing the virtual infrastructure
- Navigation basics
- Interacting with Foglight for VMware
- VMware Performance Agent configuration

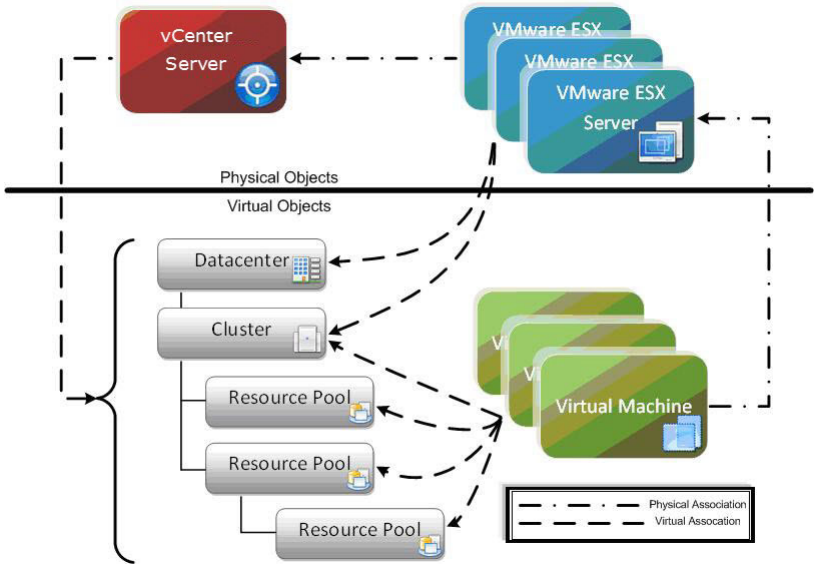
Introducing the virtual infrastructure

VMware® vSphere® provides an innovative mechanism for organizing and viewing any virtual infrastructure built on its platform. Using a unique combination of physical and logical components, this mechanism effectively and efficiently fulfills the VMware vision of the modern virtual infrastructure.

Foglight® for VMware accommodates customers of all sizes that leverage the VMware virtualization platform by examining and enhancing eminently knowledgeable VMware view of the virtual world.

The following figure highlights the components or objects that make up a typical vSphere implementation. The figure makes a clear distinction between objects that exist in the physical world and those that are considered to be virtual.

Figure 1. VMware vCenter Server infrastructure



VMware vCenter® allows for the configuration of a hierarchical organizational structure that resides primarily within the virtual domain. This enables an organization to easily configure physical VMware ESX® Servers and virtual machines to reside in logical groups that dictate the various aspects of the virtual infrastructure (like physical object location, resource allocations and limitations for virtual machines, and high availability settings for physical and virtual components).

Object roles

Before we get too far into discussing the layout and capabilities of Foglight® for VMware, we must understand the different roles the various physical and virtual objects play within the overall virtual infrastructure.

The vCenter® Server and VMware® ESX® Servers provide the physical foundation for the vSphere® infrastructure.

Virtual machines on the other hand are classified as virtual components for the purpose of management and monitoring, even though they have many of the same characteristics (like direct network and storage access) as physical systems. At any given time, a virtual machine must be contained within a single VMware ESX Server. The particular ESX Server in which a given virtual machine is contained may change of course over the lifetime of the virtual machine through the use of unique VMware technologies such as VMware vSphere® vMotion® or VMware vSphere® High Availability (VMware HA).

Physical objects

The physical objects within the VMware® virtual infrastructure are those with which you can physically interact. The virtual components or objects that make up the virtual environment cannot exist without the presence of underlying physical components.

A VMware ESX® Server is an example of a physical component.

To have Foglight® for VMware monitor a virtual infrastructure, the virtual infrastructure must consist of at least one vCenter Server that is used to manage the virtual infrastructure and at least one ESX Server that is used to run virtual machines.

NOTE: Each ESX Server that is used to run virtual machines must have its own managing vCenter Agent installed on it.

ESX Server Hosts

An ESX Server Host is the single physical component required to begin building a virtual infrastructure. An ESX Server provides a hypervisor based architecture for controlling and managing resources for the virtual machines that run on it. The virtual machines running on the host share the resources it provides. Should resources become over-committed, the ESX Server hypervisor determines which virtual machines have priority access to the shared resources (based on manual virtual machine configurations) and distributes the available resources accordingly.

Each ESX Server is managed by a single vCenter Server instance, and can be configured to exist logically within either a datacenter or cluster virtual object within the overall virtual infrastructure.

VMware vCenter Server

Although a vCenter Server can technically exist as a virtual machine, it is considered a physical component within the VMware virtual infrastructure.

VMware vCenter is the software tool used to manage virtual environments that are built on the VMware virtualization platform. vCenter creates a hierarchical structure of virtual objects that enables a system administrator to logically lay out his virtual infrastructure configuration. vCenter also introduces other advanced VMware functionality such as Distributed Resource Scheduling (DRS), VMotion, and High Availability (HA) that can be used to enhance the benefits of a virtual infrastructure.

vCenter provides a robust WSDL that Foglight for VMware leverages to capture and manipulate key characteristics and performance metrics of the various object types and objects found within the virtual

infrastructure configuration. Each vCenter instance that is to be monitored using this product must have a VMware Performance Agent configured for it that points to the Web service interface. As mentioned in the Foglight for VMware *Installation Guide*, this agent can be installed on the vCenter Server itself because all of the required components for the proper operation of the agent come pre-configured.

A single vCenter Server can monitor approximately 100 VMware ESX Servers and 1500 virtual machines before performance and scalability challenges demand the introduction of a second vCenter Server. Multiple vCenter instances can be disbursed geographically to localize the management of large, distributed vSphere implementations.

Virtual objects

Virtual objects can exist only within the confines of the virtual infrastructure. With the exception of virtual machines, virtual objects are logical and are used for organizing VMware ESX Servers and virtual machines, either geographically or by function. In addition, virtual objects allow for the advanced configuration of resource management and of high availability settings.

Virtual machines

The creation and subsequent use of virtual machines is the primary purpose for building and maintaining a virtual infrastructure. Virtual machines share many of the characteristics of physical systems (like storage and network interaction), but they do not have direct access to the hardware that is used to process their information and they are considered virtual components within the virtual infrastructure.

A virtual machine encompasses more than just a guest operating system like Microsoft Windows. A virtual machine also contains specific configurations that help to define it, such as the number of processors and the amount of memory it can leverage.

All of the resource utilization for a particular virtual machine on a VMware ESX Server is scheduled through that Server's hypervisor. The efficient tracking and analysis of this scheduling of resources at both the virtual machine and the ESX Server Host level is a key function provided by Foglight for VMware.

At any given time a virtual machine must reside on a single VMware ESX Server, but it can be moved across physical ESX Servers, typically without downtime, through the use of key vCenter functionality called VMotion. VMotion provides a method for proactively moving a virtual machine from one ESX Server to another while avoiding the downtime that can arise from having to perform actions like patching a physical host server. VMotion also provides a manual method a system administrator can use to better balance virtual machine workloads based on resource utilization trends.

A feature called Migration Modeler provides a method for analyzing the impact of using vMotion to move a virtual machine between two VMware ESX Servers in a cluster. Migration Modeler provides this functionality without you actually having to move the virtual machine.

Foglight for VMware also provides a mechanism that tracks the life cycle of the virtual machines within the virtual infrastructure. This enables you to quickly and easily view a history of a virtual machine's performance metrics and a history of its logical location within the virtual infrastructure.

VMware vCenter offers some additional valuable features that customers may wish to use including the VMware Distributed Resource Scheduling (DRS) feature for automating the process of balancing VMware ESX Server utilization and the VMware High Availability (HA) feature for recovering from host failure within a cluster.

Datacenters

A datacenter is the topmost virtual object within a vCenter Server implementation and is required before any VMware ESX Server Hosts can be added to a vCenter. A datacenter is most commonly used to identify the physical boundaries within which an ESX Server Host can exist. In most implementations these boundaries constitute a single physical location that contains a large number of ESX Server Hosts. There is no hard and fast rule stating that a datacenter must exist entirely at just one physical location, but other datacenter implementations are atypical of most virtual infrastructures.

Within the boundaries of a datacenter, objects of the same type cannot have the same name. For example, it is not possible to configure two ESX Server Hosts with the same name to reside within the same datacenter. The same goes for virtual machines, clusters, resource pools and any other objects that can be created and configured to

reside within a datacenter. Objects of the same type can have identical names as long as they are located in different datacenters.

Datastores

The management of datastores is carried out at the both the datacenter and the ESX Server levels.

Each datastore is contained within a datacenter and must be uniquely named within its containing datacenter.

A datastore represents a storage location for virtual machine files. The storage location can be a local file system path, a Virtual Machine File System Storage (VMFS) volume, or a Network Attached Storage directory.

ESX Server Hosts can be configured to mount a set of network drives (or datastores). For each storage location within a datacenter there is only one datastore, so multiple hosts may be configured to point to the same datastore. Whenever an ESX Server Host accesses a virtual machine or file within a datacenter it must use the appropriate datastore path.

Each datastore object keeps a record of ESX Server Hosts that have mounted it, and a datastore object can be removed only if no hosts are currently mounting that datastore.

Datastores are host-independent and platform-independent. Therefore, they do not change in any way when the virtual machines contained within them are moved from one ESX Server to another.

VSAN datastores

Virtual SAN (VSAN) is a software component running on the ESXi hypervisor. It collects storage resources associated with a cluster and creates a storage pool that is accessible to all hosts on the cluster. When Virtual SAN is enabled on a cluster, a VSAN datastore is created in your environment. VSAN datastores are collections of storage elements that are available to the hosts.

Clusters

A cluster object is a group of VMware ESX Servers that share common storage resources and network configurations. A cluster represents a pool of the combined resources of all of the ESX Server Hosts assigned to the cluster. For example, if four ESX Servers are added to a cluster and each ESX Server has 2x2 GHz processors with 4 GB of memory, the cluster represents a pool of 16 GHz of CPU processing power and 16 GB of memory that is available for use by virtual machines.

A cluster also serves as the boundary for virtual machine migration activity through the VMware vMotion or VMware HA features. When using either of these technologies for virtual machine migration it is critical that the participating ESX Server Hosts have identical storage resource and network configurations, and this is guaranteed within a cluster by the very definition of a cluster.

vApp

A vApp is a group of virtual machines that can be managed as a single object. vApps simplify management of complex, multi-tiered applications that run on multiple interdependent virtual machines. vApps have the same basic operations as virtual machines and resource pools. With vApps, you can set the order in which the virtual machines in the vApp power on, automatically assign IP addresses to virtual machines in the vApp, and provide application level customization.

vApps offer:

- Container for multiple virtual machines.
- Resource controls for the VMs inside the container.
- Network configurations contained inside.
- Portability of the vApp such that everything can be contained and transferred to another virtual infrastructure.
- Entire vApps can be powered on, powered off, suspended, or shutdown.
- Entire vApps can be cloned.

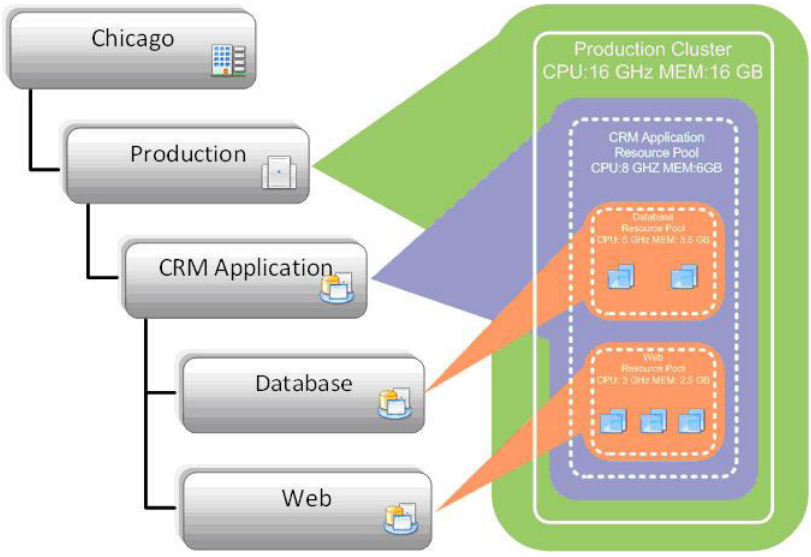
Resource pools

Resource pools enable an administrator to fine tune resource allocations within a cluster. A resource pool can be configured to leverage a portion of the overall available resources within a cluster and then virtual machines can be assigned to that resource pool. This enables an administrator to prioritize virtual machines—to either limit or guarantee certain resources to a particular virtual machine or group of virtual machines.

Resource pools can be configured in many ways, from simple to complex. For a simple example, two resource pools are configured within a cluster; one is named Production Virtual Machines and the other is named Development Virtual Machines. The Production resource pool is configured with a “High” share priority and the Development resource pool is configured with the default “Normal” share priority. In this case any virtual machine residing in the Production resource pool is automatically given twice the priority, in terms of access to system resources during periods of contention, of any virtual machine residing in the Development resource pool.

To better demonstrates the true potential of using resource pools, the following is an advanced example. Four ESX Servers are added to a cluster and each ESX Server has 2x2 GHz processors with 4 GB of memory. The cluster therefore represents a pool of 16 GHz of CPU processing power and 16 GB of memory that is available for use by virtual machines. The figure below illustrates that the Production Cluster resource that resides in the Chicago datacenter has 16 GHz of processing power and 16 GB of memory. A resource pool is created for a CRM Application that has access to 8 GHz of the cluster’s total CPU resources and 6 GB of the cluster’s total memory. By drilling down further from there you see that within the CRM Application resource pool there are two more resource pools (Database and Web). The existence of the Database resource pool ensures that key database virtual machines have access to the resources necessary to perform their highly transactional operations. The web servers have access to a smaller portion of the overall resources—just enough to provide the necessary end-user responsiveness from a web transaction perspective without impacting the key backend database infrastructure.

Figure 2. Resource pool example



To assist with the understanding of these nested relationships of virtualized objects, Foglight for VMware provides both a Topological and a Hierarchical view of the entire virtual infrastructure as well as resource pool mapping functionality for maximum flexibility in tracking advanced virtual infrastructure configurations.

Virtual switches

Your VMware environment uses virtual switches to distribute network traffic. A stand-alone ESX host typically uses a *standard virtual switch* to manage network traffic to and from virtual machines running on that host. *Distributed virtual switches* manage configuration of proxy switches, enabling communication between a virtual machine using the distributed switch and any of these components:

- any other virtual machines on any ESX hosts that use the same distributed switch
- virtual machines that use a standard virtual switch
- remote systems on a physical network connected to the same ESX host

In addition to standard and distributed virtual switches, your monitored environment may also include one or more *Cisco virtual switches*. A Cisco virtual switch is a third-party distributed virtual switch that manages network traffic between virtual machines and other components in your integrated virtual infrastructure. For more information about virtual switches, see your VMware documentation.

Folders

Folders are hierarchical components that exist within a vCenter and they enable an administrator to more easily organize the virtual environment for manageability. There are three different types of folders that can exist within the various layers of the virtual infrastructure hierarchy.

The following table lists the available types of folders, and explains the levels at which they can exist and the objects they can contain.

Table 1. Folder Types

Folder Type	Level at Which It Can Exist	Objects It Can Contain
Datacenter	vCenter Root	Datacenters
Virtual Machine	Datacenter	Virtual Machines and Templates
Compute Resources	Datacenter	Hosts and Clusters

Folders may contain nested folders of the same type, but not of other types. It is not possible, for example, to create a virtual machine folder within a datacenter folder.

Folders are provided strictly for organizational and management purposes. They offer a way for an administrator to classify objects that is not tied to (and therefore bound by) the virtual/physical relationship framework. For example, two datacenter folders are created at a vCenter root; one folder is labeled Primary Datacenters and the other is labeled Disaster Recovery Datacenters. An administrator can configure multiple primary datacenters containing production ESX Servers, place those datacenters in the Primary Datacenters folder, and then assign the necessary permissions to that folder to allow standard users to perform management tasks for the entire primary virtual infrastructure. The administrator can then configure multiple disaster recovery datacenters containing disaster recovery ESX Servers, place those datacenters in the Disaster Recovery Datacenters folder, and assign a different set of permissions to that folder. This prevents standard users from building virtual machines that may take over resources that are necessarily dedicated to HA-configured disaster failover virtual infrastructure components.

Using Foglight for VMware, you can observe either a Topology view that does not use folders and presents a logical breakdown of the virtual infrastructure by component, or a Hierarchy view that uses folders and presents the familiar interface that is found within the vCenter management server.

Navigation basics

This section describes the basic Foglight® for VMware navigation techniques necessary for using Foglight for VMware.

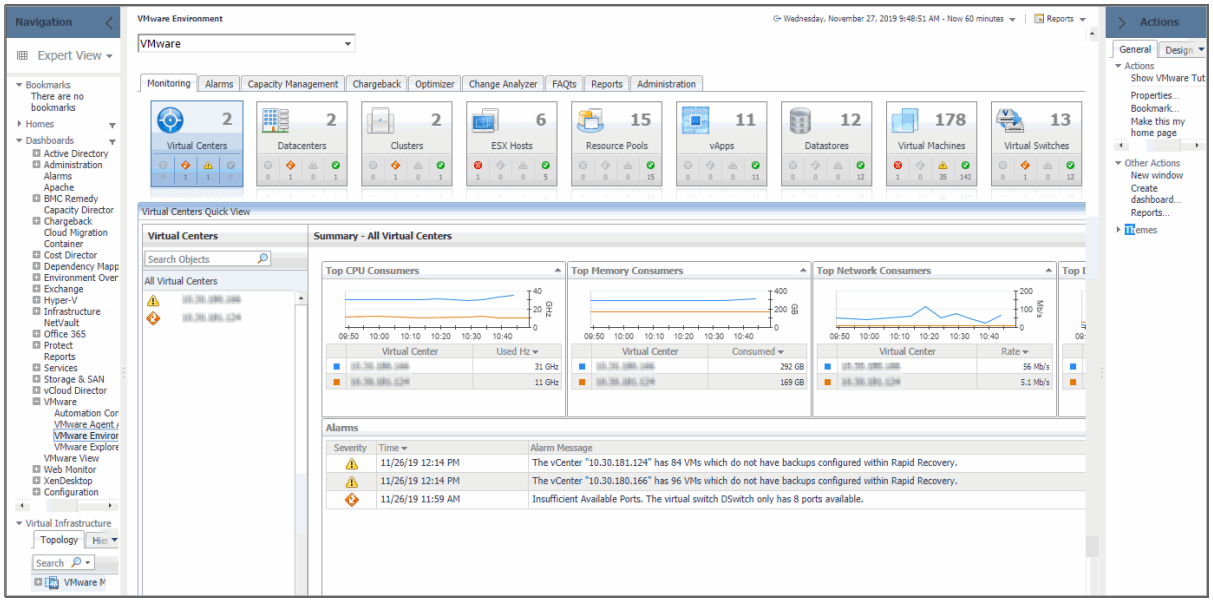
For information about navigation in the browser interface, see Interacting with Foglight for VMware on page 14.

Foglight for VMware browser interface elements

Depending on your user roles, you may see either the contents of the first bookmark (the Welcome page is the default) listed under Bookmarks, or a home page. For further details, see the *Foglight User Guide*.

Typically, the browser interface is divided into three panels: the navigation panel on the left, the display area in the middle, and the action panel on the right.

Figure 3. Foglight for VMware Browser Interface



Navigation panel

The navigation panel operates like a drawer. Its default state is open. To close the navigation panel, click the arrow at the far left of the Foglight for VMware browser interface. Click that arrow again to open the navigation panel.

The navigation panel lists all of the dashboards that are available to the current user for viewing. You can use the navigation panel to select a dashboard to view in the display area. To access a specific dashboard, open the appropriate module (the Virtual module, for example).

The navigation panel also provides access to the Foglight for VMware Administration and Configuration areas, and may provide access to some product-specific navigational views (for example, the Virtual Infrastructure view for the VMware Explorer dashboard).

If you do not see any dashboards in the navigation panel, the user id with which you signed in may not have been assigned to a group. For details, see the *Foglight for VMware User Help*.

Display area

The display area is used to view current dashboards and reports, as well as to create new dashboards and reports. You can increase the size of this area by resizing the navigation panel, or, if the action panel is open, by closing the action panel.

Action panel

The action panel operates like a drawer. Its default state is closed. To open the action panel, click the arrow at the far right of the Foglight for VMware browser interface. Click that arrow again to close the action panel.

The action panel contains the various actions and tasks you can perform with the current dashboard. It also contains views and data that you can add to a dashboard or report you are creating and provides access to the online help files.

Breadcrumbs

If you drill down into various levels across dashboards within Foglight® for VMware, a trail of breadcrumbs is left at the top of the current dashboard. This trail provides you with context. It also provides you with the name of the level you are currently viewing and with a simple mechanism for returning to any of its related parent levels.

The following breadcrumb trail was created while drilling down from the Virtual Environment Summary dashboard into the VMware Explorer dashboard. Each item within a breadcrumb trail is a hyper link to a previously viewed parent level.

Figure 4. Breadcrumb trail

For more specific information about the Virtual Environment Summary dashboard or the VMware Explorer dashboard, see Interacting with Foglight for VMware on page 14.

Time Range

The default behavior of Foglight® for VMware is to display metrics, alerts, and messages that have occurred within the last four hours. This time range, however, is configurable.

To configure the Time Range, use the Time Range popup, which you can access from the upper right corner of the Foglight for VMware browser interface.

Figure 5. Time Range popup

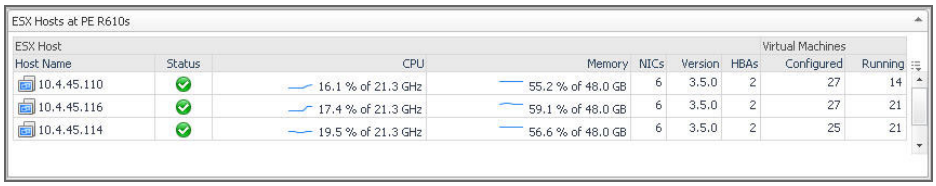
Using the Time Range popup, you can select from predefined time ranges or you can specify a custom range using either a sliding time bar or calendar precision controls to specify dates and times. When you modify the time range for a dashboard or view, it adjusts the range for all of the views contained within and drill-downs accessed from that dashboard or view. It does not adjust the time range for any parent views.

For more information about modifying the time range, see the *Foglight User Guide*.

Sortable lists

In certain Foglight® for VMware dashboards, some levels of views contain sortable lists. An example of this is the VMware Explorer dashboard Related Objects view displayed below.

Figure 6. Sortable lists



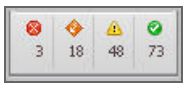
It is possible to sort this list by column using any of the column headings. Click a column heading once to sort the list in ascending order. The list is redrawn according to your specification. Click the column heading again to re-sort the list in descending order.

This is handy when you want to have an organized view of virtual machines or host objects sorted by name, status, or some other criterion.

Alarms and their status indicators

Foglight® for VMware uses status indicators to show the alarm states of the objects within the virtual infrastructure. Four status indicators (fatal, critical, warning, and normal), similar to those displayed in the following image, are used throughout the Foglight for VMware dashboards.

Figure 7. Alarm indicators



The Foglight for VMware alarm types respond to thresholds that are defined within the Foglight for VMware rules. As metrics change and move through thresholds, alarms are raised. As a metric moves through thresholds, the severity of an alarm changes, which causes the associated status indicator to change.

For detailed information about the rules included with the product, see Rules on page 253.

It is important to note that any events that trigger an alarm for an object do not trigger an alarm for any of the object's parents. For example, a single virtual machine running at a high CPU utilization does not trigger an alarm for its parent ESX® Server. An alarm would only be triggered for the parent ESX Server if the server itself was running at a high CPU utilization.

Mouse-over actions

Many items within the Foglight® for VMware dashboards display additional information when you hover the cursor over them. For example, when you hover the cursor over a graph you are likely to see a specific value or values that correspond) to the position of the cursor. When you hover the cursor over an individual metric, you are likely to see a small descriptive popup.

Interacting with Foglight for VMware

When you deploy Foglight® for VMware, a set of predefined dashboards enables you to view the performance of your virtual system at a glance. They allow you to ensure consistent application performance by drilling down for details from higher-level components such as clusters, hosts, and virtual machines, to viewing detailed specifics about each component, such as CPU utilization and network I/O.

First, familiarize yourself with roles needed to access different parts of the browser interface included with the product (see About VMware roles). Then, ensure your monitored agents are configured for data collection. You do that by navigating to the **Administration** tab of the VMware Environment dashboard. This tab lists the available agents and shows their status, and provides access to other administrative tasks. For more information, see Exploring administrative tasks on page 15 and Configuring monitoring agents for data collection on page 20.

Start by looking at the status of your integrated system by navigating to the VMware VirtualCenters dashboard. This dashboard shows the status of each of the Virtual Centers within the infrastructure and the related elements such as datacenters, clusters, hosts, resource pools, and virtual machines. For more information, see Viewing the overall system status on page 25.

From there, navigate to the **Monitoring** tab of the VMware Environment dashboard. Select a specific object or group of objects, such as monitored clusters, servers, and virtual machines, and look at the detailed metrics about the CPU load, network I/O, total memory, or disk space consumed by that specific component or group of components. To see more details about the selected server or virtual machine, use the VMware Explorer. For more information about these dashboards, see Exploring your VMware environment on page 26 and Investigating performance metrics on page 29.

Next, review the alarms that are generated against your environment and, if required, set their sensitivity level. The **Administration** tab on the VMware Environment dashboard enables you to configure the level of alarm

sensitivity. The alarm sensitivity reflects the level of alarms the system stores and displays. For more information, see Exploring VMware alarms on page 39.

The VMware Explorer's **Administration** tab provides access to common administrative tasks that you can use to manage monitored servers and virtual machines directly from the Foglight for VMware browser interface. For example, use this tab to shut down or reboot monitored servers, create virtual machines, and grant them access to system resources, create virtual machine snapshots or automate system workflows. For more information, see Administering monitored ESX hosts and virtual machines on page 42.

To read about additional features, such as planning for virtual machine migrations, creating OS mapping rules, or reviewing topology object instances and expired data, see Additional features on page 54.

About VMware roles

The Management Server relies on roles to control user access. Each user can have one or more roles. The roles granted to a user determine the set of actions that the user can perform. The Management Server includes a set of built-in roles that control access to dashboards and reports included with the Management Server. The following roles are included with Foglight® for VMware to control access to the dashboards and reports:

- *VMware Administrator*: This role provides full access to all product components, views and reports.
- *VMware Automation User*: Users with this role can access the VMware Explorer **Administration** tab. This tab provides quick access to common administrative tasks that include server shutdown, virtual machine creation, resource allocation, and others.

  IMPORTANT: Executing VMware administration tasks, such as rebooting an ESX® host or a VM, require specific VMware® permissions.

- *VMware Operator User*: This role restricts the user to the VMware Environment and VMware Explorer dashboards only, except the **Administration** tab, and **NetFlow Setting** and **Cisco Setting** dialog boxes. Attempts to navigate to these elements result in the following message: `Sorry. The view is not authorized.`
- *VMware QuickView User*: This role restricts the user to the VMware Environment dashboard only. Attempts to navigate to the VMware Explorer result in the following message: `You are not authorized to access view "VMware Explorer".`
- *VMware Report User*: This role grants access to the Foglight for VMware reports only. None of the VMware views are accessible if this is the user's only role. To work with reports, the user additionally requires the Reports Manager role.

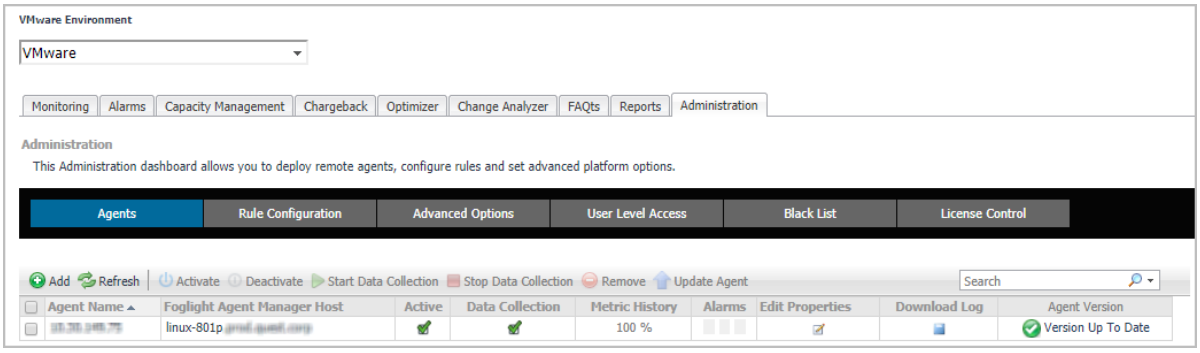
For more information about roles, users, and security, see the *Administration and Configuration Help*.

Exploring administrative tasks

The **Administration** tab of the VMware Environment dashboard allows you to deploy remote agents, configure rules, and set advanced platform options.

This tab consists of the Rule Configuration tab, Advanced Options tab, User Level Access tab, Black List tab, License Control tab, and the Agents view.

Figure 8. VMware Environment Administration tab



Rule Configuration tab

The **Rule Configuration** tab contains links to administrative tasks that you can initiate from this tab:

- **Set Alarm Sensitivity Level:** Sets the level of alarms that the system generates, stores, and displays. For more information, see Setting the alarm sensitivity level on page 41.

Advanced Options tab

The **Advanced Options** tab contains links to administrative tasks that you can initiate from this tab:

- **Configure OS Mapping:** Associates different versions of an operating system with a common OS name. For more information, see Creating OS mapping rules on page 55.
- **Review Instances and Limits:** View existing VMware object instances. For more information, see Reviewing object instances and limits on page 56.
- **Metrics Collection Management:** Configure the metrics collect by agent. For more information, see Configure Metrics Collection on page 57.

User Level Access tab

The **User Level Access** tab is used to filter which resources are accessible to Foglight users or Foglight user groups.

Prerequisites

Before assigning resources to be accessed by certain users or user groups, make sure to assign only the "*Dashboard User*" and "*VMware Operator User*" roles to the specified users or user groups.

NOTE: Ensure that the specified users or user groups only have the "*Dashboard User*" and "*VMware Operator User*" roles.

To configure the resources to be accessed by the user (or user group):

1. On the navigation panel, under **Dashboards**, choose **VMware > VMware Environment**
2. On the VMware Environment dashboard that appears in the display area, choose **Administration > User Level Access**.
3. Select the user (or user group), and then click the button in the *Configure* column.
4. In the **Authorization Dialog**, select the resources from the left table, and then click **>>** to move them to the right table, and then click **save**.

   The Save Configuration dialog box appears, showing the configuration of User Level access has been saved successful.

Black List tab

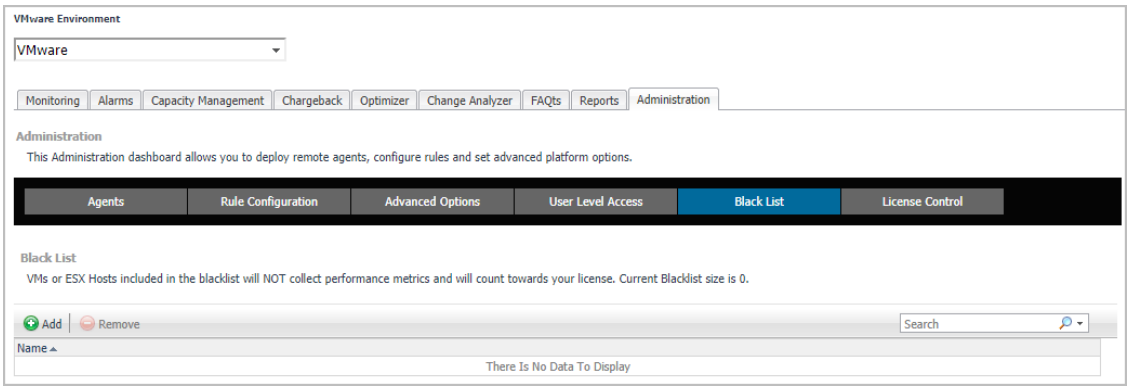
The **Black List** tab is used to manage blacklists for VMs and ESX Hosts. Entities included in blacklists are not included in the collection of performance metrics.

To manage the VMs and ESX Hosts Black List:

1 On the navigation panel, under **Dashboards**, choose **VMware > VMware Environment**.

2 On the **VMware Environment** dashboard that appears in the display area, choose **Administration > Black List**.

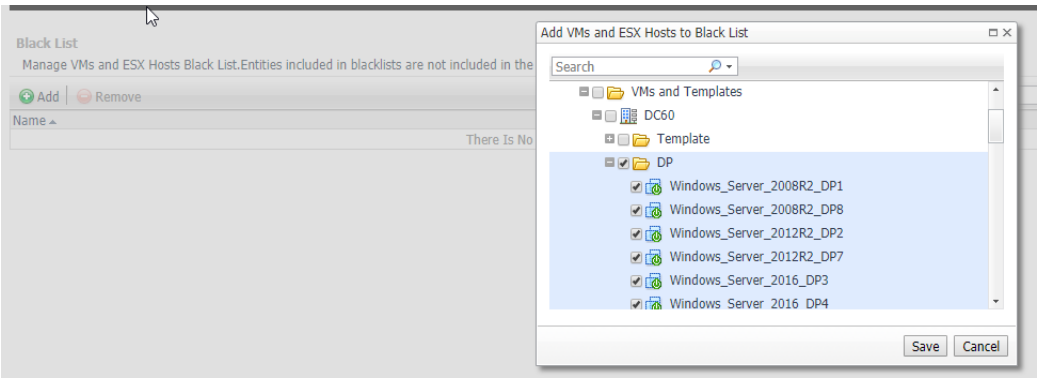
Figure 9. Black List Tab view



3 Click **Add** button.

4 In the **Add VMs and ESX Hosts to Black List Dialog**, choose the VMs and ESX hosts need to add to black list, and then click **Save**. The page will be redirected to the Black List table view and show all the VMs and ESX Hosts which are in the black list.

Figure 10. Add VMs and ESX Hosts to Black List dialog



5 To remove VMs or ESX Hosts from black list, choose the VMS and ESX Hosts need to be removed from the black list, and then click **Remove**.

6 In the **Confirm Remove Dialog,** click **Delete** to remove the selected objects.

License Control tab

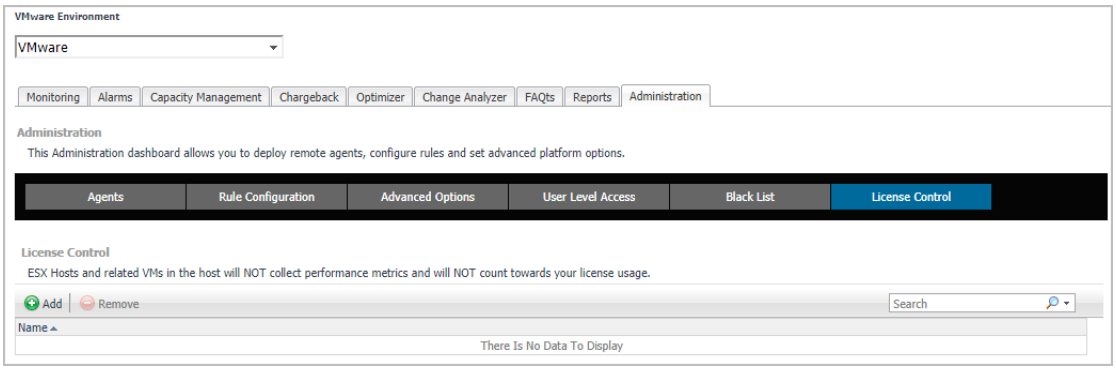
The **License Control** tab is used to manage license usage for ESX Hosts. The ESX Hosts and related VMs in the host added to the license control list will not collect performance metrics and will not count towards license usage.

To manage the ESX Hosts license control list:

1 On the navigation panel, under **Dashboards**, choose **VMware > VMware Environment.**

2 On the VMware Environment dashboard that appears in the display area, choose **Administration > License Control**.

Figure 11. License Control tab view

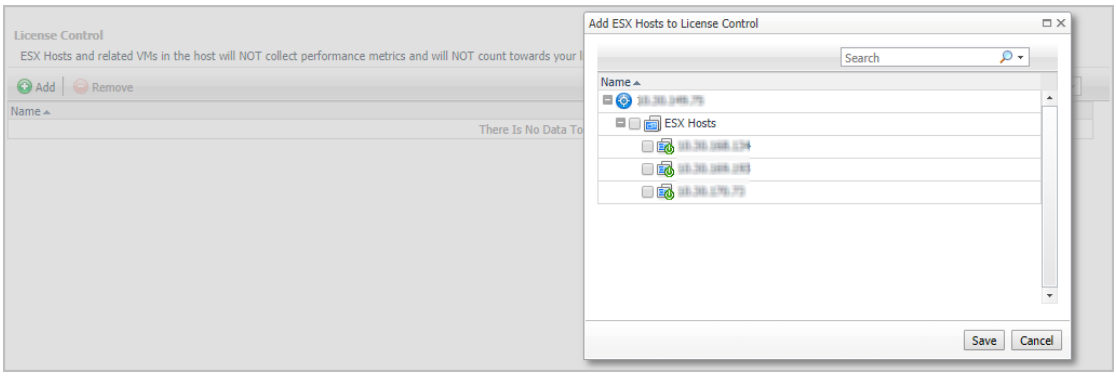


3 Click **Add** button.

4 In the **Add ESX Hosts to License Control** dialog box, choose the ESX hosts to be added to license control list and then click **Save**.

The page will be redirected to the **License Control List table** view and show all the ESX Hosts which are under license control.

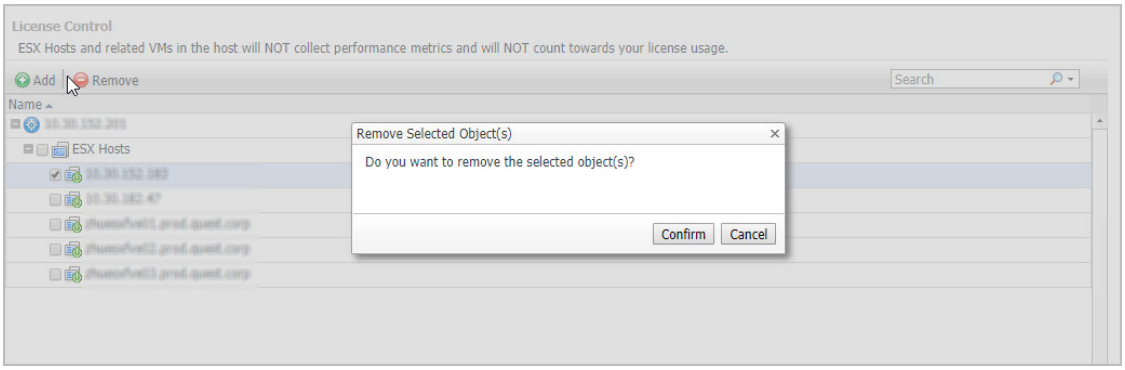
Figure 12. Add ESX Hosts to License Control dialog box



5 To remove ESX Hosts from license control, choose the ESX Hosts to be removed from the license control list, and then click **Remove**.

In the **Remove Selected Object(s)** dialog box, click **Confirm** to remove the selected objects.

Figure 13. Remove Selected Object(s) dialog box



Agents view

The **Agents** view shows a list of existing agent instances and a set of agent management buttons at the top of the list. The following buttons are available:

- **Add:** Starts a workflow for creating new agent instances. For more information, see Configuring monitoring agents for data collection on page 20.
- **Refresh:** Refreshes the list of agent instances and their states.
- **Activate:** Activates one or more selected agent instances. Activating an agent instance starts the agent process on the machine on which the agent is installed.
- **Deactivate:** Deactivates one or more selected agent instances. Deactivating an agent stops the agent process on the machine on which the agent is installed.
- **Start Data Collection:** Starts the data collection for one or more selected agent instances. Starting an agent's data collection causes the agent to begin monitoring a Virtual Center, and to send the collected metrics back to the Management Server.
- **Stop Data Collection:** Stops the data collection for one or more selected agent instances. Stopping an agent's data collection causes the agent to stop monitoring the Virtual Center.
- **Edit Properties:** Starts a workflow for editing the properties of one or more selected agent instances. Each agent comes with a set of properties that it uses to configure its correct running state. For more information, see Setting the Configuration properties on page 68.
- **Remove:** Deletes the selected agent instance.
- **Update Agent**: Updates the agent package to the latest version.

To perform an agent management command, select the one or more check boxes in the left-most column and click the appropriate button. For example, to start an agent's data collection, select the check box in the agent row and click **Start Data Collection**.

The table in the **Agents** area lists the existing VMware Performance Agent instances. For more details about the data appearing in this table, see Agents view on page 159.

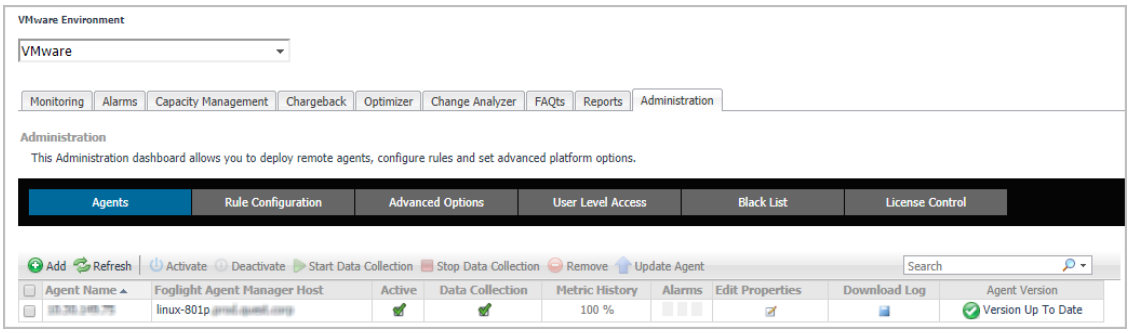
Accessing the Administration tab

To access the Administration tab:

1. Log in to the Foglight browser interface.
2. Ensure that the navigation panel is open.

   To open the navigation panel, click the right-facing arrow ▶ on the left.
3. On the navigation panel, under **Dashboards**, choose **VMware > VMware Environment**.
4. On the VMware Environment dashboard that appears in the display area, open the **Administration** tab.

   The **Administration** tab appears in the display area.



Configuring monitoring agents for data collection

Foglight® for VMware uses the VMware Performance Agent to collect information from monitored environments. Creating a VMware Performance Agent instance creates the agent process on the Agent Manager host. Activating the VMware Performance Agent starts that agent process while starting an agent instance's data collection enables the agent to start collecting data from the monitored vCenter® and to send it to Foglight for VMware.

When the VMware Performance Agent package is successfully deployed, create one or more agent instances, activate them, and start their data collection. To perform these steps in a single operation for one or more monitored hosts, use the **Agents** view on the **Administration** tab.

Each VMware Performance Agent monitors a single Virtual Center. When you create a VMware Performance Agent instance and the Agent Setup wizard determines that the Virtual Center was not previously monitored by this Foglight instance, it starts importing historical data into Foglight. This data is not immediately available as it takes some time to collect it. This process can import data collected over 30 days or less, depending on the amount of data available in the Virtual Center. This allows you to explore VMware metrics as soon as the data is imported, instead for waiting for the agent to collect some data from the Virtual Center. The **Metric History** column in the **Agents** table indicates the progress of the historical data import. Historical data is intended for charting, trending, and general presentation purposes. It does not cause any alarms to fire.

To import vCenter historical data, the minimum recommended vCenter Statistics Levels must be at least 2 in the samples that are collected for one month for the agent to populate 30 days of historic collections. The following table lists the minimum Statistics Levels for all collection frequencies. For more information about vCenter Statistics levels, see your VMware® documentation.

Table 2. Statistics Levels for all collection frequencies

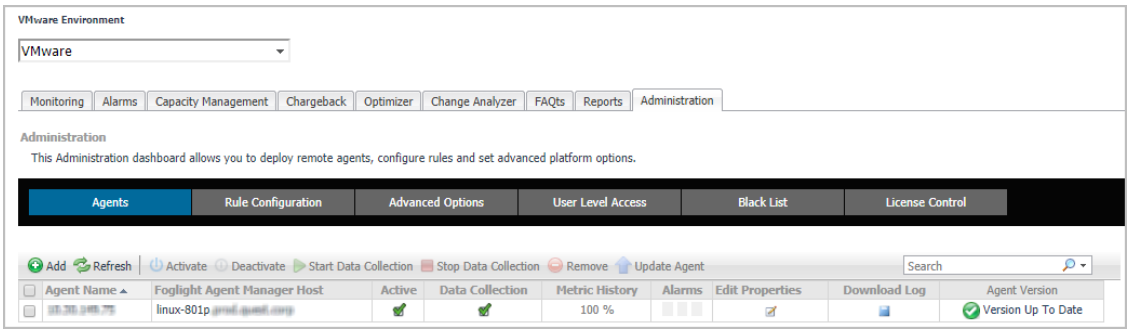
Collection Interval	Collection Frequency	Statistics Level
1 Day	5 Minutes	1
1 Week	30 Minutes	1
1 Month	**2 Hours**	**2**
1 Year	1 Day	1

IMPORTANT: Before creating your first VMware Performance agent, you must configure a Virtual Center user with sufficient privileges. For more information, see "Enabling VMware Performance Agents to Collect Data from a Virtual Center" in the Foglight for VMware *Installation Guide*.

NOTE: In FIPS-compliant mode, you need to import the CA certificate or the self-signed certificate to the KeyStore of FglAM. For more information, see Managing certificates.

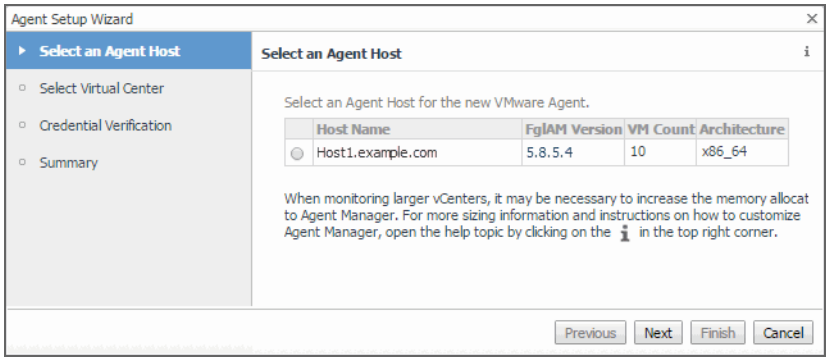
To create, activate VMware Performance Agent instances, and start their data collection:

1. Log in to the Foglight browser interface.
2. On the navigation panel, under **Dashboards**, choose **VMware > VMware Environment**
3. On the VMware Environment dashboard that appears in the display area, open the **Administration** tab.



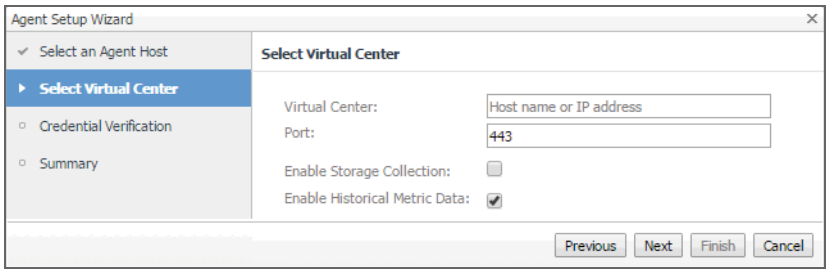
4 Launch the **Agent Setup Wizard**. In the **Agents** area, click **Add**.

The **Agent Setup Wizard** appears with the **Select an Agent Host** page open.



5 Select the host machine running the Agent Manager that you want to manage the VMware Performance Agent you are about to create, and click **Next**.

The **Agent Setup Wizard** refreshes, showing the **Select Virtual Center** page.



6 Specify the Virtual Center that you want to monitor.

a In the **Virtual Center** box, type the fully qualified name of the host on which the Virtual Center is running.

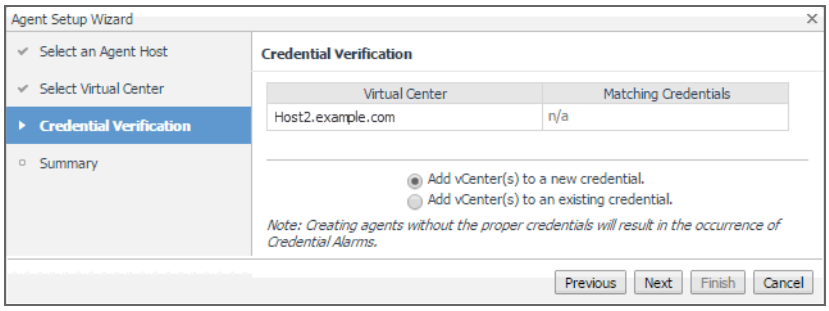
b In the **Port** box, type the port number of the host running the Virtual Center that will be used by the VMware Performance Agent to connect to the Virtual Center.

c If you want to enable the VMware Performance Agent to collect the Foglight Storage data, select the **Enable Storage Collection** check box. Foglight Storage can help you optimize the VMware environment by monitoring virtual storage and its underlying physical storage components. For more information about this product, see the *Managing Foglight Manager Storage User and Reference Guide*.

d If you want to import historical data, select the **Enable Historical Metric Data** check box. This data is not immediately available as it takes some time to collect it. This process can import data collected over 30 days or less, depending on the amount of data available in the Virtual Center. Selecting this option allows you to explore VMware metrics as soon as the data is imported, instead for waiting for the agent to collect some data from the Virtual Center.

e Click **Next**.

The **Agent Setup Wizard** refreshes, showing the **Credential Verification** page.



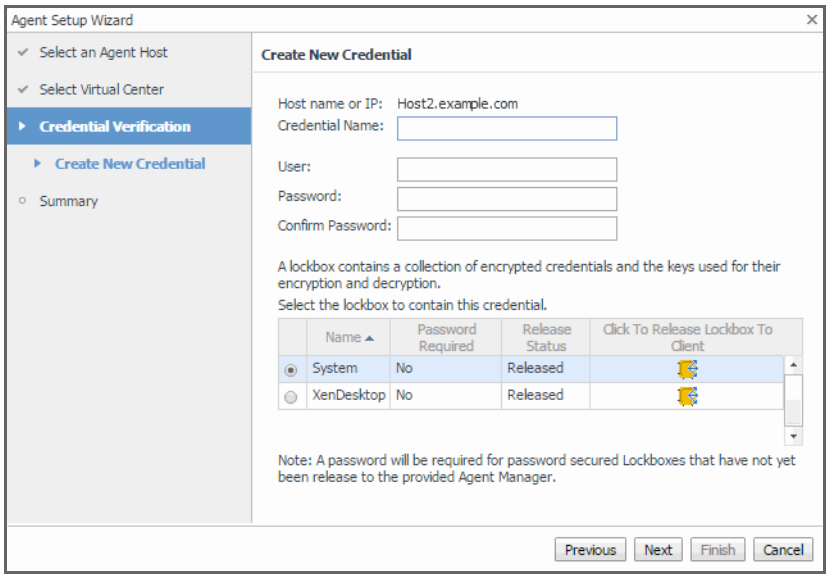
7 Specify user credentials the VMware Performance Agent needs to log into tho Virtual Center host. Select one of the following options:

> **IMPORTANT:** The Virtual Center user account must have sufficient privileges. For more information, see “Enabling VMware Performance Agents to Collect Data from a Virtual Center” in the Foglight for VMware *User and Reference Guide*.

- **Add vCenter(s) to a new credential**: Select this option if you want to create a new credential for the selected vCenter. Click **Next** and continue to Step 8.
- **Add vCenter(s) to an existing credential**: Select this option if you want to use an existing credential for the selected vCenter. This option is suitable if an existing credential has the information needed to access the vCenter. Click **Next and** continue to Step 9.

For complete information about Foglight credentials, see the *Administration and Configuration Help*.

8 **Creating a new credential only**.



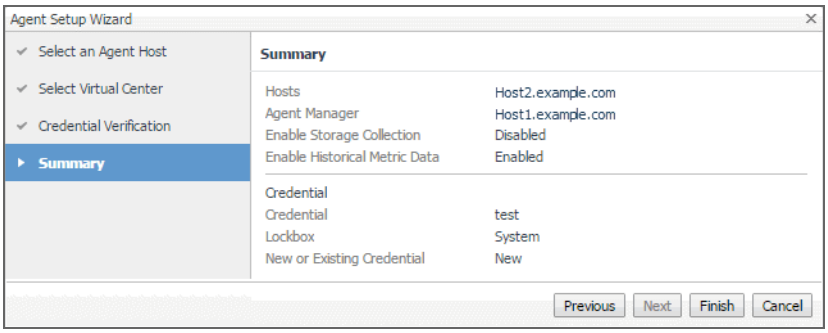
a Specify the following information:

- **Credential Name**: Type a name that uniquely identifies the credential.
- **User**: Type the vCenter user name.
- **Password**: Type the vCenter password.
- **Confirm Password**: Type the vCenter password.

b Select a lockbox in which you want to keep the credential. A lockbox can be used to group credentials for access and/or security. In smaller Foglight installations, you can use the default **System** lockbox.

c Click **Next**.

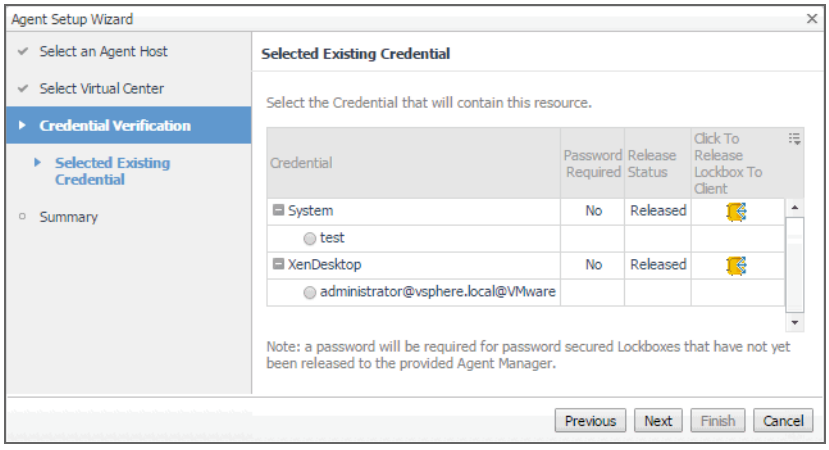
The **Summary** page appears.



d Click **Finish**.

The **Agent Setup Wizard** closes, and the **Agents** area refreshes, showing a newly created VMware Performance agent instance.

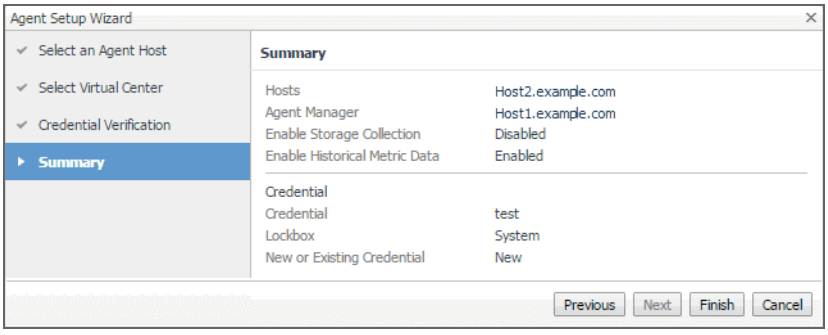
9 **Using an existing credential only**.



a Select an existing credential that you want to use to access the vCenter.

b Click **Next**.

The **Summary** page appears.



c Click **Finish**.

The **Agent Setup Wizard** closes, and the Agents area refreshes, showing a newly created VMware Performance agent instance.

Managing certificates

Syntax Conventions

In order to successfully make use of the Foglight commands in your monitoring environment, review the syntax conventions before getting started. The syntax conventions are as follows:

- Generic examples follow the UNIX path structure that uses forward slashes '/' to separate directories.
- Platform-specific examples follow standard platform conventions. For example, UNIX-specific examples use forward slashes ‘/’ as directory delimiters, while Windows examples use backslashes ‘\’.
- *<foglight_home>* is a placeholder that represents the path to the Foglight Management Server installation.
- *<foglight_agent_mgr_home>* is a placeholder that represents the path to the Foglight Agent Manager installation. This can be the location of the Foglight Agent Manager installation on a monitored host, or the home directory of the Foglight Agent Manager that comes embedded with the Foglight Management Server. For example:

  Path to the Foglight Agent Manager installation on a monitored host (Windows):

  C:\Quest\Foglight_Agent_Manager

  Path to the embedded Foglight Agent Manager installation (Windows):

  C:\Quest\Foglight\fglam
- Unless otherwise specified, Foglight commands are case-sensitive.

Managing certificates for FglAM

Foglight Evolve agents use Foglight Agent Manager (FglAM) to manage certificates for SSL encryption connection.

Prerequisite

All the certificate-related command line options require that FglAM be **up and running**.

Add a certificate

```
bin/fglam --add-certificate "user alias 1"=/path/to/certificate/file
```

- Validate the certificate and ensure the following:
  - It is not expired.
  - It is an X.509 format.
  - FglAM requires the Base64 format. To verify if the certificate file is encoded with Base64, open the certificate with a notepad and the certificate should be similar to the following example:

    ```
    -----BEGIN CERTIFICATE-----
    XXXXXXXX=
    -----END CERTIFICATE-----
    ```

    NOTE: If the certificate is not Base64 format, use openssl command to convert the certificate file into a Base64 file. Use either of the following commands depending on the source form:

    ```
    openssl x509 -inform DER -in xxx.cer -out xxx.crt
    ```

    or

    ```
    openssl x509 -inform PEM -in xxx.cer -out xxx.crt
    ```
- The `alias` is required and is used in the list and delete operations to refer to the certificate. It can be anything.

List installed certificates

```
bin/fglam --list-certificates
```

Print out a list of certificates and the aliases that refer to them.

Refer to the example output below:

```
List of installed certificates:
  Alias                Certificate Info
  -----                ----------------
  user alias 1        XXXX
```

Delete a certificate

Remove a certificate referred to by an `alias`.

```
bin/fglam --delete-certificate "user alias 1"
```

A full example for managing certificate for FglAM

- Add an example certificate into FglAM certificate store

  ```
  C:\Quest\Foglight\fglam\bin>fglam.exe --add-certificate "Evolve-test"="D:/Evolve-test.crt"
  …
  2020-02-27 16:31:01.000 INFO  [native] Certificate added: Certificate from
    D:\Evolve-test.crt added as Evolve-test
  ```

- List the example certificate in the FglAM certificate store

  ```
  C:\Quest\Foglight\fglam\bin>fglam.exe --list-certificate
  …
    Alias                       Certificate
    -----                       -----------
    Evolve-test                         Issuer:
                                  CN: XXX
  ```

- Delete the example certificate from the FglAM certificate store

  ```
  C:\Quest\Foglight\fglam\bin>fglam.exe --delete-certificate "Evolve-test"
  …
  2020-02-27 16:28:21.000 INFO  [native] Certificate deleted: Certificate
    Evolve-test deleted
  ```

Viewing the overall system status

The VMware VirtualCenters dashboard has just one view that displays a Status view for each vCenter that exist within the virtual infrastructure. This dashboard and its embedded status views can be used to take a quick look at the status of each of the vCenters within the infrastructure.

Figure 14. VMware VirtualCenters dashboard

Each vCenter Status view provides an alarm summary for the objects contained within the vCenter. If you click any of the alarm indicators in the alarm summary, an Alarms popup appears showing a list of alarms for the object type that is associated with the alarm indicator.

To access this dashboard, from the navigation panel, under **Dashboards**, choose **VMware > VMware VirtualCenters**.

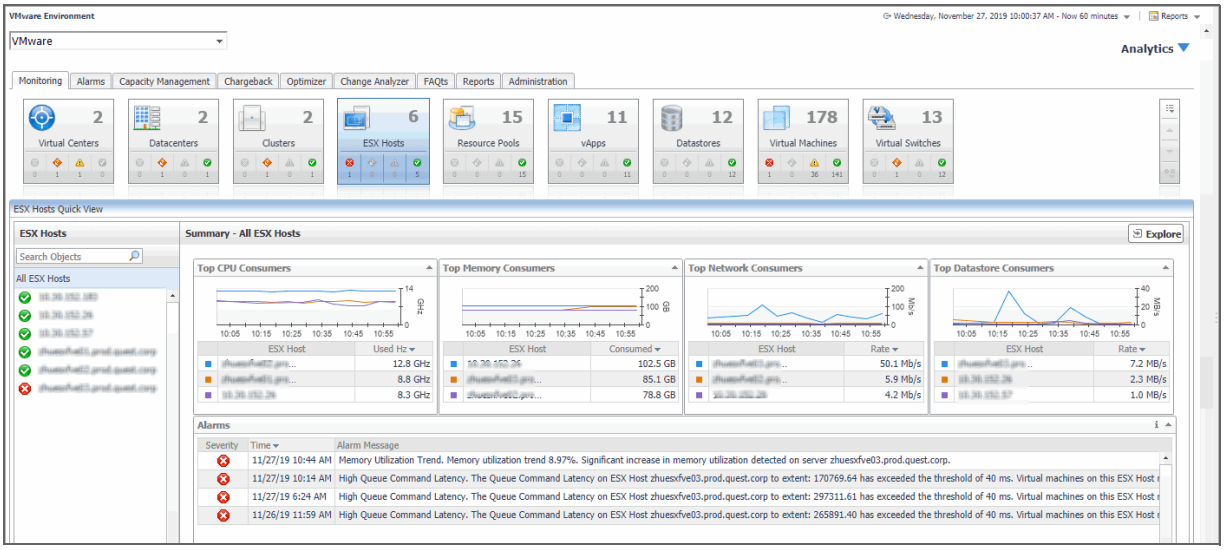
For reference information about the data appearing on this dashboard, see VMware VirtualCenter views on page 157.

Exploring your VMware environment

A typical virtual environment contains a set of ESX® host and virtual machines. An ESX host can be a part of a cluster, and can have one or more virtual machines associated with it. Other components of a Virtual Center include datacenters, resource pools, vApp, and data stores. You can view the overall state of these components on the VMware Environment dashboard.

Selecting an object or group of objects, such as clusters, servers, or virtual machines, shows additional information about your selection. For example, selecting all ESX hosts identifies the top three consumers of CPU, memory, network, and disk resources and shows the related alarm states. Selecting a specific ESX host shows the CPU, memory, network, and disk usage for the selected ESX host, along with high-level hardware and software configuration.

Figure 15. VMware Environment dashboard



When you navigate to the VMware Environment dashboard for the first time, the **Monitoring** tab appears open. This tab provides an overall summary of your virtual environment. Other tabs are also available. This topic describes the **Monitoring** tab. For information about other tabs, see the following topics:

- **FAQts**

    - Exploring frequently asked questions on page 29
- **Reports**
    - Generating reports on page 60
- **Administration**
    - Setting the alarm sensitivity level on page 41
    - Creating OS mapping rules on page 55
    - Reviewing object instances and limits on page 56
    - Configuring monitoring agents for data collection on page 20
- **Chargeback**
    - Managing chargeback on page 58
- **Capacity Management**
    - Managing capacity on page 58

Choosing a specific virtual environment from the list in the top-right shows the information about the selected environment.

Figure 16. Service selection

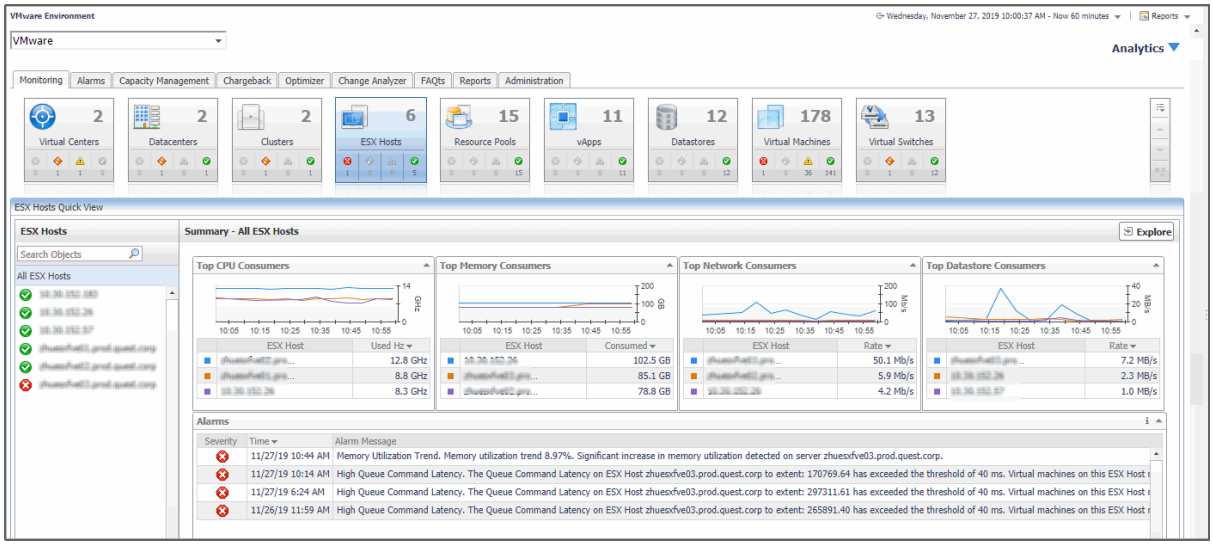
The list shows a list of services. Each service can contain a different combination of monitored components.

NOTE: The VMware Environment dashboard is service-based. The VMware service created by Foglight for VMware for a particular vCenter does not contain template virtual machines (VMs). The VMware Explorer dashboard is inventory-based. The VMware Explorer dashboard counts all VMs, including template VMs, for each vCenter. Therefore, the number of VMs for a particular vCenter is different when you view it through the VMware Environment dashboard than the number that appears when you view it through the VMware Explorer dashboard.

The VMware Environment dashboard is made up of the following views: the Virtual Environment Overview and Quick-View. Selecting an object type and its alarm state in the Virtual Environment Overview shows the summary information for your selection in the Quick-View. For reference information about the data appearing on this dashboard, see VMware Environment views on page 158.

For example, when you select the Normal state on the ESX Hosts tile, the ESX Hosts that are in the Normal state are listed in the ESX Hosts view, and summary information for those ESX Hosts appears in the ESX Hosts Summary view.

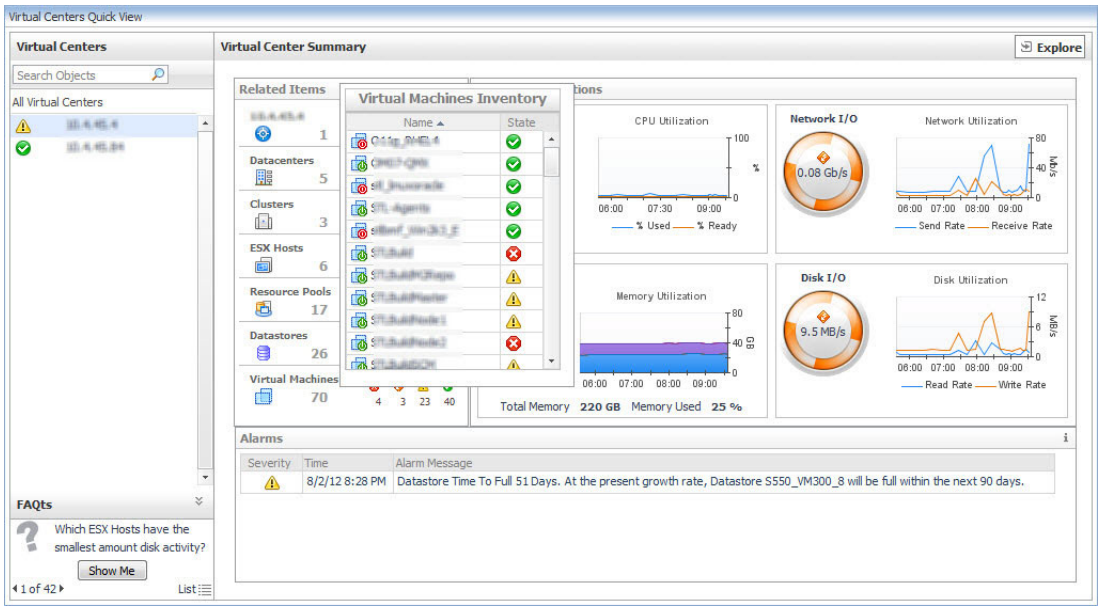
In the example below, the ESX Hosts tile is selected. The **ESX Hosts** view is populated with all monitored ESX Hosts regardless of their alarm state. Summary information for those ESX Hosts appears in the ESX Host Summary view.



From there, clicking a specific object instance on the left shows additional summary information about the selected object. The Inventory view, for example, shows all of the objects related to the selected object, along with their respective alarm state counts. All objects in the object relationship hierarchy, including the selected object, are shown in the Inventory view, so that you see the entire relationship hierarchy for the selected object. Each level in the hierarchy is labeled with the corresponding object type name. When there is only one object at a particular level in the hierarchy, the object name is displayed instead of the object type name.

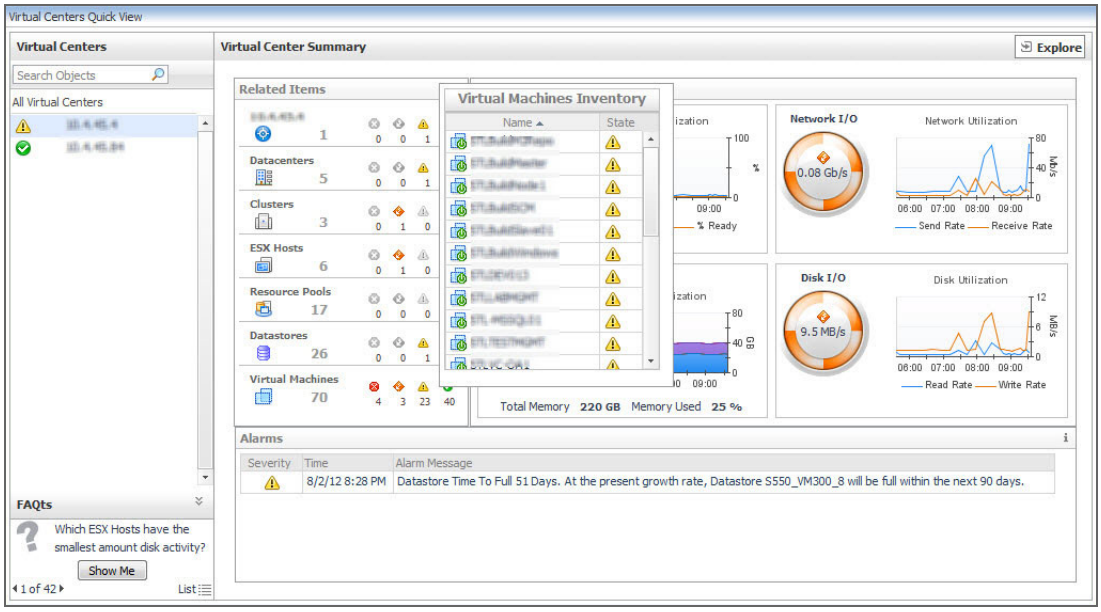
The next example shows a number of virtual machines that are associated with a selected Virtual Center. Clicking that number shows a popup with the list of virtual machines. You can click any object in the popup list to quickly navigate to the VMware Explorer dashboard, and review detailed information about that particular object.

Figure 17. Virtual Center Summary



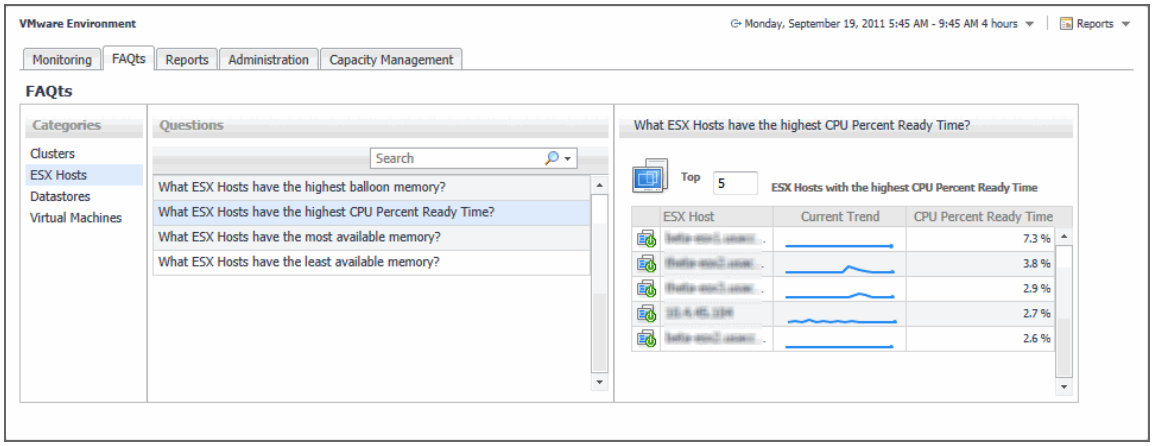
The Inventory view also provides several alarm state icons with counts. Clicking a state icon or the number below it to view a popup that shows the alarms of that state for the corresponding object type. For example, clicking the Warning state shows a dwell with a list of related objects against which Warning alarms are generated.

Figure 18. Virtual Machines in Warning state



Exploring frequently asked questions

The VMware Environment dashboard contains the **FAQts** tab that you can use to ask questions about your monitored systems and review the answers. In the **Categories** pane, the **FAQts** view shows several question categories. Clicking a category shows the questions belonging to that category in the **Questions** pane. From there, clicking a question shows the answer on the right.

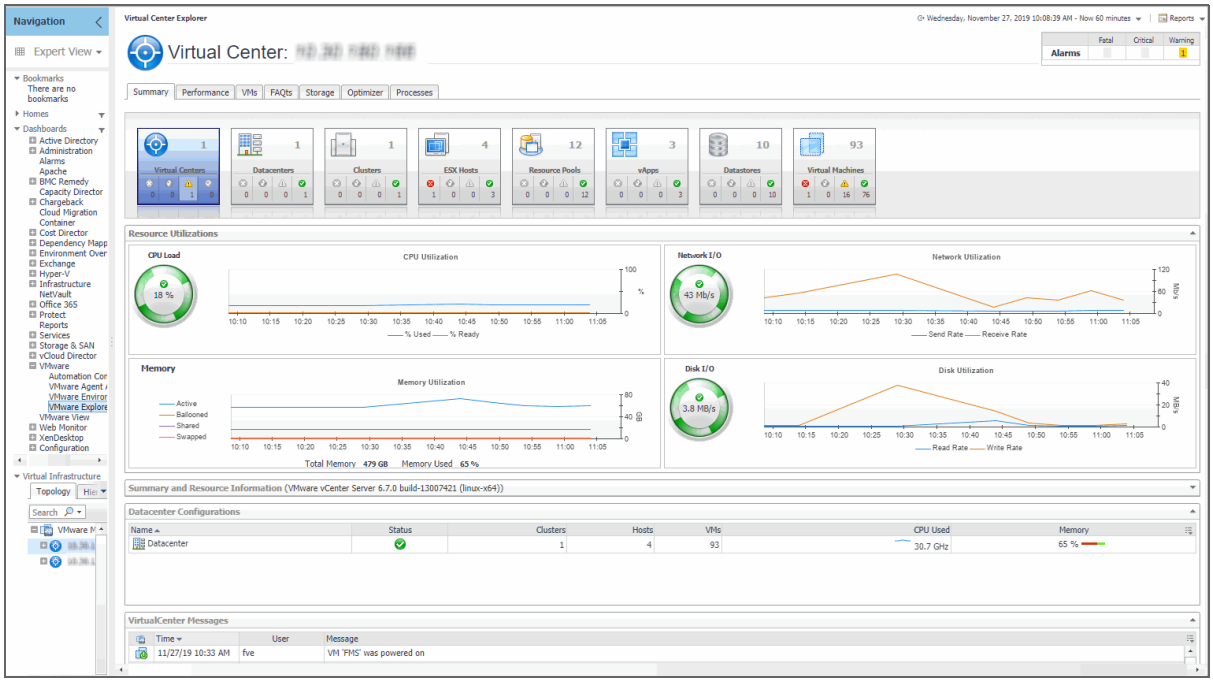


For reference information about this view, see FAQts tab on page 89.

Investigating performance metrics

The VMware Explorer allows you to monitor a wide range of elements in your virtual infrastructure. It contains a number of informative views through which you can quickly and easily access detailed information about any of the available components (physical or virtual) within the infrastructure. Its hierarchical interface includes drilldown capabilities that display various performance metrics and alarms within the virtual infrastructure.

Figure 19. VMware Explorer



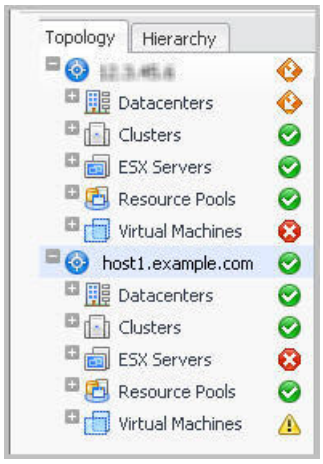
NOTE: The VMware Explorer dashboard is inventory-based. The VMware Explorer dashboard counts all virtual machines (VMs), including template VMs, for each vCenter. The Virtual Environment Summary dashboard is service-based. The VMware service created by Foglight® for VMware for a particular vCenter does not contain template VMs. Therefore, the number of VMs for a particular vCenter is different when you view it through the VMware Explorer dashboard than the number that appears when you view it through the Virtual Environment Summary dashboard.

To access this dashboard, from the navigation panel, under Dashboards, click **VMware > VMware Explorer**. For complete reference about the data appearing on this dashboard, see VMware Explorer views on page 77.

The VMware Explorer dashboard contains the following views: the Virtual Infrastructure view and VMware Explorer Primary view.

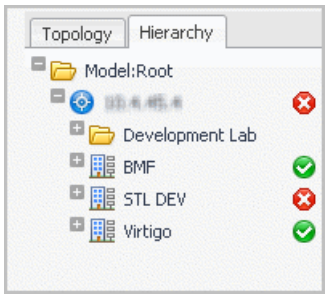
The Virtual Infrastructure view contains a navigation tree on the Topology tab that represents the various virtual infrastructure objects: Virtual Centers, Datacenters, Clusters, ESX Hosts, Resource Pools, and Virtual Machines. For each individual object or group of objects, a status indicator appears, showing the alarm of highest severity that is outstanding for the that object or objects. For example, there are 25 virtual machines configured for a vCenter. Twenty of the virtual machines have a normal status, three have a warning status, and two have a critical status. In the Topology view, the virtual machines container for that vCenter displays a critical status indicator to show that at least one of the virtual machines associated with the vCenter has an outstanding critical alarm.

Figure 20. Topology tab



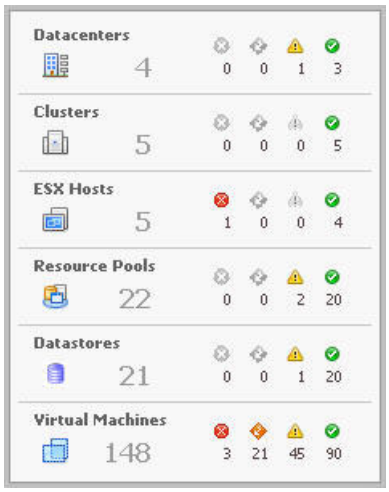
The Hierarchy tab shows the logical layout of vCenter management servers.

Figure 21. Hierarchy tab



Hovering over an object in the Virtual Infrastructure view, you see a popup that provides a summary of the present state of that object.

Figure 22. Object summary dwell

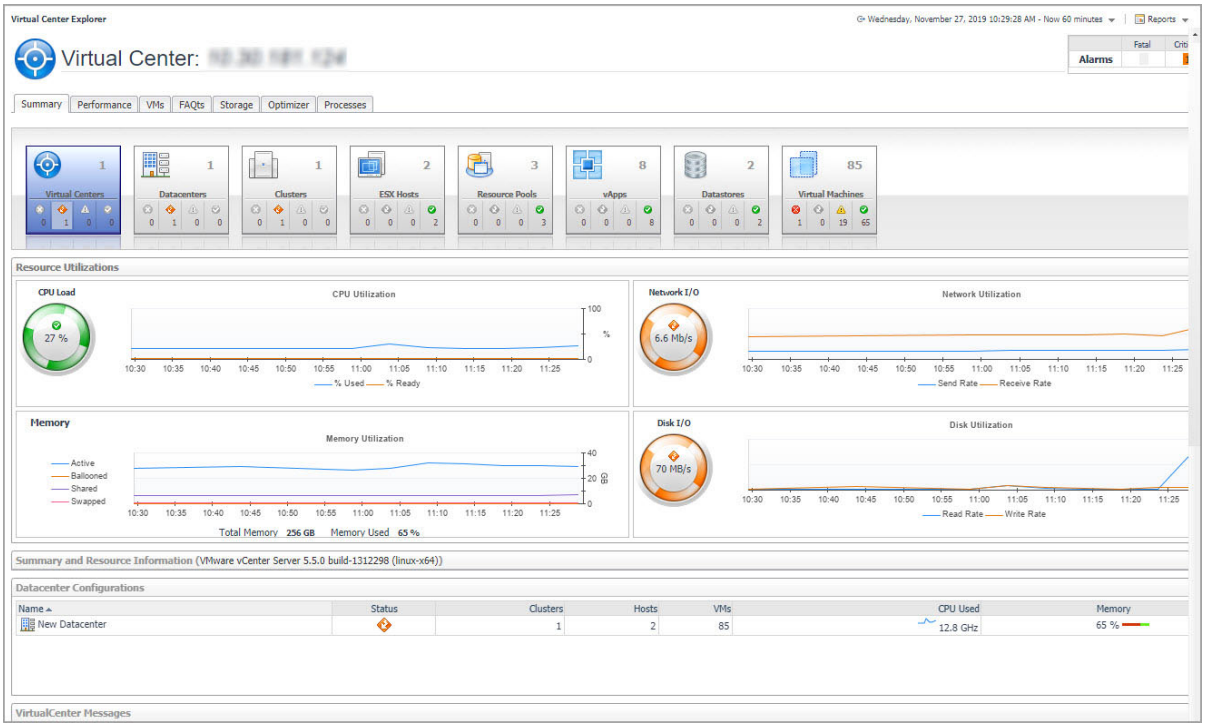


Selecting an object or group of objects on either tab of the Virtual Infrastructure view displays performance details about your selection in the VMware Explorer Primary view. The VMware Explorer Primary view takes up the entire display area of the Foglight for VMware browser interface. This view provides significant value to administrators who leverage Foglight for VMware to monitor their virtual infrastructure.

Selecting an object or group of objects on either tab of the Virtual Infrastructure view displays performance details about your selection in the VMware Explorer Primary view. The VMware Explorer Primary view takes up the entire

display area of the Foglight for VMware browser interface. This view provides significant value to administrators who leverage Foglight for VMware to monitor their virtual infrastructure.

Figure 23. VMware Explorer



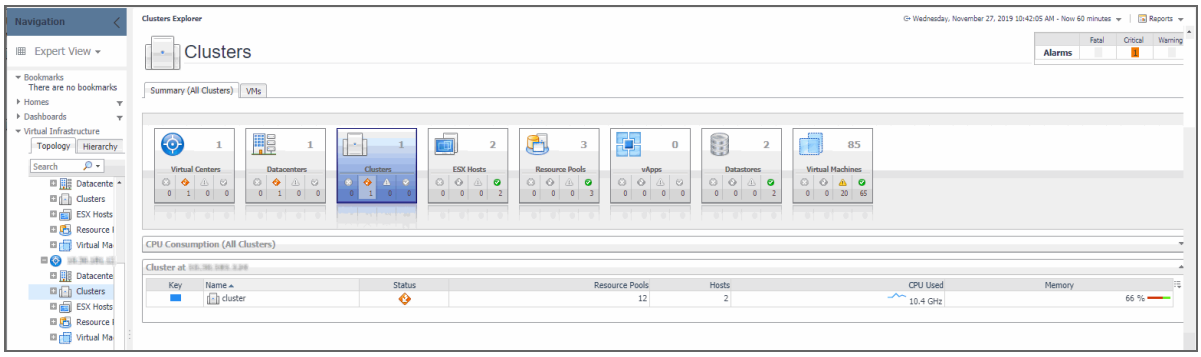
The alarm summary in the top-right shows the number of alarms at each severity level that are outstanding for the selected object. Clicking an alarm count lists the active alarms for the object.

A set of tiles displayed along the top indicate the type of the selected object or objects, and the related alarm counts.

Additionally, a collection of navigation tabs appears in this view. These navigation tabs vary from object to object, but generally contain a tab to an object summary (typically the default view), a tab to an object performance overview, and one or more tabs to other relevant information.

The display area changes in appearance and content, depending on the selected object or group of objects. For example, if you select an object type container from the Topology view, the Summary tab displays a consumption graph and a table that are representative of the group of objects within that container.

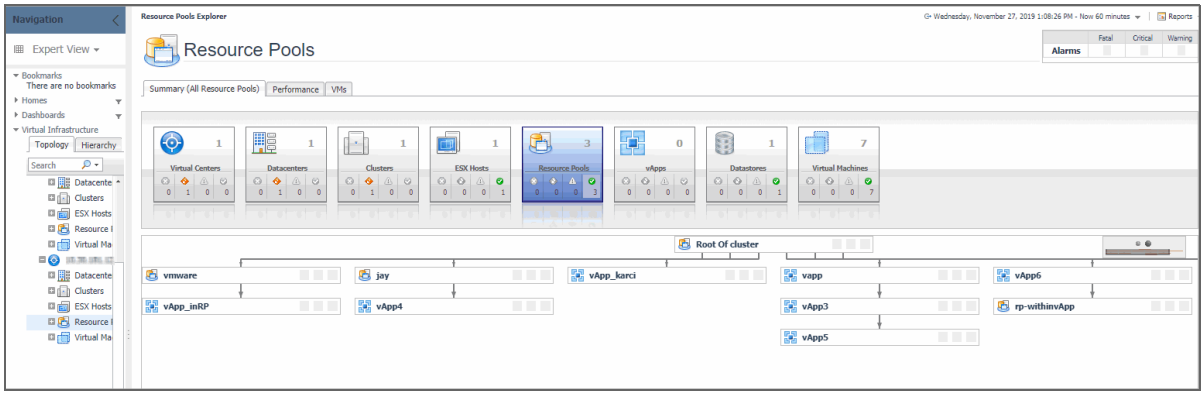
Figure 24. VMware Explorer Summary tab



However, selecting a Resource Pool container from the Topology tab displays a Resource Pools Relationship Tree on the Summary tab. This tree contains every resource pool that belongs to the clusters within the associated

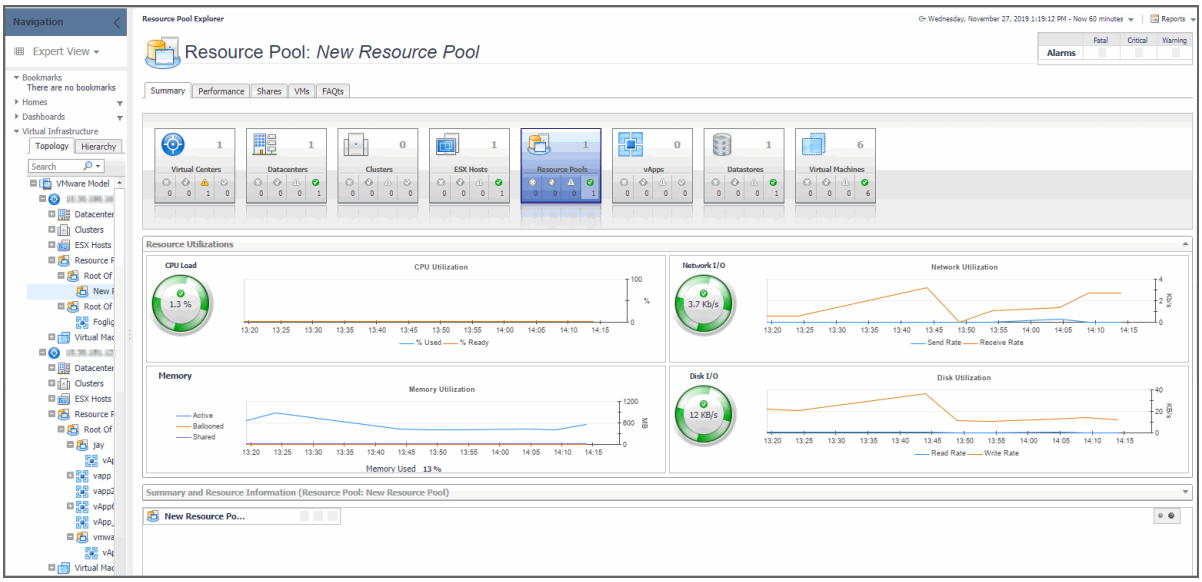
vCenter. This is useful if you want to see how those resource pools are laid out, or if you want to take a look at the utilization statistics for each configured resource pool on the vCenter.

Figure 25. Resource Pool tree



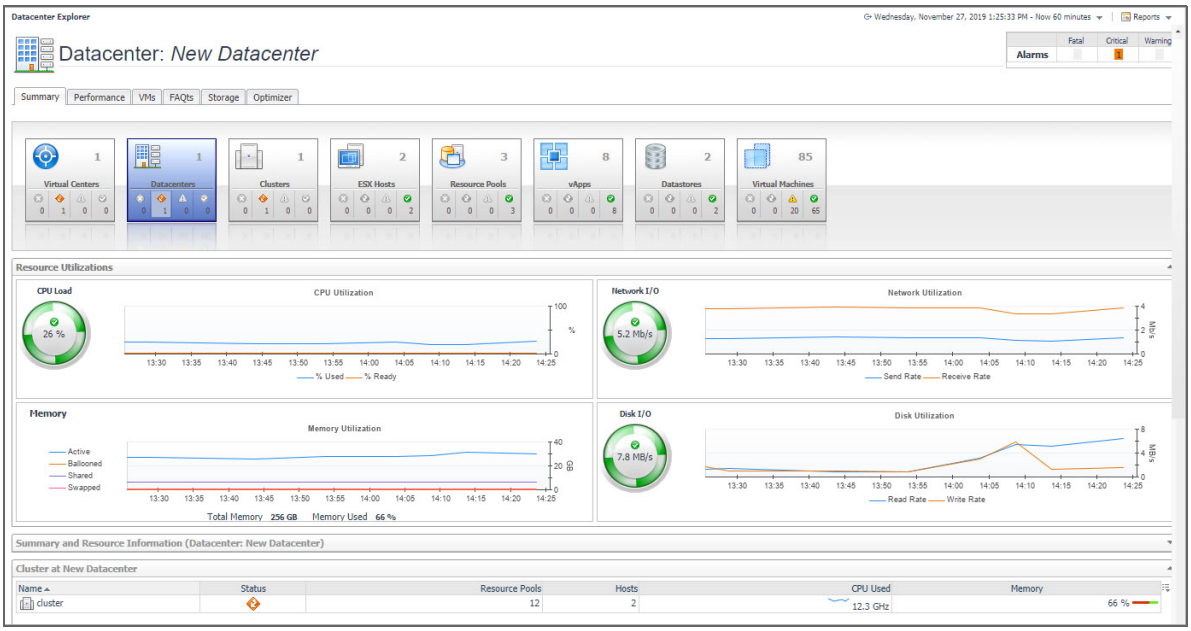
If you select an individual resource pool from the Virtual Infrastructure view, the Summary displays summary and utilization information for that resource pool. This is typically the type of information you see on the Summary tab when you select any individual object from the Virtual Infrastructure view.

Figure 26. Resource Pool Summary



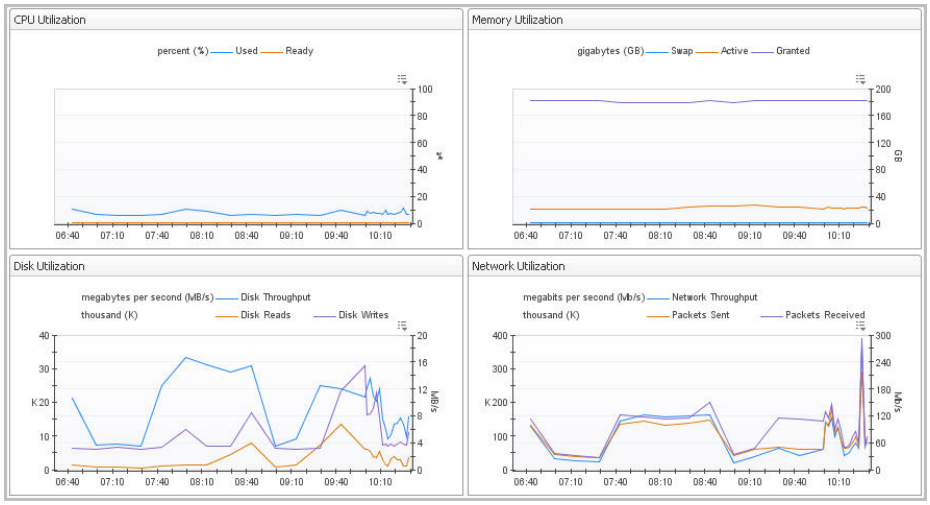
The metrics and the amount of detail displayed in the display area vary depending on the type of the selected object. For example, in the image below, the tiles indicate that the selected object is the *New Datacenter* datacenter, and that it is connected to one vCenter, one cluster, two ESX® Hosts, and so on.

Figure 27. Datacenter Summary



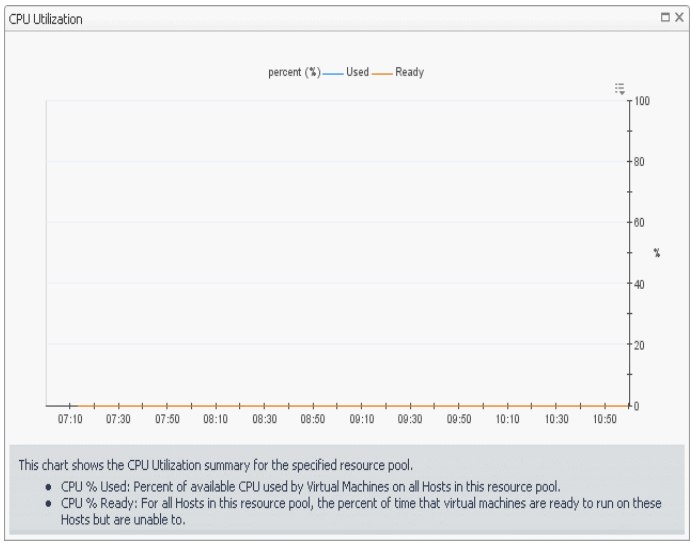
The Utilizations view, typically located across the center of the display area tab, provides numerical and graphical representations of utilization metrics associated with the selected object or group of objects. For example, selecting a single resource pool from the Virtual Infrastructure view and opening the Performance tab in the display area, displays four graphs in the Utilizations view, showing CPU, memory, disk, and network resource utilizations for the selected resource pool.

Figure 28. Resource Utilization views



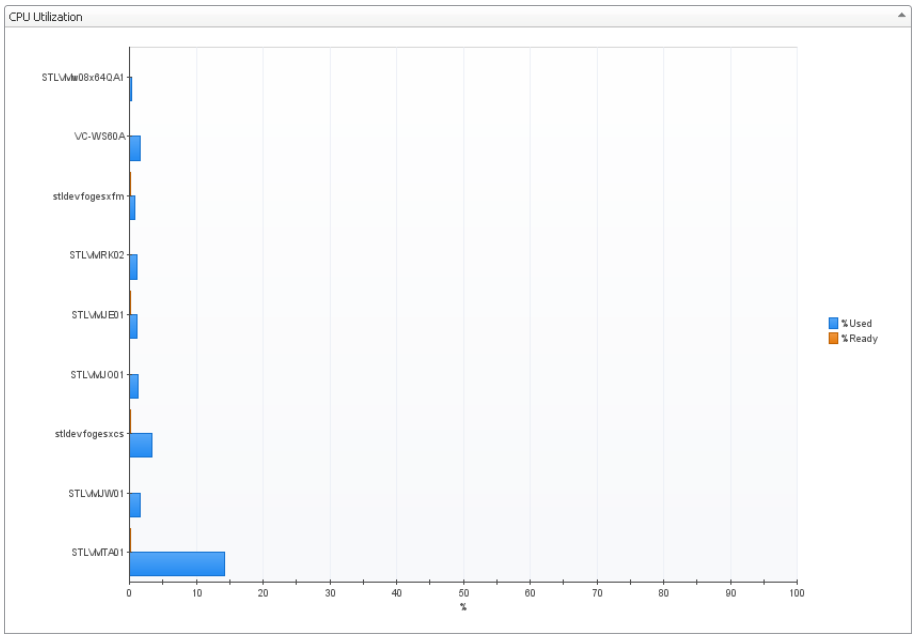
From there, clicking a graph or a spinner shows a larger view of the graph with descriptive text about each metric appearing in the graph.

Figure 29. Resource Pools, CPU Utilization drilldown



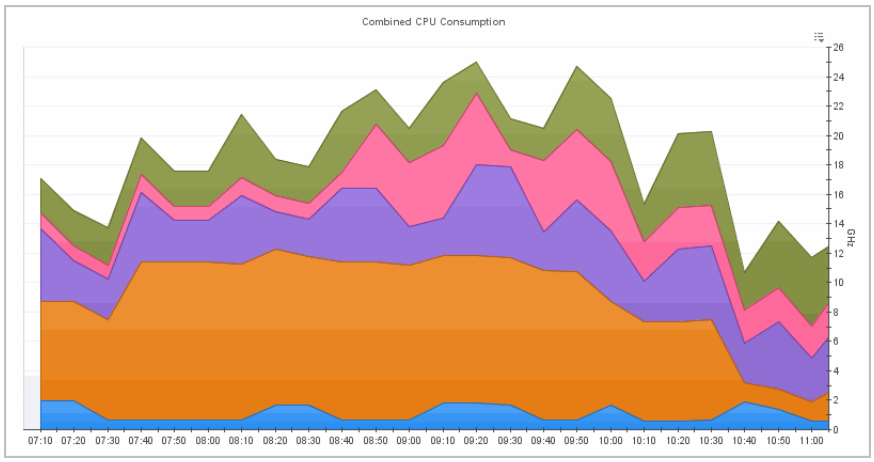
If you open the **VMs** tab for that same resource pool, the Utilizations view displays one graph illustrating the percent-used and percent-ready CPU utilization for the virtual machines of the resource pool.

Figure 30. Resource Pools, VM CPU Utilization drilldown



If, however, you select a collection of ESX Hosts from the Virtual Infrastructure view and you open the Summary tab, an informative graph appears in place of a Utilizations view. Selecting a collection of objects in the Virtual Infrastructure view always shows a composite view displaying information about all object instances contained in that collection.

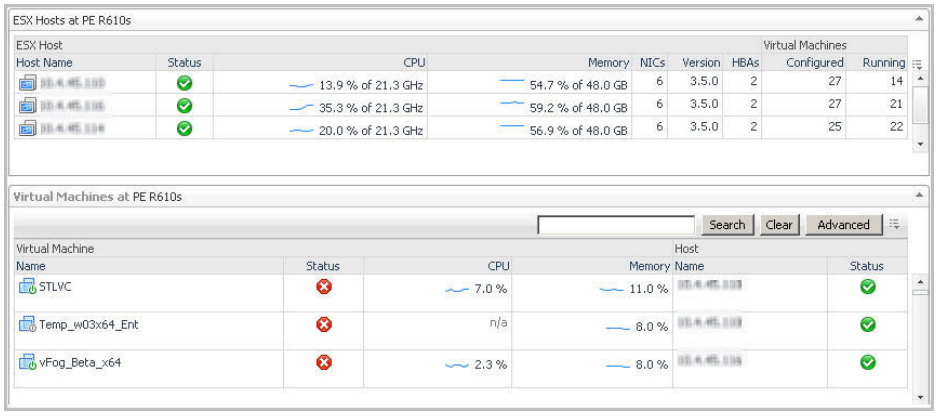
Figure 31. Combined CPU Consumption



In addition to the Utilizations view, one or more Related Objects views may appear at the bottom of the display area. These views take the form of tables and list either the parent or child objects or both (whichever are applicable) of the object being viewed, and provide pertinent details about each one. Their appearance depends on the type and range of objects selected in the Virtual Infrastructure view.

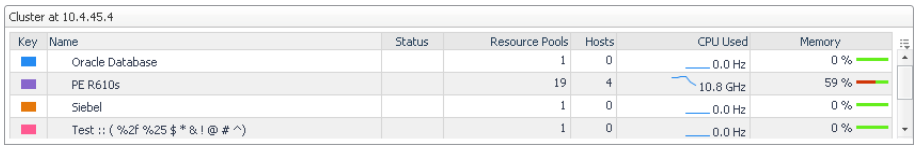
For example, if you select a single cluster, two Related Objects views appear: one displaying the ESX hosts that belong to their cluster, and another listing the virtual machines running on those hosts. The views also display the performance metrics associated with each list item.

Figure 32. Related Objects views



However, when you select a cluster container, the **Summary** tab shows a Related Objects view that lists all of the clusters in that container and provides pertinent details about each one.

Figure 33. Cluster details



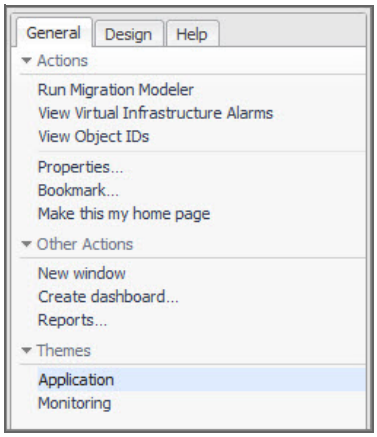
Accessing VMware actions and tasks

The action panel operates like a drawer. Its default position is closed. To open the action panel, click the arrow at the far right of the Foglight for VMware browser interface.

The action panel provides you with easy access to a number of useful actions and tasks. However, it only provides additional Foglight for VMware related actions when you are viewing the VMware Explorer dashboard.

The following image shows an example of a typical VMware Explorer dashboard action panel.

Figure 34. Action panel



The actions available in the action panel vary depending on the object displayed in the VMware Explorer dashboard. The following actions are available from the VMware Explorer dashboard action panel:

- Run Migration Modeler
- View Virtual Infrastructure Alarms
- View Object IDs

Run Migration Modeler

Under the Actions heading, the Run Migration Modeler link takes you to the VMware Modeler dashboard, which provides you with a mechanism for viewing the impact that migrating a virtual machine will have on a target ESX Host.

For more information on the Migration Modeler, including specific instructions on how to run the Migration Modeler, see Planning for virtual machine migrations on page 54.

View Virtual Infrastructure Alarms

Under the Actions heading, the View Virtual Infrastructure Alarms link takes you to the vmAlarms dashboard. For specific information on the vmAlarms dashboard, see Exploring VMware alarms on page 39.

View Object IDs

Under the Actions heading, the View Object IDs link takes you to the Object IDs dialog box. The Object IDs dialog box lists all of the objects in the virtual infrastructure with their type and object ID. The object IDs are the true names of the objects. To produce component-specific thresholds, context is required in the form of the relevant object ID.

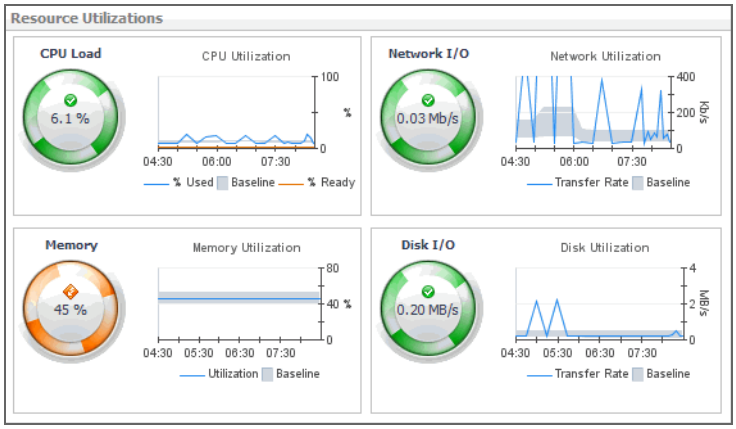
To narrow down the list of objects, type a relevant text string in the search field provided and click **Search**. You can type things like a portion of the object type name (for example, server), a portion of the object name (for example, part of the IP address), or a portion of the object ID. To clear the **Search** box, click **Clear**.

For more advanced search options, click **Advanced**. To narrow down the list to objects of a particular type, type the object type name in the **Type** box. To find the object by name, type the object name in the **Name** box. To find the object by ID, type the object ID in the Object ID field.

Viewing baseline ranges

Foglight can estimate system performance by comparing metric values against a baseline range. A baseline establishes expected data patterns during a given time period. This feature is only available when your Foglight system includes a baseline cartridge with applicable metric definitions. Foglight for VMware uses the capabilities of the IntelliProfile cartridge, which enables the appearance of baseline data for ESX hosts and virtual machines on the VMware Environment and VMware Explorer dashboards.

Figure 35. Resource Utilization views



Baseline data can also be displayed on custom dashboards and views for the following metric properties.

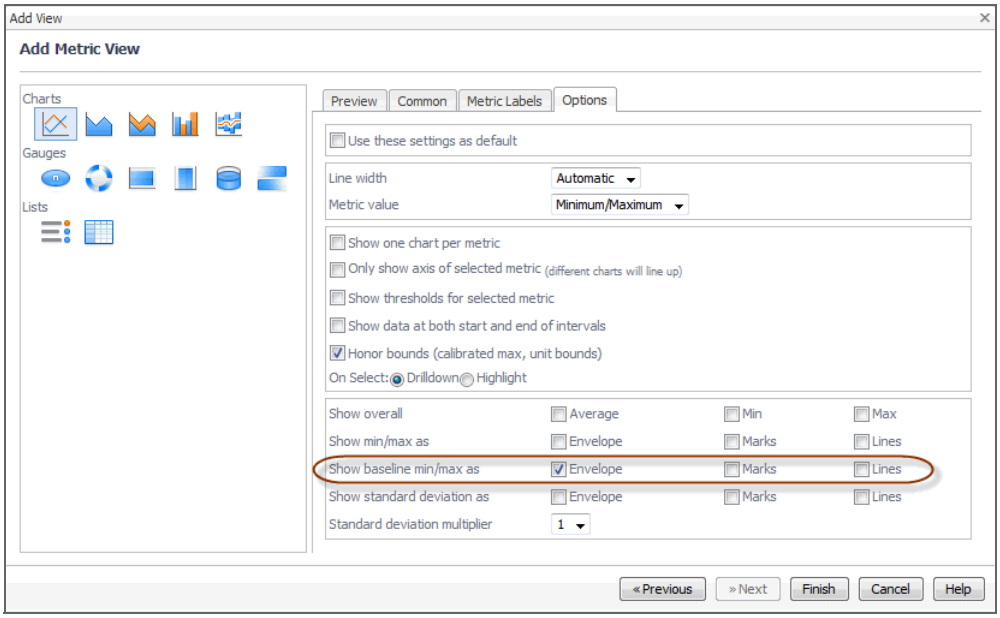
Table 3. Topology types and the related metric properties

Topology Type	Metric Property
HostCPUs	`utilization`
Memory	`utilization`
HostStorage	`diskTransferRate`
HostNetwork	`transferRate`
VMWVirtualMachineMemory	`active`
VMWVirtualMachineMemory	`consumed`
VMWESXServerMemory	`active`
VMWESXServerMemory	`consumed`

Start creating a custom dashboard by clicking **Create dashboard** on the action panel. From there, create a view and add one or more of the data elements listed above. For complete information about custom dashboards and how to get started, refer to the *Foglight User Help* and the *Creating Custom Dashboards* learning video.

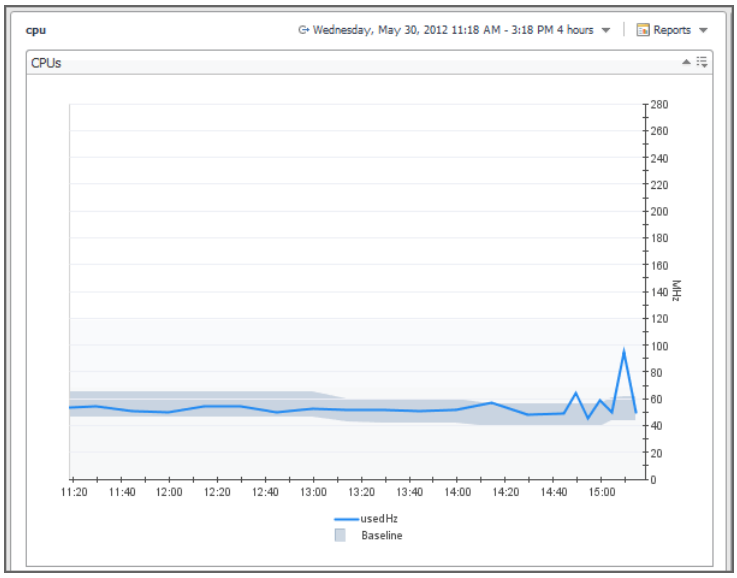
Before finishing, edit the view properties and enable the appearance of the baseline minimum and maximum values by selecting one or more of the **Show baseline min/max as** check boxes.

Figure 36. Add View dialog box



When you finish creating the custom dashboard, the blue line in the chart indicates metric values over time, while the grey shaded area represents the baseline range for the selected metric.

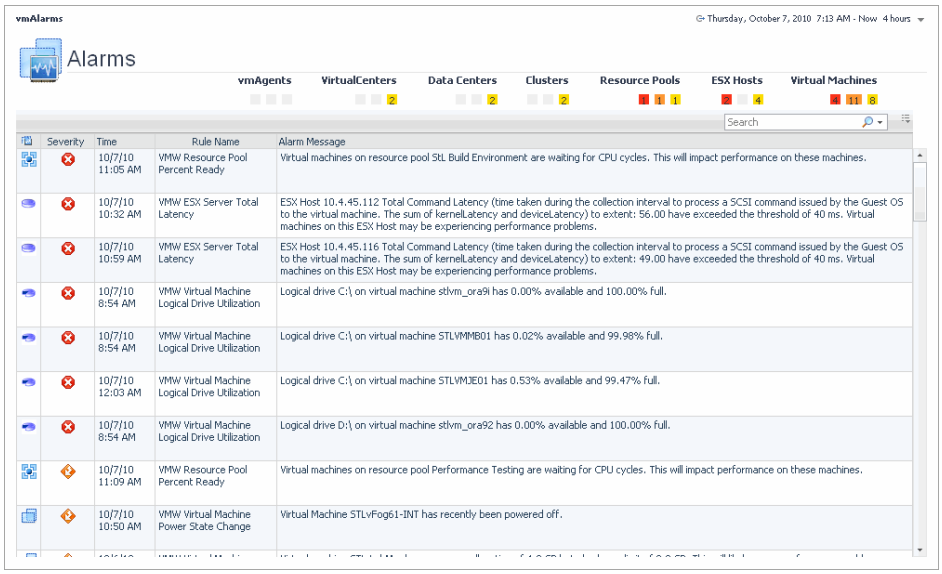
Figure 37. Baseline range for a view



Exploring VMware alarms

The vmAlarms dashboard is a simple dashboard that shows the alarms that have been triggered but not cleared within Foglight for VMware. It can be used to isolate alarms specific to the virtualized environment.

Figure 38. VMware Alarms



To access this dashboard, from the navigation panel, under **Dashboards**, choose **VMware > vmAlarms**. For reference information about the data appearing on this dashboard, see VMware Alarms views on page 74.

Filtering alarms

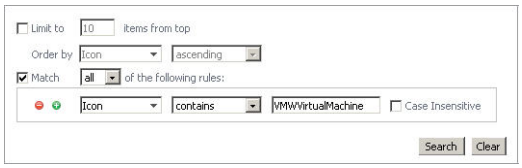
The vmAlarms dashboard provides some filtering controls. Use it to isolate alarms related to a specific bottleneck or issue in your virtual environment. The **Search** box appears in the top-right corner of the alarm list.

Figure 39. Alarm filter

Type a text string and press ENTER. The list of alarms refreshes, showing only those alarms that match that filter.

For more advanced filtering, click the down-facing arrow, and in the list that appears, click **Advanced Search**. A dwell appears.

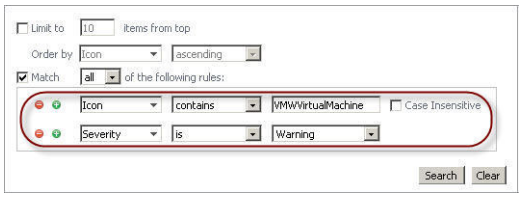
Figure 40. Advanced Search



To search on a Foglight for VMware object name, select **Match all of the following rules**, and in the **Icon** box below, type a full or partial name of the object you want to search for, and then click **Search**. The Alarms List refreshes, showing only those alarms that are generated against the specified object type. For a list of icons and the related object names, see Virtual Infrastructure View Object Icons on page 152.

If you want to search on an alarm severity or rule name, or to combine different search criteria, update or add one or more rules in the **Match all of the following rules** area. For example, to search for alarms generated against a specific object type and have a specific severity, create one rule to specify the object type, and one for the rule severity.

Figure 41. Filtering rules



To search for alarms generated during a specific time, create a Time rule and specify the time range.

Figure 42. Specifying a time range

To search for a specific alarm message, create an Alarm Message rule and specify the message you want to search for.

Figure 43. Searching for a specific alarm message

To remove the filter, delete the search string and press ENTER. The list of alarms refreshes, showing all the generated alarms.

For more information on filtering lists in Foglight for VMware, refer to the *Foglight for VMware User Guide*.

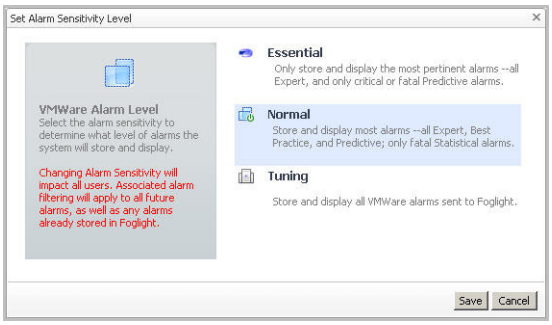
Setting the alarm sensitivity level

The **Administration** tab on the VMware Environment dashboard enables you to configure the level of alarm sensitivity. The Foglight® for VMware alarm sensitivity reflects the level of alarms the system stores and displays.

To configure the level of alarm sensitivity:

1 On the VMware Environment dashboard, open the **Administration** tab and click **Set Alarm Sensitivity Level**.

The **Set Alarm Sensitivity Level** dialog box appears.



2 On the dialog box, click one of the alarm sensitivity levels to select it. Normal is the default level.

3 Click **Save**.

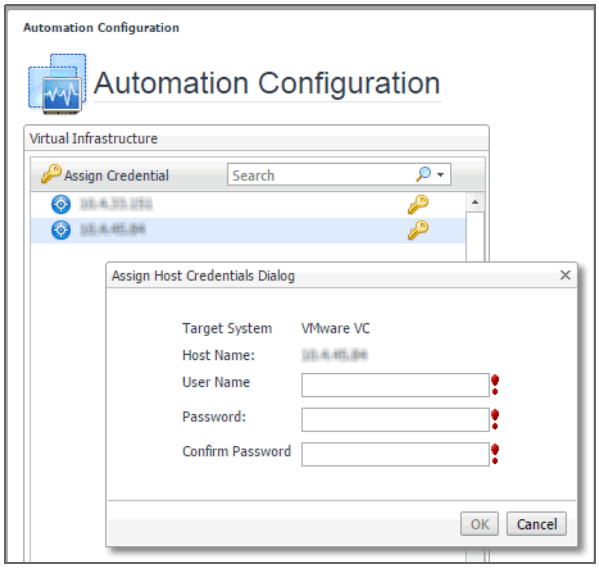
Administering monitored ESX hosts and virtual machines

A VMware® environment typically includes one or more Virtual Centers. A Virtual Center includes a collection of datacenters, clusters, ESX® hosts, resource pools, and virtual machines. Data centers are typically used to define physical boundaries within which ESX hosts exist, while resource pools enable an administrator to fine-tune resource allocations within a cluster. A cluster can have one or more ESX hosts associated with it, and one or more virtual machines can run on each ESX hosts. Each virtual machine is allocated a portion of the ESX host's resources, including disk, CPU, memory, and network resources. A virtual machine has its own machine name and IP address, and it runs a guest OS (for example, MS Windows XP), along with other applications.

Additionally, VMware implements the concepts of virtual machine snapshots and ESX host workflows. A virtual machine snapshot is a virtual machine image that you can return to at any point in time. A workflow, on another hand, is a way to automate ESX host tasks, and re-run them using a different set of parameters. For example, you can use an existing virtual machine creation task, change some of its resource allocation parameters, and run it again.

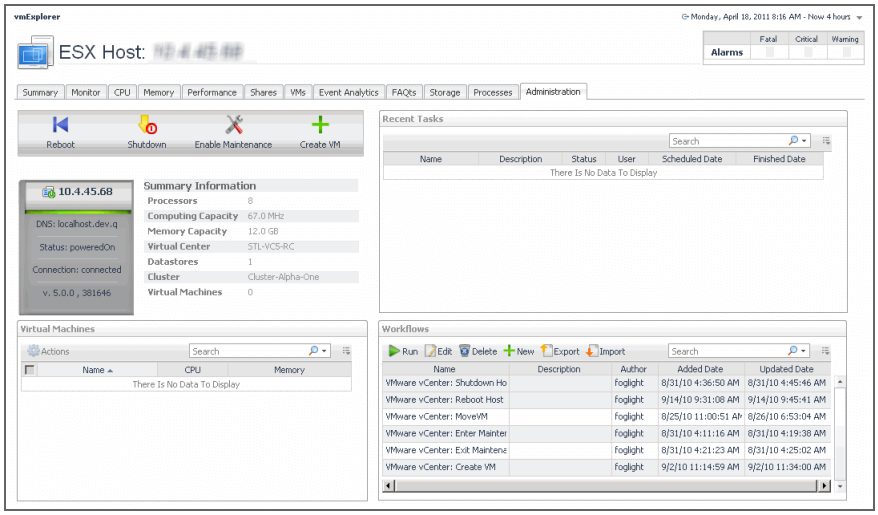
These actions require that you set up credentials for the virtual center on the Automation Configuration dashboard. To do that, on the navigation panel, under **Dashboards**, choose **VMware > Automation Configuration**. On the Automation Configuration dashboard that appears, in the **Virtual Infrastructure** view, select a virtual center, click **Assign Credential**, and provide host credentials in the **Assign Host Credentials Dialog** box. Failing to configure host credentials results prevents the automated tasks from being executed.

Figure 44. Configuring host credentials



The VMware Explorer's Administration tab provides access to most of these administration tasks. Use it to shut down or reboot physical ESX hosts and virtual machines, or to create virtual machines and edit their resource allocation. This tab also provides quick access to creating and editing virtual machine snapshots and ESX host workflows.

Figure 45. VMware Explorer's Administration tab



To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance:

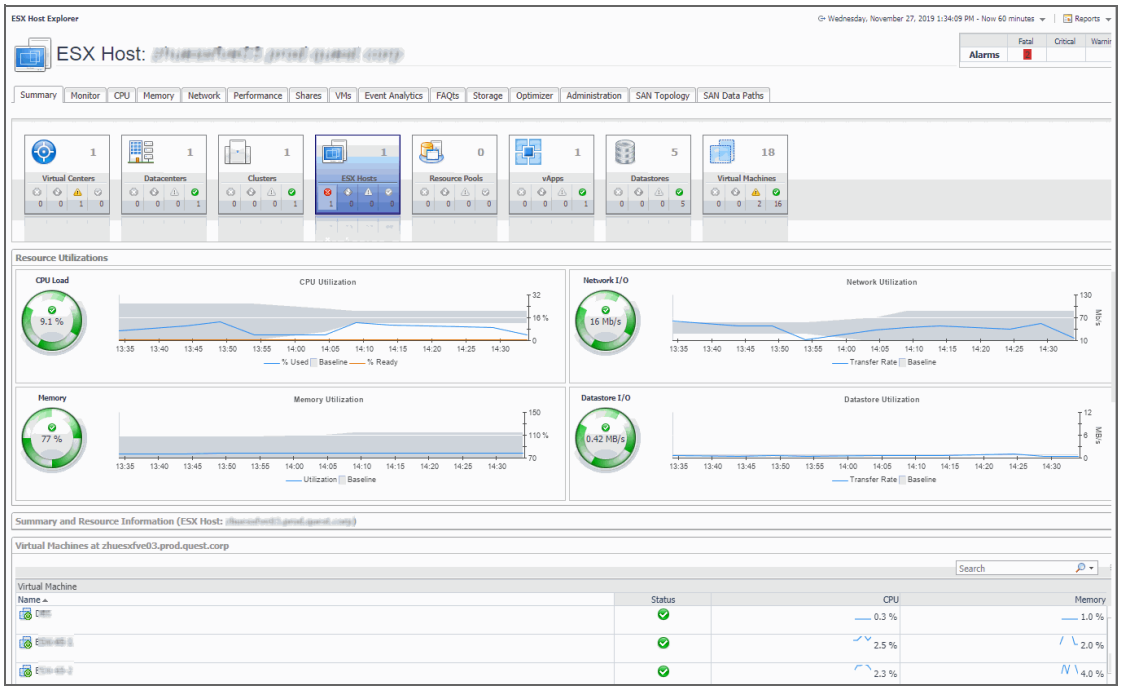
1 Log in to the Foglight browser interface.

2 Ensure that the navigation panel is open.

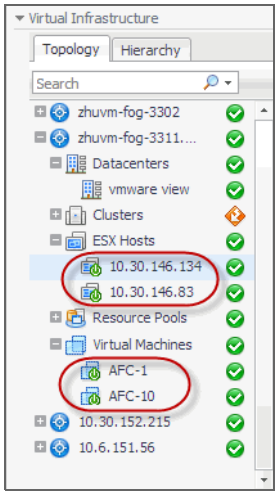
To open the navigation panel, click the right-facing arrow on the left.

3 On the navigation panel, under **Dashboards**, choose **VMware > VMware Explorer**.

The VMware Explorer appears in the display area, with the **Summary** tab open.

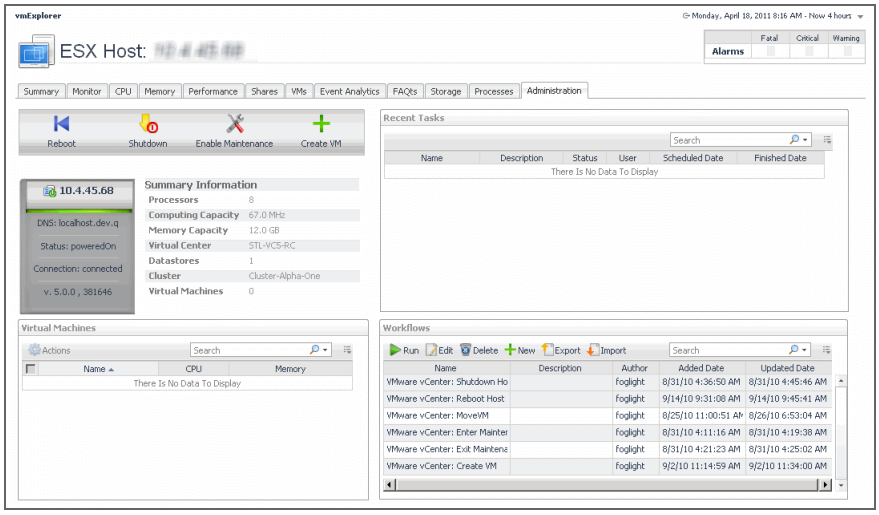


4 On the navigation panel, under **Virtual Infrastructure**, on the **Topology** tab, select an ESX host or virtual machine object instance in the navigation tree.

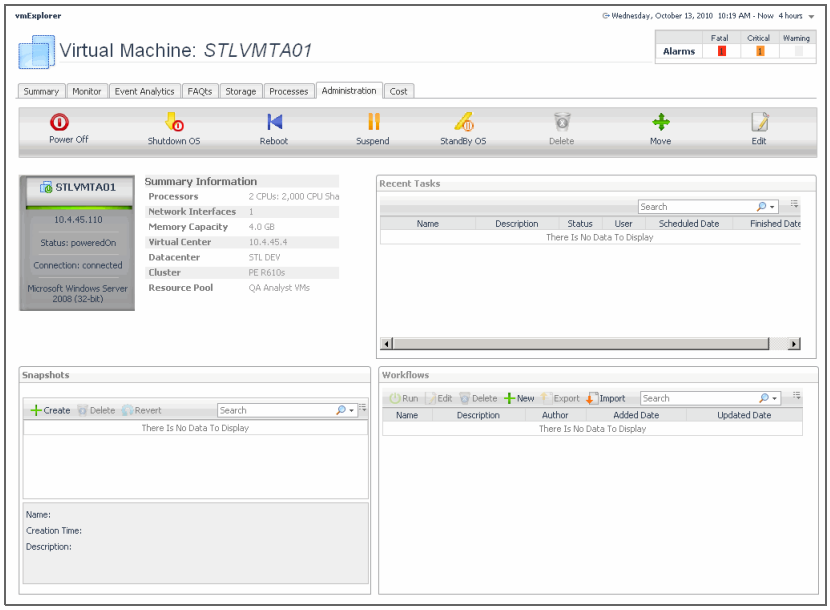


5 In the VMware Explorer, open the **Administration** tab.

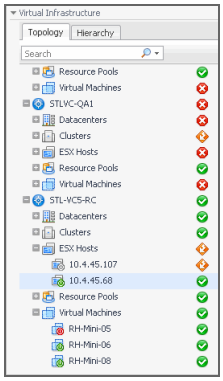
This image illustrates the content of the **Administration** tab when exploring ESX host details.



When you select a virtual machine in the VMware Explorer, a slightly different set of tasks appears.



TIP: Use the **Topology** tab to quickly switch between object instances and display their details in the VMware Explorer. For more information about this view, see Virtual Infrastructure view on page 151.



6 Use this tab to perform common administrative tasks, as required.

For complete details, see the following topics:

- Shutting down and rebooting ESX hosts, and enabling maintenance on page 45
- Creating virtual machines on page 47
- Suspending, rebooting and powering off virtual machines on page 49
- Deleting virtual machines on page 50
- Creating, managing, and reverting to virtual machine snapshots on page 51
- Automating VMware administration with workflows on page 52

Shutting down and rebooting ESX hosts, and enabling maintenance

Use the **Reboot**, **Shutdown**, and **Enable Maintenance** buttons on the VMware Explorer **Administration** tab to perform these operations, as required.

Figure 46. Administration toolbar

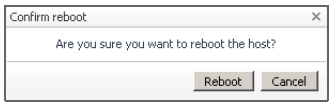
To reboot an ESX host:

1 Select an ESX host object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Reboot**.

The **Confirm reboot** dialog box appears.



3 In the **Confirm reboot** dialog box, click **Reboot**.

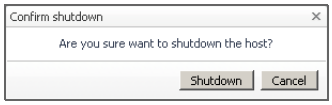
To shut down an ESX host:

1 Select an ESX host object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Shutdown**.

The **Confirm shutdown** dialog box appears.



3 Click **Shutdown**.

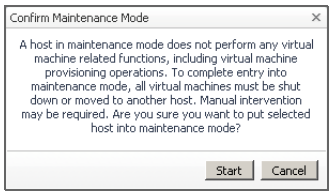
To enable maintenance of an ESX host

1 Select an ESX host object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Enable Maintenance**.

The **Confirm Maintenance Mode** dialog box appears.

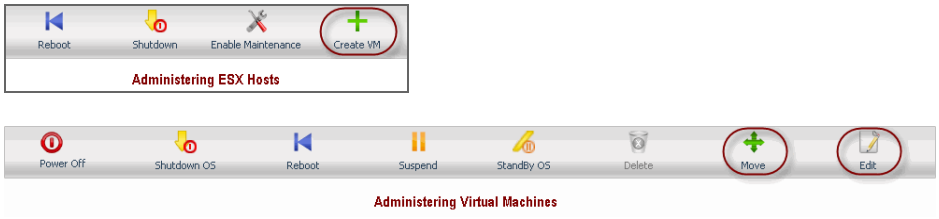


3 Click **Start**.

Creating virtual machines

Use the **Create VM**, **Edit**, and **Move** buttons on the VMware Explorer **Administration** tab to perform these operations.

Figure 47. Administration toolbars



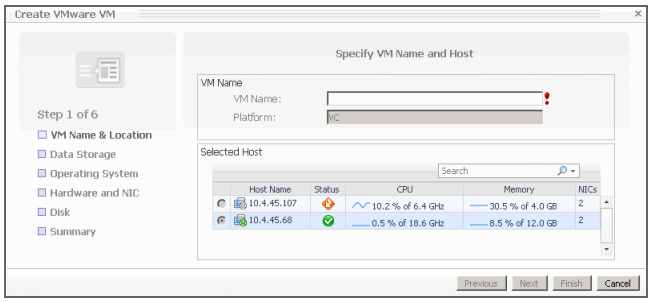
To create a virtual machine:

1 Select an ESX host object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Create VM**.

The **Create VMware VM** dialog box appears with the **Specify VM Name and Host** page open.



3 Follow the flow in the wizard by supplying the required information and clicking **Next**. At any point you can return to a previous step using the **Previous** button.

a On the **Specify VM Name and Host** page, in the **VM Name** box, specify the name of the virtual machine that you are about to create.

b On the **Specify Data Storage** page, specify the datastore that you want to associate with this virtual machine.

c On the **Guest Operating System** page, select the guest OS under which you want this virtual machine to run.

d On the **Customize Hardware and Network** page, define the number of CPUs and memory size that you want to allocate to the VM. If necessary, add a network adapter and assign a static or dynamic IP address.

e On the **Customize Disk(s)** page, allocate disk resources to the virtual machine.

f On the **Summary** page, review your settings and click **Finish**.

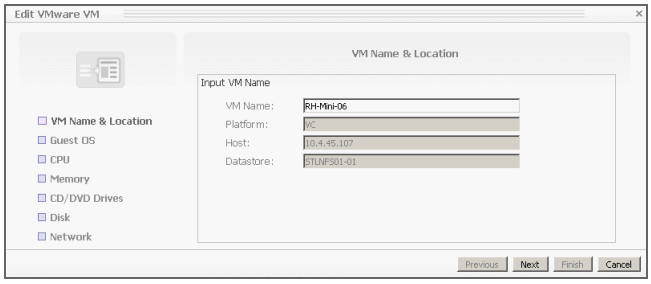
To reconfigure a virtual machine:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Edit**.

The **Edit VMware VM** dialog box appears with the **VM Name & Location** page open.



3 Follow the flow in the wizard by supplying the required information and clicking **Next**. At any point you can return to a previous step using the **Previous** button.

   a On the **VM Name & Location** page, edit the name of the virtual machine, if required.

   b On the **Guest OS** page, select the guest OS under which you want this virtual machine to run.

   c On the **Customize CPU Usage** page, edit the CPU allocation properties as required, including the number of CPUs, if the CPUs are to be shared, and the related allocation limits.

   d On the **Customize Memory Usage** page, edit the memory amounts that are allocated to the virtual machine.

   e On the **CD/DVD Drives** page, add or remove any CD or DVD drives, as required.

   f On the **VM Disk** page, add or remove any disks, as required.

   g On the **Network** page, add or remove any network adapters.

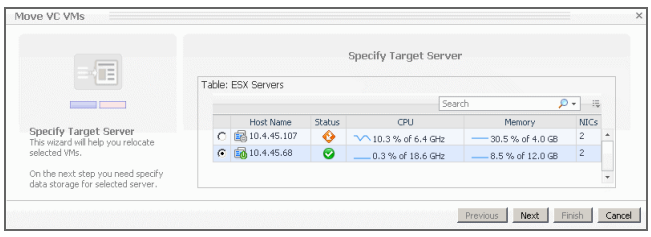
To move a virtual machine to a different server:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

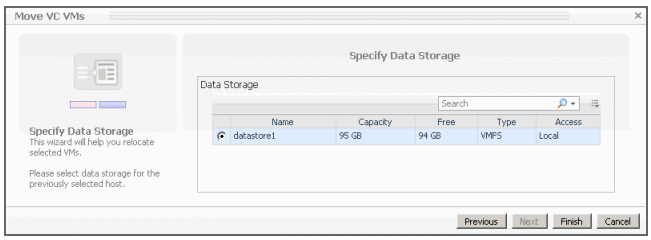
2 On the VMware Explorer **Administration** tab, click **Move**.

The **Move VC VMs** dialog box appears with the **Specify Target Server** page open.



3 Select the monitored ESX host to which you want to move the virtual machine and click **Next**.

The **Move VC VMs** dialog box refreshes, showing the **Specify Data Storage** page.



4 Specify the datastore that you want to associate with this virtual machine, and click **Finish**.

Suspending, rebooting and powering off virtual machines

Use the **Power Off**, **Reboot**, and **Suspend** buttons on the VMware **Administration** tab to perform these operations, as required.

Figure 48. Administration toolbar

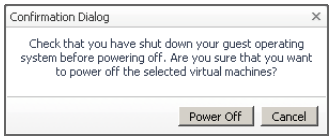
To power off a virtual machine:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Power Off**.

The **Power Off Virtual Machine** dialog box appears.



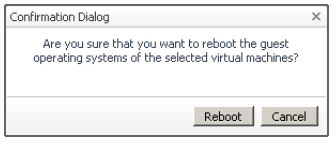
To reboot a virtual machine:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Reboot**.

The **Confirmation Dialog box** appears.



3 Click **Reboot**.

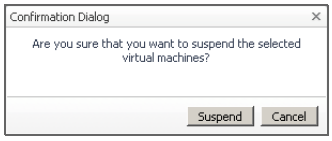
To suspend a virtual machine:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Suspend**.

The **Confirmation Dialog** appears.



3 Click **Suspend**.

4 Click **OK**.

Shutting down a guest OS and switching to standby mode

Use the **Shutdown OS** and **StandBy OS** buttons on the VMware **Administration** tab to perform these operations, as required.

Figure 49. Administration toolbar

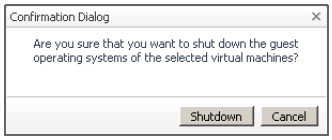
To shut down a guest OS:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **Shutdown OS**.

The **Confirmation Dialog** appears.



3 In the **Confirmation Dialog**, click **Shutdown**.

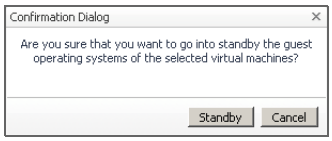
To switch a guest OS to standby mode:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, click **StandBy OS**.

The **Confirmation Dialog** appears.



3 In the **Confirmation Dialog**, click **Standby**.

Deleting virtual machines

Use the **Delete** button on the VMware Explorer **Administration** tab to delete a virtual machine, as required.

Figure 50. Administration toolbar

To delete a virtual machine:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

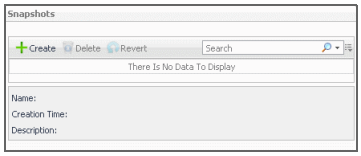
2 Power of the virtual machine. For instructions, see To power off a virtual machine: on page 49.

3 On the VMware Explorer **Administration** tab, click **Delete**.

Creating, managing, and reverting to virtual machine snapshots

A virtual machine snapshot is a saved virtual machine image to which you can return at any point in time. Use the **Snapshots** view on the VMware Explorer **Administration** tab to create, manage, and revert to virtual machine snapshots, as required.

Figure 51. Snapshots view



To create a virtual machine snapshot:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, in the **Snapshots** view, click **Create**.

The **Create Snapshot** dialog box appears.

3 In the **Create Snapshot** dialog box, in the **Snapshot name** box, type the snapshot name.

4 Click **OK**.

To delete a virtual machine snapshot:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, in the **Snapshots** view, select the virtual machine snapshot that you want to delete.

3 Click **Delete**.

To revert to a virtual machine snapshot:

1 Select a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, in the **Snapshots** view, select the virtual machine snapshot to which you want to revert.

3 Click **Revert**.

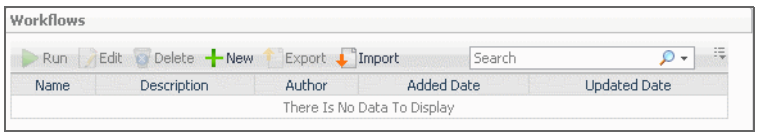
The **shutdown the operating system** dialog box appears.

4 Click **OK**.

Automating VMware administration with workflows

A workflow is a collection of tasks arranged into a specific order, that you can run multiple times against the same or different set of objects. It provides a way to automate common scenarios and simplify administration in general. Use the **Workflows** view on the VMware Explorer **Administration** tab to create and manage ESX host workflows.

Figure 52. Workflows view



To create or edit a workflow:

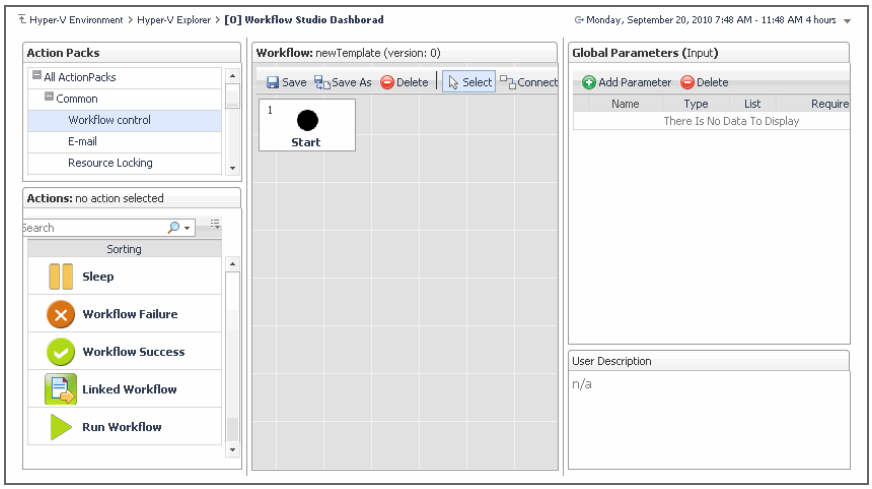
1 Select an ESX host or a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 To create a workflow, on the VMware Explorer **Administration** tab, in the **Workflows** view, click **New**.

To edit a workflow, in the **Workflows** view, select the workflow that you want to edit, and click **Edit**.

The Workflow Studio dashboard appears in the display area.



3 Define the workflow, as required.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

4 To return to the VMware Explorer, use the bread crumb trail.

To run an ESX host workflow:

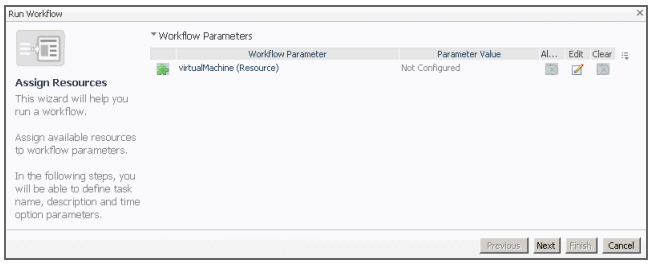
1 Select an ESX host or a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, in the **Workflows** view, select the workflow that you want to run.

3 Click **Run**.

The **Run Workflow** dialog box appears.



4 Edit the workflow parameters, as required. The type and range of parameters depend on those defined in the selected workflow.

Click **Next**.

5 In the **Specify Task Details** page that appears in the **Run Workflow** dialog box, specify the task name, description, and time options, then click **Finish**.

To delete an ESX host workflow:

1 Select an ESX host or a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, in the **Workflows** view, select the workflow that you want to delete.

3 Click **Delete**.

To export an ESX host workflow to a file:

1 Select an ESX host or a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, in the **Workflows** view, select the workflow that you want to export to a file.

3 Click **Export**.

The **Export a Workflow** dialog box appears.

4 Specify the name and location of the file to which you want to export the workflow.

To import an ESX host workflow from a file:

1 Select an ESX host or a virtual machine object instance and open the VMware Explorer **Administration** tab.

> **TIP:** For instructions, see To open the VMware Explorer's Administration tab for an ESX host or virtual machine object instance: on page 43.

2 On the VMware Explorer **Administration** tab, in the **Workflows** view, select the workflow that you want to import from a file.

3 Click **Import**.

The **Import a Workflow** dialog box appears.

4 Navigate to the file containing the workflow you want to edit.

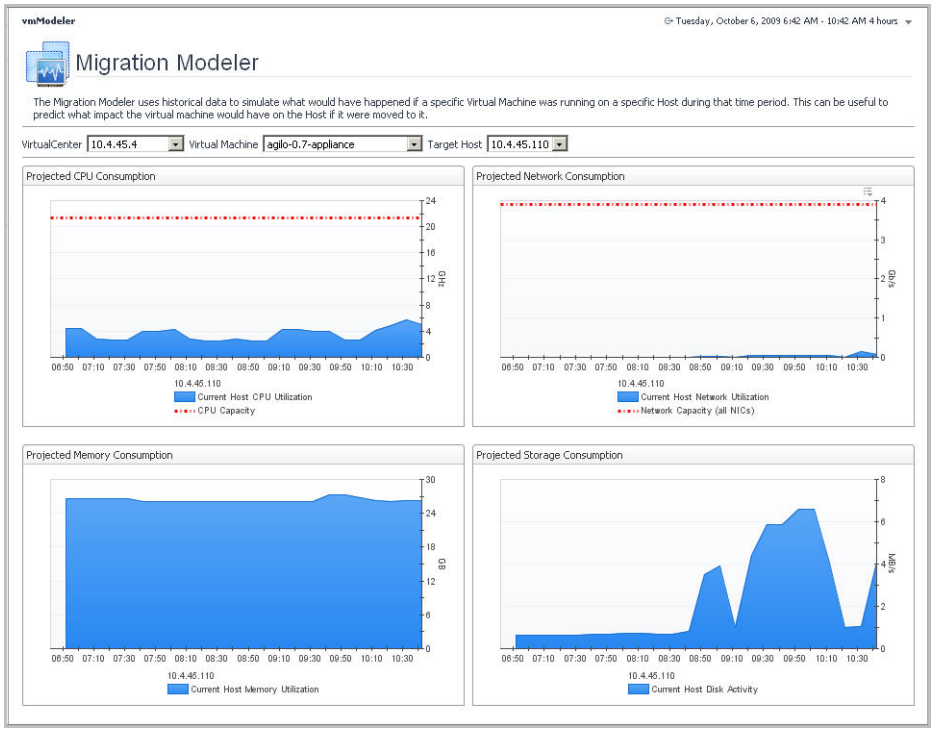
Additional features

Planning for virtual machine migrations

The VMware Modeler dashboard provides a mechanism you can use to view the impact that migrating a virtual machine will have on a target ESX Host. This dashboard takes up the entire display area of the Foglight for VMware browser interface. It can be accessed in two different ways:

- If you are in the VMware Explorer dashboard, you can access the VMware Modeler dashboard by using the Run Migration Modeler link under the Actions heading on the action panel to the right of the Foglight for VMware browser interface. For more information about the action panel with respect to Foglight for VMware tasks and actions, refer to Accessing VMware actions and tasks on page 36.
- From within any dashboard, you can access the VMware Modeler dashboard by clicking the VMware Modeler link under Dashboards > Virtual > VMware in the navigation panel.

Figure 53. Migration Modeler



The VMware Modeler dashboard provides four graphs that show current and projected numbers, for CPU and memory utilization and network and disk activity, on the target ESX Host over the time range specified in the VMware Explorer dashboard.

The blue area on the graphs represents current consumption or activity on the target ESX Host. The orange area specifies projected worst case consumption or activity. The red dotted line specifies the target ESX Host capacity with respect to the corresponding metric. For reference information about the data appearing on this dashboard, see VMware Modeler views on page 156.

To run the Migration Modeler:

1 From the VirtualCenter list, select the vCenter within which the migration will take place.

2 From the Virtual Machine list, select the virtual machine that is to be migrated.

3 From the Target Host list, select the ESX Host that will be the target for the migration.

When using the VMware Modeler dashboard, you should extend the time range in order to better assess the long term impact of the potential migration. For specific information about adjusting dashboard time ranges, refer to the *Foglight for VMware User Guide*.

Creating OS mapping rules

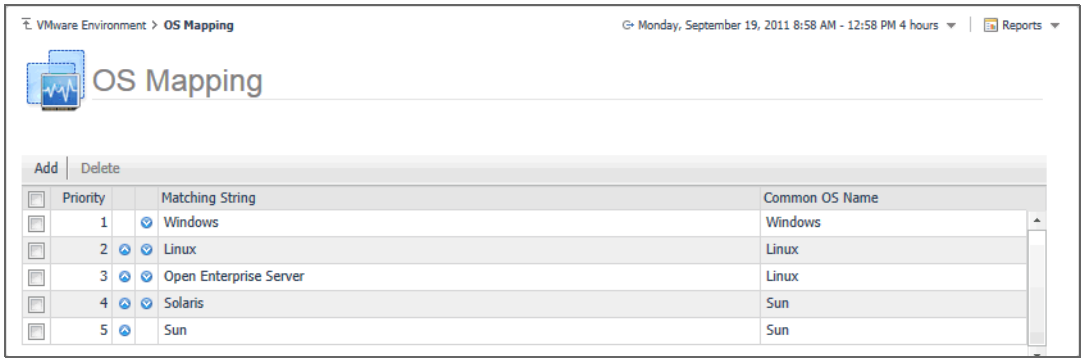
OS mapping involves associating various versions and editions of a particular operating system with a common OS name. You configure OS mapping rules using the **Administration** tab on the VMware Environment dashboard. This helps Foglight for VMware map the OS names reported by Foglight for VMware to those reported by physical OS monitoring, so that you can view all Windows machines, all Linux machines, and so on.

For reference information about this view, see OS Mapping view on page 203.

To configure OS mapping rules:

- On the VMware Environment dashboard, open the **Administration** tab and click **Configure OS Mapping**.

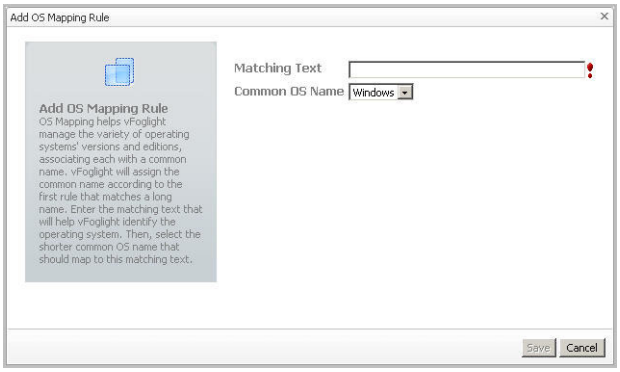
  The **OS Mapping** view appears.



To add an OS mapping rule:

1 In the **OS Mapping** view, click **Add**.

  The **Add OS Mapping Rule** dialog box appears.



2 In the **Add OS Mapping Rule** dialog box, in the **Matching Text** box, type the OS name with its edition and/or version number to help Foglight for VMware identify the operating system.

3 In the **Common OS Name** list, select the shorter common OS name.

4 Click **Save**.

Foglight for VMware matches the shorter common OS name with the text you provided in Step 2.

To delete an OS mapping rule:

1 In the **OS Mapping** view, select an OS mapping rule by clicking the associated check box in the left column.

2 Click **Delete**.

3 Click **Save**.

To configure the priority of an OS mapping rule:

- In the **OS Mapping** view, move a rule one level up by clicking the up arrow in the rule's row.
- Move a rule one level down by clicking the down arrow in the rule's row.

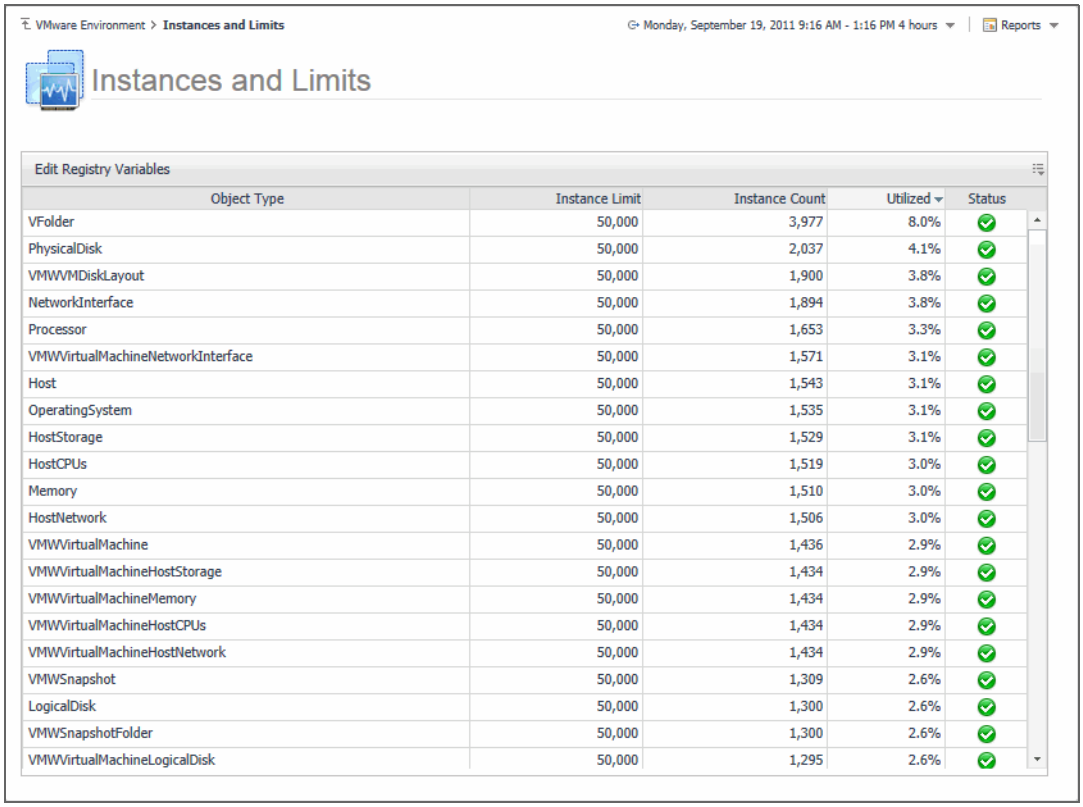
Reviewing object instances and limits

Foglight collects data from monitored environments and creates a data model in real-time. The resulting topology model consists of nodes where each node is an object instance of a particular object type. Each type of monitoring environment can have a unique set of object types. Foglight for VMware includes a set of topology object types and their definitions. When Foglight collects data from your VMware environment, it builds the topology model that consists of the instances of the object types defined by Foglight for VMware. By default, a monitored environment can result in up to 50,000 object instances being created by a single object type. This value is controlled by the `foglight.limit.instances` registry variable.

Registry variables have a global default value and type-specific scoped values. This means that different object types can have different instance limits.

Explore the **Instances and Limits** view to see the existing VMware object types. To access this view, on the VMware Environment dashboard, open the **Administration** tab, and click **Review Instances and Limits**.

Figure 54. Instances and Limits



Object Type	Instance Limit	Instance Count	Utilized	Status
VFolder	50,000	3,977	8.0%	
PhysicalDisk	50,000	2,037	4.1%	
VMWVMDiskLayout	50,000	1,900	3.8%	
NetworkInterface	50,000	1,894	3.8%	
Processor	50,000	1,653	3.3%	
VMWVirtualMachineNetworkInterface	50,000	1,571	3.1%	
Host	50,000	1,543	3.1%	
OperatingSystem	50,000	1,535	3.1%	
HostStorage	50,000	1,529	3.1%	
HostCPUs	50,000	1,519	3.0%	
Memory	50,000	1,510	3.0%	
HostNetwork	50,000	1,506	3.0%	
VMWVirtualMachine	50,000	1,436	2.9%	
VMWVirtualMachineHostStorage	50,000	1,434	2.9%	
VMWVirtualMachineMemory	50,000	1,434	2.9%	
VMWVirtualMachineHostCPUs	50,000	1,434	2.9%	
VMWVirtualMachineHostNetwork	50,000	1,434	2.9%	
VMWSnapshot	50,000	1,309	2.6%	
LogicalDisk	50,000	1,300	2.6%	
VMWSnapshotFolder	50,000	1,300	2.6%	
VMWVirtualMachineLogicalDisk	50,000	1,295	2.6%	

The **Instances and Limits** view displays the list of the existing VMware object types, and for each type it shows the type name, instance limit, instance count, instance limit utilization, and the current status given as a highest severity level associated with an instance of that type. This information can give you insight into the size of your database and whether additional adjustments are required to improve your system performance. For example, if an object type results in a high number of object instances, this may result in performance bottlenecks. To prevent them, check if any of these are updated recently and, if not, delete them from the database.

To view the list of existing registry variables or to edit them, click **Edit Registry Variable** in the top-left corner. For complete information about registry variables, see the *Administration and Configuration Help*.

For reference information about this view, see Instances and Limits view on page 202.

Configure Metrics Collection

VMware agent has collect total 99 metrics from vCenter, but some metrics are not used to VMware dashboard and relate products (Capacity Director, Optimizer and so on), so the user can disable the collection of these metrics at this view.

For reference information about this view, see Metrics Collection Management View on page 204.

To configure the metrics collection:

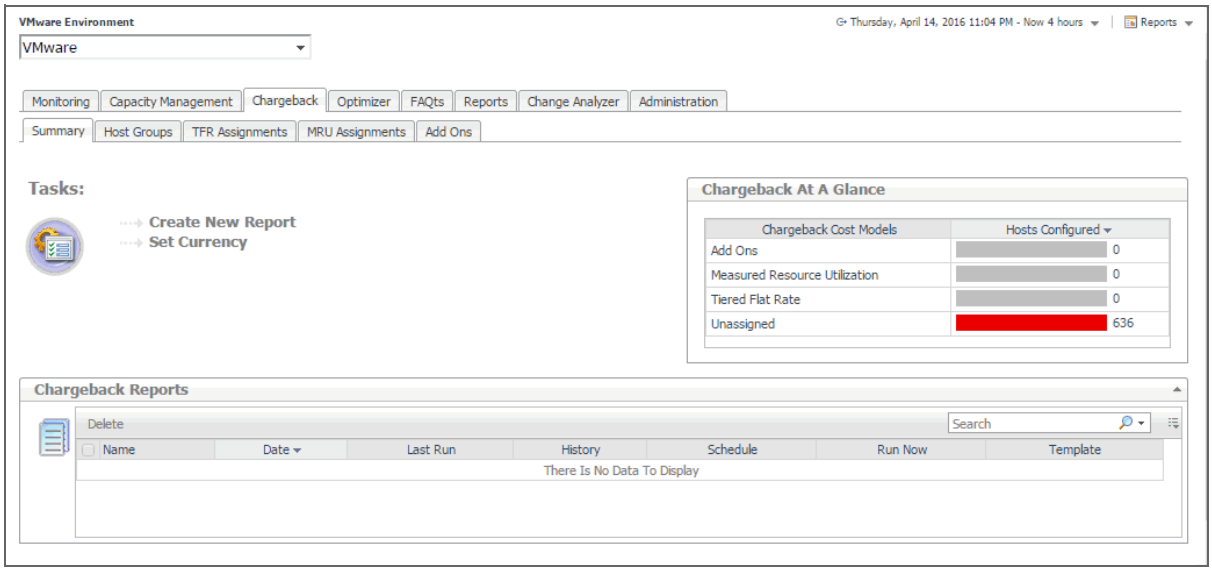
1. On the navigation panel, under **Dashboards**, choose **VMware > VMware Environment**.
2. On the VMware Environment dashboard that appears in the display area, choose **Administration > Advanced Options**, click **Metrics Collection Management**.
3. Select the agent, click the button **Collect Metrics For Dashboard Only** or **Restore The Default Setting**, and then click the button **Save Edited Configuration**. The default setting is collect all metrics.

> **NOTE:** User can also select/deselect the **Collecting** checkbox, but we wouldn't recommend it because some metrics have been used for conversion of other metrics.

Managing chargeback

In an IT environment with a high number of physical and virtual machines, it is often important to determine the true cost of virtual machines in order to adequately plan resources for system utilization. The **Chargeback** tab available on the VMware Environment dashboard provides standard models, allowing you to get insight into host machine usage within a data center.

Figure 55. Chargeback tab

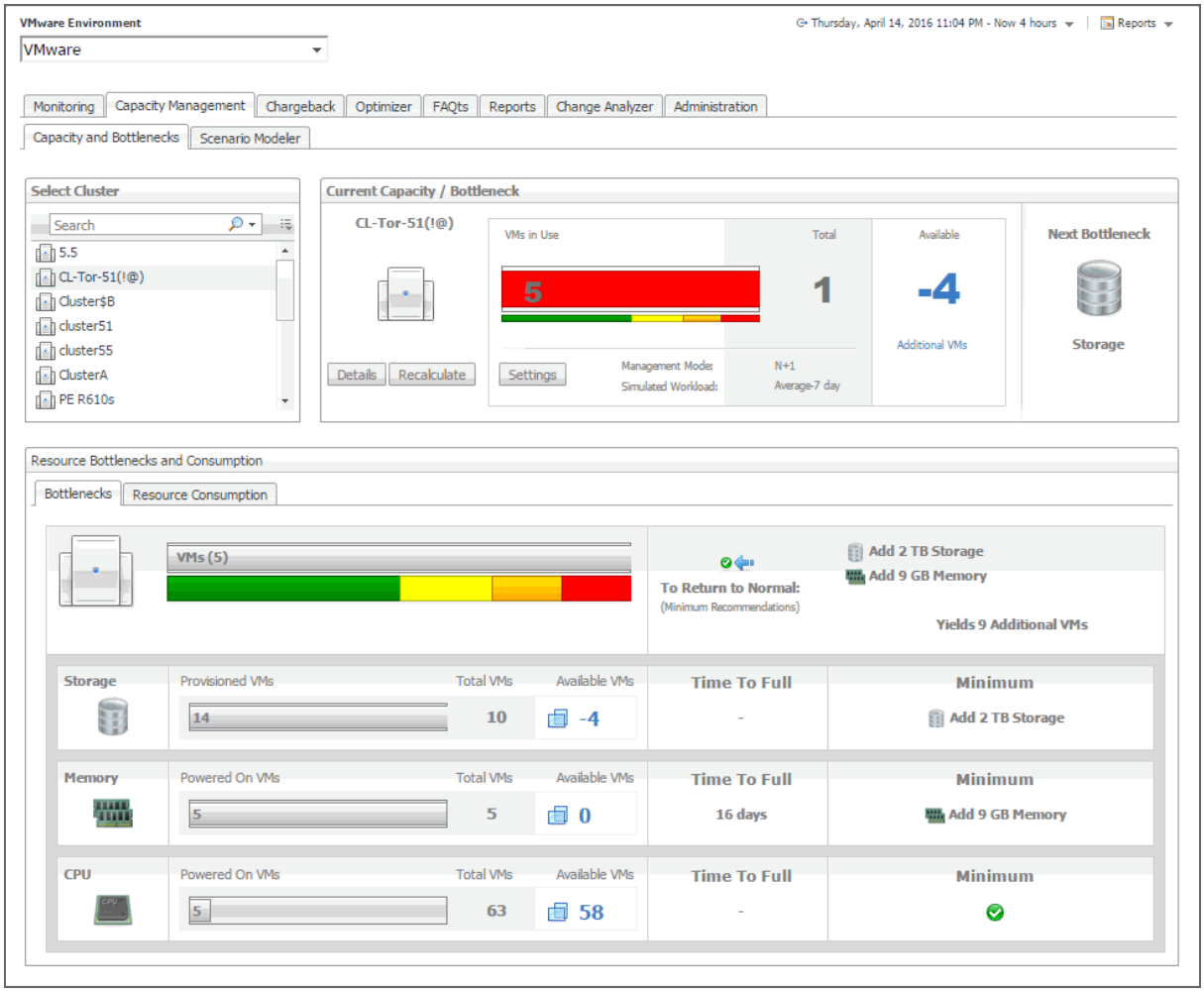


For complete information about this tab, see the *Managing Chargeback User Guide*.

Managing capacity

Larger distributed environments often require tools for accurately predicting resource consumption in order to plan for continuous expansion of virtual and physical machines and prevent bottlenecks in your production environment. The **Capacity Management** tab available on the VMware Environment dashboard allows you to get insight into capacity bottlenecks and management.

Figure 56. Managing Capacity tab

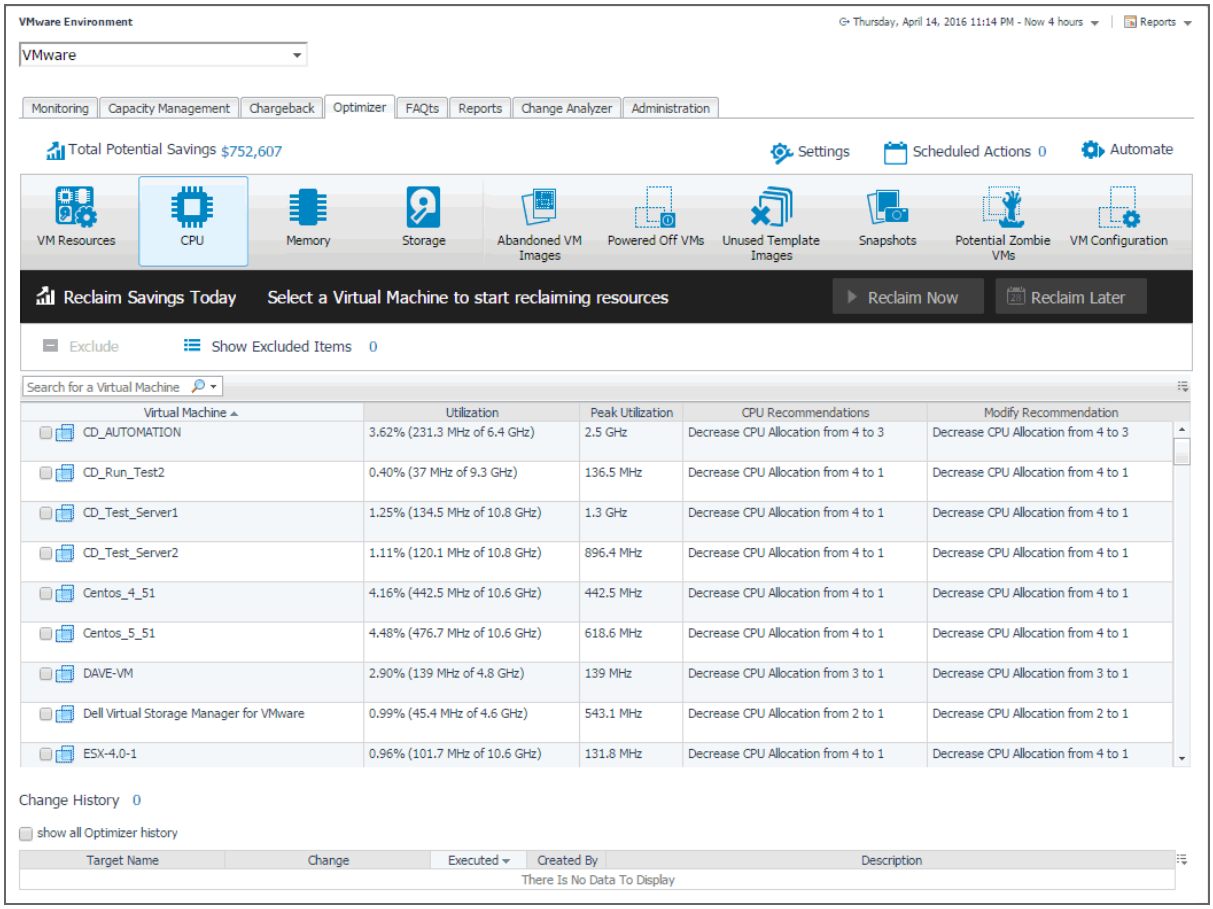


For complete information about this tab, see the *Managing Capacity in Virtual Environments User Guide*.

Optimizing resources

With virtual machines quickly becoming the industry standard in an IT infrastructures, making it necessary to plan for the addition of virtual machines to the physical hosts. This is often a challenge for administrators. Foglight™ Resource Optimizer simplifies the optimization process, providing waste-finding and right-sizing functionality for virtualized environments. The **Optimizer** tab appearing on the VMware Environment dashboard allows you to get insight into capacity bottlenecks and management. Use this tab when you want to optimize the CPU, memory, network, and storage consumption, and to project and plan for additional requirements in your environment.

Figure 57. Optimizer tab



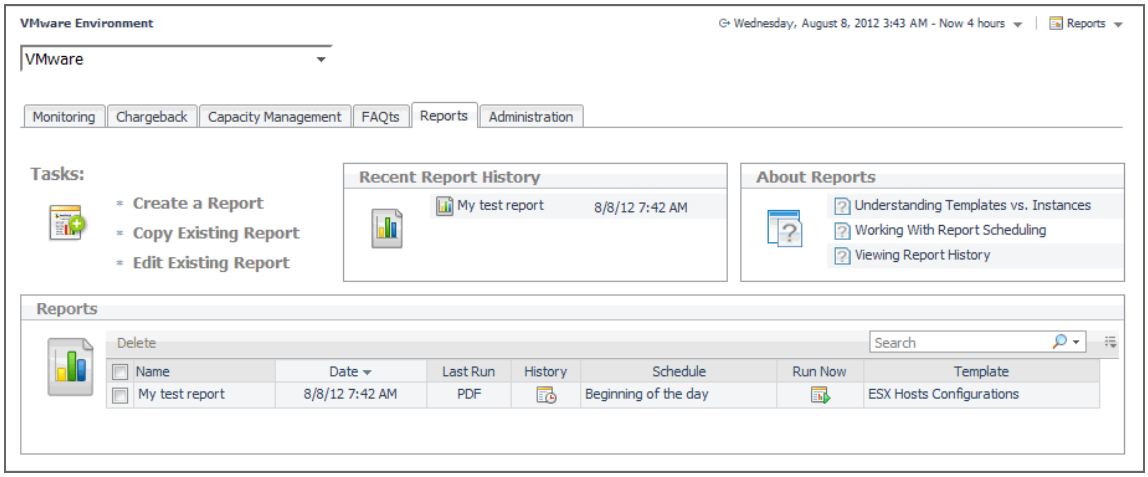
For complete information about this tab, see the *Foglight™ Resource Optimizer for VMware Environments User Guide*.

Generating reports

Foglight for VMware includes a report generation ability. This allows you to create reports using a set of predefined templates to report on the various aspects of your virtual environment. Foglight for VMware includes a collection of predefined report templates.

You can generate, copy, and edit reports using the **Reports** tab on the VMware Environment dashboard, or alternatively the Reports dashboard included with the Management Server.

Figure 58. Reports tab



For complete information about this tab, see the *Managing Capacity in Virtual Environments User Guide*. For more information about the Reports dashboard, see the *Foglight User Help*.

You can generate, copy, and edit reports using the Reports dashboard included with the Management Server. For more information, see the *Foglight User Help*.

Available report templates

The following templates are available with Foglight for VMware.

Table 4. Foglight for VMware report templates

Report Template Name	Object Type	This template can be used to generate a report that…
Datastore Capacity	ESX Host	Shows the capacity of one or more datastores.
Datastore Usage by ESX Hosts	ESX Host	Shows, for a specified datastore, its usage per-ESX Host.
ESX Host Capacity and Performance - Detail	ESX Host	Contains the capacity and performance details for the selected ESX Host.
ESX Host Capacity and Performance - Summary	ESX Host	Summarizes the capacity and performance details of the selected ESX Host.
ESX Hosts Configurations	VirtualCenter	Shows the configurations for the ESX Hosts in the selected vCenter.
ESX Hosts Network Performance - Service	Service	Contains the network performance details for the ESX Hosts in the selected service.
ESX Hosts Performance by Service - Detail	Service	Contains the performance details for the ESX Hosts in the selected service.
ESX Hosts Performance by Service - Summary	Service	Summarizes the performance details of the ESX Hosts in the selected service.
ESX Hosts Physical Disk Latencies	Service	Shows the top 5 and bottom 5 ESX Hosts for queue and total disk latency over a user-specified time range. The report takes into consideration only the ESX Hosts in the service specified.
ESX Hosts Summary by Datacenter (deprecated)	Datacenter	Contains the summary details for the ESX Servers contained within the selected datacenter.
ESX Hosts Summary by Service	Service	Contains the summary details for the ESX Hosts contained within the selected service.
ESX Hosts Summary by VirtualCenter (deprecated)	VirtualCenter	Contains the summary details for the ESX Servers managed by the selected vCenter.

Table 4. Foglight for VMware report templates

Report Template Name	Object Type	This template can be used to generate a report that…
ESX Hosts Utilization - Detail	Service	Shows the top *N* and bottom *N* ESX Hosts based on CPU utilization, CPU percent ready, memory utilization, disk transfer rate, and network transfer rate over a user-specified time range. The value of *N* is also user-specified. The report takes into consideration only the ESX Hosts in the service specified.
ESX Hosts Utilization - Summary	Service	Shows the top 5 and bottom 5 ESX Hosts based on CPU utilization, CPU percent ready, memory utilization, disk transfer rate, and network transfer rate over a user-specified time range. The report takes into consideration only the ESX Hosts in the service specified.
ESX Server Capacity by Cluster (deprecated)	Cluster	Contains the capacity details for the ESX Servers contained within the selected cluster.
ESX Server Capacity by Datacenter (deprecated)	Datacenter	Contains the capacity details for the ESX Servers contained within the selected datacenter.
ESX Server Capacity by Service (deprecated)	Service	Contains the capacity details for the ESX Servers in the selected service.
ESX Server Capacity by VirtualCenter (deprecated)	VirtualCenter	Contains the capacity details for the ESX Servers managed by the selected vCenter.
Open Snapshots Report	Service	For all of the open snapshots for each virtual machine in the specified service. Open snapshots are those with no child snapshots.
Powered Off Virtual Machines	VirtualCenter	Lists the powered off virtual machines in a specified vCenter.
Snapshots Aging Report	Service	For all of the snapshots older than *N* days for each virtual machine in the specified service. The value of *N* is user-specified with a default value of 100. All snapshots are included in the report.
Virtual Asset Tracking by Service	Service	Shows the virtual machine host changes for a given service.
Virtual Infrastructure Alarm Summary	VirtualCenter	This template can be used to generate a report that contains the alarm (or event) history for the selected vCenter object.
Virtual Infrastructure Datastore Capacity	Datastore	Shows the capacity of the selected datastores and lists the ESX Servers and virtual machines that are connected to them. Information about the logical and physical disks on the virtual machines is also displayed in this report.
Virtual Infrastructure Overview	N/A	Summarizes your virtual infrastructure, so that you can be sure you are in compliance with the Foglight for VMware license.
Virtual Machine CPU Usage and Percent Ready	Service	Shows, for a given service, the CPU usage for virtual machines and the percent of time those virtual machines were waiting on CPU cycles.
Virtual Machine CPU Usage and Percent Ready (deprecated)	ESX Server	Shows, for a given set of ESX Servers, or for all ESX Servers if none are specified, the CPU usage for virtual machines and the percentage of time those virtual machines were waiting on CPU cycles.
Virtual Machine VMware Tool State	Virtual Machine	Lists virtual machines along with the status of their VMware Tools installation.

Table 4. Foglight for VMware report templates

Report Template Name	Object Type	This template can be used to generate a report that…
Virtual Machines Available CPU and Memory - Detail	Service	Shows the top *N* and bottom *N* virtual machines based on available CPU and memory over a user-specified time range. The value of *N* is also user-specified. The report takes into consideration only the virtual machines in the service specified.
Virtual Machines Available CPU and Memory - Summary	Service	Shows the top 5 and bottom 5 virtual machines based on available CPU and memory over a user-specified time range. The report takes into consideration only the virtual machines in the service specified.
Virtual Machines Configurations	VirtualCenter	Shows the configurations for the virtual machines in the selected vCenter.
Virtual Machines Creation and Usage - Detail	Virtual Infrastructure	Shows the number of virtual machines configured and the number of virtual machines powered on during a user-specified time range. The report displays the data in separate tables based on clusters and standalone ESX hosts. In addition, the report provides this information on a per-cluster and per-server basis. The report takes into consideration the clusters and standalone ESX hosts of the whole virtual infrastructure; it is not based on a specific service.
Virtual Machines Creation and Usage - Summary	Virtual Infrastructure	Shows the number of virtual machines configured and the number of virtual machines powered on during a user-specified time range. The report displays the data in separate tables based on clusters and standalone ESX hosts. The report takes into consideration the clusters and standalone ESX hosts of the whole virtual infrastructure; it is not based on a specific service.
Virtual Machines Logical Disks with X% or Less Free Storage - Detail	VirtualCenter	Shows relevant details for all virtual machines that have *X* percent or less free storage available. The value of *X* is user-specified.
Virtual Machines Logical Disks with X% or Less Free Storage - Summary	VirtualCenter	Summarizes relevant details for all virtual machines that have *X* percent or less free storage available. The value of *X* is user-specified.
Virtual Machines Logical Disks with X% or More Free Storage - Detail	VirtualCenter	Shows relevant details for all virtual machines that have *X* percent or more free storage available. The value of *X* is user-specified.
Virtual Machines Logical Disks with X% or More Free Storage - Summary	VirtualCenter	Summarizes relevant details for all virtual machines that have *X* percent or more free storage available. The value of *X* is user-specified.
Virtual Machines Network Performance - Service	Service	Contains the network performance details for the virtual machines in the selected service.
Virtual Machines Storage	Virtual Machine	Shows the capacity and usage of logical and physical disks on the selected virtual machines.
Virtual Machines Utilization - Detail	Service	Shows the top *N* and bottom *N* virtual machines based on CPU-used Hz, CPU percent ready, memory consumed, disk growth rate, disk transfer rate, and network transfer rate over a user-specified time range. The value of *N* is also user-specified. The report takes into consideration only the virtual machines in the service specified.

Table 4. Foglight for VMware report templates

Report Template Name	Object Type	This template can be used to generate a report that…
Virtual Machines Utilization - Summary	Service	Shows the top 5 and bottom 5 virtual machines based on CPU-used Hz, CPU percent ready, memory consumed, disk growth rate, disk transfer rate, and network transfer rate over a user-specified time range. The report takes into consideration only the virtual machines in the service specified.
Virtual Machines with X% or Less Overallocated Memory	VirtualCenter	Shows relevant details for all virtual machines that have *X* percent or less overallocated memory. The value of *X* is user-specified.
Virtual Machines with X% or More Overallocated Memory	VirtualCenter	Shows relevant details for all virtual machines that have *X* percent or more overallocated memory. The value of *X* is user-specified.
VMware Tools Update Required	Service	Shows the status of the VMware tools for the existing virtual machines and suggests required actions. The report takes into consideration only the virtual machines associated with the selected service.

VMware Performance Agent configuration

The VMware Performance Agent collects data from the virtual infrastructure and sends it to the <Product Name>™ Management Server. The agent keeps track of resource utilization metrics and alerts you when certain pre-defined thresholds are reached.

VMware Performance Agent and Agent Manager configuration

On 64-bit hosts meeting the minimum system requirements, the embedded Agent Manager can be used to run VMware Performance Agents to monitor up to 500 virtual machines. If the total number of virtual machines to be monitored from a single agent host is greater than 500, an Agent Manager should be installed on a separate host.

IMPORTANT: Foglight Evolve Virtual Appliance comes pre-configured to support up to 4,000 virtual machines. If you are using this product, there is no need to follow the configuration procedure described in this section.

If additional cartridges and agents are added to the environment, product performance should be monitored and agents moved off of the embedded Agent Manager to reduce the load.

Table 5. Foglight VMware Performance Agent host system requirements

	Minimum CPU	Minimum Memory	Total Monitored VMs
Windows 64-bit	2[1]	4 GB	2000
Linux 64-bit	2[1]	4 GB	2000

[1] Additional CPUs may be required for larger environments.

Monitoring more than 4000 virtual machines from a single agent host

The Agent Manager JVM usually requires additional memory to monitor more than 4000 virtual machines. The total number of virtual machines is the total from all vCenters that will be monitored from all VMware Performance agents running on the Agent Manager.

The following calculations are guidelines, not hard and fast rules. Memory requirements can vary greatly from installation to installation with similar VM counts. If insufficient memory is configured, the failure mode is easily recognizable: all agents on the Agent Manager host will go into a broken state after the agent(s) were activated for a short period of time, usually within 24 hours. In addition, the Agent Manager log will contain a line similar to the following:

```
Caused by: java.lang.OutOfMemoryError: Java heap space
```

If this is the case, add memory greater than what is shown in the calculations below, in increments of 512 MB until the agents stabilize.

JVM memory requirements for VMware Performance agents are calculated using the following formula:

```
512 MB + 0.5 MB/VM
```

According to the above formula, monitoring 4000 virtual machines requires 2560 MB of memory:

```
512 MB + 2048 MB = 2560 MB
```

This is the default setting for agents deployed on 64-bit systems.

Similarly, monitoring 8000 virtual machines requires 4608 MB of memory:

```
512 MB + 4096 MB = 4608 MB
```

This requires a change in the default Agent Manager settings.

To change the JVM memory settings:

1. Determine the amount of *additional* memory required. This will be the total from the last step above minus the default value of 2560 MB. In the example above, this is 4608 MB – 2560 MB = *2048 MB*.
2. On the agent machine, open the *baseline.jvmargs.config* file for editing. The file is located in the *<Agent_Manager_home>/state/default/config* directory.
3. Add the following lines to the `memory settings` section:

   ```
   vmparameter.0 = "-Xms2048m";
   vmparameter.1 = "-Xmx2048m";
   ```

   NOTE: If this file has been previously edited have been made to this file, increment the numeric parameters accordingly.

4. Delete the existing deployed negotiation configuration settings directory:

   <Agent_Manager_home>/state/default/config/deployments

5. Restart the Agent Manager for these settings to take effect.

Host system recommendations

Dedication

When monitoring larger vCenters, the Agent Manager machine hosting the VMware Performance agents should be dedicated to this task. No other Foglight agent types should run on the host and the host should not run any other applications.

Memory

Regardless of the values set for JVM memory above, Agent Manager never allocates more than 80% of system memory. So the machine hosting the Agent Manager and VMware Performance Agents must have sufficient memory. Beyond the memory requirements of the Agent Manager, a minimum of 2 GB should be free for the operating system. In the example above for 8000 VMs and an Agent Manager memory requirement of 4608 MB, the host should have a minimum of 6656 MB - the greater of:

```
1.25 x 4608 MB = 5760 MB
```

Or:

```
2048 + 4608 MB = 6656 MB
```

If the Agent Manager is configured on a virtual machine, it is recommended that the VM use a memory reservation to ensure maximum performance.

CPU

CPU usage on the Agent Manager host is relatively low most of the time. However, usage peaks dramatically during the performance metric collection. This is normal and expected. CPU utilization consistently over 50% is an indication that additional processing power is required. As with memory, usage can vary between different installations with similar numbers of virtual machines. The following guidelines should be followed.

Table 6. CPU usage guidelines

Up to 1000 VMs	2 CPUs
1000 – 4000 VMs	4 CPUs
4000+ VMs	add 1 CPU per 1000 VMs – round up when necessary

When the Agent Manager and VMware Performance agents are running on a virtual machine, the VM should be configured with CPU reservation whenever possible to ensure best performance. Lack of processing power on the Agent Manager manifests in missed collections and gaps in the data usually noticeable in various graphs throughout the Foglight for VMware dashboards.

Configuring agent properties

When an agent connects to <Product Name>™, it is provided with sets of properties that it uses to configure its correct running state. Each agent is provided with a combination of two types of properties: agent properties and shareable properties.

Default versions of these properties are installed with Foglight for VMware. However, you can edit the default shareable and agent properties, configure agent properties that apply only to a specific agent instance, and create edited clones of shareable properties that are used by a subset of agents of a certain type.

There are two ways to access the VMware Performance Agent properties:

- On the VMware Environment dashboard, on the **Administration** tab, select an agent instance and click **Edit Properties** (see Configuring monitoring agents for data collection on page 20). This method only provides access to the Configuration properties, but not the Black List and Data Collection Scheduler properties.
- On the Agent Status dashboard, select an agent instance and click **Edit Properties**. This method provides access to the full set of VMware Performance Agent properties, and is described in this topic.

For more information about working with agent properties, see the *Administration and Configuration Guide*.

To modify agent properties:

1. Log in to the Foglight browser interface.
2. Ensure that the navigation panel is open.

   To open the navigation panel, click the right-facing arrow ▶ on the left.

3 Navigate to the VMware Performance Agent properties. An agent instance can have a combination of global and private properties. Global properties apply to all instances of the agent type, while private properties apply only to specific agent instances.

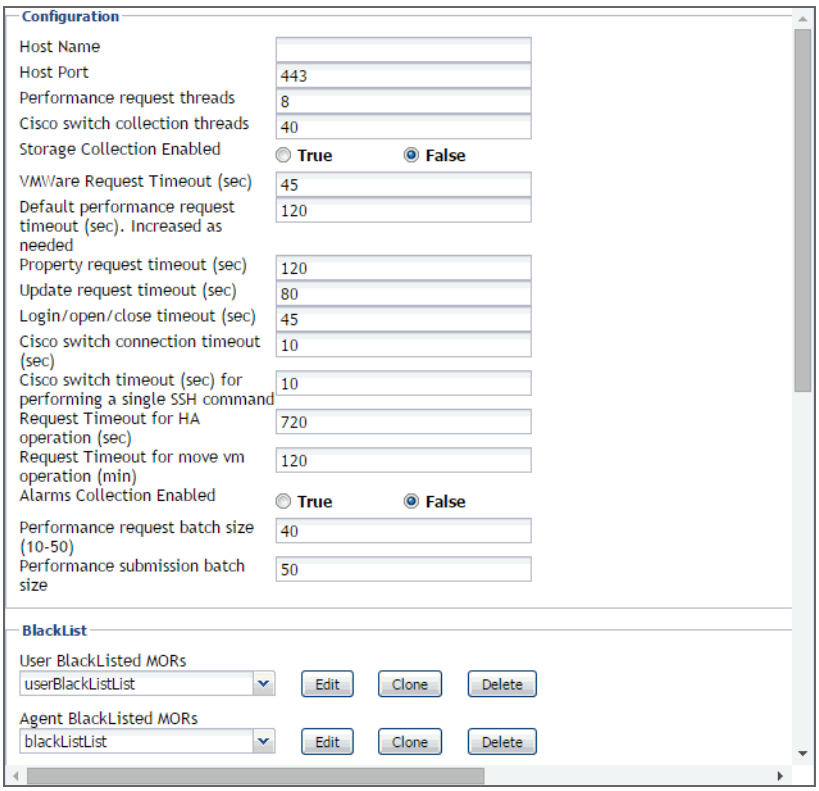
a On the navigation panel, under **Dashboards**, choose **Administration > Agents > Agent Status**.

> **IMPORTANT:** Another way of editing the VMware Performance Agent properties is through the Agent Properties dashboard. The properties you specify on this dashboard apply to all instances of the VMware Performance Agent type. To be certain that you are editing properties for a particular agent instance, without overwriting any properties of other VMware Performance instances, use the Agent Status dashboard instead of the Agent Properties dashboard.

b On the Agent Status dashboard, select the instance of the VMware Performance Agent whose properties you want to modify and click **Edit > Edit Properties**.

c Click **Modify the private properties for this agent** to indicate that you want to edit the properties of the selected VMware Performance Agent instance.

A list of agent properties appears in the display area.



The configuration of agent properties described in this section include:

- Setting the Configuration properties on page 68
- Setting the FileCollector properties on page 69
- Setting the vSwitchCollector properties on page 69
- Setting the Duplicate VM List properties on page 70
- Setting the Black List properties on page 70
- Setting the Data Collection Scheduler properties on page 72

Setting the Configuration properties

The **Configuration** properties point the VMware Performance Agent to the machine on which the Virtual Center is running, and provide some additional configuration settings.

To set the Configuration properties:

1 Locate the VMware Performance Agent's **Configuration** properties.

2 Set the **Configuration** properties as follows:

- **Host Name**: The fully qualified host name of the machine on which the Virtual Center is running.
- **Host Port**: The port number of the machine on which the Virtual Center is running that will be used by the VMware Performance Agent to connect to that machine in order to collect data from the monitored Virtual Center.
- **Performance request threads**: The number of threads in a performance request.
- **Cisco switch collection threads**: The number of threads in a Cisco switch collection.
- **Storage Collection Enabled**: If you are running <Product Name>™ for Storage Management and want to enable the VMware Performance Agent to collect the Foglight Storage data, select **True**, otherwise, set this property to **False**. Foglight for Storage Management can help you optimize the VMware environment virtual storage and its underlying physical storage components. For more information about this product, see your Foglight for Storage Management documentation.
- **VMWare Request Timeout (sec)**: The amount of time in seconds after which a VMware request times out.
- **Default performance request timeout (sec)**. **Increased as needed**: The amount of time in seconds after which a default performance request times out.
- **Property request timeout (sec)**: The amount of time in seconds after which a property request times out.
- **Update request timeout (sec)**: The amount of time in seconds after which an update request times out.
- **Login/open/close timeout (sec)**: The amount of time in seconds after which login, open, or close requests times out.
- **Cisco switch connection timeout (sec)**: The amount of time in seconds after which a Cisco switch connection times out.
- **Cisco switch timeout (sec) for performing a single SSH command**: The amount of time in seconds after which an attempt to perform a single SSH command on a Cisco switch times out.
- **Request Timeout for HA operation (sec)**: The amount of time in seconds after which an HA operation request times out.
- **Request Timeout for move vm operation (min)**: The amount of time in minutes after which a request for an operation to move a virtual machine times out.
- **Alarms Collection Enabled**: If you want to collect VMware alarms from the monitored system, set this to **True**. Otherwise, select **False**.
- **Performance request batch size (10-50)**: The size of a performance request batch.
- **Performance submission batch size**: The size of a performance submission batch.

3 Click **Save**.

Setting the FileCollector properties

A file collector is a component that captures metrics from specific files on the monitoring system. The **FileCollector** properties instruct the VMware Performance Agent which datastores, file directories, and files to exclude from monitoring.

To set the FileCollector properties:

1 Locate the VMware Performance Agent's **FileCollector** properties.

2 Set the **FileCollector** properties as follows:

- **Excluded Datastores**: Select a list in which you want to specify the datastores that you want to exclude from monitoring. You can select or clone an existing list, and edit it, as required. The default list is `excludedDatastoresList`. Lists can be shared between multiple agent instances. For more information about list properties, see the *Administration and Configuration Help*.

  For each datastore entry in the list, set its properties as follows:

  - **Datastore Name**: The name of one or more datastores that you want to exclude from monitoring. To specify multiple datastores, you must use regular expressions.
  - **Regex Flag**: Indicates if the **Datastore Name** contains a regular expressions.
- **Excluded Folders**: Select a list in which you want to specify the file directories that you want to exclude from monitoring. You can select or clone an existing list, and edit it, as required. The default list is `hiddenFolders`. Lists can be shared between multiple agent instances. For more information about list properties, see the *Administration and Configuration Help*.

  For each directory entry in the list, set its properties as follows:

  - **Folder Name**: The path to one or more directories that you want to exclude from monitoring. To specify multiple directories, you must use regular expressions.
  - **Regex Flag**: Indicates if the **Folder Name** contains a regular expressions.
- **Excluded Files**: Select a list in which you want to specify the files that you want to exclude from monitoring. You can select or clone an existing list, and edit it, as required. The default list is `vmwareSrmFiles`. Lists can be shared between multiple agent instances. For more information about list properties, see the *Administration and Configuration Help*.

  For each directory entry in the list, set its **File Name Regex** property to a regular expression that points to one or more files that you want to exclude from monitoring.

3 Click **Save**.

Setting the vSwitchCollector properties

A vSwitch collector is a component that captures metrics from virtual switches on the monitoring system. The **vSwitchCollector** properties instruct the VMware Performance Agent which virtual switches to monitor.

To set the vSwitchCollector properties:

1 Locate the VMware Performance Agent's **vSwitchCollector** properties.

2 Set the **vSwitchCollector** properties as follows:

- **Monitoring Switches**: Select a list in which you want to specify the VMware virtual switches that you want to monitor. You can select or clone an existing list, and edit it, as required. The default list is `monitoredSwitchList`. Lists can be shared between multiple agent instances. For more information about list properties, see the *Administration and Configuration Help*.

  For each switch entry in the list, set its properties as follows:

  - **DVS Managed Object Reference**: The managed object reference of the distributed virtual switch.

        - Switch IP: The IP address of the virtual switch.
        - Fglam IP: The IP address of the Agent Manager associated with this VMware Performance Agent instance.
        - Listening Port: The port number the virtual switch uses.
        - End Date: The date after which the virtual switch will no longer be in use.
        - Enable Data Collect: An indicator of whether this VMware Performance Agent instance collects the data about this virtual switch.
    - **Other Switches (Non-VMware)**: Select a list in which you want to specify the non-VMware virtual switches that you want to monitor. You can select or clone an existing list, and edit it, as required. The default list is `monitoredSwitchList`. Lists can be shared between multiple agent instances. For more information about list properties, see the *Administration and Configuration Help*.

      For each switch entry in the list, set its properties as follows:
        - **DVS Managed Object Reference**: The managed object reference of the distributed virtual switch.
        - Switch IP: The IP address of the virtual switch.
3 Click **Save**.

Setting the Duplicate VM List properties

A duplicated virtual machine is a copy or clone of an existing VM in your environment. The **Duplicate VM List** properties indicate to the VMware Performance Agent which virtual machines are duplicates or clones of the existing VMs.

To set the Duplicate VM List properties:

1 Locate the VMware Performance Agent's **Duplicate VM List** properties.

2 Set the **Duplicate VM List** properties as follows:

- **Duplicate VM List MOR**: Select a list in which you want to specify the duplicated virtual machines. You can select or clone an existing list, and edit it, as required. The default list is `duplicateVMListList`. Lists can be shared between multiple agent instances. For more information about list properties, see the *Administration and Configuration Help*.

  For each directory entry in the list, set its **Duplicate VM Item** property to contain the managed

3 Click **Save**.

Setting the Black List properties

In some rare cases, the VMware Performance Agent can encounter ESX® hosts and virtual machines for which it cannot collect data. To prevent these problems, the VMware Performance Agent detects these entities, excludes them from data collection, and adds them to the agent black list.

Any metrics associated with these objects are not included in roll up performance metrics. When an entity is added to the agent black list, an agent message and alarm are generated makes you aware of the problem so that you can investigate it further in the monitored VMware® environment. When the issue with the entity is resolved, it can be removed from the agent black list. The next available performance collection includes this entity in the data collection request.

In addition to the list that is populated by the agent, there is a user-populated black list. You populate this list by adding ESX hosts and virtual machines that you want to exclude from data collection. This feature enables Foglight administrators to disable data collection for certain ESX hosts and virtual machines, which also prevents their performance metrics from being submitted to Foglight.

CAUTION: Black listing an ESX host disables data collection for that ESX host, including the collection of virtual machine, storage, and network metrics for that host.

Any metrics associated with these objects are submitted as part of roll up metrics. For example, if a virtual machine that appears on the user-populated black list is part of a resource pool, the virtual machine performance metrics are included with the performance metrics of other virtual machines from the same resource pool. This resource pool performance data is collected and submitted to Foglight. At the same time, the black-listed virtual machine object will not appear to have any performance metrics stored for this object. ESX hosts are handled the same way in terms of rolling up performance data for clusters, datacenters, or the Virtual Center.

Each ESX host or virtual machine entry in the user black list should include the Managed Object Reference (MOR) value. The MOR value is assigned to monitored objects in the monitored VMware environment and is collected by Foglight for VMware. This value is stored in the `Managed Object Reference` property of ESX host and virtual machine objects. You can use the Data Browser to find out the MOR values for those ESX hosts or virtual machines that you want to exclude from data collection.

The agent checks both lists during data collection. You can remove entities from either list, as required. For example, if you resolve an issue with a virtual machine that causes data collection problems, you can remove the virtual machine from the black list.

For any ESX hosts or virtual machines that you want to exclude from data collection an entry should exist in the agent or user black lists. While you can add entries to the user lists, agent black lists should only be populated by the VMware Performance Agent. Any ESX hosts or virtual machines for which you want to enable data collection must have their entries removed from either black lists.

Every VMware Performance Agent instance is associated with an agent and a user black list. Each agent instance should maintain a unique pair of these lists. Because list properties in Foglight (also known as secondary properties) are shareable properties, meaning that they are accessible to all agent instances of the type in which they are defined, you should clone an agent and a user black list for each agent instance and give them unique names.

Entities included in these lists are not included in the collection of performance metrics. Other collections are not affected by their contents.

To set the black list properties:

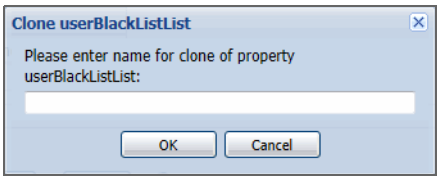
1 Locate the VMware Performance Agent's **BlackList** properties.

2 Associate this agent instance with a user black list.

   a Choose the user black list that you want to use for this agent instance. Click the **User BlackListed MORs** list, and select the black list. The default list is `userBlackList`.

   b Clone the selected list to create a unique user black list for this agent instance. Click **Clone** on the right.

   The **Clone userBlackList** dialog box appears.



   c In the **Clone userBlackList** dialog box, type the name of the user black list. It is recommended to use a syntax that makes the list name unique and easily associated with this agent instance. For example: *<list_name>_<agent_name>*

   d Click **OK** to close the **Clone userBlackList** dialog box.

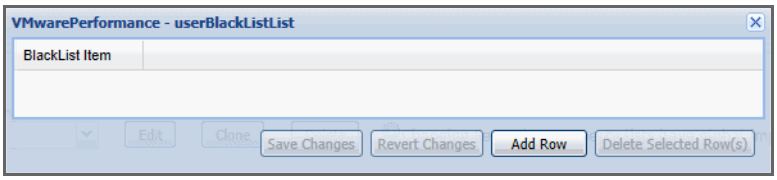
   The newly cloned user black list is now associated with this agent instance.

3 Edit the user black list to disable or enable data collection for particular ESX hosts or virtual machines.

IMPORTANT: For any ESX hosts or virtual machines that you want to exclude from data collection, an entry should exist in the agent or user black lists. While you can add entries to the user lists, agent black lists should only be populated by the VMware Performance Agent. Any ESX hosts or virtual machines for which you want to enable data collection must have their entries removed from either black lists.

a Click **Edit** on the right of the **User BlackListed MORs** list.

The **VMwarePerformance - userBlackList** dialog box appears.



b To disable data collection for an ESX host or virtual machine, add it to the list.

IMPORTANT: Black listing an ESX host disables data collection for that ESX host, including the collection of virtual machine, storage, and network metrics for that host.

To black list an ESX host or virtual machine, click **Add Row**, and in the new row that appears, in the **BlackList Item** column, specify the ESX host or virtual machine using the following syntax:

<**host**|**vm**>-<*MOR*>

Where:

- **host**: Indicates that the black list item is an ESX host.
- **vm**: Indicates that the black list item is a virtual machine.
- *MOR*: The value of the Managed Object Reference property of the ESX host or virtual machine that you want to exclude from data collection.

  For example: `vm-20123`

  TIP: You can use the Data Browser to find out the MOR values for those ESX hosts or virtual machines that you want to exclude from data collection.

c To enable data collection for an ESX host or virtual machine, remove it from the list. Select the ESX host or virtual machine entry in the list, and click **Delete Selected Row(s)**.

The list refreshes, no longer showing the deleted entry.

4 Click **Save**.

Setting the Data Collection Scheduler properties

Use the Data Collection Scheduler properties to adjust how frequently the VMware Performance Agent collects data from the monitored server.

To set the data collection properties:

1 Locate the VMware Performance Agent's **Data Collection Scheduler** properties.

2 Set the **Data Collection Scheduler** properties as follows:

a Select a collection configuration list. You can select or clone an existing collection configuration list, and edit it, as required.

b Add, remove, or edit collectors in the list.

c For each collector, set its properties as follows:

- **Collector Name**: The name of the collector. A collector is a component that captures specific type of metrics. Existing collectors are: **Relationship And Hierarchy Data**, **Inventory Entity Properties**, **Performance Metrics**, and **Events Collection**.
- **Default Collection Interval**: Contains the length of the default collection interval. The default collection intervals for the existing collectors are:

  Relationship and Hierarchy: 2 minutes

  Inventory Entity Properties: 5 minutes

  Performance Metrics: 5 minutes

  Events Collection: 3 minutes
- **Time Unit**: Contains the time unit for measuring the default collection interval: milliseconds, seconds, minutes, hours, or days.
- **Fast-Mode Collection Interval**: Contains the length of the collection interval when the agent is running in fast mode.
- **Fast-Mode Time Unit**: Contains the length of the collection interval when the agent is running in fast mode.
- **Fast-Mode Max Count**: Contains the maximum count of entries when the agent is running in fast mode.

2

Reference

This chapter contains reference information about views, rules, and data tables that are included with Foglight® for VMware. Read this chapter to find out details about these components.

- Views
- Rules

Views

Foglight® for VMware ships with predefined views to help you monitor your application server environment. This chapter provides quick reference information about each view.

Foglight for VMware displays monitoring data in views that group, format, and display data. The main types are described below.

Dashboards are top-level views that do not receive data from other views. Dashboards usually contain a number of lower-level views. The dashboards supplied with Foglight for VMware, as well as those created by users, are available in the navigation panel.

Lower-level views in Foglight for VMware can be added to dashboards or can be accessed by drilling down from a dashboard. They receive and display data directly from the Foglight for VMware Management Server or from other views. Some views filter or select data that appears in other views in the same dashboard. Some are tree views with expandable nodes for selecting servers, applications, or data.

Foglight for VMware ships with several dashboards that allow you to monitor and configure your virtual environment. Each of these dashboards contains a number of views. This section describes these views in more detail. For more information about the VMware dashboards, see Interacting with Foglight for VMware.

Foglight for VMware includes the following groups of views:

- VMware Alarms views
- VMware Explorer views
- VMware Modeler views
- VMware VirtualCenter views
- VMware Environment views
- Other views

VMware Alarms views

The VMware Alarms dashboard contains the following views:

- Alarms Overview
- Alarms List view

Alarms Overview

Purpose

The Alarms Overview provides a quick and easy way for you to view Foglight for VMware alarms grouped by object type and severity level. You can use this Overview to monitor alarms and to identify the sources of problems within the virtual infrastructure. If you click any of the alarm counts for a particular object type, a popup displaying just the alarms for that object type appears.

Figure 59. Alarms Overview

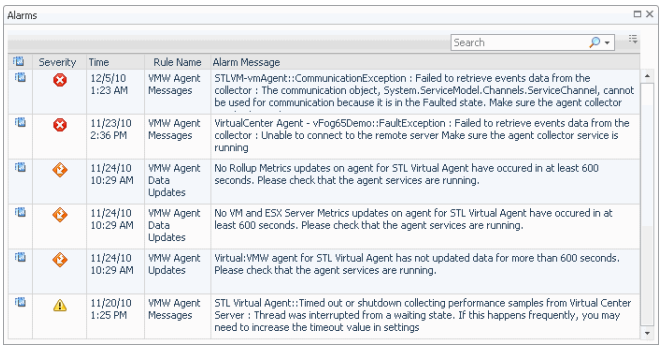
For more information about the VMware Alarms dashboard on which this view appears, see Exploring VMware alarms on page 39.

How to Get Here

- Open the VMware Alarms dashboard.

  The Alarms Overview appears at the top of this dashboard.

Table 7. Description of the View

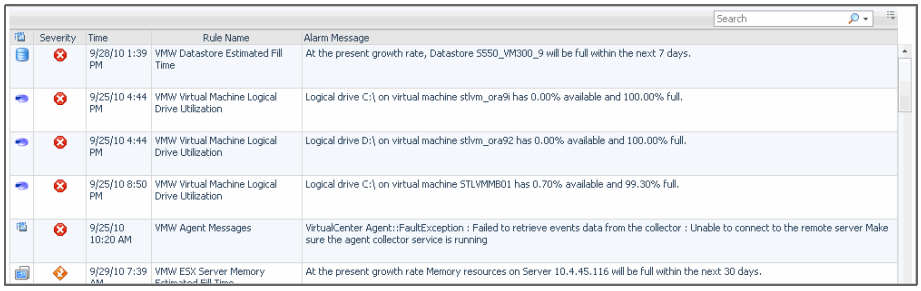
Data displayed	• **Alarm counts**. The total counts of alarms associated with the various components, broken down by alarm types (Normal, Warning, Critical, Fatal). • Drill down on any alarm count. Displays the **Alarms** dialog box that shows a list of all alarms associated with the selected component type.
Where to go next	

Alarms List view

Purpose

Each alarm row in the Alarms List contains an object icon that identifies the source of the alarm, an alarm icon that indicates the severity of the alarm, the time when the alarm occurred, and the text of the alarm. The columns are sortable so that alarms can be listed in order by source, severity, time, or message. Simply click a column heading to sort the table by that column.

Figure 60. Alarms List view



If you click an alarm's severity icon, a popup for acknowledging or clearing that alarm is displayed. The popup provides a lot of pertinent information about the alarm, such as the rule of origin for the alarm, the history of the alarm, and all of the notes attached to the alarm. If you click the message or any other column in the row, you are provided with a popup menu. From the popup menu, you can choose to view a VMware Explorer dashboard for the corresponding object.

For more information about managing alarms with the Foglight for VMware browser interface, see the *Foglight for VMware User Guide*.

How to Get Here

- Open the VMware Alarms dashboard.

  The Alarms List view takes up the majority of that dashboard.

Table 8. Description of the View

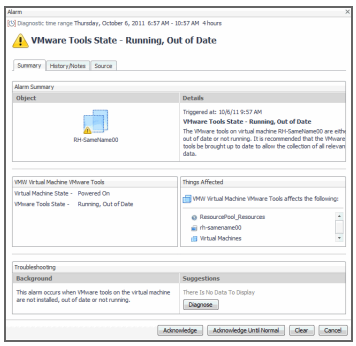
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Object indicator**. Indicates if the alarm is related to a virtual center, datacenter, cluster, ESX host, resource pool, virtual machine, datastore, agent, or logical drive. • **Rule Name**. The name of the rule that triggered the alarm. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on:

Table 8. Description of the View

- **Alarm Message**, **Object indicator**, **Rule Name**, or **Time**. For server and virtual machine objects, the **Select Drilldown** dwell appears.

From here, selecting **VMware Explorer** shows the selected server or virtual machine in the VMware Explorer, with the Summary tab open. Selecting **Quick View** shows the selected component in the Quick-View.

- **Severity**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.



VMware Explorer views

The VMware Explorer dashboard contains the following views:

- Administration tab
- Cost tab
- CPU tab
- Event Analytics tab
- FAQts tab
- Memory tab
- Monitor tab
- Network tab
- Performance tab
- Processes tab
- Related Objects views
- Resource Pools Relationship Tree view
- Shares tab
- Storage tab (Cluster)
- Storage tab (Datacenter)
- Storage tab (ESX Host)
- Storage tab (Virtual Machine)
- Summary tab

- Summary (All Clusters) tab
- Summary (All Datacenters) tab
- Summary (All Resource Pools) tab
- Summary (All Servers) tab
- Summary (All Virtual Machines) tab
- Virtual Infrastructure view
- VMware Explorer Primary view
- VMs tab

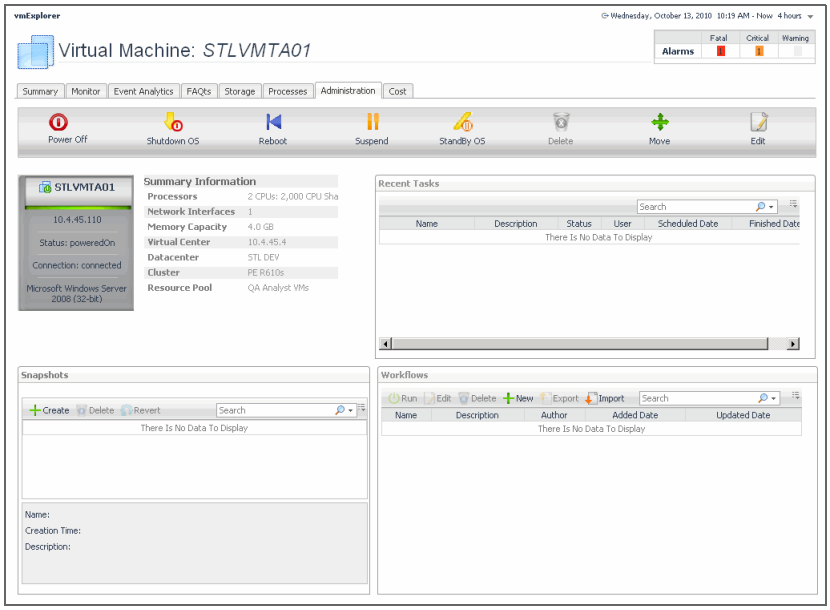
Administration tab

Purpose

The VMware Explorer's **Administration** tab provides access to common administrative tasks. It also shows configuration details for a server or a virtual machine (depending on the selected object type), and some high-level information about the object's resource consumption.

NOTE: The Administration tab is only available in Foglight Pro, when the Virtual-VMware-Admin and Virtual-HyperV cartridges are installed. It is not included with Foglight SE. In Foglight Pro, this tab is accessible if your Foglight user account includes the VMware Automation User role.

Figure 61. Administration tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select an ESX host or virtual machine instance.
3. In the VMware Explorer, open the Administration tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Recent Tasks
- ESX Host Configuration
- ESX Host Summary Information
- ESX Host Toolbar
- Snapshots
- Virtual Machine Configuration
- Virtual Machines
- Virtual Machine Summary Information
- Virtual Machine Toolbar
- Workflows

Table 9. Recent Tasks

Description	This table lists the tasks that are performed for the selected ESX host or virtual machine.
Data displayed	• **Description**. The task description. • **Finished Date**. The date on which the task finished. • **Name**. The task name. • **Scheduled Date**. The date on which the task is scheduled to run. • **Status**. The task status. • **User**. The Foglight for VMware user who started the task.

Table 10. ESX Host Configuration

Description	Shows the basic configuration details for the selected ESX host. **NOTE:** This view only appears when you are exploring ESX host details.

Table 11. ESX Host Summary Information

Description	Shows physical configuration details for the selected ESX host. **NOTE:** This view only appears when you are exploring ESX host details.
Data displayed	• **Cluster**. The name of the cluster to which the selected ESX host belongs, if applicable. • **Computing Capacity**. The CPU resources available to the selected ESX host. • **Datastores**. The number of datastores associated with the ESX host. • **Memory Capacity**. The memory capacity of the selected ESX host. • **Processors**. The number of CPUs used by the selected ESX host. • **Virtual Center**. The IP address of the associated vCenter. • **Virtual Machines**. The number of virtual machines running on the selected ESX host.

Table 12. ESX Host Toolbar

Description	Contains buttons for initiating common administrative tasks. **NOTE:** This view only appears when you are exploring ESX host details.
Data displayed	• **Create VM**. Creates a virtual machine on the selected ESX host. • **Enable Maintenance**. Enables maintenance of the selected ESX host. • **Reboot**. Reboots the selected ESX host. • **Shutdown**. Shuts down the selected ESX host.

Table 13. Snapshots

Description	Contains a hierarchical view of the selected virtual machine's snapshots. It also contains buttons for initiating common administrative tasks. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **Create**. Creates a virtual machine snapshot. • **Delete**. Deletes a selected virtual machine snapshot. • **Revert**. Reverts to a selected virtual machine snapshot.

Table 14. Virtual Machine Configuration

Description	Shows the name of the selected virtual machine and its basic configuration, including its IP address, status, machine name, configuration, virtualization application (VMWare), and the guest OS. **NOTE:** This view only appears when you are exploring virtual machine details.

Table 15. Virtual Machines

Description	Shows a list of virtual machines associated with the selected ESX host. **NOTE:** This view only appears when you are exploring ESX host details.
Data displayed	• **CPU**. The current percentage of the selected virtual machine's CPU load, used to execute system code and user programs, based on the total CPU capacity allocated to that virtual machine. • **Name**. Virtual machine name. • **Memory**. The total amount of memory that is available to the virtual machine.

Table 16. Virtual Machine Summary Information

Description	Shows additional configuration details for the selected virtual machine. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **Cluster**. The name of the cluster to which the virtual machine belongs. • **Datacenter**. The name of the datacenter associated with the virtual machine. • **Memory Capacity**. The amount of memory available to the selected virtual machine. • **Network Interfaces**. The number of network interface cards used by the selected virtual machine. • **Processors**. The number of CPUs used by the selected virtual machine. • **Resource Pool**. The name of the resource pool associated with the virtual machine. • **Virtual Center**. The IP address of the Virtual Center the virtual machine belongs to.

Table 17. Virtual Machine Toolbar

Description	Contains buttons for initiating common administrative tasks. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **Delete**. Deletes the selected virtual machine. • **Edit**. Edits the settings of the selected virtual machine. • **Move**. Moves the selected virtual machine. • **Power On**. Starts the selected virtual machine. • **Reboot**. Restarts the selected virtual machine. • **Shutdown OS**. Shuts down the guest OS on the selected virtual machine.

Table 17. Virtual Machine Toolbar

	• **StandBy OS**. Causes the guest OS to be in standby mode. • **Suspend**. Suspends the selected virtual machine.

Table 18. Workflows

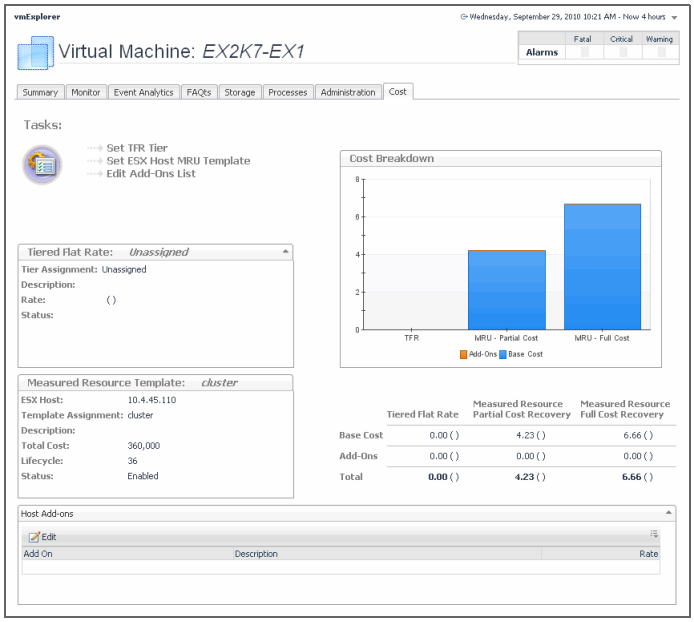
Description	This view contains a list of the available workflows along with buttons for creating and editing workflows. A workflow is a collection of tasks that are arranged into a specific order, that you can run multiple times against the same or different set of objects. It provides a way to automate common scenarios and simplify administration in general. For each workflow, this view contains its name and description, the dates on which the workflow was added and updated, and the name of the Foglight user who created the workflow. You can use this view to create, edit, delete, and run workflows, and to import or export them to a file. **NOTE:** Creating or editing workflows takes you to the Workflow Studio dashboard. This dashboard is defined in Foglight for VMware for Automation. For complete details about this dashboard, see the Foglight for VMware for Automation documentation.
Data displayed	• **Added**. The date on which the workflow was added. • **Author**. The name of the Foglight for VMware user who created the workflow. • **Delete**. Deletes a selected workflow. • **Description**. The workflow description. • **Edit**. Edits a selected workflow. • **Export**. Exports a selected workflow to a file. • **Import**. Imports a workflow from a file. • **Name**. The workflow name. • **New**. Creates a new workflow. • **Run**. Runs a selected workflow. • **Updated**. The date on which the workflow was updated.

Cost tab

Purpose

The VMware Explorer's **Cost** tab contains information about the costs associated with the selected host's usage. The information about these costs is provided by the cost models and host assignments that are configured in the Foglight for Chargeback. For more information about the Foglight for Chargeback, see the *Managing Chargeback User and Reference Guide*.

Figure 62. Cost tab



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, that appears on the navigation panel, select a virtual machine instance.

3 In the VMware Explorer, open the Cost tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Cost Breakdown
- Host Add-ons
- Measured Resource Template
- Tasks
- Tiered Flat Rate

Table 19. Cost Breakdown

Description	Shows the levels of Tiered Flat Rate (TFR) and Measured Resource Utilization (MRU), including the base cost and the cost of add-on's, if applicable.
Data displayed	• **Add-Ons**. Shows the cost of upgrades to standard host configurations. These upgrades could include hardware, software, licensing, or even infrastructure items such as rack space or power backup units. • **Base Cost**. Shows the cost of a standard host configuration.

Table 20. Host Add-ons

Description	Lists the existing host add-on's and allows you to edit the existing add-on's. Add-on's are upgrades to any standard host configuration. These upgrades could include hardware, software, licensing, or infrastructure items such as rack space or power backup units. Add-on's consist of other costs incurred in the IT infrastructure.
Data displayed	• **Add-On**. Contains the name of the add-on.

Table 20. Host Add-ons

- **Edit**. Allows you to edit a selected add-on.
- **Description**. Contains the description of the add-on.

Table 21. Measured Resource Template

Description	Provides an overview of the measured resource template host assigned to the host. Measured Resource Utilization (MRU) is based on actual percentage utilizations of CPU, Memory, Network, and disk IO weight. You can create templates based on these levels.
Data displayed	• **Description**. The description of the template associated with the selected virtual machine. • **Hypervisor**. The name of the server in which the virtual machine is running. • **Lifecycle**. The length of time the selected virtual machine will be used. • **Status**. The template status. • **Template Assignment**. The name of the template associated with the selected virtual machine. • **Total Cost**. The total cost of the selected virtual machine for the duration of its life cycle.

Table 22. Tasks

Description	Contains access to wizards that allow you to set up TFR tiers, MRU templates, and edit add-on's.
Data displayed	• **Edit Add-Ons List**. Starts a wizard that allows you to add add-on's to the selected virtual machine. • **Set MRU Template**. Starts a wizard that allows you to create a measured resource template and associate it with the selected virtual machine. • **Set TFR Tier**. Starts a wizard that allows you to create tiers and associate them with the selected virtual machine. A tiered flat rate (TFR) is a pre-configured level of expense that is associated with a virtual machine.

Table 23. Tiered Flat Rate

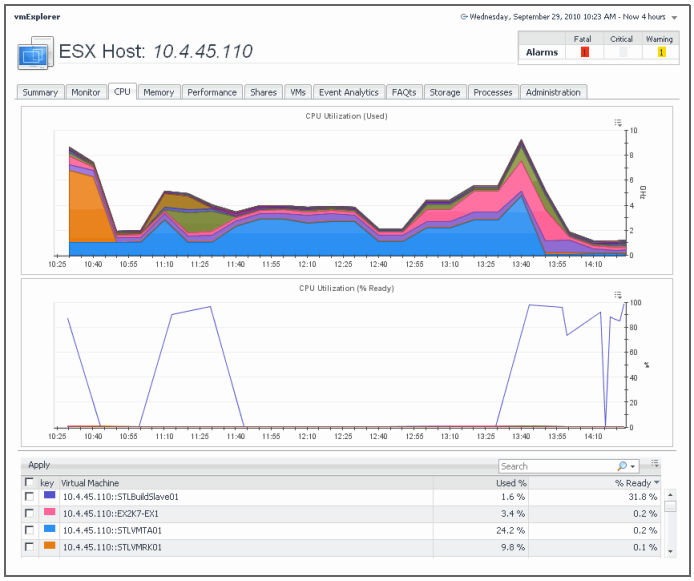
Description	Provides an overview of the tiered flat rate assignment. A tier is a level of expense for a host machine. Using the Tiered Flat Rates (TFR) you can determine monthly costs of the selected virtual machine.
Data displayed	• **Description**. The description of the tiered flat rate associated with the selected virtual machine. • **Rate**. The rate of the tier cost over time. • **Status**. The tier status. • **Tier Assignment**. The name of the tiered flat rate associated with the selected virtual machine.

CPU tab

Purpose

The VMware Explorer's **CPU** tab displays the combined CPU utilization for an ESX host, showing the amount of processing speeds that are used by each virtual machine that is running on that host. This includes the amount of used processing speed, and the percentage of time the CPU resources are ready for use, all during a selected time period.

Figure 63. CPU tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select a virtual machine instance.
3. In the VMware Explorer, open the CPU tab.

Description of Embedded Views

This view is made up of the following embedded views:

- CPU Utilization (Used)
- CPU Utilization (% Ready)
- Virtual Machines

Table 24. CPU Utilization (Used)

Description	Shows the amounts of processing speed used by each virtual machine that is running on the selected ESX host during the selected time period.
Where to go next	Drill down on: • **CPU Utilization (Used) graph**. Displays additional information about the CPU utilization, indicating which virtual machines are selected and have their CPU utilization showing in the graph.

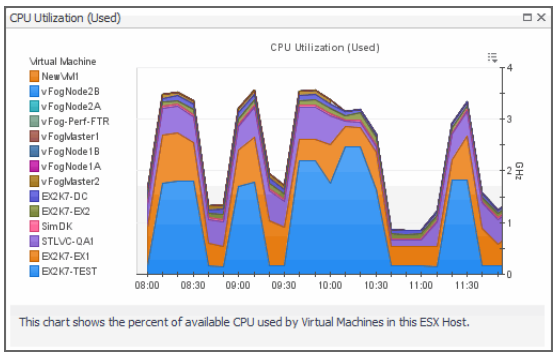


Table 25. CPU Utilization (% Ready)

Description	This view shows the percentage of time the CPU resources are ready for use by each virtual machine that is running on the selected ESX host during the selected time period.
Where to go next	Drill down on: • **CPU Utilization (% Ready) graph**. Displays additional information about the CPU resources that are ready for use, indicating which virtual machines are selected and have their CPU utilization showing in the graph.

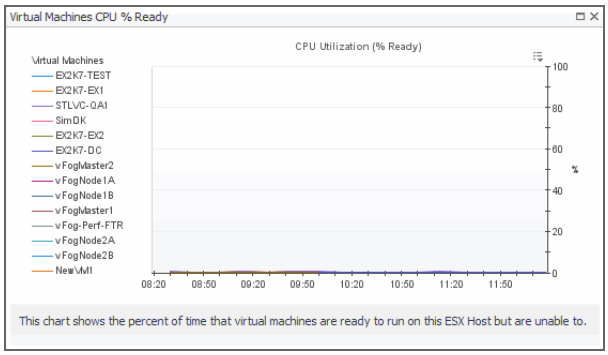


Table 26. Virtual Machines

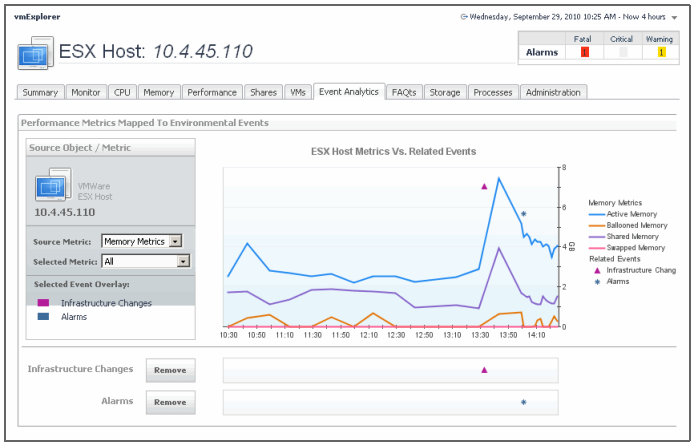
Description	Shows a list of all virtual machines that are running on the selected ESX host. By default, the CPU Utilization (Used) and CPU Utilization (% Ready) graphs show the information about all virtual machines that exist in your environment. Selecting one or more virtual machines in this view and clicking **Apply** shows CPU utilization information for the selected virtual machines. This can help you quickly compare the statistics for two or more virtual machines, when needed.
Data displayed	• **Key**. Indicates the color used in the CPU Utilization (Used) and CPU Utilization (% Ready) graphs to identify the virtual machine. • **Used %**. The percentage of time the CPU resources are ready for use by this virtual machine. • **% Ready**. The percentage of time the CPU resources are used by this virtual machine. • **Virtual Machine**. The name of the virtual machine.

Event Analytics tab

Purpose

VMware Explorer's **Event Analytics** tab contains details about the state of resource-related metrics collected about an ESX host or a virtual machine over a selected time period, and also shows any events that occurred during that time frame.

Figure 64. Event Analytics tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select an ESX host or virtual machine instance.
3. In the VMware Explorer, open the Event Analytics tab.

Description of Embedded Views

This view is made up of the following embedded views:

- ESX Host Metrics Vs. Related Events
- Infrastructure Changes and Alarms
- Source Object/Metric
- VM Metrics Vs. Related Events

Table 27. ESX Host Metrics Vs. Related Events

Description	Shows a chart indicating the values for one or more metrics selected in the Source Object/Metric view. **NOTE:** This view only appears when you are exploring ESX host details.
Data displayed	• **Alarms**. If any alarms are generated against the selected ESX host during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart. • **CPU Metrics, % Ready**. The percentage of the ESX host's CPU utilization that is ready for use. • **CPU Metrics, % Used**. The percentage of the ESX host's CPU utilization spent on executing system code and user programs during the selected time period. • **Disk Metrics, Read Rate**. The rate at which the ESX host reads data from the disk during the selected time period. • **Disk Metrics, Write Rate**. The rate at which the ESX host writes data to the disk during the selected time period. • **Infrastructure changes**. If any infrastructure changes occur for the selected ESX host during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart. An infrastructure change is any configuration change that affects the properties of the selected ESX host. This includes the ESX host startup, shutdown, pause, changed shares, changes to memory settings, and similar types of changes.

Table 27. ESX Host Metrics Vs. Related Events

- **Memory Metrics, Active Memory**. Amount of physical memory that is actively being used.
- **Memory Metrics, Balloon Memory**. Amount of memory being used by the VMware Memory Control Driver to allow the virtual machine OS to selectively swap memory.
- **Memory Metrics, Shared Memory**. Amount of memory that is freed up on the ESX host due to transparent page sharing.
- **Memory Metrics, Swapped Memory**. Amount of memory that is stored in disk swap space.
- **Network Metrics, Receive Rate**. The rate at which the ESX host receives data from the network during the selected time period.
- **Network Metrics, Send Rate**. The rate at which the ESX host sends data to the network during the selected time period.

Where to go next Drill down on:

- **Alarm** or **infrastructure change**. Displays additional information about the selected alarm or change.

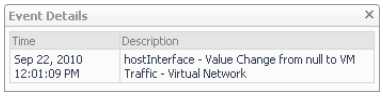


Table 28. Infrastructure Changes and Alarms

Description Allows you to add events as overlays to the ESX Host Metrics Vs. Related Events or VM Metrics Vs. Related Events view, and correlate the resource consumption to the stability of your environment.

Data displayed

- **Alarms**. Allows you to add alarms to the chart, and to review any alarms that are generated against the selected server, during the selected time period.
- **Infrastructure changes**. Allows you to add infrastructure changes to the chart, and to review any infrastructure changes that occur for the selected server during the selected time period. An infrastructure change is any configuration change that affects the properties of the selected ESX host or virtual machine object. This includes the object's startup, shutdown, pause, changed shares, changes to memory settings, and similar types of changes.

Where to go next Drill down on:

- **Alarm** or **infrastructure change**. Displays the **Event Details** dialog box.

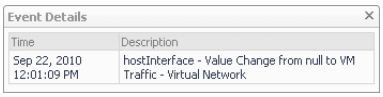


Table 29. Source Object/Metric

Description Identifies the monitored object (ESX host or virtual machine) and the metrics that appear in the chart view on the right.

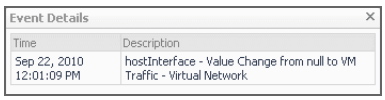
Data displayed

- **Selected Event Overlay**. Indicates if the chart on the right shows any color-coded overlays that represent infrastructure and/or alarm events, in addition to the selected source metric.
- **Selected Metric**. The metric whose values appear in the chart on the right. For each metric type, you can display the values of a selected metric, or all metric values associated with that type. For example, selecting **Disk Metrics** gives you an option of displaying **Read Rate**, **Write Rate**, or both metrics (**All**) in the chart.

Table 29. Source Object/Metric

- **Server/virtual machine name**. The name of the selected object (ESX host or virtual machine instance).
- **Source Metric**. Shows the type of the metric that appears in the chart on the right. Possible metric types include: **CPU Metrics**, **Disk Metrics**, **Memory Metrics**, and **Network Metrics**.

Table 30. VM Metrics Vs. Related Events

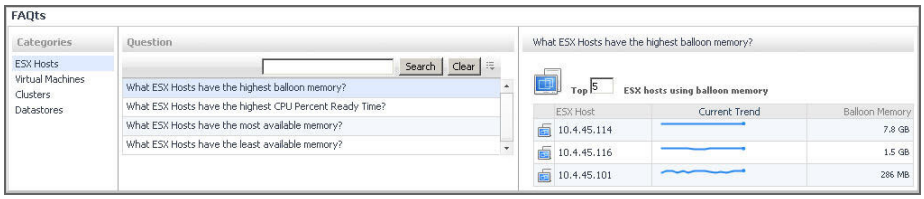
Description	Shows a chart indicating the utilization percentage for one or more metric values selected in the Source Object/Metric view. If any infrastructure changes occur for the selected server during the selected time period, you can add them as an overlay to the chart using the Infrastructure Changes and Alarms view. This can give you a good idea on how the current resource consumption affects your environment as a whole. For example, a steady increase in memory consumption can trigger memory utilization alarms, which typically indicates that you need to allocate more memory to the affected virtual machine. **NOTE:** This view only appears when you explore virtual machine details.
Data displayed	• **Alarms**. If any alarms are generated against the selected virtual machine during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart. • **CPU Metrics, % Used**. The percentage of the virtual machine's CPU utilization spent on executing system code and user programs during the selected time period. • **Disk Metrics, Read Rate**. The rate at which the virtual machine reads data from disk during the selected time period. • **Disk Metrics, Write Rate**. The rate at which the virtual machine writes data to disk during the selected time period. • **Infrastructure changes**. If any infrastructure changes occur for the selected virtual machine during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart. An infrastructure change is any configuration change that affects the properties of the selected virtual machine. This includes the virtual machine startup, shutdown, pause, changed shares, changes to memory settings, and similar types of changes. • **Memory Metrics, Active Memory**. Amount of physical memory that is actively being used. • **Memory Metrics, Balloon Memory**. Amount of memory being used by the VMware Memory Control Driver to allow the virtual machine OS to selectively swap memory. • **Memory Metrics, Shared Memory**. Amount of memory that is freed up on the virtual machine due to transparent page sharing. • **Memory Metrics, Swapped Memory**. Amount of memory that is stored in disk swap space. • **Network Metrics, Receive Rate**. The rate at which the virtual machine receives data from the network during the selected time period. • **Network Metrics, Send Rate**. The rate at which the virtual machine sends data to the network during the selected time period.
Where to go next	Drill down on: • **Alarm** or **infrastructure change**. Displays the **Event Details** dialog box. 

FAQts tab

Purpose

Through three embedded views (the Categories, Question, and Answer views), the **FAQts** tab enables you to ask Foglight for VMware questions and provides the answers to those questions.

Figure 65. FAQts tab



How to Get Here

The **FAQts** view appears on both the Virtual Environment Summary and VMware Explorer dashboards as a navigation tab.

Description of Embedded Views

The FAQts view is made up of the following embedded views:

- Answer
- Categories
- Questions

Answer

This view provides an answer to the question selected in the Questions view. The answer appears in the following form:

Top *x <objects of category>…*

where *x* is the number of objects of the category you provided in the Categories view.

Specify *x* by entering a number. The answer is relative to the subset of the infrastructure you are viewing in the dashboard. For example, the top 5 datastores are different for each individual cluster in the infrastructure.

Categories

This view lists the categories for which questions can be answered for you by Foglight for VMware.

Click a category in the list to select it.

Questions

This view lists the questions, for the category selected in the Categories, that can be answered for you by Foglight for VMware.

Click a question in the list to select it.

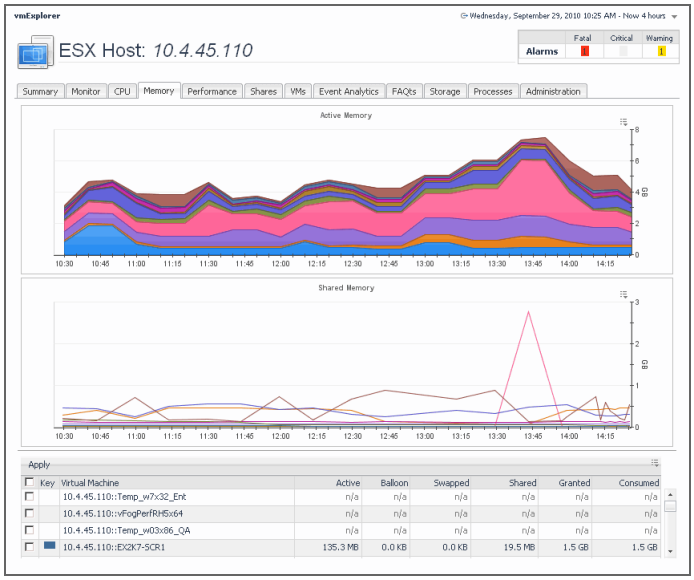
If the list of questions is long and you want to narrow it down, search for a particular text string using the **Search** box.

Memory tab

Purpose

The VMware Explorer's **Memory** tab displays the combined memory utilization for an ESX host, showing the amount memory used by each virtual machine that is running on that host. This includes the amount of active and shared memory in GB, all during a selected time period.

Figure 66. Memory tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select an ESX host instance.
3. In the VMware Explorer, open the Memory tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Active Memory
- Shared Memory
- Virtual Machines

Table 31. Active Memory

Description	Shows the amounts of active memory used by each virtual machine that is running on the ESX host during the selected time period.

Table 31. Active Memory

Where to go next	Drill down on: • **Active Memory**. Displays additional information about the active memory used by each virtual machine, indicating which virtual machines are selected and have their active memory metrics showing in the graph.

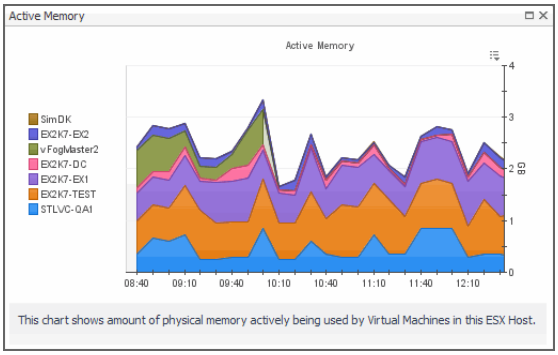


Table 32. Shared Memory

Description	Shows the amounts of shared memory used by each virtual machine that is running on the ESX host during the selected time period.
Where to go next	Drill down on: • **Shared Memory graph**. Displays additional information about the shared memory used by each virtual machine, indicating which virtual machines are selected and have their shared memory metrics showing in the graph.

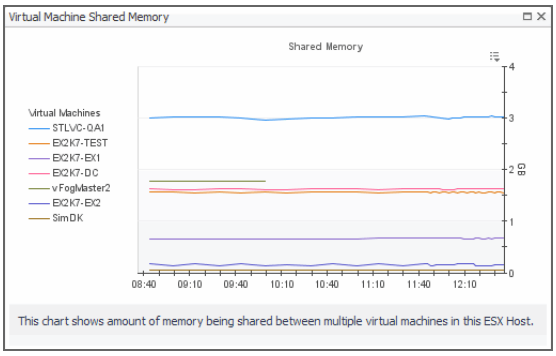


Table 33. Virtual Machines

Description	Shows the list of all virtual machines that are running on the selected ESX host. By default, the Active Memory and Shared Memory graphs show the information about all virtual machines that exist in your environment. Selecting one or more virtual machines in this view and clicking **Apply** shows memory information for the selected virtual machines. This can help you quickly compare the statistics for two or more virtual machines, when needed.
Data displayed	• **Key**. Indicates the color used in the Active Memory and Shared Memory graphs to identify the virtual machine • **Active**: Amount of physical memory that is actively being used. • **Balloon**: Amount of memory being used by the VMware Memory Control Driver to allow the virtual machine OS to selectively swap memory. • **Consumed**: Amount of memory that is consumed by the current processes. • **Granted**: Total amount of memory that is allocated to the virtual machine.

Table 33. Virtual Machines

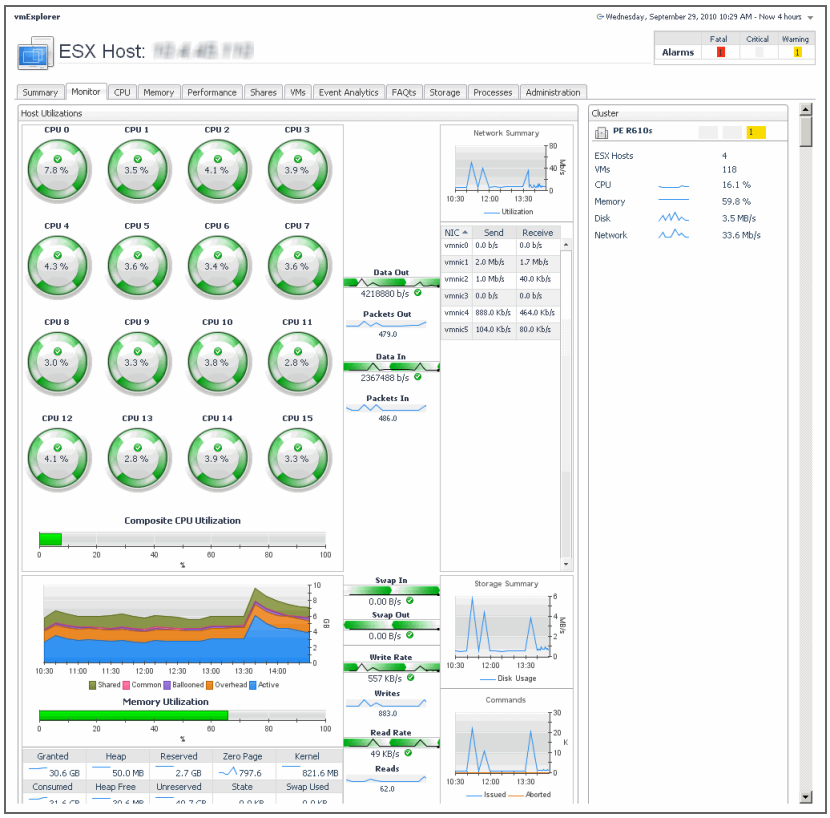
- **Shared**: Amount of memory that is freed up on the host due to transparent page sharing.
- **Swapped**: Amount of memory that is stored in disk swap space.

Monitor tab

Purpose

The VMware Explorer's **Monitor** tab shows details of system resources consumption for a server or a virtual machine.

Figure 67. Monitor tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select an ESX host or virtual machine instance.
3. In the VMware Explorer, open the Monitor tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Cluster
- Datacenter
- ESX Host

- Host Utilizations
- Resource Pool
- Virtual Machines
- Virtual Machine Messages
- Virtual Machine Utilizations

Table 34. Cluster

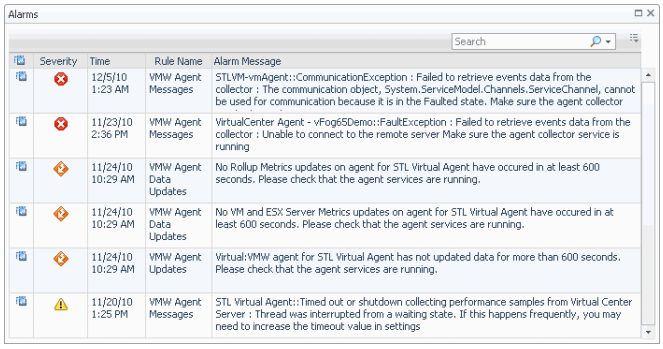
Description	Shows the details about the cluster to which the selected ESX host belongs. **NOTE:** This view only appears when you are exploring ESX host details.
Data displayed	• **Cluster**. The name of the cluster to which the selected server belongs, followed by the total counts of alarms associated with the cluster, broken down by alarm types (Normal, Warning, Critical, Fatal). • **CPU**. The current percentage of the overall cluster's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **Disk**. The overall cluster's current disk I/O rate. • **ESX Hosts**. The number of all ESX hosts associated with the cluster, including running and turned-off servers. • **Memory**. The current percentage of the cluster's memory usage. • **Network**. The current rate at which the cluster transfers data from and to the network. • **VMs**. The number of all virtual machines associated with the cluster, including running and powered-off virtual machines. • Drill down on any alarm count. Displays the **Alarms** dialog box that shows a list of all related alarms.
Where to go next	

Table 35. Datacenter

Description	Shows the details about the datacenter the selected virtual machine is associated with. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **Clusters**. The name of the cluster the selected datacenter is associated with. • **CPU**. The current percentage of the overall datacenter's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **Datacenter**. The name of the datacenter with which the selected virtual machine is associated, followed by the total counts of alarms associated with the datacenter, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Disk**. The overall datacenter's current disk I/O rate. • **Hosts**. The number of all hosts associated with the datacenter, including running and turned-off hosts. • **Memory**. The current percentage of the datacenter's memory usage.

Table 35. Datacenter

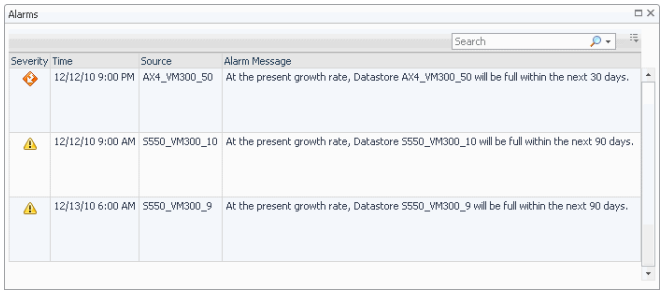
Where to go next	• **Network**. The current rate at which the datacenter transfers data from and to the network. • **VMs**. The number of all virtual machines associated with the datacenter, including running and powered-off virtual machines. • Drill down on any alarm count. Displays the **Alarms** dialog box that shows a list of all alarms associated with the datacenter. 

Table 36. ESX Host

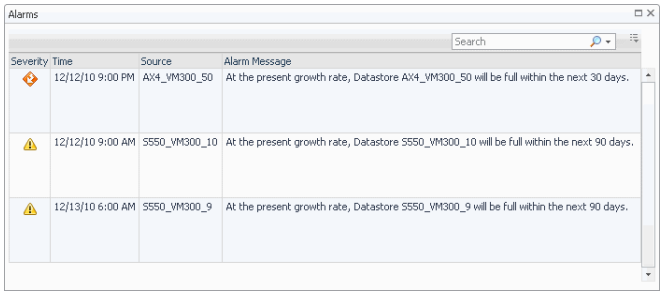
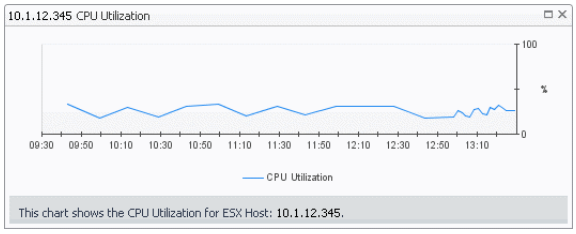
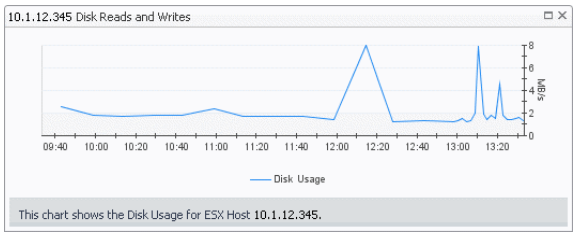
Description	Shows the current state of the ESX Host associated with the selected virtual machine, its current resource consumption, and indicates the number of virtual machines associated with the server. **NOTE:** This view only appears when exploring virtual machine details.
Data displayed	• **CPU**. The current percentage of the ESX host's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **Disk**. The ESX host's current disk I/O rate. • **Memory**. The current percentage of the ESX host's memory usage. • **Virtual machines**. The number of the virtual machines associated with the ESX host, followed by the counts of all alarms associated with the virtual machines, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **VMs Running**. The number of the virtual machines associated with the ESX host that are currently running.
Where to go next	Drill down on: • Any alarm count. Displays the **Alarms** dialog box that shows a list of all alarms raised against that host. 

Table 36. ESX Host

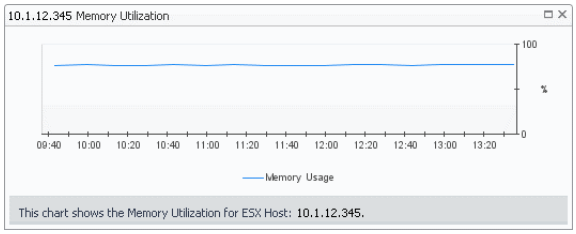
- **CPU**. Displays the **CPU Utilization** dialog box.



- **Disk**. Displays the **Disk Reads and Writes** dialog box.



- **ESX Host**. Displays the host details in the Summary tab.
- **Memory**. Displays the **Memory Utilization** dialog box.



- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines name associated with the server.

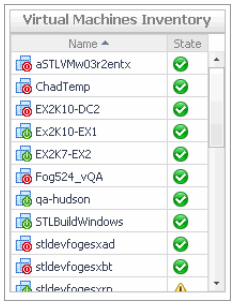


Table 37. Host Utilizations

Description	Shows the utilization of the selected ESX host's resources. **NOTE:** This view only appears when exploring ESX host details.
Data displayed	• **Commands, Aborted**. The number of commands that are aborted during the selected time range. • **Commands, Issued**. The total number of commands that are issued during the selected time range. • **Composite CPU Utilization**. The combined CPU utilization across all CPUs on the selected ESX host.

Table 37. Host Utilizations

- **CPU 0-*N***. The current percentage of each individual CPU's load, used to execute system code and user programs, based on the total CPU capacity.
- **Data In**. The rate at which data is received from the network during the selected time period.
- **Data Out**. The rate at which data is transferred to the network during the selected time period.
- **Memory Utilization, Active**. The amount of physical memory that is actively being used by the host.
- **Memory Utilization, Ballooned**. The amount of physical memory that is actively being used by the VMware Memory Control Driver to allow the guest OS to selectively swap memory.
- **Memory Utilization, Common**: Amount of host memory that contains common pages across multiple virtual machines as a result of transparent page sharing.
- **Memory Utilization, Consumed**. The amount of memory that is consumed by the current processes.
- **Memory Utilization, Granted**. The amount of memory granted to the selected virtual machine.
- **Memory Utilization, Heap Free**. The amount of free heap memory.
- **Memory Utilization, Heap**. The amount of heap memory.
- **Memory Utilization, Kernel**. The amount of memory consumed by the kernel.
- **Memory Utilization, Overhead**. The percentage of the server memory that is used by the current process.
- **Memory Utilization, Reserved**. The amount of memory that is reserved by virtual machines that are running on the selected ESX host.
- **Memory Utilization, Shared**. The amount of physical memory that is freed up due to transparent page sharing.
- **Memory Utilization, State**. The amount of state memory.
- **Memory Utilization, Swap Used**. The amount of memory that is stored in disk swap space.
- **Memory Utilization, Unreserved**. The amount of memory that is not reserved by any virtual machines for the selected ESX host.
- **Memory Utilization, Zero Page**. The amount of memory that is zero memory.
- **Memory Utilization**. The percentage of the ESX host memory that is currently in use.
- **Network Summary, NIC**. The name of the network interface card.
- **Network Summary, Receive**. The current rate at which the network interface card receives data from the network.
- **Network Summary, Send**. The current rate at which the network interface card transfers data to the network.
- **Network Summary, Utilization**. The current rate at which the server transfers data to and from the network during the selected time period.
- **Packets In**. The rate at which network packets are received during the selected time period.
- **Packets Out**. The rate at which network packets are sent during the selected time period.
- **Read Rate**. The rate at which data is read from the disk during the selected time period.
- **Reads**. The percentage of elapsed time that the disk is busy servicing read requests during the selected time period.

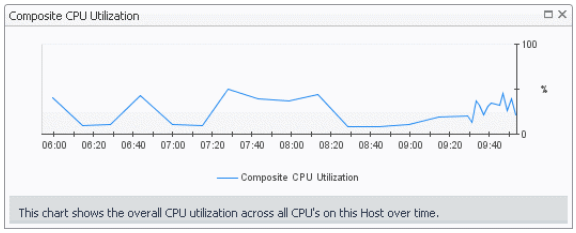
Table 37. Host Utilizations

- **Storage Summary, Disk Usage**. The rate at which the server reads from or writes data to disk during the selected time period.
- **Swap In**. The rate at which memory swap-ins occur.
- **Swap Out**. The rate at which memory swap-outs occur. When memory becomes scarce, the OS swaps out sleeping processes, then swaps out active processes that use large amounts of memory. If swap-outs occur, the swap space can become critically low.
- **Write Rate**. The rate at which data is written to the disk during the selected time period.
- **Writes**. The percentage of elapsed time that the disk is busy servicing write requests during the selected time period.

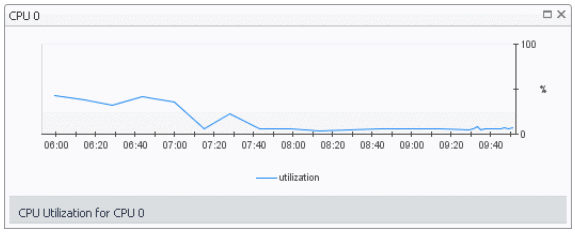
Where to go next Drill down on:

- **Commands, Issued** or **Aborted**. Displays the **Commands** dialog box.

- **Composite CPU Utilization**. Displays the **Composite CPU Utilization** dialog box.



- **CPU 0-*N***. Displays the **CPU** *N* dialog box.



- **Data In**. Displays the **Data In** dialog box.

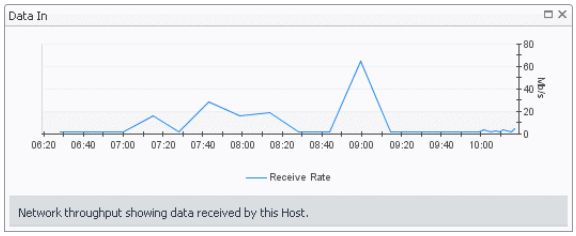
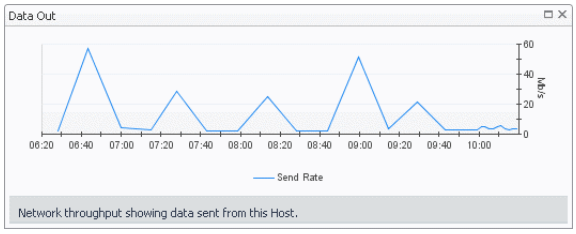
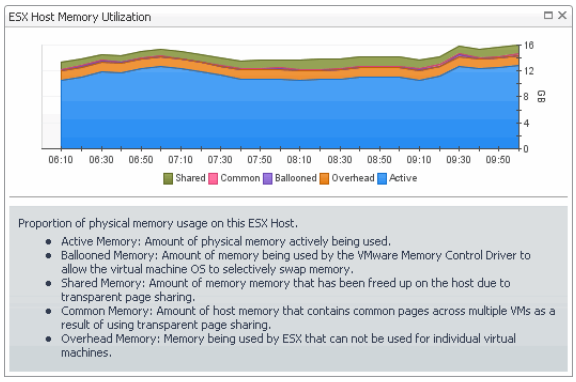


Table 37. Host Utilizations

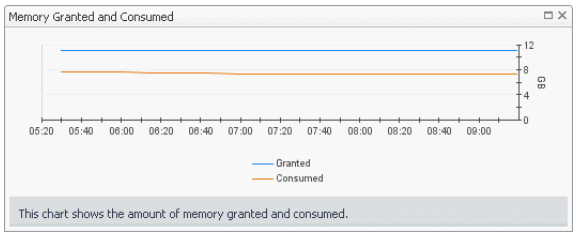
- **Data Out**. Displays the **Data Out** dialog box.



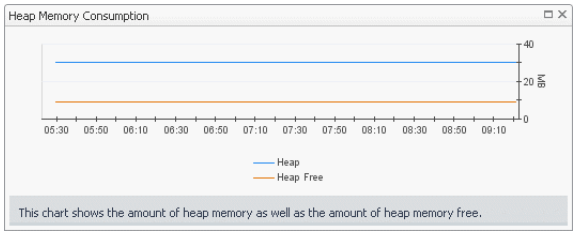
- **Memory Utilization: Active, Ballooned, Common, or Overhead, Shared**. Displays the **ESX Host Memory Utilization** dialog box.



- **Memory Utilization: Granted or Consumed**. Displays the **Memory Granted and Consumed** dialog box.



- **Memory Utilization: Heap or Heap Free**. Displays the **Heap Memory Consumption** dialog box.



- **Memory Utilization: Kernel**. Displays the **Kernel Memory** dialog box.

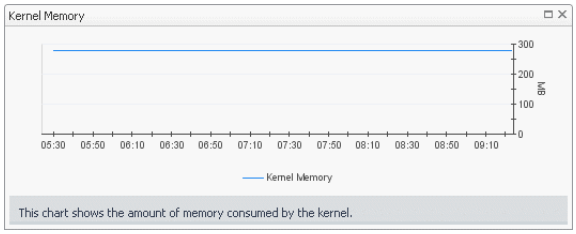
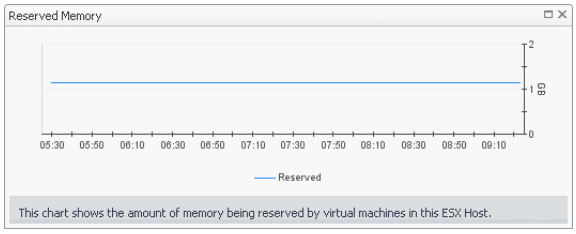
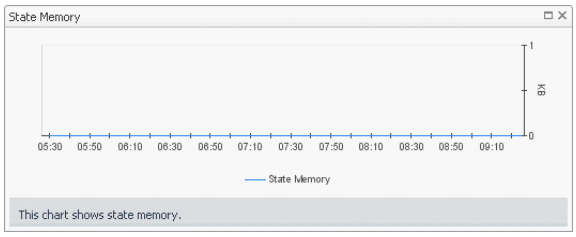


Table 37. Host Utilizations

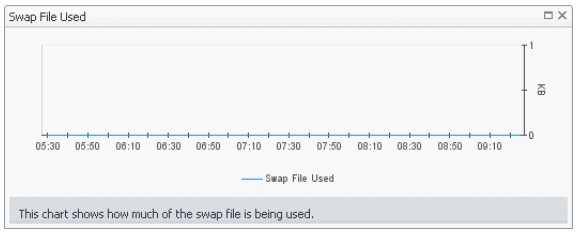
- **Memory Utilization: Reserved**. Displays the **Reserved Memory** dialog box.



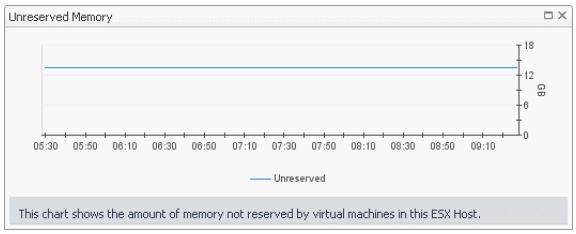
- **Memory Utilization: State**. Displays the **State Memory** dialog box.



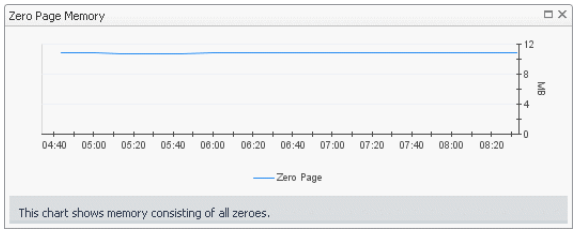
- **Memory Utilization: Swap Used**. Displays the **Swap File Used** dialog box.



- **Memory Utilization: Unreserved**. Displays the **Unreserved Memory** dialog box.



- **Memory Utilization: Zero Page**. Displays the **Zero Page Memory** dialog box.



- **Memory Utilization**. Displays the **Host Memory Utilization** dialog box.

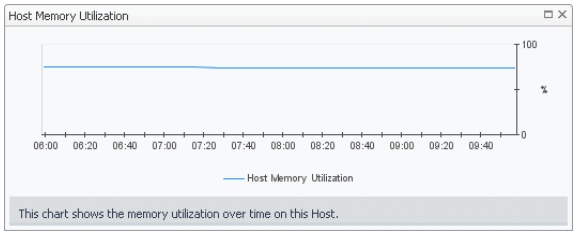
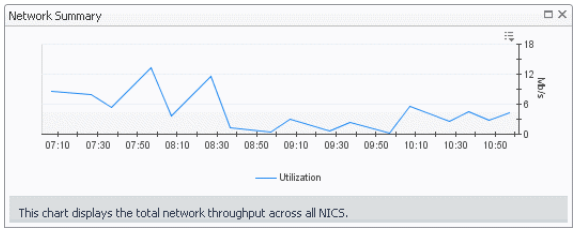
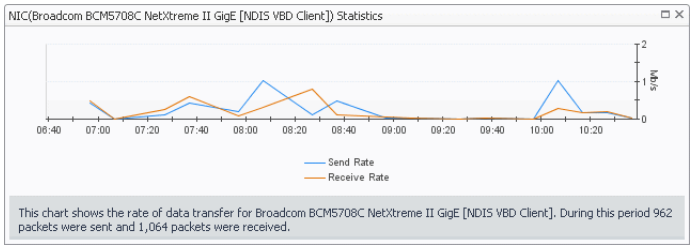


Table 37. Host Utilizations

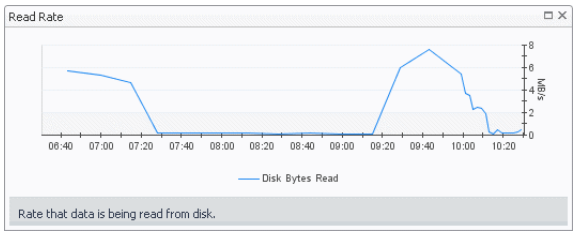
- **Network Summary Utilization**. Displays the **Network Summary** dialog box.



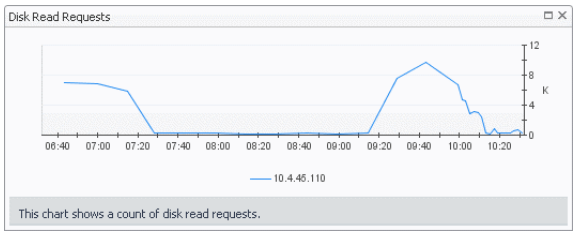
- **NIC (any entry)**. Displays the **NIC Statistics** dialog box.



- **Read Rate**. Displays the **Read Rate** dialog box.



- **Reads**. Displays the **Disk Read Requests** dialog box.



- **Storage Summary, Disk Usage**. Displays the **Storage Summary** dialog box.

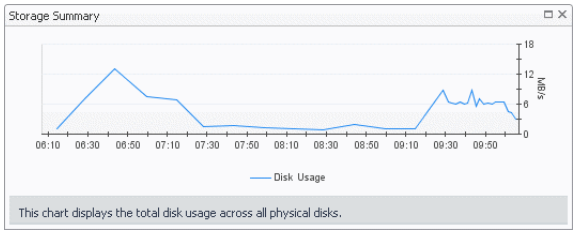
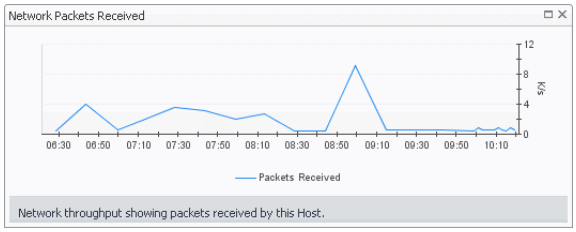
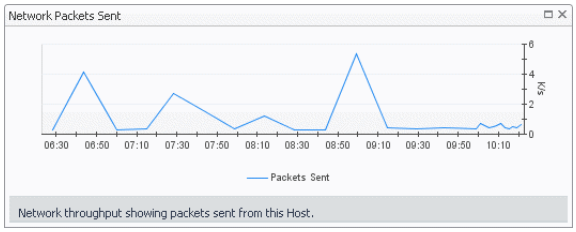


Table 37. Host Utilizations

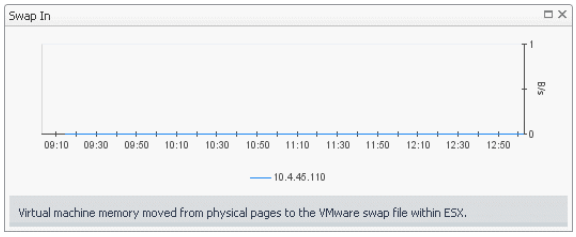
- **Packets In**. Displays the **Network Packets Received** dialog box.



- **Packets Out**. Displays the **Network Packets Sent** dialog box.



- **Swap In**. Displays the **Swap In** dialog box.



- **Swap Out**. Displays the **Swap Out** dialog box.

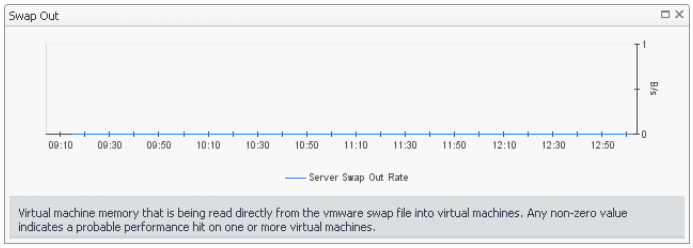
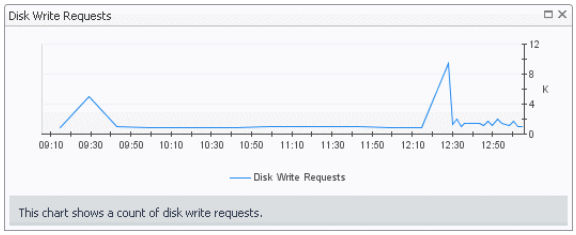


Table 37. Host Utilizations

- **Disk Write Requests** dialog box



- **Write Rate**. Displays the **Write Rate** dialog box.

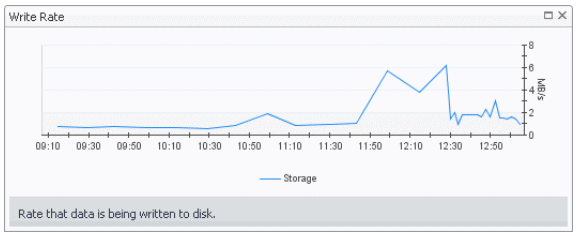


Table 38. Resource Pool

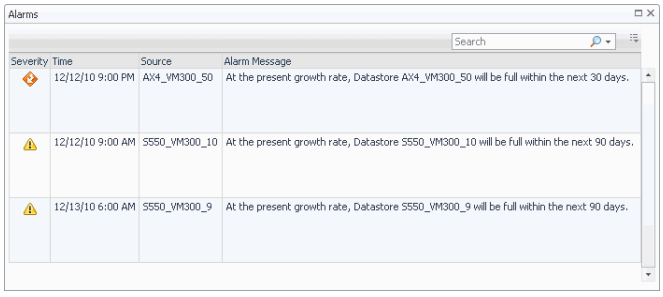
Description	Shows the details about the resource the selected virtual machine is associated with. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **CPU**. The current percentage of the overall datacenter's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **Disk**. The overall datacenter's current disk I/O rate. • **Memory**. The current percentage of the datacenter's memory usage. • **Network**. The current rate at which the datacenter transfers data from and to the network. • **Resource Pool**. The name of the resource pool with which the selected virtual machine is associated, followed by the total counts of alarms associated with the resource pool, broken down by alarm types (Normal, Warning, Critical, Fatal). • **VMs**. The number of all virtual machines associated with the datacenter, including running and powered-off virtual machines. • Drill down on any alarm count. Displays the **Alarms** dialog box that shows a list of all alarms associated with the resource pool.
Where to go next	

Table 39. Virtual Machines

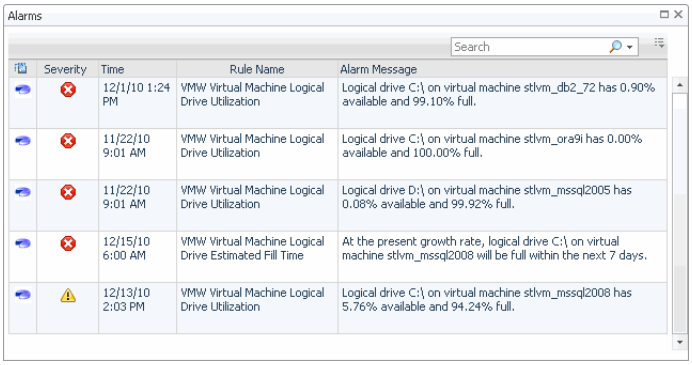
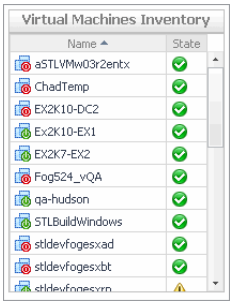
Description	Shows a list of virtual machines associated with the selected server. **NOTE:** This view only appears when exploring ESX host details.
Data displayed	• **Running**. The number of the virtual machines, associated with the selected ESX host, that are currently running. • **Virtual Machine**. For each virtual machine there is an entry showing the name of the virtual machine followed by the total counts of alarms associated with the virtual machine, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Virtual machines**. The number of the virtual machines associated with the server, followed by the counts of all alarms associated with the virtual machines, broken down by the alarm state (Normal, Warning, Critical, Fatal).
Where to go next	Drill down on: • Any alarm count. Displays the **Alarms** dialog box that shows the related alarms.  • **Virtual Machine**. Displays the virtual machine details on the Summary tab. • **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines name associated with the ESX host. 

Table 40. Virtual Machine Messages

Description	Shows a list messages associated with the selected virtual machine. **NOTE:** This view only appears when exploring virtual machine details.
Data displayed	• **Message**. The message content. • **Time**. The time at which the message is created.

Table 41. Virtual Machine Utilizations

Description	Shows the utilization of the selected virtual machine's resources. **NOTE:** This view only appears when exploring virtual machine details.
Data displayed	• **Commands, Aborted**. The number of commands that are aborted during the selected time range.

Table 41. Virtual Machine Utilizations

- **Commands, Issued**. The total number of commands that are issued during the selected time range.
- **Composite CPU Utilization**. The combined CPU utilization across all CPUs on the selected virtual machine.
- **CPU 0-*N***. The current percentage of each individual CPU's load, used to execute system code and user programs, based on the its total CPU capacity.
- **Data In**. The rate at which data is received from the network during the selected time period.
- **Data Out**. The rate at which data is transferred to the network during the selected time period.
- **Memory Utilization, Active**. The amount of physical memory that is actively being used by the virtual machine.
- **Memory Utilization, Balloon Actual**. The amount of memory that is used by the VMware Memory Control Driver to allow the guest OS to selectively swap memory.
- **Memory Utilization, Balloon Target**. The amount of memory set as the balloon target.
- **Memory Utilization, Ballooned**. The amount of physical memory that is actively being used by the VMware Memory Control Driver to allow the guest OS to selectively swap memory.
- **Memory Utilization, Common**: Amount of virtual machine memory that contains common pages across multiple virtual machines as a result of transparent page sharing.
- **Memory Utilization, Consumed**. The amount of memory that is consumed by the current processes.
- **Memory Utilization, Granted**. The amount of memory granted to the selected virtual machine.
- **Memory Utilization, Overhead**. The percentage of the virtual machine memory that is used by the current process.
- **Memory Utilization, Shared**. The amount of the virtual machine memory that is freed up due to transparent page sharing.
- **Memory Utilization, Swap Target**. The amount of memory set as the swap target.
- **Memory Utilization, Swap Used**. The amount of memory that is stored in disk swap space
- **Memory Utilization, Zero Page**. The amount of memory that is zero memory.
- **Memory Utilization**. The percentage of the virtual machine memory that is currently in use.
- **Network Summary, NIC**. The name of a network interface card used by the selected virtual machine.
- **Network Summary, Receive**. The current rate at which a network interface card receives data from the network.
- **Network Summary, Send**. The current rate at which a network interface card transfers data to the network.
- **Network Summary, Utilization**. The current rate at which the virtual machine transfers data to and from the network during the selected time period.
- **Packets In**. The rate at which network packets are received during the selected time period.
- **Packets Out**. The rate at which network packets are sent during the selected time period.
- **Read Rate**. The rate at which data is read from the disk during the selected time period.

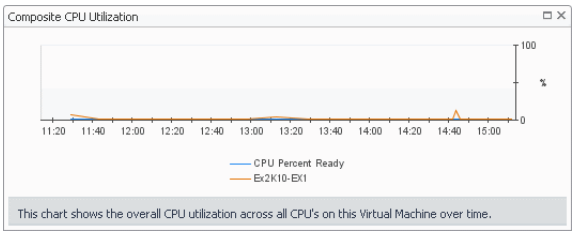
Table 41. Virtual Machine Utilizations

- **Reads**. The percentage of elapsed time that the disk is busy servicing read requests during the selected time period.
- **Storage Summary, Disk Usage**. The rate at which the server reads from or writes data to disk during the selected time period.
- **Swap In**. The rate at which memory swap-ins occur.
- **Swap Out**. The rate at which memory swap-outs occur. When memory becomes scarce, the OS swaps out sleeping processes, then swaps out active processes that use large amounts of memory. If swap-outs occur, the swap space can become critically low.

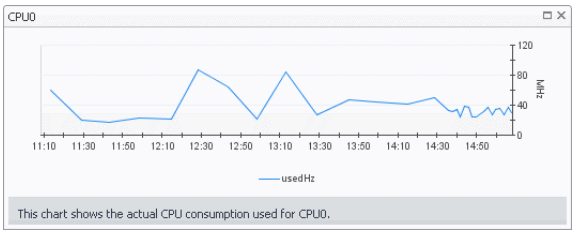
Where to go next Drill down on:

- **Commands, Issued** or **Aborted**. Displays the **Commands** dialog box.

- **Composite CPU Utilization**. Displays the **Composite CPU Utilization** dialog box.



- **CPU 0-*N***. Displays the **CPU** *N* dialog box.



- **Data In**. Displays the **Data In** dialog box.

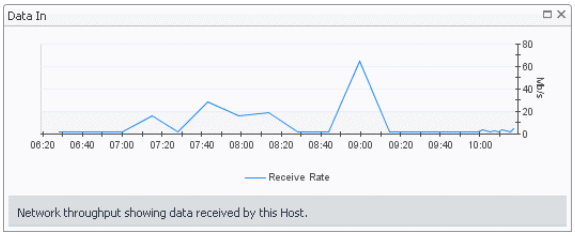
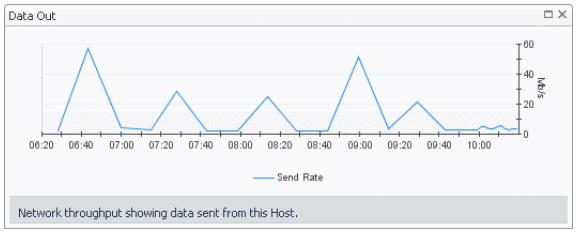
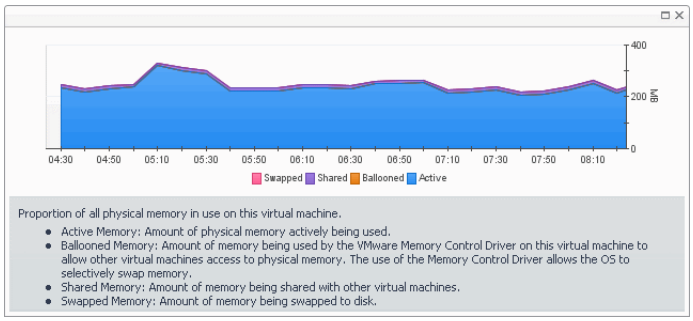


Table 41. Virtual Machine Utilizations

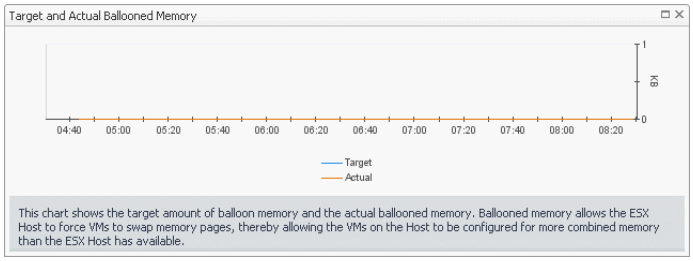
- **Data Out**. Displays the **Data Out** dialog box.



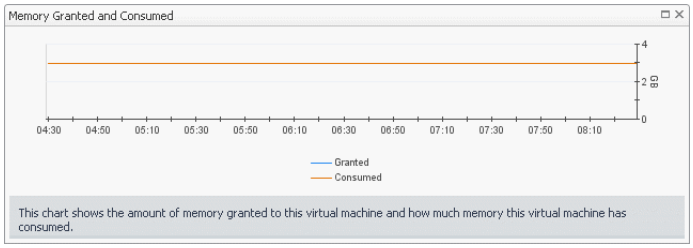
- **Memory Utilization: Active, Ballooned, Shared, or Swapped**. Displays the **Virtual Machine Memory Utilization** dialog box.



- **Memory Utilization: Balloon Actual or Balloon Target**. Displays the **Target and Actual Ballooned Memory** dialog box.



- **Memory Utilization: Granted or Consumed**. Displays the **Memory Granted and Consumed** dialog box.



- **Memory Utilization: Swap Target or Swap Used**. Displays the **Target and Actual Swap Size** dialog box.

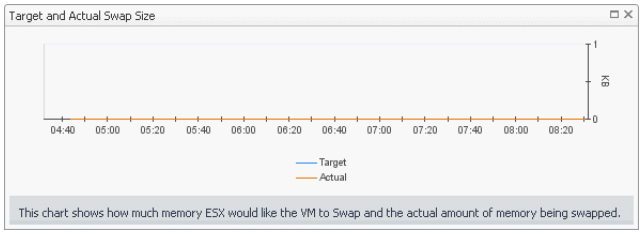
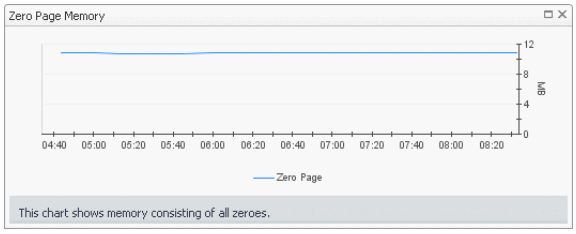
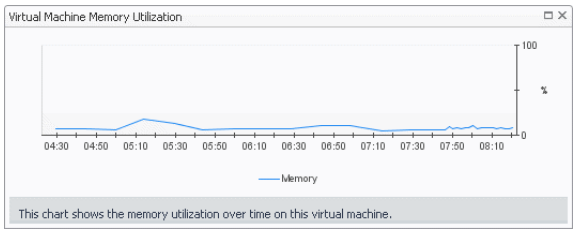


Table 41. Virtual Machine Utilizations

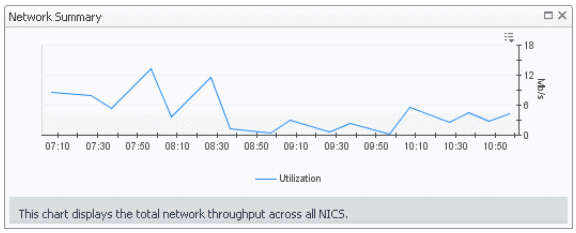
- **Memory Utilization: Zero Page**. Displays the **Zero Page Memory** dialog box.



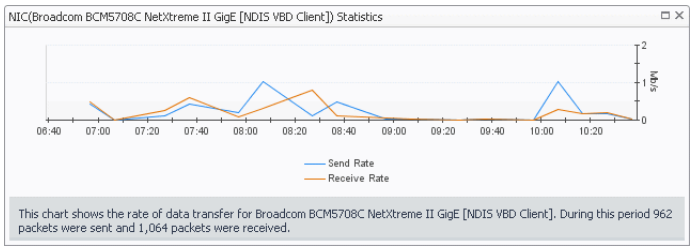
- **Memory Utilization**. Displays the **Virtual Machine Memory Utilization** dialog box.



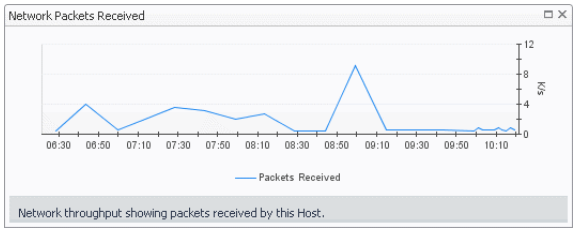
- **Network Summary Utilization**. Displays the **Network Summary** dialog box.



- **NIC (any entry)**. Displays the **NIC Statistics** dialog box.



- **Packets In**. Displays the **Network Packets Received** dialog box.



- **Packets Out**. Displays the **Network Packets Sent** dialog box.

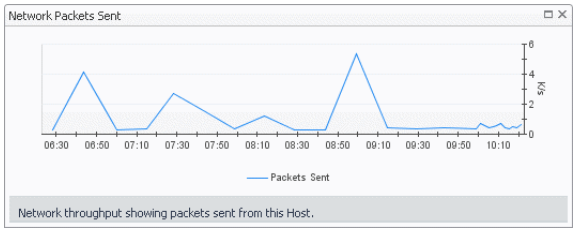
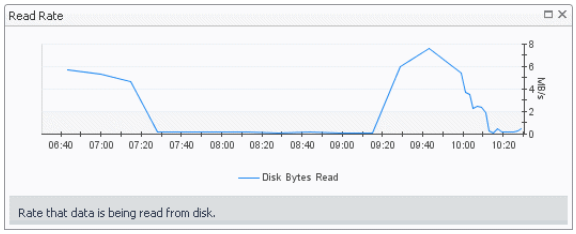
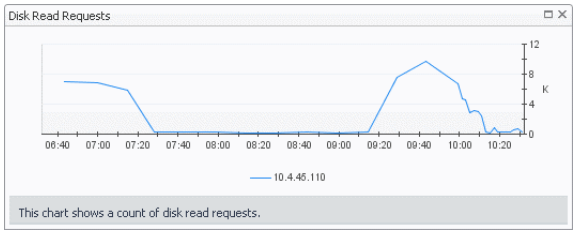


Table 41. Virtual Machine Utilizations

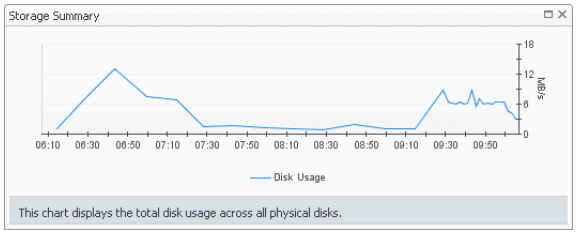
- **Read Rate**. Displays the **Read Rate** dialog box.



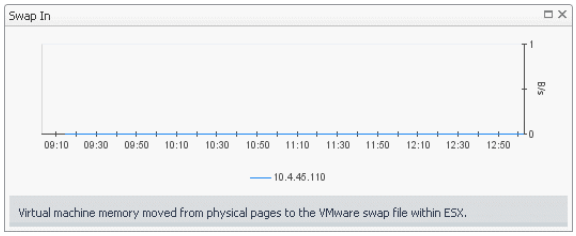
- **Reads**. Displays the **Disk Read Requests** dialog box.



- **Storage Summary, Disk Usage**. Displays the **Storage Summary** dialog box.



- **Swap In**. Displays the **Swap In** dialog box.



- **Swap Out**. Displays the **Swap Out** dialog box.

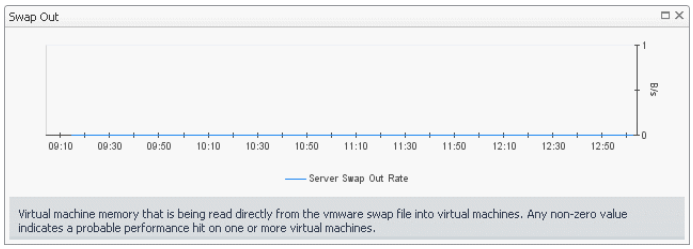
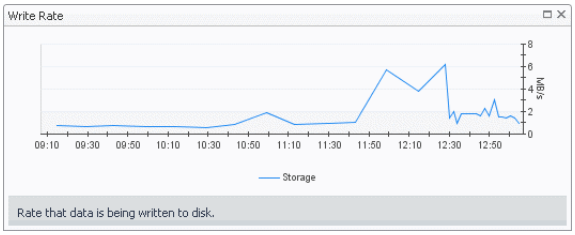
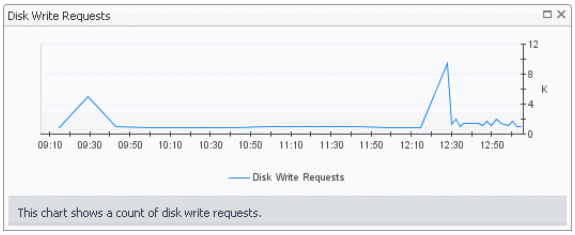


Table 41. Virtual Machine Utilizations

- **Write Rate**. Displays the **Write Rate** dialog box.



- **Writes**. Displays the **Disk Write Requests** dialog box.

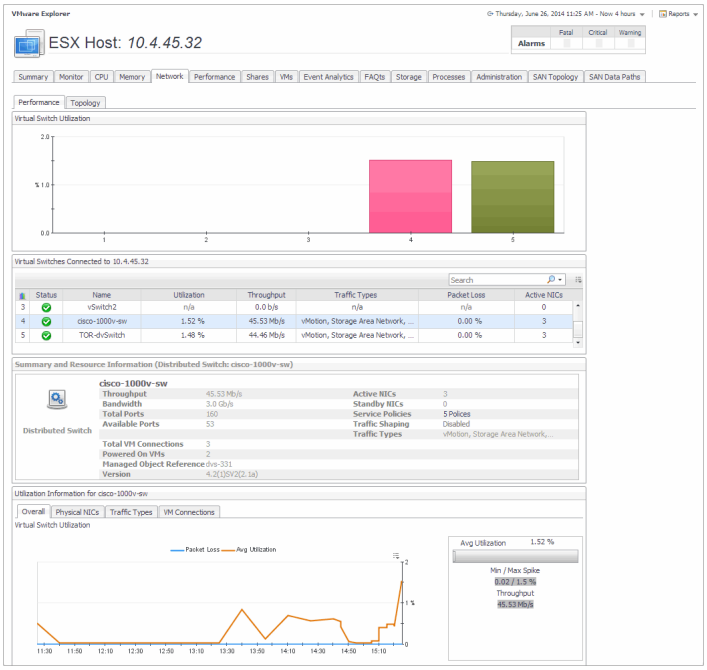


Network tab

Purpose

This tab displays the utilization of the virtual switches associated with the selected ESX hosts.

Figure 68. Network tab



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, that appears on the navigation panel, select a ESX host.

3 In the VMware Explorer, open the **Network** tab.

Description of Embedded Views

This tab is made up of the following embedded views:

- Performance tab, Virtual Switch Utilization
- Performance tab, Virtual Switches Connected to ESX Host
- Performance tab, Summary and Resource Information
- Performance tab, Utilization Information
- Topology tab

Table 42. Performance tab, Virtual Switch Utilization

Description	For each virtual switch associated with the selected ESX host (and listed in Performance tab, Virtual Switches Connected to ESX Host), it displays the percentage of the network resources available to the switch that are in use.

Table 43. Performance tab, Virtual Switches Connected to ESX Host

Description	Identifies the virtual switches associated with the selected ESX host.
Data displayed	• **Name**. The name of the virtual switch. • **Utilization**. The current percentage of the network resources available to the virtual switch that are in use. • **Throughput**. The rate of network traffic processed by the virtual switch. • **Traffic Types**. Identifies the data traffic types that are processed by the virtual switch. • **Packet Loss**. The average percentage of time the data packets sent to the virtual switch are not echoed back. • **Active NICs**. The number of active network interface cards that the virtual switch uses.
Where to go next	• Drill down on any virtual switch entry in the table. This causes the Performance tab, Summary and Resource Information and Performance tab, Utilization Information views to refresh, showing additional information about the selected virtual switch.

Table 44. Performance tab, Summary and Resource Information

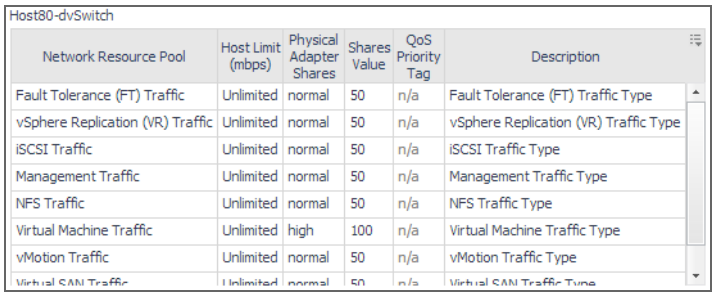
Description	Shows detailed configuration information about the selected virtual switch.
Data displayed	• **Throughput**. The rate of network traffic processed by the virtual switch. • **Bandwidth**. The amount of network bandwidth available to the switch. • **Total Ports**. The total number of ports on the virtual switch. • **Available Ports**. The number of available ports on the virtual switch. • **Total VM Connections**. The total number of virtual machines connected to the ESX host through the virtual switch. • **Powered On VMs**. The total number of virtual machines connected to the ESX host through the virtual switch that are currently powered on. • **Managed Object Reference**. Identifies the virtual switch in your monitored environment. • **Version**. The version number of the distributed switch component in your virtual environment. • **Active NICs**. The number of active network interface cards that the virtual switch uses.

Table 44. Performance tab, Summary and Resource Information

- **Standby NICs**. The number of network interface cards that the virtual switch uses, that are currently in standby mode.
- **Network I/O Control (standard or distributed virtual switches only)**. Indicates if the selected switch can use network resource pools to prioritize network traffic.
- **Service Policies (Cisco virtual switches only)**. Shows the number of service policies in use.
- **Traffic Shaping**. Indicates if the traffic shaping policy is enabled or disabled on the selected switch. A traffic shaping policy can restrict the network bandwidth to a port or if a port is configured to temporarily allow transmission of data at higher than normal speeds. For more information about these policies, see your VMware documentation.
- **Traffic Types**. Identifies the data traffic types that are processed by the virtual switch.

Where to go next Drill down on:

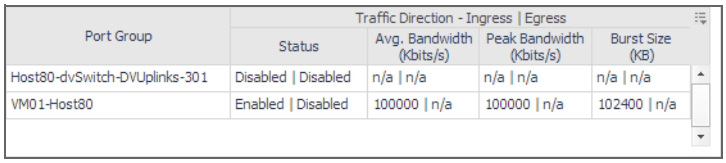
- **Network I/O Control (standard or distributed virtual switch only)**. Displays a dwell showing a list of network pools the virtual switch uses and the related information.


Host80-dvSwitch

Network Resource Pool	Host Limit (mbps)	Physical Adapter Shares	Shares Value	QoS Priority Tag	Description
Fault Tolerance (FT) Traffic	Unlimited	normal	50	n/a	Fault Tolerance (FT) Traffic Type
vSphere Replication (VR) Traffic	Unlimited	normal	50	n/a	vSphere Replication (VR) Traffic Type
iSCSI Traffic	Unlimited	normal	50	n/a	iSCSI Traffic Type
Management Traffic	Unlimited	normal	50	n/a	Management Traffic Type
NFS Traffic	Unlimited	normal	50	n/a	NFS Traffic Type
Virtual Machine Traffic	Unlimited	high	100	n/a	Virtual Machine Traffic Type
vMotion Traffic	Unlimited	normal	50	n/a	vMotion Traffic Type
Virtual SAN Traffic	Unlimited	normal	50	n/a	Virtual SAN Traffic Type

Table 44. Performance tab, Summary and Resource Information

- **Traffic Shaping**. Displays a dwell showing a list of port groups associated with the virtual switch and the related information.



Port Group	Traffic Direction - Ingress | Egress			
	Status	Avg. Bandwidth (Kbits/s)	Peak Bandwidth (Kbits/s)	Burst Size (KB)
Host80-dvSwitch-DVUplinks-301	Disabled | Disabled	n/a | n/a	n/a | n/a	n/a | n/a
VM01-Host80	Enabled | Disabled	100000 | n/a	100000 | n/a	102400 | n/a

- **Service Policies (Cisco virtual switches only)**. Displays the **Service Policies** dialog box showing a navigation tree with port groups and the policies associated with each group. Navigate the tree and click a network policy to find out more information about it.

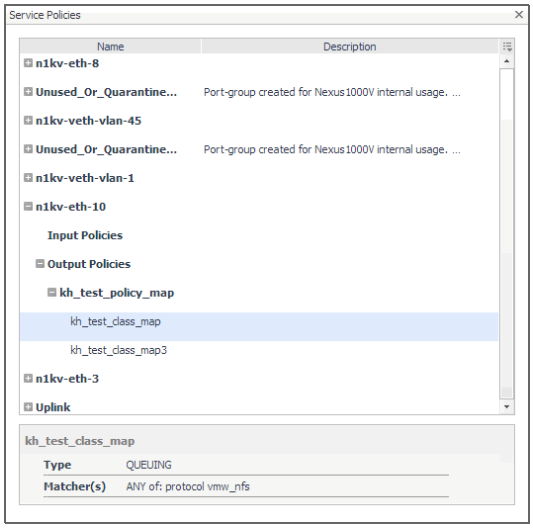


Table 45. Performance tab, Utilization Information

Description	Displays detailed utilization information for the virtual switch selected in the Performance tab, Virtual Switches Connected to ESX Host view.
Data displayed	• **Overall tab, Virtual Switch Utilization chart**. Displays the overall switch efficiency. The **Packet Loss** line in the chart represents the average percentage of time the data packets sent to the monitored switch are not echoed back over the selected time period. The **Avg Utilization** line in the chart represents the average percentage of the network resources available to the switch that are in use over the selected time period. The **Avg Utilization** percentage indicates the average percentage of the network resources available to the switch that are currently in use. **Min / Max Spikes** shows the difference between the lowest and highest percentage of the average utilization. **Throughput** is the rate of network traffic processed by the virtual switch. • **Physical NICs tab, Physical Adapter Utilization chart**. Displays the overall utilization of each network interface card used by the virtual switch. • **Physical NICs tab, Physical Adapter Distribution chart**. Displays the overall workload distribution for each network interface card used by the virtual switch. **High/Low Utilization** shows the difference between the lowest and highest percentage of the average utilization. **Variance** is the difference between the lowest and highest average network adapter utilization

Table 45. Performance tab, Utilization Information

- **Traffic Types tab, Traffic Type Utilization chart**. Illustrates how different types of data traffic are represented in the overall network traffic managed by the selected switch. The current percentages of different type of network traffic appear in the table, while the chart displays the values captured over the selected time period.
- **VM Connections tab, Virtual Machine Connections chart**. For each virtual machine associated with the selected virtual switch, it displays its average inbound and outbound data transfer rates over the selected time period.

Table 46. Topology tab

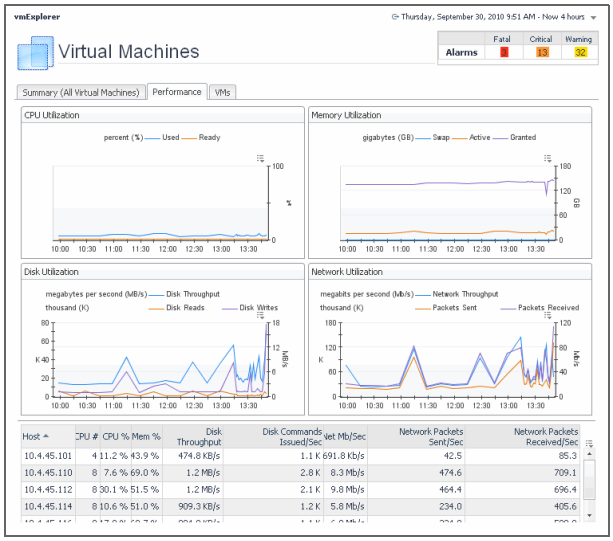
Description	Visualize the relationships between the objects in your environment through an interactive map. The map illustrates how different components relate to each other, and the levels of the available resources available to them. For more information about the topology map appearing on this tab, see Standard vSwitch Topology and Distributed vSwitch Topology views on page 246

Performance tab

Purpose

This tab displays the resource utilization for the selected object or group of objects over a selected period of time.

Figure 69. Performance tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select a Virtual Center, datacenter, cluster, ESX host, resource pool, or one of the following containers: Datacenters, ESX Hosts, Resource Pools, or Virtual Machines.
3. In the VMware Explorer, open the Performance tab.

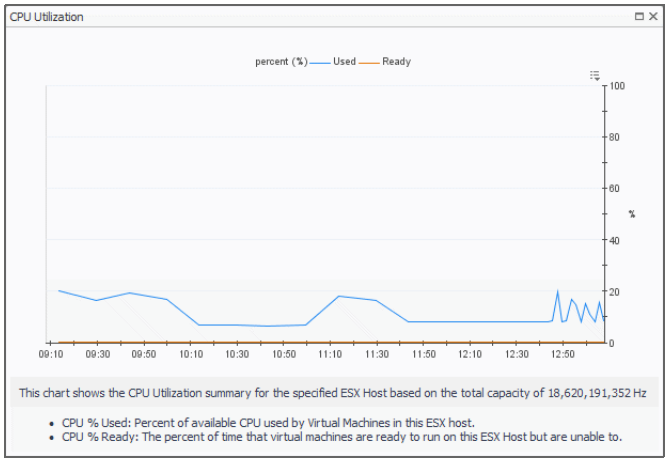
Description of Embedded Views

This tab is made up of the following embedded views:

- CPU Utilization

- Disk Utilization
- Hosts
- Memory Utilization
- Network Utilization

Table 47. CPU Utilization

Description	Shows the CPU utilization summary for the selected component based on its total capacity during a selected time period.
Data displayed	• **Ready**. The percentage of time the CPU is ready but is not used. • **Used**. The percentage of available CPU processing that is currently in use. • Drill down on the **CPU Utilization** graph. Displays the graph along with some additional information.
Where to go next	

Disk Utilization

Description	Shows the disk utilization summary for the selected component during a selected time period.
Data displayed	• **Disk Reads**. The amount of data read from disk. • **Disk Writes**. The amount of data written to disk. • Drill down on the **Disk Utilization** graph. Displays the graph along with some additional information.
Where to go next	

Table 48. Hosts

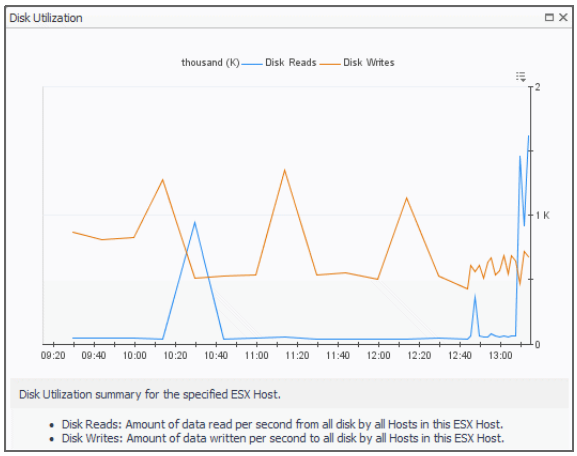
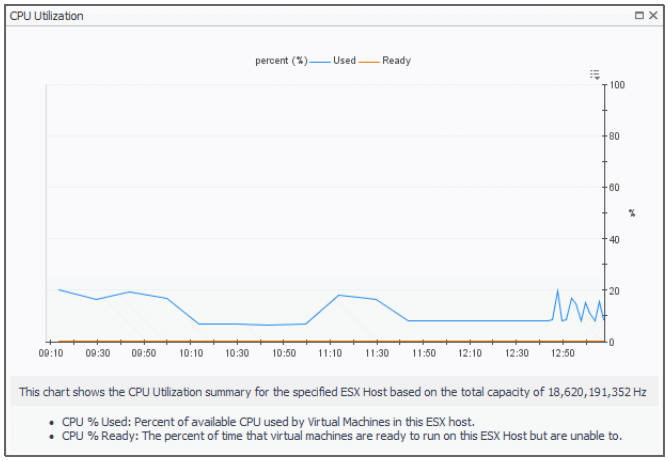
Description	View shows a list of all ESX hosts associated with the selected component. For each host, it shows its name, the number of CPUs, the current percentages of CPU and memory use, disk throughput rate, rate at which disk commands are issued, and the rate at which data packets are sent to and received from the network. **NOTE:** This view only appears when you are exploring virtual centers, Datacenters container, datacenters, ESX Host container, Resource Pools container, resource pools, or Virtual Machines container.
Data displayed	• **CPU #**. The number of CPUs associated with the host. • **CPU %**. The current CPU utilization for the selected host. • **Disk Commands Issued/Sec**. The rate of disk commands issued for the selected host. • **Disk Throughput**. The disk throughput rate for the selected host. • **Host**. The host's IP address. • **Mem %**. The current memory utilization for the selected host. • **Net Mb/Sec**. The current rate of network throughput for the selected host. • **Network Packets Sent/Sec**. The rate of network packets sent to the network. • **Network Packets Received/Sec**. The rate of network packets received from the network.
Where to go next	• Drill down on the **Disk Utilization** graph. Displays the graph along with some additional information. 

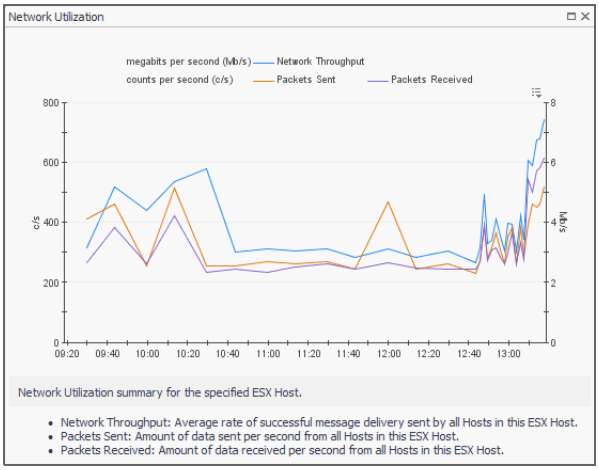
Table 49. Memory Utilization

Description	Shows the physical memory utilization summary for the selected component, broken into the amounts of memory that is swapped to disk, actively used, and allocated, all during a selected time period.
Data displayed	• **Active**. The amount memory that is actively used. • **Granted**. The amount memory that is allocated to the selected component.

Table 49. Memory Utilization

	• **Swapped**. The amount memory that is swapped to disk. • Drill down on the **CPU Utilization** graph. Displays the graph along with some additional information.
Where to go next	

Network Utilization

Description	Shows the network utilization summary for the selected component, including the average rate of network throughput, and the amounts of data sent to and received from the network
Data displayed	• **Network Throughput**. The average rate of network throughput. • **Packets Received**. The amount of data received from the network. • **Packets Sent**. The amount of data sent to the network. • Drill down on the **Network Utilization** graph. Displays the graph along with some additional information.
Where to go next	

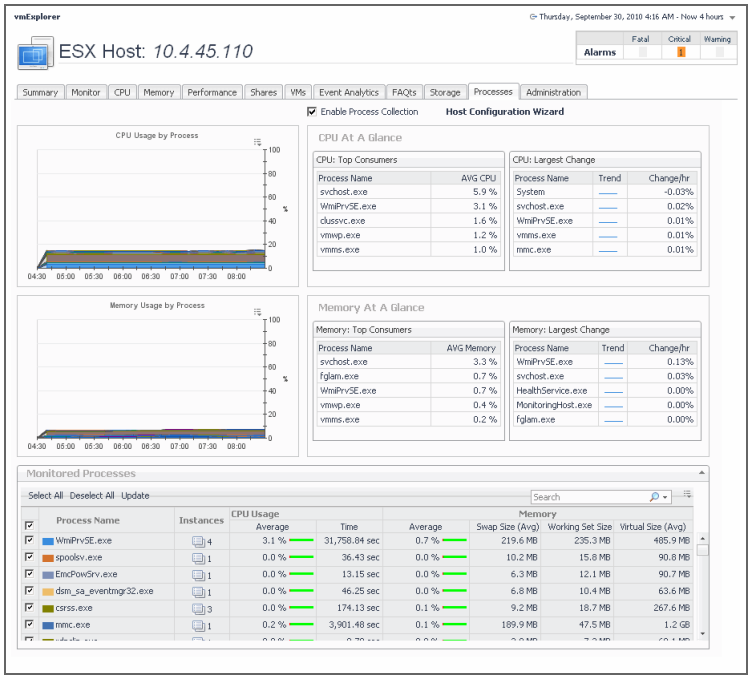
Processes tab

Purpose

This tab only appears when you are exploring individual Virtual Centers, ESX hosts, and virtual machines, and have Foglight for Guest Processes Investigation installed and active. It displays an organized view of process information gathered by Foglight for Guest Process Investigation from the virtual or physical machine configured to

send process information. When you open this tab, the process information for the selected server or virtual machine appears, allowing you to view the current CPU, memory, and monitored process statistics.

Figure 70. Processes tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select a Virtual Center, ESX host, or virtual machine instance.
3. In the VMware Explorer, open the Processes tab.

Description of Embedded Views

This tab is made up of several embedded views. For complete information about these views, see the *Investigating Guest Processes User and Reference Guide*.

Related Objects views

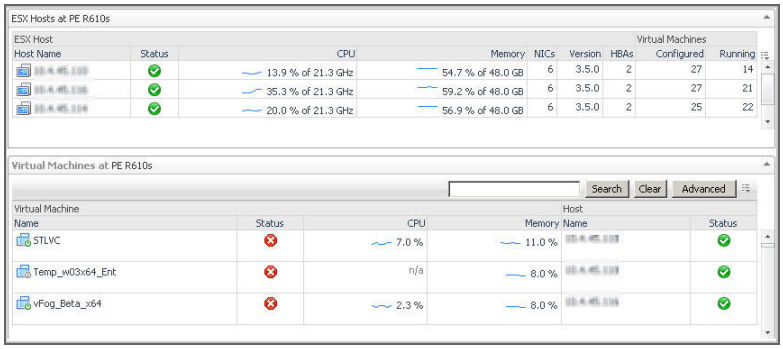
At least one Related Objects view is provided in the VMware Explorer dashboard.

Related Objects views are part of the VMware Explorer Primary view and are typically located at the bottom of the Primary view. More than one Related Objects view may appear at a time.

Purpose

Related Objects views provide summary information on either the parent or child objects or both (whichever is applicable) of the object being viewed in the dashboard.

Figure 71. Related Objects views



Related Objects views differ from each other and may not appear at all depending on the object or collection of objects selected from the Virtual Infrastructure view and on the navigation tab selected from the VMware Explorer Primary view heading.

Related Objects views for an individual object display tables that list either the parents or children or both (whichever is applicable) of the selected object, and provide pertinent summary details about each one. The Related Objects view for a collection of objects displays a table that lists all of the objects in the selected collection and provides pertinent summary details about each one. You can sort Related Objects view tables by a particular column by clicking the corresponding column heading. If you select an object from the table by clicking on one of the table rows, all of the views in the VMware Explorer dashboard get updated with information about that object.

Resource Pools Relationship Tree view

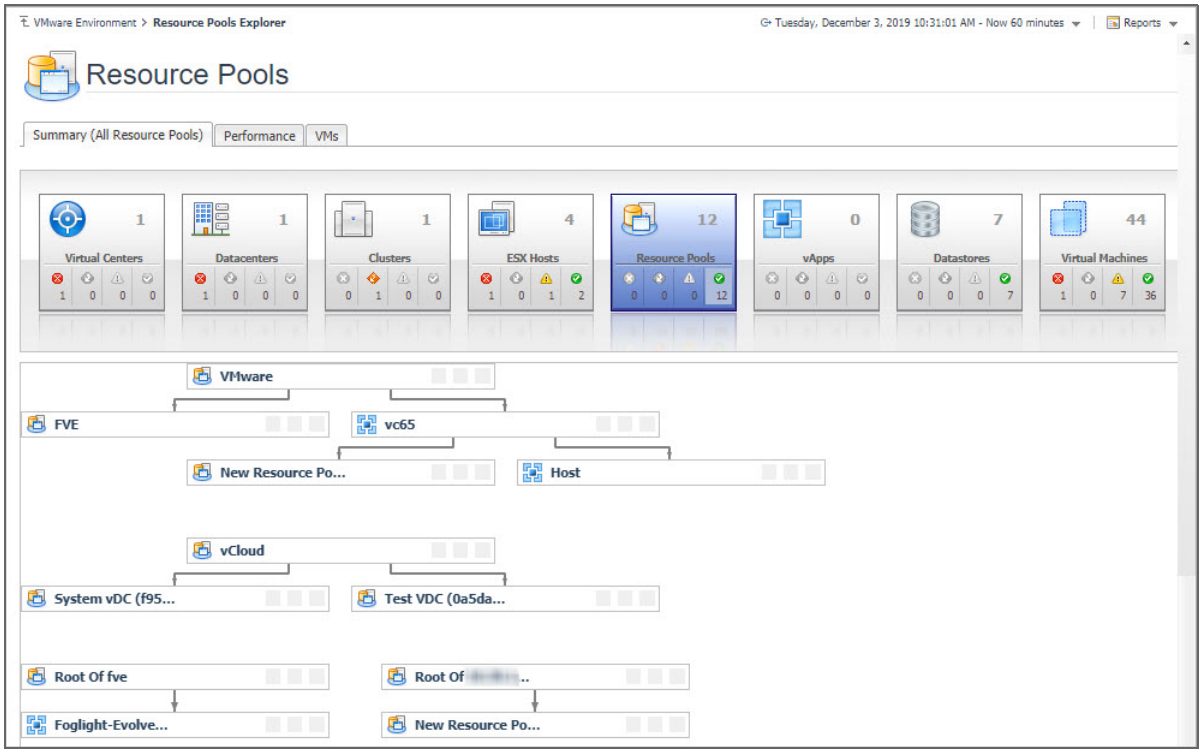
Purpose

The Resource Pools Relationship Tree view is provided in the VMware Explorer dashboard. If you select a Resource Pool container from the Topology view on the Virtual Infrastructure view and click the Summary navigation tab within the VMware Explorer Primary view, a Resource Pools Relationship Tree view is displayed in the Primary view. A Resource Pools Relationship Tree contains every resource pool that belongs to the clusters within the associated VirtualCenter.

For more information about the VMware Explorer dashboard, see Investigating performance metrics on page 29.

The Resource Pools Relationship Tree view is useful if you want to see how the resource pools within the clusters are laid out or if you want to take a look at the utilization statistics for each configured resource pool on the VirtualCenter.

Figure 72. Resource Pools Relationship Tree view



The default Resource Pools Relationship Tree simply displays the names of the various resource pools and their parent/child relationships.

You can use the Normal Zoom Level button on the mini map at the top right of the Relationship Tree to zoom into a more detailed version of the Tree. You can use the Minimized Zoom Level button on the mini map to zoom back out again.

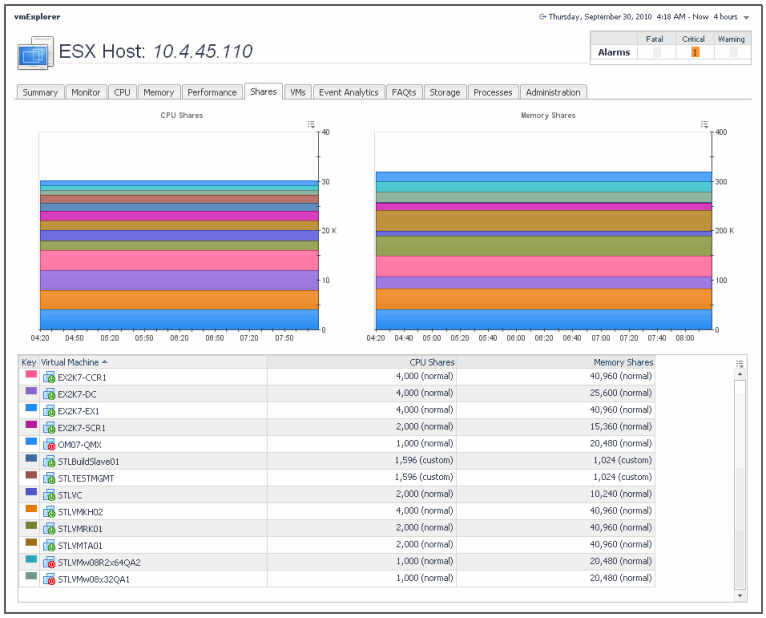
You can browse through a Relationship Tree by clicking and dragging the rectangular shadow provided on the mini map.

Shares tab

Purpose

The VMware Explorer's **Shares** tab displays the CPU and memory shares that are in use by the virtual machines associated with the selected component.

Figure 73. Shares tab



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, that appears on the navigation panel, select a cluster, ESX host, or resource pool instance.

3 In the VMware Explorer, open the Shares tab.

Description of Embedded Views

This view is made up of the following embedded views:

- CPU Shares
- Memory Shares
- Virtual Machines

Table 50. CPU Shares

Description	Shows the CPU shares that are in use by the virtual machines associated with the selected cluster, ESX host, or resource pool instance.

Table 50. CPU Shares

Where to go next	Drill down on: • **CPU Shares** graph. Displays additional information about the CPU shares, indicating which virtual machines are selected and their CPU shares showing in the graph.

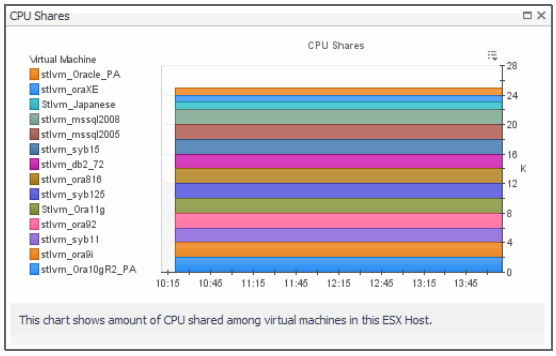


Table 51. Memory Shares

Description	Shows the memory shares that are in use by the virtual machines associated with the selected cluster, ESX host, or resource pool instance.
Where to go next	Drill down on: • **Memory Shares** graph. Displays additional information about the memory shares, indicating which virtual machines are selected and shows their memory shares in the graph.

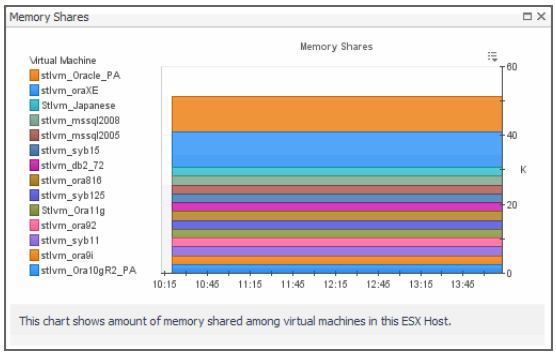


Table 52. Virtual Machines

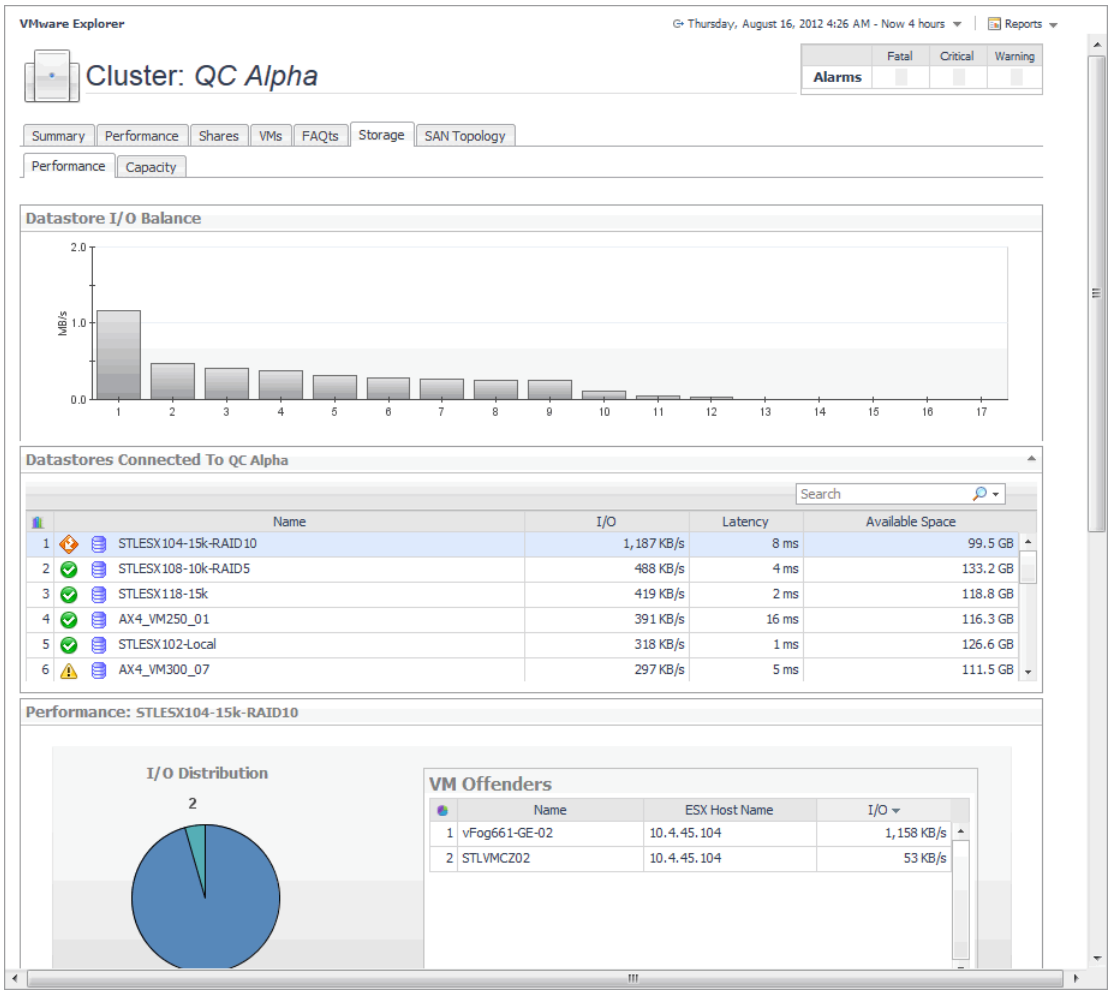
Description	Shows the list of all virtual machines that are associated with the selected cluster, ESX host, or resource pool instance.
Data displayed	• **CPU Shares**. The number of CPU shares. • **Key**. The color indicator for displaying this information in the Active Memory and Shared Memory views. • **Memory Shares**. The number of memory shares. • **Virtual Machine**. The name of the virtual machine.
Where to go next	Drill down on: • **Virtual Machine**. For more information, see Summary tab on page 131.

Storage tab (Cluster)

Purpose

The VMware Explorer's **Storage** tab displays the disk storage capacity associated with the selected component. Selecting a cluster and opening this tab displays the storage metrics associated with the selected cluster.

Figure 74. Storage tab (Cluster)



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select a cluster.
3. In the VMware Explorer, open the **Storage** tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Capacity: Datastore (Capacity tab)
- Datastore Capacity Balance (Capacity tab)
- Datastore I/O Balance (Performance tab)
- Datastores Connected to Cluster (Performance and Capacity tabs)

- ESX Hosts (Performance tab)
- ESX I/O Balance (Performance tab)
- Performance: Datastore (Performance tab)

Table 53. Capacity: Datastore (Capacity tab)

Description	This view contains information about the selected datastore data capacity.
Data displayed	• **Datastore, In Use**. The percentage of disk space in use. • **Most Available, Available Space**. The disk space available on the datastore. • **Most Available, Name**. The name of the datastore. • **VMs On Datastore, Allocated**. The amount of memory allocated to the virtual machine. • **VMs On Datastore, In Use**. The amount of memory used by the virtual machine. • **VMs On Datastore, Name**. The name of the virtual machine associated with the datastore.

Table 54. Datastore Capacity Balance (Capacity tab)

Description	This view shows the datastore capacity for each datastore connected to the selected cluster.

Table 55. Datastore I/O Balance (Performance tab)

Description	This view shows the data transfer rates for each datastore connected to the selected cluster.

Table 56. Datastores Connected to Cluster (Performance and Capacity tabs)

Description	This view lists the datastores connected to the selected cluster and shows performance metrics associated with each datastore.
Data displayed	• **Available Space**. The amount of available space on the datastore. • **I/O**. The datastore data transfer rates. • **Latency**. The datastore latency. • **Name**. The datastore name and its alarm status.

Table 57. ESX Hosts (Performance tab)

Description	This view lists the ESX hosts belonging to the selected cluster and associated with the selected datastore, and shows performance metrics associated with each ESX host.
Data displayed	• **Name**. The ESX host name or IP address. • **Read**. The ESX host data read rates. • **Read Latency**. The ESX host read latency. • **Write**. The ESX host data write rates. • **Write Latency**. The ESX host write latency.

Table 58. ESX I/O Balance (Performance tab)

Description	This view shows the data transfer rates each ESX host belonging to the selected cluster and associated with the selected datastore.

Table 59. Performance: Datastore (Performance tab)

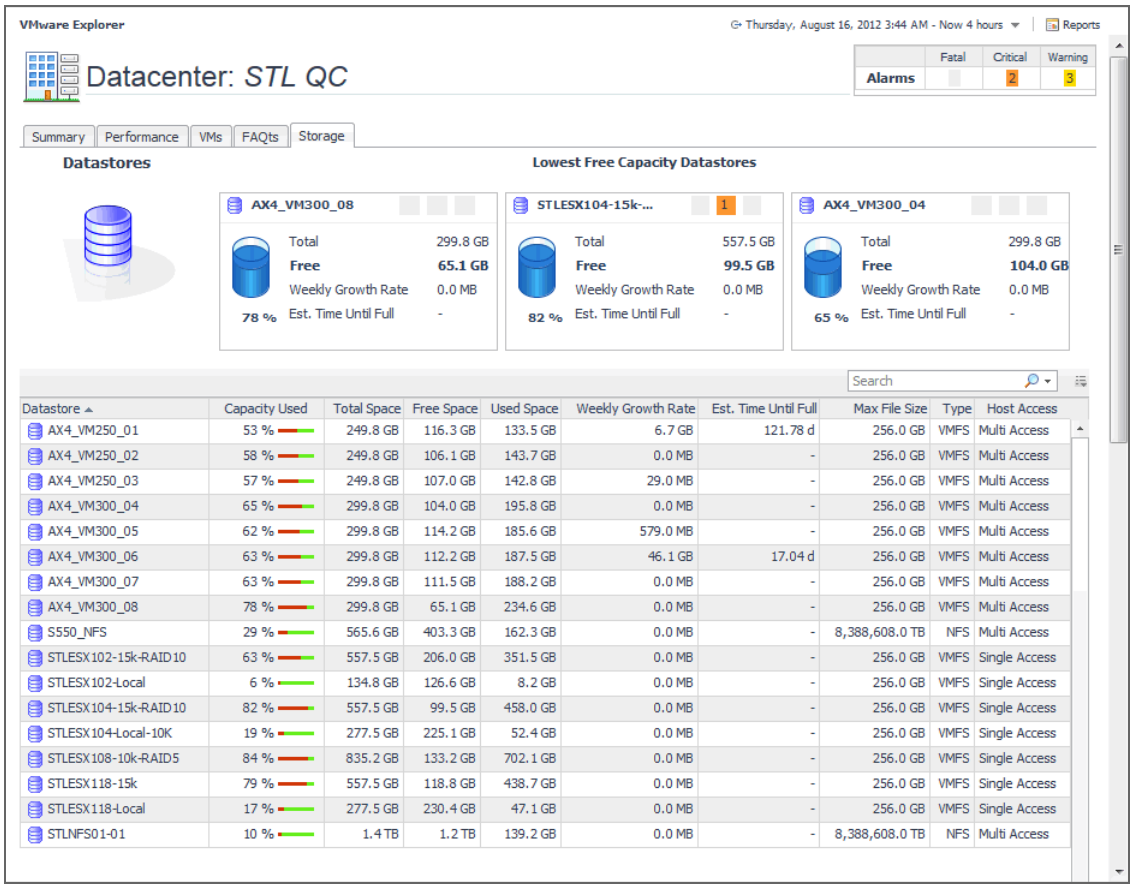
Description	This view shows the amount I/O resources used by the virtual machines associated with the selected datastore.
Data displayed	• **I/O Distribution**. A pie chart indicating how much the individual virtual machines contributed to the use of I/O resources. • **VM Offenders, Name**. The name of the virtual machine. • **VM Offenders, ESX Host Name**. The name of the ESX host on which the ESX machine is running. • **VM Offenders, I/O**. The data transfer rate for the virtual machine.

Storage tab (Datacenter)

Purpose

The VMware Explorer's **Storage** tab displays the disk storage capacity associated with the selected component. Selecting a data center and opening this tab displays storage metrics for all Datastores associated with the selected Datacenter.

Figure 75. Storage tab (Datacenter)



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, that appears on the navigation panel, select a Datacenter.

3 In the VMware Explorer, open the **Storage** tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Lowest Free Capacity Datastores
- Datastores

Table 60. Lowest Free Capacity Datastores

	The **Storage** tab displays three tiles, identifying the datastores with the lowest amount of free space.
Description	This view contains information about the used, free, and total space of the selected components' datastores, along with projected short-term estimates, given the current growth patterns.
Data displayed	• **Datastore**. The name of the selected datastore, followed by the related alarm counts. • **Est. Time Until Full**. The estimated amount of time until which this datastore will become full. • **Free**. The amount of free space for this datastore. • **Total**. The total amount of space for this datastore. • **Weekly Growth Rate**. The average amount of space the datastore expands every week.

Table 61. Datastores

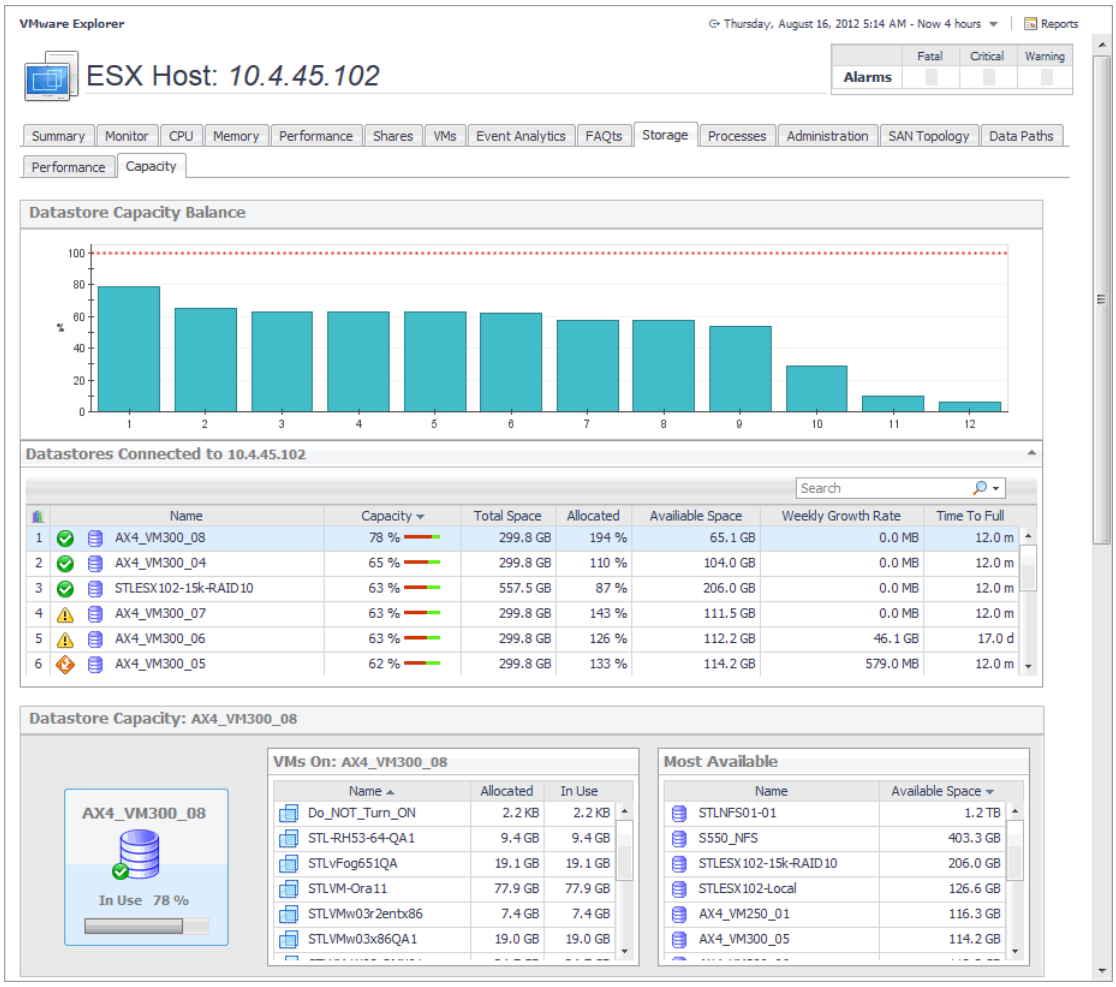
Description	Lists the datastores associated with the selected datacenter, and shows storage metrics associated with each datastore.
Data displayed	• **Capacity Used**. The current percentage of the used disk space. • **Datastore**. The datastore name. • **Est. Time Until Full**. The estimated time after which the disk will be full. • **Free Space**. The amount of disk space that is free. • **Host Access**. The host access type. • **Max File Size**. The maximum file size. • **Total Space**.The total disk space, including used and free space. • **Type**. The file system type. • **Used Space**. The amount of used disk space. • **Weekly Growth Rate**. The estimated growth pattern of the used disk space.

Storage tab (ESX Host)

Purpose

The VMware Explorer's **Storage** tab displays the disk storage capacity associated with the selected component. Selecting an ESX host and opening this tab displays the storage metrics associated with the selected ESX host.

Figure 76. Storage tab (ESX Host)



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select an ESX host.
3. In the VMware Explorer, open the **Storage** tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Datastore Capacity (Capacity tab)
- Datastore Capacity Balance (Capacity tab)
- Datastore I/O Balance (Performance tab)
- Datastore Performance (Performance tab)
- Datastores Connected to ESX Host (Performance and Capacity tabs)
- Storage Adaptor Utilization (Performance tab)
- Storage Adaptors (Performance tab)

Table 62. Datastore Capacity (Capacity tab)

Description	This view contains information about the selected datastore data capacity.
Data displayed	• **Datastore, In Use**. The percentage of disk space in use. • **Most Available, Available Space**. The disk space available on the datastore. • **Most Available, Name**. The name of the datastore. • **VMs On Datastore, Allocated**. The amount of memory allocated to the virtual machine. • **VMs On Datastore, In Use**. The amount of memory used by the virtual machine. • **VMs On Datastore, Name**. The name of the virtual machine associated with the datastore.

Table 63. Datastore Capacity Balance (Capacity tab)

Description	This view shows the datastore capacity for each datastore connected to the selected ESX host.

Table 64. Datastore I/O Balance (Performance tab)

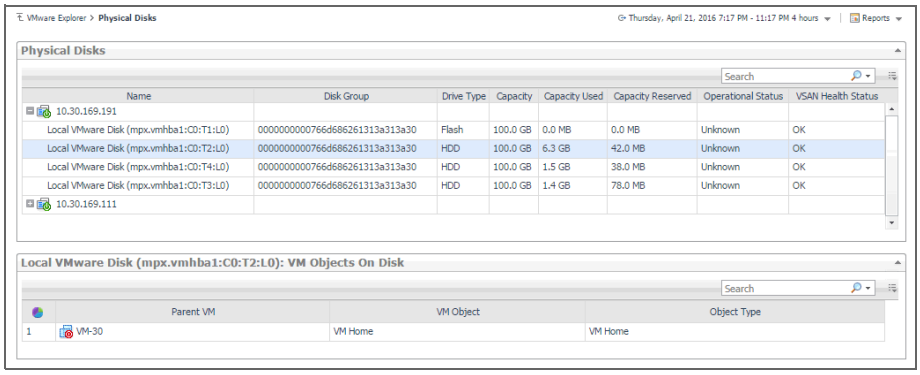
Description	This view shows the data transfer rates for each datastore connected to the selected ESX host.

Table 65. Datastore Performance (Performance tab)

Description	This view shows a the amount I/O resources used by the virtual machines associated with the selected datastore.
Data displayed	• **Disks/Extents, Name** (VMFS and NFS datastores only). The name of the disk associated with the datastore. For more information about VMFS and NFS datastores, see Datastores on page 9. • **Disks/Extents, Read** (VMFS and NFS datastores only). The rate at which the data is read from the disk. • **Disks/Extents, Read Latency** (VMFS and NFS datastores only). The read latency of the disk. • **Disks/Extents, Write** (VMFS and NFS datastores only). The rate at which the data is written to the disk • **Disks/Extents, Write Latency** (VMFS and NFS datastores only). The write latency of the disk. • **I/O Distribution**. A pie chart indicating how much the individual virtual machines contributed to the use of I/O resources. • **VM Offenders, Name**. The name of the virtual machine. • **VM Offenders, ESX Host Name**. The name of the ESX host on which the ESX machine is running.

Table 65. Datastore Performance (Performance tab)

- **VM Offenders, I/O**. The data transfer rate for the virtual machine.
- **Vsan Disks** (VSAN datastores only). Click **Explore Physical Disks** view to display the more information about physical disks.



For complete details about the data appearing on these views, see the following sections:

- Physical Disks (VSAN Physical Disks tab, VSAN datastores only)
- Local VMware Disk: VM Objects On Disk (VSAN Physical Disks tab, VSAN datastores only)

For more information about VSAN datastores, see VSAN datastores on page 9.

Table 66. Datastores Connected to ESX Host (Performance and Capacity tabs)

Description	This view lists the datastores connected to the selected ESX host and shows performance metrics associated with each datastore.
Data displayed	• **Available Space**. The amount of available space on the datastore. • **Latency**. The datastore latency. • **My I/O**. The datastore data transfer rates associated with the selected ESX host. • **Name**. The datastore name and its alarm status. • **Total I/O**. The total datastore data transfer rate.

Table 67. Storage Adaptor Utilization (Performance tab)

Description	This view shows the data transfer rates for each storage adaptor associated with the selected ESX host.

Table 68. Storage Adaptors (Performance tab)

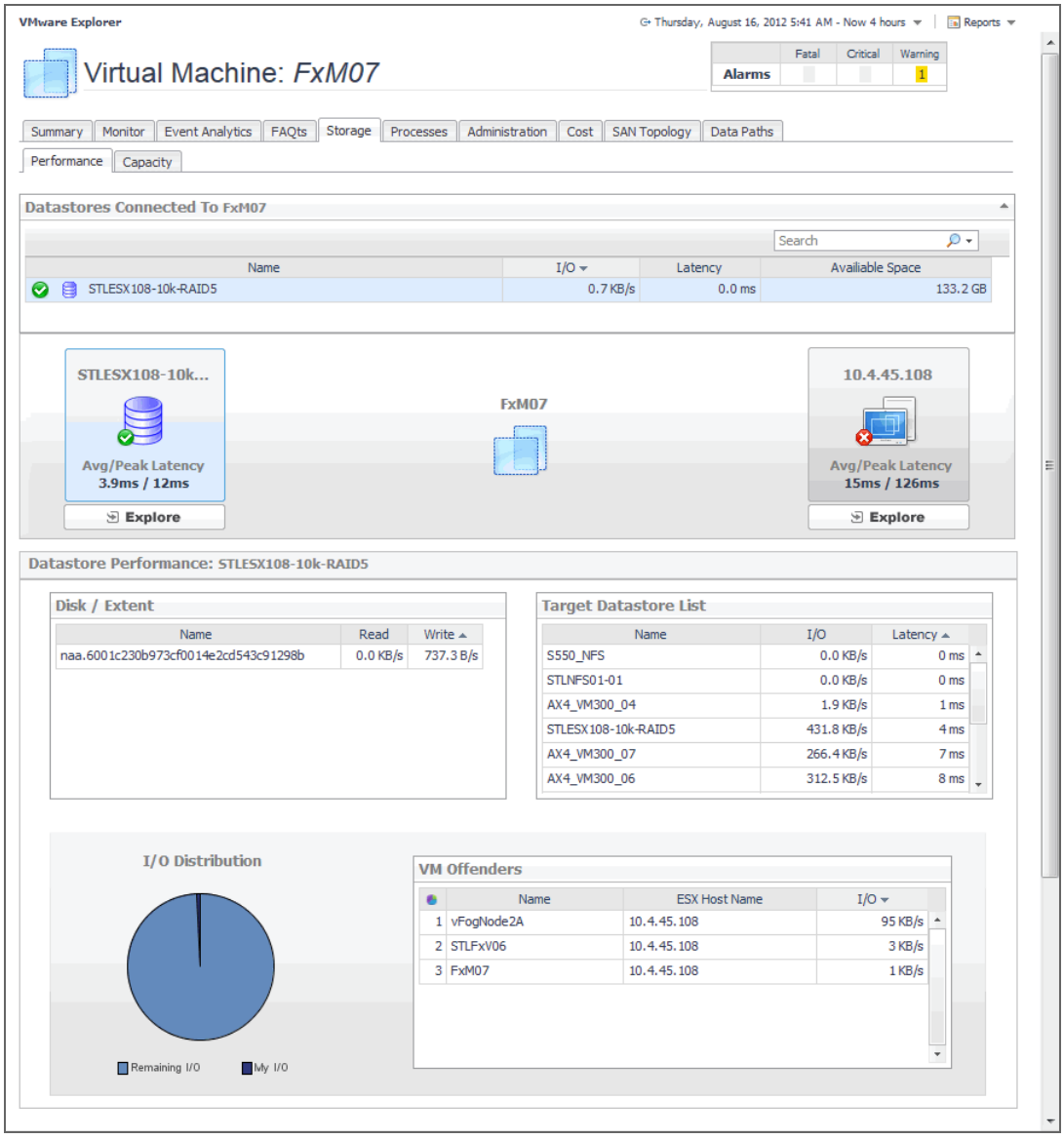
Description	This view lists the storage adaptors associated with the selected ESX host, and shows performance metrics for each adaptor.
Data displayed	• **Name**. The storage adaptor name.
	• **Read**. The storage adaptor data read rates.
	• **Read Latency**. The storage adaptor read latency.
	• **Write**. The storage adaptor data write rates.
	• **Write Latency**. The storage adaptor write latency.

Storage tab (Virtual Machine)

Purpose

The VMware Explorer's **Storage** tab displays the disk storage capacity associated with the selected component. Selecting a virtual machine and opening this tab displays the storage metrics associated with the selected virtual machine.

Figure 77. Storage tab (Virtual Machine)



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select a virtual machine.
3. In the VMware Explorer, open the **Storage** tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Datastore Capacity (Capacity tab)
- Datastore Performance (Performance tab)
- Datastores Connected to Virtual Machine (Performance and Capacity tabs)
- Virtual Machine Capacity (Capacity tab)

Table 69. Datastore Capacity (Capacity tab)

Description	This view contains information about the selected datastore and virtual machine data capacity.
Data displayed	• **Datastore, Current Utilization, Allocated**. The amount and percentage of disk space allocated to the datastore. • **Datastore, Current Utilization, Available Space**. The disk space available on the datastore. • **Datastore, Current Utilization, Capacity**. The total disk space on the datastore. • **Datastore, Current Utilization, In Use**. The amount and percentage of disk space the datastore uses. • **Datastore, In Use**. The percentage of disk space in use by the datastore. • **Virtual Machine, Current Utilization, Allocated**. The amount and percentage of disk space allocated to the virtual machine. • **Virtual Machine, Current Utilization, In Use**. The amount and percentage of disk space the virtual machine uses. • **Virtual Machine, In Use**. The percentage of disk space in use by the virtual machine.

Table 70. Datastore Performance (Performance tab)

Description	This view shows the amount of I/O resources used by the datastore associated with the selected virtual machine.
Data displayed	• **Disk/Extent, Name**. The name of the disk associated with the datastore. • **Disk/Extent, Read**. The read rate of the disk associated with the datastore. • **Disk/Extent, Write**. The write rate of the disk associated with the datastore. • **I/O Distribution**. A pie chart indicating how much the selected virtual machines contributes to the overall use of I/O resources. • **Target Datastore List, I/O**. The data transfer rate of the target datastore. • **Target Datastore List, Latency**. The data transfer latency of the target datastore. • **Target Datastore List, Name**. The name of the target datastore. • **VM Offenders, ESX Host Name**. The name of the ESX host on which the ESX machine is running. • **VM Offenders, I/O**. The data transfer rate for the virtual machine. • **VM Offenders, Name**. The name of the virtual machine.

Table 71. Datastores Connected to Virtual Machine (Performance and Capacity tabs)

Description	This view lists the datastores connected to the selected virtual machine and shows performance metrics associated with each datastore.
Data displayed	• **Available Space**. The amount of available space on the datastore. • **Datastore, Avg/Peak Latency**. The average and peak latency rates for the selected datastore.

Table 71. Datastores Connected to Virtual Machine (Performance and Capacity tabs)

- **ESX Host, Avg/Peak Latency**. The average and peak latency rates for the ESX host associated with the selected virtual machine.
- **Latency**. The datastore latency.
- **I/O**. My I/O. The datastore data transfer rates associated with the selected ESX host.
- **Name**. The datastore name and its alarm status.
- **Total I/O**. The total datastore data transfer rate.

Table 72. Virtual Machine Capacity (Capacity tab)

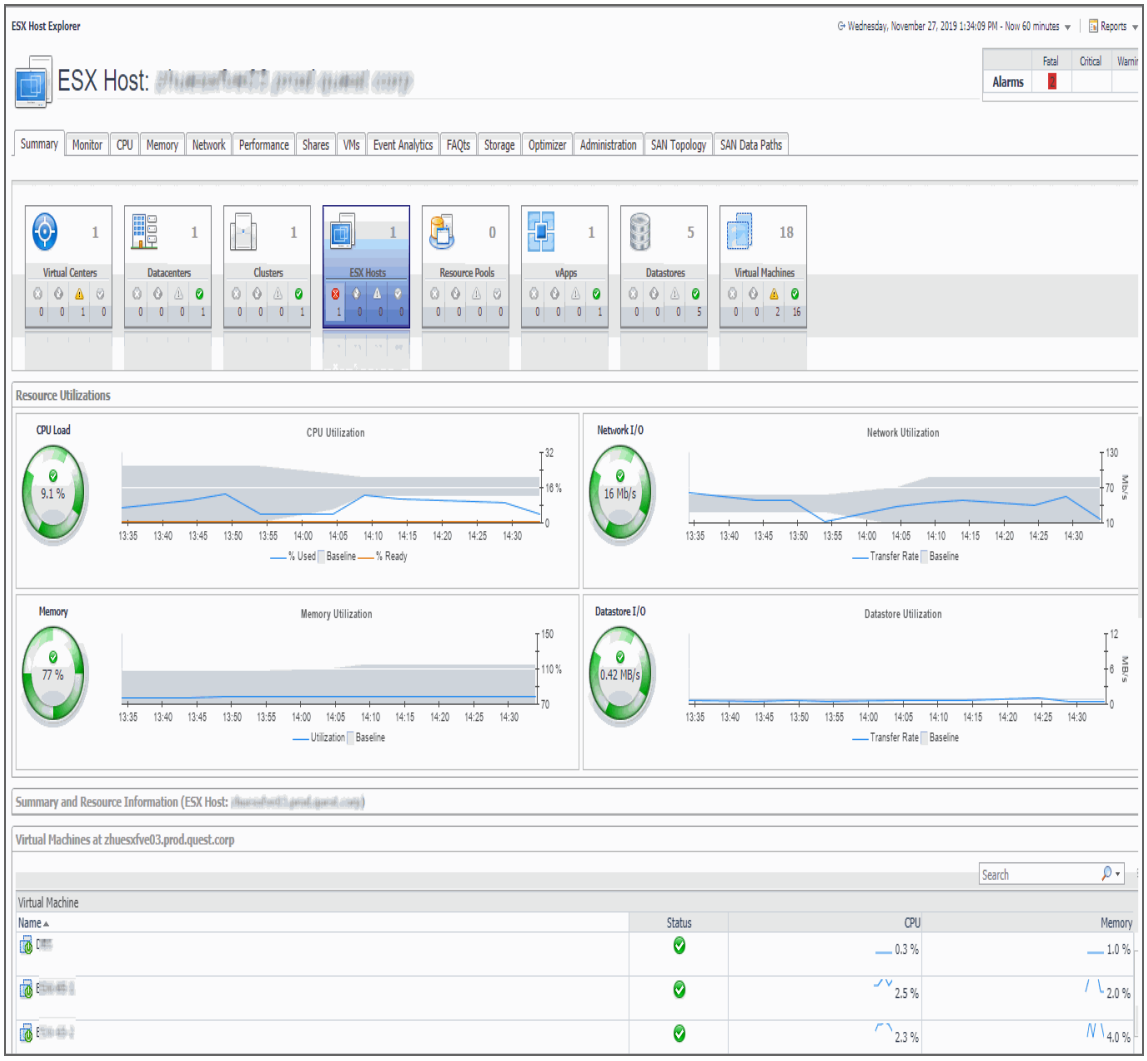
Description	This view lists the logical disks associated with the selected virtual machines and shows their performance metrics.
Data displayed	• **Available Space**. The space currently available on the logical disk. • **Capacity**. The logical disk capacity. • **In Use**. The amount of disk space used by the logical disk. • **Logical Disk**. The name of the logical disk. • **Time To Full**. The estimated time after which the disk will be full. • **Total Space**. The total space allocated to the logical disk. • **Weekly Growth Rate**. The estimated growth pattern of the used disk space.

Summary tab

Purpose

The Summary view provides a hierarchical inventory, in the form of tiles, of the objects that are related to the object or group of objects selected.

Figure 78. Summary tab



Each tile shows the number of instances of the corresponding object type, as well as the counts of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).

More detailed information for the selected object or objects is displayed in the collapsible views below the Summary view.

On a tile, click the object type icon, the object type name, or the object count, to view a popup that lists all objects of the corresponding type, along with their respective states. Click a column header on the popup to change the sort order. Click an object in the popup list to view details for that object in the VMware Explorer dashboard.

On a tile, click an alarm state icon or the number below it to view a popup that shows the outstanding alarms of that state for the corresponding object type.

If an alarm state has a count of zero, then you can not select that alarm state. When you click a normal state icon or count, the VMware Explorer page is refreshed, but you do not see an alarm popup because there are no alarms associated with the normal state.

How to Get Here

1 Open the VMware Explorer.

2 In the Virtual Infrastructure view, select a Virtual Center, datacenter, cluster, ESX host, resource pool, or a virtual machine.

The Summary tab is the first tab you see open in the display area.

Description of Embedded Views

This view is made up of the following embedded views:

- Cluster
- ESX Hosts
- Notes
- Resource Pool
- Resource Utilizations
- Servers
- Summary and Resource Information
- Virtual Environment
- Virtual Machines
- Virtual Machine and Resource Pool Changes

Table 73. Cluster

Description	Shows a list of clusters associated with the selected datacenter. **NOTE:** This view only appears when viewing datacenter details.
Data displayed	• **CPU Used**. The amount of CPU processing power used by all ESX hosts associated with the cluster and the selected datacenter. • **Hosts**. The number of ESX hosts associated with the cluster and the selected datacenter. • **Memory**. The percentage of total memory used by all ESX hosts associated with the cluster and the selected datacenter. • **Name**. The cluster name. • **Resource Pools**. The number of resource pools associated with the cluster and the selected datacenter. • **Status**. The status of the cluster, associated with any alarms raised against that virtual machine. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the alarm severity (Warning, Critical, or Fatal).
Where to go next	Drill down on any cluster entry. The Summary tab refreshes, showing the cluster details

Table 74. ESX Hosts

Description	Shows a list of ESX hosts associated with the selected cluster or datacenter. **NOTE:** This view only appears when viewing cluster or datacenter details.
Data displayed	• **ESX Host, CPU**. The amount of CPU processing power used by the ESX host. • **ESX Host, HBAs**. The number of host adapters that exist on the ESX host. • **ESX Host, Memory**. The percentage of total memory used by the ESX host. • **ESX Host, Name**. The virtual machine name. • **ESX Host, NICs**. The number of network interface cards that exist on the ESX host. • **ESX Host, Status**. The status of the virtual machine, associated with any alarms raised against that virtual machine. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the alarm severity (Warning, Critical, or Fatal). • **ESX Host, Version**. The version of the VMware ESX Server application installed on the host.

Table 74. ESX Hosts

	• **Virtual Machines, Configured**. The number of virtual machines that are configured to run on the ESX host. • **Virtual Machines, Running**. The number of virtual machines currently running on the host.
Where to go next	Drill down on any ESX host entry. The Summary tab refreshes, showing the ESX host details.

Table 75. Notes

Description	Shows additional notes about the selected virtual machine. **NOTE:** This view only appears when viewing virtual machine details.

Table 76. Resource Pool

Description	For complete information about this view, see Resource Pools Relationship Tree view on page 118.

Table 77. Resource Utilizations

Description	Shows the resource consumption for the selected cluster, server, or virtual machine broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected component's (cluster, server, or virtual machine) CPU load, used to execute system code and user programs, based on the total CPU capacity available to that component. • **CPU Utilization, % Used**. The percentage of the selected component's (cluster, server, or virtual machine) CPU utilization spent on executing system code and user programs during the selected time period. • **CPU Utilization, % Ready**. The percentage of the selected component's (cluster, server, or virtual machine) CPU resources that are ready to execute system code and user programs during the selected time period. • **CPU Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data. **NOTE:** This information is only available when exploring ESX hosts or virtual machines. • **Datastore I/O**. The current datastore I/O rate for the selected ESX host. **NOTE:** This information is only available when exploring ESX hosts. • **Datastore Utilization, Baseline**. An envelope indicating the expected datastore utilization range based on historical data. **NOTE:** This information is only available when exploring ESX hosts. • **Datastore Utilization, Transfer Rate**. The rate at which data was read from and written to the datastore of the selected ESX host during the specified time period. **NOTE:** This information is only available when exploring ESX hosts. • **Datastore Utilization, Write Rate**. The rate at which data was written to the datastore of the selected component during the specified time period. **NOTE:** This information is only available when exploring ESX hosts. • **Datastore I/O**. The current datastore I/O rate for the selected server or cluster. **NOTE:** This information is only available when exploring ESX hosts. • **Disk Utilization, Baseline**. An envelope indicating the expected disk utilization range based on historical data. **NOTE:** This information is only available when exploring datacenters, clusters, resource pools, virtual machines, or virtual centers.

Table 77. Resource Utilizations

- **Disk Utilization, Transfer Rate**. The rate at which data was read from and written to the disks of the selected component during the specified time period.

NOTE: This information is only available when exploring datacenters, clusters, resource pools, virtual machines, or virtual centers.

- **Disk Utilization, Write Rate**. The rate at which data was written to the disks of the selected component during the specified time period.

NOTE: This information is only available when exploring datacenters, clusters, resource pools, virtual machines, or virtual centers.

- **Disk I/O**. The current disk I/O rate for the selected server or cluster.

NOTE: This information is only available when exploring datacenters, clusters, resource pools, virtual machines, or virtual centers.

- **Memory Usage**. The current percentage of the average memory usage by the selected component (server or cluster).
- **Memory Utilization, Baseline**. An envelope indicating the expected memory utilization range based on historical data.

NOTE: This information is only available when exploring ESX hosts or virtual machines.

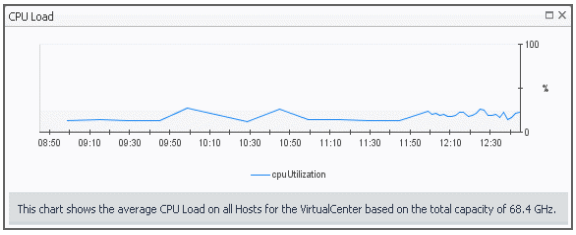
- **Memory Utilization, Utilization**. The percentage of the available memory that the selected component (server or cluster) uses during the specified time period.
- **Network I/O**. The current rate at which the selected component (cluster, server, or virtual machine) transfers data from and to the network.
- **Network Utilization, Baseline**. An envelope indicating the expected network utilization range based on historical data.

NOTE: This information is only available when exploring ESX hosts or virtual machines.

- **Network Utilization, Transfer Rate**. The rate at which the selected component (cluster, server, or virtual machine) receives and sends data to the network during the selected time period.

Where to go next Drill down on:

- **CPU Load** spinner. Displays the **CPU Load** dialog box.



- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.

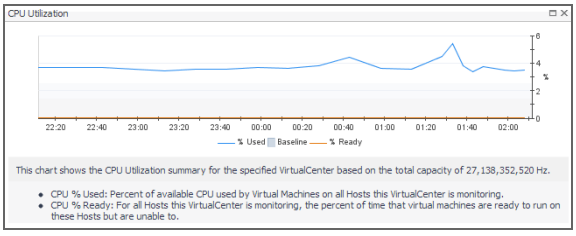
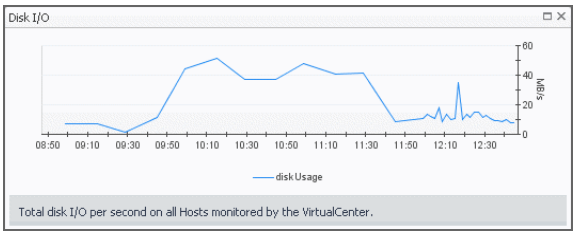


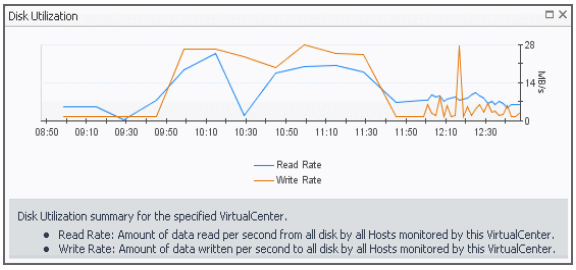
Table 77. Resource Utilizations

- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.



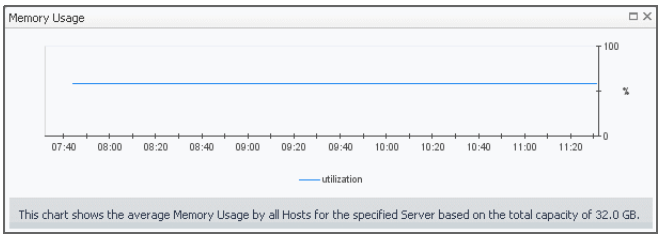
NOTE: This drilldown is only available when viewing server or cluster details in the VMware Explorer.

- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.



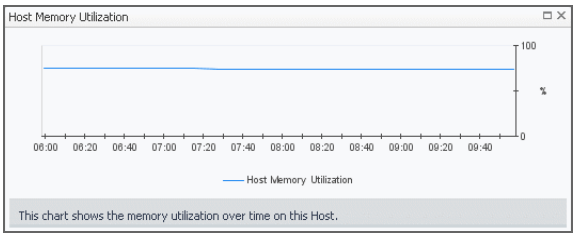
NOTE: This drilldown is only available when viewing server or cluster details in the VMware Explorer.

- **Memory Usage** spinner. Displays the **Memory Usage** dialog box.



NOTE: This drilldown is only available when viewing server or cluster details in the VMware Explorer.

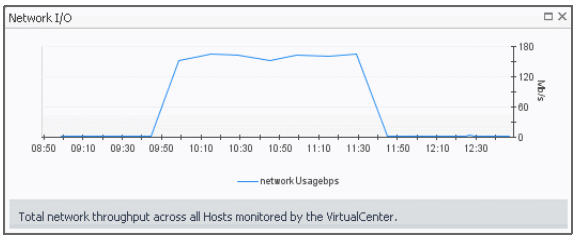
- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.



NOTE: This drilldown is only available when viewing server or cluster details in the VMware Explorer.

Table 77. Resource Utilizations

- **Network I/O** spinner. Displays the **Network I/O** dialog box.



- **Network Utilization** graph. Displays the **Network Utilization** dialog box.

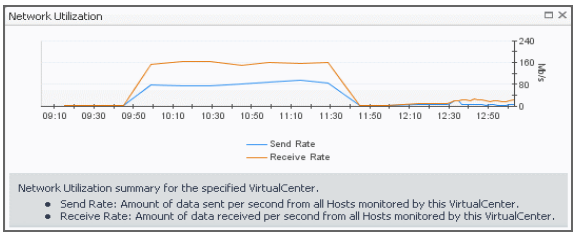


Table 78. Servers

Description	Shows a list of servers that belong to the selected cluster. **NOTE:** This view only appears when viewing cluster details.
Data displayed	• **Server, CPU**. The current percentage of the server's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **Server, Memory**. The current percentage of the server's memory usage by the selected component. • **Server, NICs**. The number of network interface cards that the server uses. • **Server, Server Name**. The server name. • **Server, Status**. The server status, associated with any alarms raised against that server. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the alarm severity (Warning, Critical, or Fatal). • **Server,** Version. The operating system version. • **Virtual Machines, Configured**. The number of virtual machines that exist on the server. • **Virtual Machines, Running**. The number of virtual machines that are currently running on the server.
Where to go next	Drill down on any server entry. The VMware Explorer dashboard appears, showing the server details on the Summary tab.

Table 79. Summary and Resource Information

Description	Shows physical configuration details for the selected server or virtual machine.
Data displayed	**Data appearing when viewing cluster details:** • **Datacenter**. The name of the datacenter associated with the cluster. • **Datastores**. The number of datastores associated with the selected cluster. • **ESX Hosts**. The number of ESX hosts that belong to the selected cluster. • **Memory Capacity**. The combined memory capacity of the servers that belong to the selected cluster. • **Network Interfaces**. The number of network interface cards used by the servers that belong to the selected cluster.

Table 79. Summary and Resource Information

- **Processing Power**. The CPU speed available to the selected cluster.
- **Resource Pools**. The number of resource pools associated with the cluster.
- **Virtual Center**. The IP address of the Virtual Center to which the cluster belongs.
- **Virtual Machines Hosted**. The number of virtual machines hosted in the selected cluster.

Data appearing when viewing ESX host details:

- **Cluster**. The name of the cluster to which the selected ESX host belongs.
- **Computing Capacity**. The CPU processing power available to the ESX host.
- **Connection Status**. The ESX host's connection status.
- **Current Status**. The current status of the selected ESX host: `Turned off` or `Powered On`.
- **Datastores**. The number of datastores associated with the ESX host.
- **DNS Name**. The fully qualified DNS name of the host.
- **ESX Software Version**. The VMware application version.
- **Memory Capacity**. The memory capacity of the selected ESX host.
- **Network Interfaces**. The number of network interface cards that exist on the ESX host.
- **Processors**. The number of CPUs used by the selected server.
- **Virtual Machines Count**. The number of virtual machines running on the selected server.
- **VM's Powered On Count**. The number of virtual machines that exist on the host that are currently powered on.

Data appearing when viewing virtual machine details:

- **Cluster**. The name of the cluster to which the selected virtual machine belongs.
- **Connection Status**. The virtual machine's connection status.
- **Current Status**. The current status of the selected virtual machine: `Turned off` or `Powered On`.
- **Datacenter**. The name of the datacenter associated with the virtual machine.
- **DNS Name**. The fully qualified DNS name of the virtual machine.
- **ESX Host**. The IP address of the ESX host on which the virtual machine is running.
- **IP address**. The IP address of the virtual machine.
- **Memory Capacity**. The amount of memory resources allocated to the virtual machine.
- **Network Interfaces**. The number of network interface cards used by the selected virtual machine.
- **OS**. The name of the operating system used by the selected virtual machine.
- **Processors**. The number of CPUs used by the selected virtual machine and the number of the CPU shares.
- **Resource Pools**. The name of the resource associated with the virtual machine.
- **Storage Devices**. The number of physical and logical disks associated with the virtual machine.
- **Uptime**. The percentage of time during which the virtual machine is running.
- **Virtual Center**. The IP address of the Virtual Center to which the virtual machine belongs.
- **Vmware Tools**. The name of VMware applications used to manege the virtual machine.

Data appearing when viewing datacenter details:

- **Clusters**. The number of clusters associated with the datacenter.

Table 79. Summary and Resource Information

- **Combined Processing**. The combined CPU processing power available to the datacenter.
- **Datastores**. The number of datastores associated with the datacenter.
- **ESX Hosts**. The number of ESX hosts associated with the datacenter.
- **Memory Capacity**. The combined memory capacity available to the datacenter.
- **Network Interfaces**. The number of network interface cards available to the datacenter.
- **Resource Pools**. The number of resource pools associated with the datacenter.
- **Virtual Machines Hosted**. The number of virtual machines associated with the datacenter.

Data appearing when viewing resource pool details:

- **CPU Limit**. The maximum CPU processing power allocated to the datacenter.
- **CPU Reservation**. The CPU processing power allocated to the datacenter.
- **CPU Shares**. The state of CPU shares associated with the datacenter.
- **Memory Limit**. The maximum memory resources allocated to the datacenter.
- **Memory Reserved**. The memory resources allocated to the datacenter.
- **Memory Shares**. The state of memory shares associated with the datacenter.
- **Nested Resource Pool(s)**. The number of child resource pools.
- **Parent**. The host name or IP address of the resource pool parent element.
- **Virtual Machines**. The number of virtual machines associated with the resource pool.

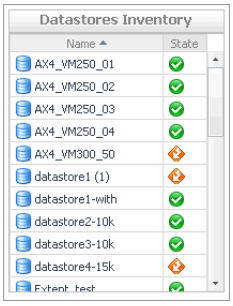
Table 80. Virtual Environment

Description	The VMware Explorer's Virtual Environment view displays a high-level overview of your virtual environment. The view has a tile for each object type: **Virtual Centers**, **Datacenters**, **Clusters**, **ESX Hosts**, **Resource Pools**, **Datastores**, and **Virtual Machines**. Each tile shows the number of the corresponding object instances in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).
Data displayed	• **Alarm counts**. The total counts of alarms associated with the clusters, servers, or virtual machines, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Cluster count**. The number of clusters in the Virtual Center. • **Datacenter count**. The number of datacenters in the Virtual Center. • **Datastore count**. The number of datastores in the Virtual Center. • **ESX Host count**. The number of ESX hosts in the Virtual Center. • **Resource Pools**. The number of resource pools in the Virtual Center. • **Virtual Machine count**. The number of virtual machines in the Virtual Center • **Virtual Center count**. There can be only one Virtual Center in each model.
Where to go next	Drill down on: • **Cluster**. Displays the **Clusters Inventory** dwell, showing the names and states of one or more clusters associated with the selected component.

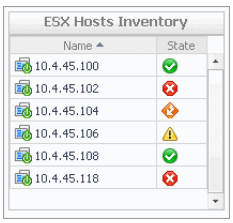
Table 80. Virtual Environment

- **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the names and states of one or more datacenters associated with the selected component.

- **Datastores**. Displays the **Datastores Inventory** dwell, showing the names and states of one or more datastores associated with the selected component.



- **ESX Hosts**. Displays the **ESX Hosts Inventory** dwell, showing the names and states of one or more ESX hosts associated with the selected component.



- **Resource Pools**. Displays the **Resource Pools Inventory** dwell, showing the names and states of one or more resource pools associated with the selected component.

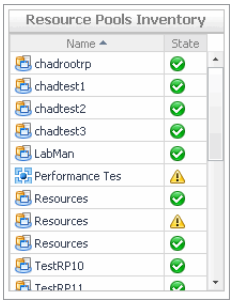


Table 80. Virtual Environment

- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the virtual center containing the selected component.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of one or more virtual machines associated with the selected component.

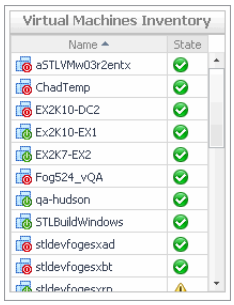


Table 81. Virtual Machines

Description	Shows a list of virtual machines associated with the selected cluster or ESX host. **NOTE:** This view only appears when viewing cluster or ESX host details.
Data displayed	• **Name**. The virtual machine name. • **Status**. The status of the virtual machine, associated with any alarms raised against that virtual machine. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the alarm severity (Warning, Critical, or Fatal).
Where to go next	Drill down on any virtual machine entry. The Summary tab refreshes, showing the virtual machine details.

Table 82. Virtual Machine and Resource Pool Changes

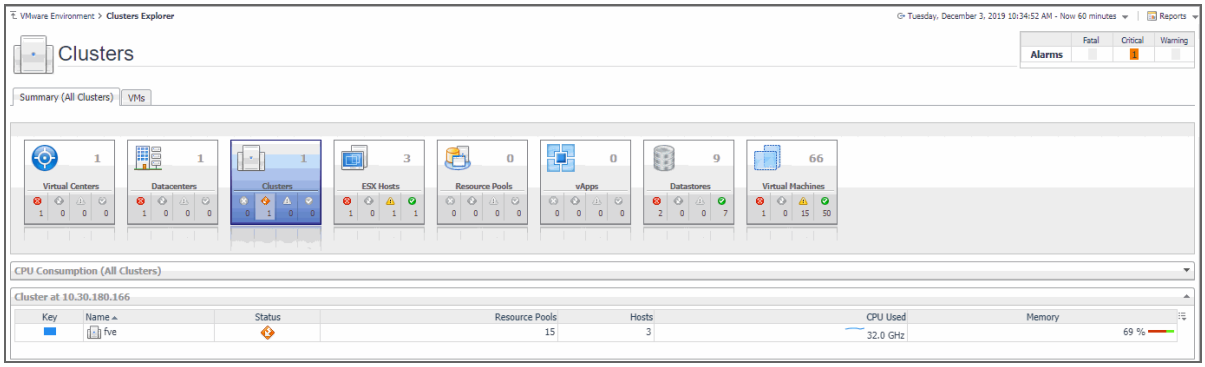
Description	Shows a list of asset tracking changes associated with the selected virtual machine and its resource pool. **NOTE:** This view only appears when viewing virtual machine details.
Data displayed	• **Change**. The change description. • **Time**. The date and time at which the change occurred. • **Details**. Additional details about the change.

Summary (All Clusters) tab

Purpose

The **Summary (All Clusters)** tab shows a summary of system resources for all available clusters in a Virtual Center.

Figure 79. Summary (All Clusters) tab



How to Get Here

1 Open the VMware Explorer.

2 In the Virtual Infrastructure view, that appears on the navigation panel, select the **Clusters** node.

The VMware Explorer refreshes in the display area with the Summary (All Clusters) tab open.

Description of Embedded Views

This view is made up of the following embedded views:

- Clusters at Virtual Center
- Combined CPU Consumption
- Virtual Environment

Table 83. Clusters at Virtual Center

Description	This tabular view lists the clusters that exist in the Virtual Center.
Data displayed	• **CPU Used**. The current amount of the CPU speed used by the ESX hosts in the cluster. • **Hosts**. The number of ESX hosts in the cluster. • **Key**. The color used in the Combined CPU Consumption chart to represent the cluster. • **Memory**. The current percentage of memory used by all servers in the cluster. • **Name**. Cluster name. • **Resource Pools**. The number of resource pools in the cluster. • **Status**. The status of the cluster, associated with any alarms raised against that cluster. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal).
Where to go next	Drill down on any cluster entry. The VMware Explorer refreshes, showing the cluster details on the Summary tab.

Table 84. Combined CPU Consumption

Description	Shows the combined percentage of the CPU usage for all clusters in the Virtual Center.
Data displayed	• **Combined CPU Consumption, %**. The combined percentage of the CPU utilization used by all ESX hosts in all clusters to execute system code and user programs during the selected time period.

Table 84. Combined CPU Consumption

Where to go next Drill down on:

- **Combined CPU Consumption %**. Displays the **Combined CPU Consumption** dialog box.

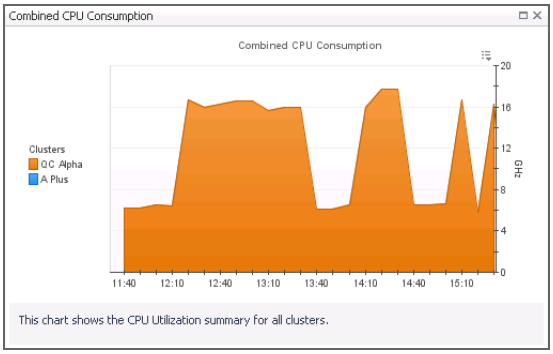


Table 85. Virtual Environment

Description The VMware Explorer's Virtual Environment view displays a high-level overview of your virtual environment. The view has a tile for each object type: **Clusters**, **Servers**, and **Virtual Machines**. Each tile shows how many of the corresponding object instances there are in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).

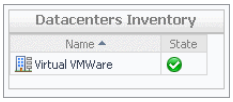
Data displayed

- **Alarm counts**. The total counts of alarms associated with the clusters, servers, or virtual machines, broken down by alarm types (Normal, Warning, Critical, Fatal).
- **Cluster count**. The number of clusters in your virtual environment.
- **Server count**. The number of physical servers in your virtual environment.
- **Virtual Machine count**. The number of virtual machines in your environment.

Where to go next Drill down on:

- **Cluster**. Displays the **Clusters Inventory** dwell, showing the names and states of all clusters that exist in the Virtual Center.

- **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the names and states of all datacenters that exist in the Virtual Center.



- **Datastores**. Displays the **Datastores Inventory** dwell, showing the names and states of all datastores that exist in the Virtual Center.

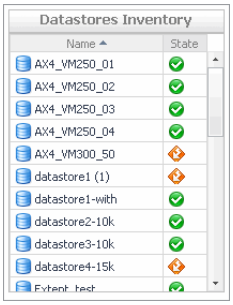
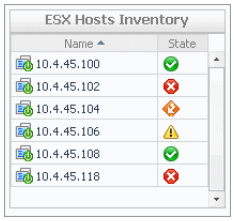
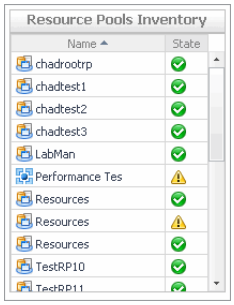


Table 85. Virtual Environment

- **ESX Hosts**. Displays the **ESX Hosts Inventory** dwell, showing the names and states of all ESX hosts that exist in the Virtual Center.

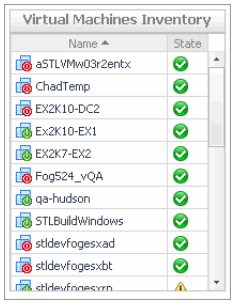


- **Resource Pools**. Displays the **Resource Pools Inventory** dwell, showing the names and states of all resource pools that exist in the Virtual Center.



- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the selected Virtual Center.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all resource pools that exist in the Virtual Center.

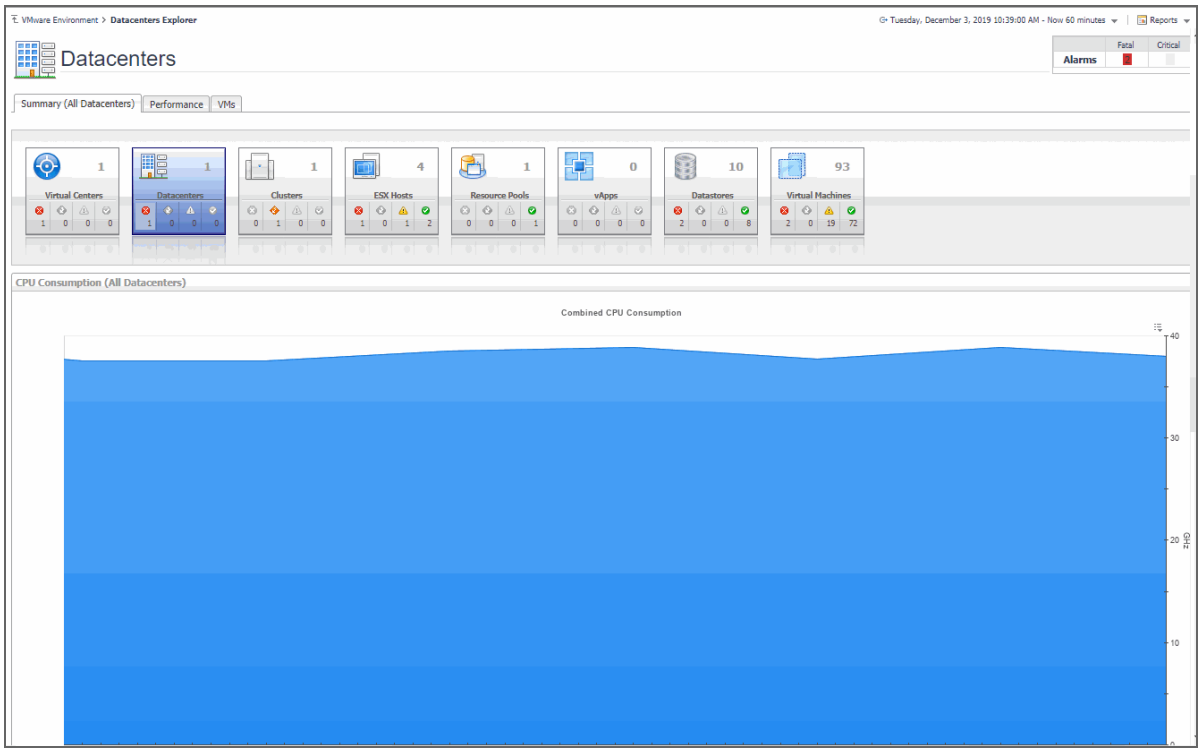


Summary (All Datacenters) tab

Purpose

The **Summary (All Datacenters)** tab shows a summary of system resources for all datacenters that currently exist in a selected Virtual Center.

Figure 80. Summary (All Datacenters) tab



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, that appears on the navigation panel, select the **Datacenters** node.

The VMware Explorer refreshes in the display area, showing the Summary (All Datacenters) tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Combined CPU Consumption
- Datacenter Configurations
- Virtual Environment

Table 86. Combined CPU Consumption

Description	Shows the combined percentage of the CPU usage for all ESX hosts in the system.
Data displayed	• **Combined CPU Consumption %**. The combined percentage of the CPU utilization used by all ESX hosts to execute system code and user programs during the selected time period.

Table 86. Combined CPU Consumption

Where to go next	Drill down on: • **Combined CPU Consumption %**. Displays the **Combined CPU Consumption** dialog box.

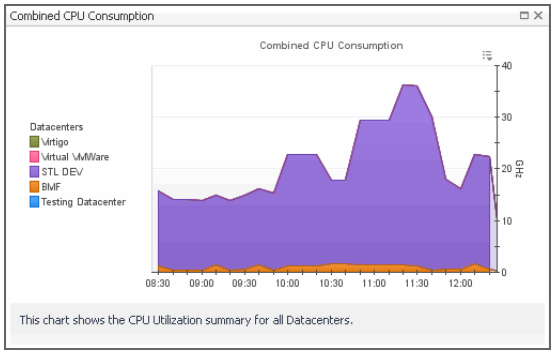


Table 87. Datacenter Configurations

Description	This tabular view lists all datacenters that exist in a Virtual Center configuration.
Data displayed	• **Clusters**. The number of clusters associated with the datacenter. • **CPU Used**. The current amount of the CPU speed that is used by the ESX hosts associated with the datacenter. • **Hosts**. The number of ESX hosts associated with the datacenter. • **Key**. The color used in the Combined CPU Consumption chart to represent the datacenter. • **Memory**. The current percentage of memory that is used by the ESX host. • **Name**. The datacenter name. • **Status**. The datacenter status, associated with any alarms raised against it. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal). • **VMs**. The number of virtual machines associated with the datacenter.
Where to go next	Drill down on any datacenter entry. The VMware Environment dashboard appears, showing the datacenter details on the Summary tab.

Table 88. Virtual Environment

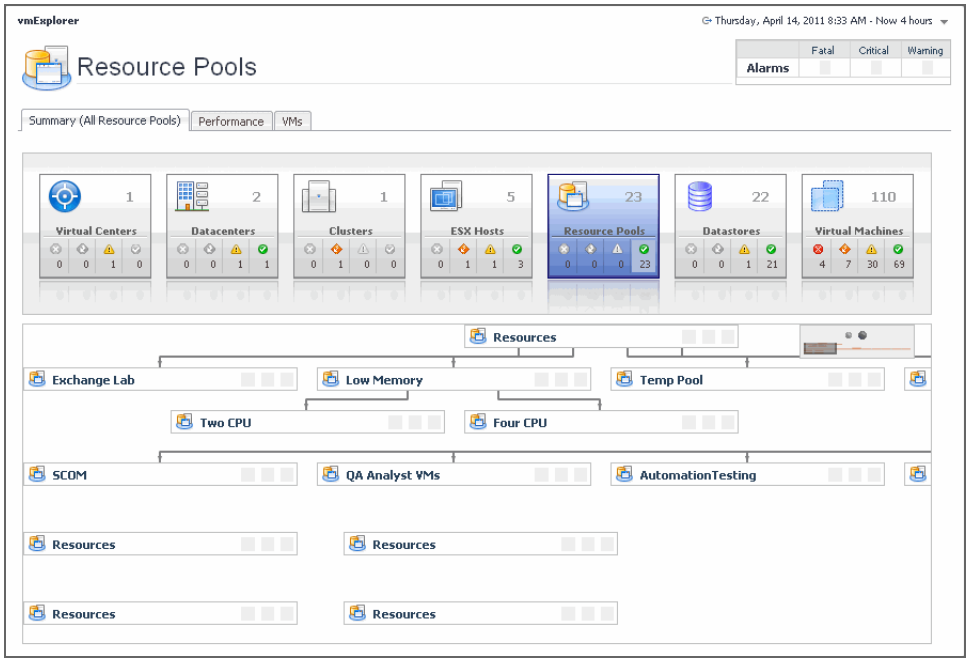
Description	This embedded view shows the same information as the Virtual Environment view appearing on the Summary (All Clusters) tab. See page 143 for complete information.

Summary (All Resource Pools) tab

Purpose

The **Summary (All Resource Pools)** tab shows a summary of system resources for all resource pools that currently exist in a selected Virtual Center.

Figure 81. Summary (All Resource Pools) tab



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, that appears on the navigation panel, select the **Resource Pools** node.

The VMware Explorer refreshes in the display area, showing the Summary (All Resource Pools) tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Resource Pool
- Virtual Environment

Resource Pool

For complete information about this view, see Resource Pools Relationship Tree view on page 118.

Virtual Environment

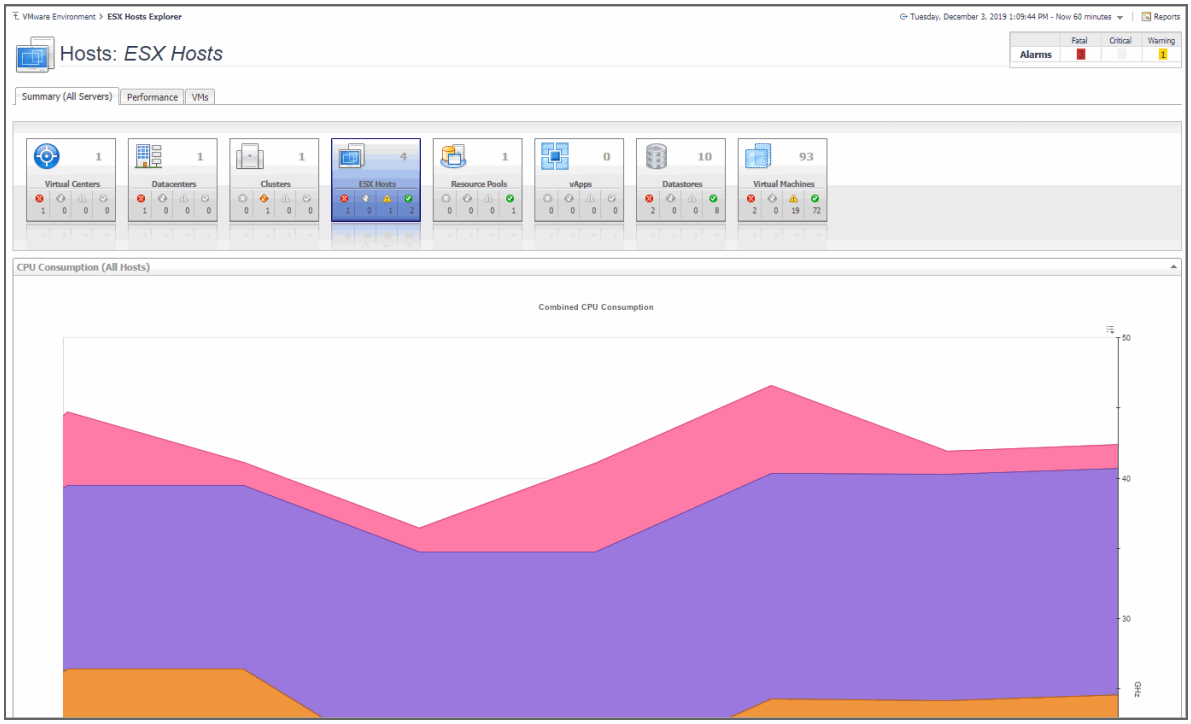
This embedded view shows the same information as the Virtual Environment view appearing on the Summary (All Clusters) tab. See page 143 for complete information.

Summary (All Servers) tab

Purpose

The **Summary (All Servers)** tab shows a summary of system resources for all ESX hosts that currently exist in a selected Virtual Center.

Figure 82. Summary (All Servers) tab



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, that appears on the navigation panel, select the **ESX Hosts** node.

The VMware Explorer refreshes in the display area, showing the Summary (All Servers) tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Combined CPU Consumption
- ESX hosts
- Virtual Environment

Table 89. Combined CPU Consumption

Description	Shows the combined percentage of the CPU usage for all ESX hosts in the system.
Data displayed	• **Combined CPU Consumption %**. The combined percentage of the CPU utilization used by all ESX hosts to execute system code and user programs during the selected time period.

Table 89. Combined CPU Consumption

Where to go next	Drill down on: • **Combined CPU Consumption %**. Displays the **Combined CPU Consumption** dialog box.

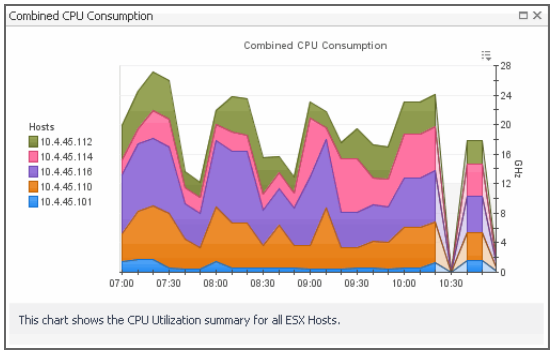


Table 90. ESX hosts

Description	This tabular view lists all ESX hosts that exist in your environment.
Data displayed	• **ESX host, CPU**. The current amount of the CPU speed that is used by the ESX host. • **ESX host, Key**. The color used in the Combined CPU Consumption chart to represent the ESX host. • **ESX host, Memory**. The current percentage of memory that is used by the ESX host. • **ESX host, NICs**. The number of network interface cards used by the ESX host. • **ESX host, ESX host Name**. ESX host name. • **ESX host, Status**. The ESX host status, associated with any alarms raised against it. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal). • **ESX host, Version**. The version number of the Windows OS running on the ESX host. • **Virtual Machines, Configured**. The number of virtual machines that exist on the ESX host. • **Virtual Machines, Running**. The number of virtual machines that are running on the ESX host.
Where to go next	Drill down on any ESX host entry. The VMware Environment dashboard appears, showing the ESX host details on the Summary tab.

Table 91. Virtual Environment

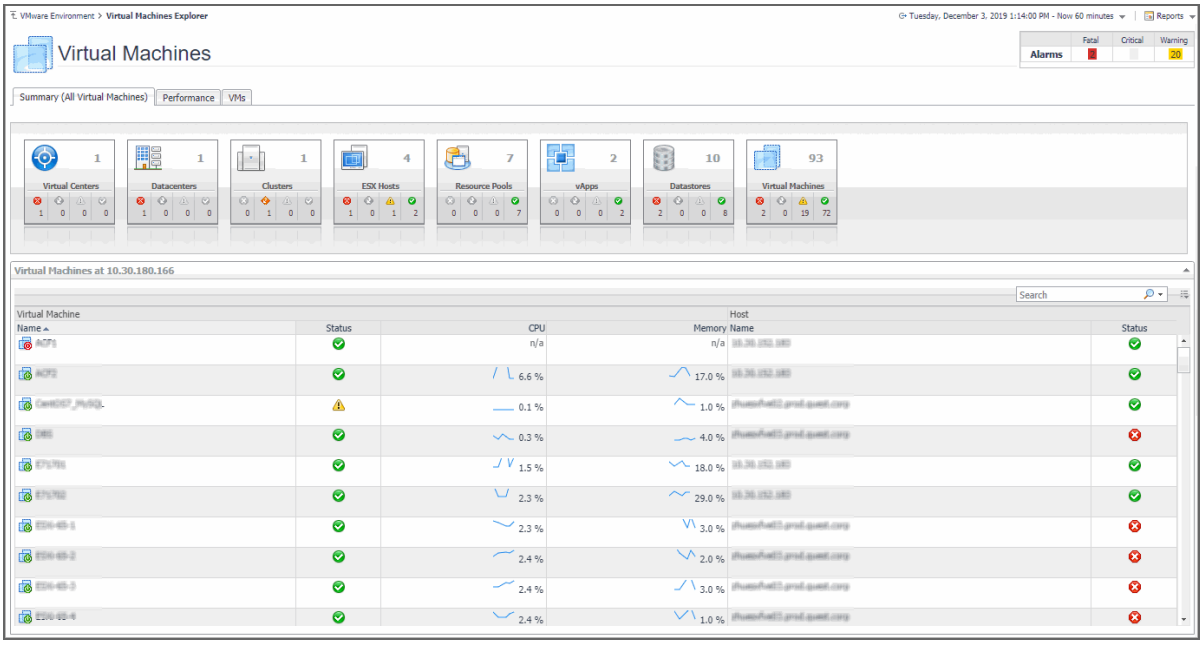
Description	This embedded view shows the same information as the Virtual Environment view appearing on the Summary (All Clusters) tab. See page 143 for complete information.

Summary (All Virtual Machines) tab

Purpose

The **Summary (All Virtual Machines)** tab shows a summary of system resources for all virtual machines that currently exist in the selected Virtual Center.

Figure 83. Summary (All Virtual Machines) tab



How to Get Here

1 Open the VMware Explorer.

2 On the Virtual Infrastructure view, select a **Virtual Machines** node.

The VMware Explorer refreshes in the display area, showing the Summary (All Virtual Machines) tab.

Description of Embedded Views

This view is made up of the following embedded views:

- Virtual Environment
- Virtual Machines

Table 92. Virtual Environment

Description	This embedded view shows the same information as the Virtual Environment view appearing on the Summary (All Clusters) tab. See page 143 for complete information.

Table 93. Virtual Machines

Description	This tabular view lists all virtual machines that exist in the selected Virtual Center.
Data displayed	• **Virtual Machine, Name**. The name of the server on which the virtual machine is running. • **Virtual Machine, Status**. The status of the server on which the virtual machine is running, associated with any alarms raised against it. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal). • **Virtual Machine, CPU**. The percentage of the virtual machine's CPU utilization spent on executing system code and user programs. • **Virtual Machine, Name**. The virtual machine name.

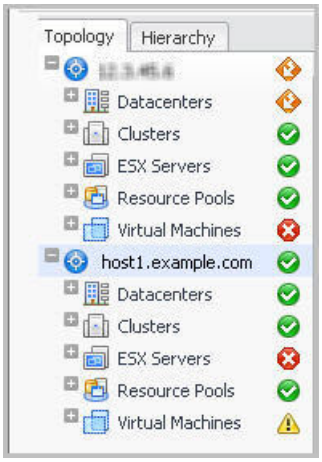
Table 93. Virtual Machines

	• **Virtual Machine, Status**. The virtual machine status, associated with any alarms raised against it. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal). • **Virtual Machine, Memory**. The total amount of memory allocated to the virtual machine.
Where to go next	Drill down on any virtual machine entry. The VMware Environment dashboard appears, showing the server details on the Summary tab.

Virtual Infrastructure view

Purpose

The Virtual Infrastructure view provides an organized view of the various virtual infrastructure objects that are monitored by Foglight for VMware. It serves as a navigation tool, and it also presents pertinent alarm information.



When you select an object from the Virtual Infrastructure view, all of the views in the VMware Explorer dashboard are updated with information pertaining to that object.

How to Get Here

- Open the VMware Explorer.

  The Virtual Infrastructure view appears on the navigation panel.

Description of Embedded Views

The Virtual Infrastructure view is made up of the following embedded views:

- Topology Tab
- Hierarchy Tab
- Mouse-over Status Popups

Topology Tab

The Topology view is organized into a tree using object type (or topology type) containers for branches.

Within the Topology view, all of the virtual infrastructure objects are organized into a tree using object type (or topology type) containers for branches. The top-level objects in the Topology view are always the vCenters.

The top-level objects in the Topology view are always the VirtualCenters.

Each VirtualCenter in the Topology view contains several object type containers, and each object type container contains every object of that particular type that is managed by the parent VirtualCenter.

Each object type container, as well as each object, has a representative icon that is displayed to the left, as shown in the following table.

Table 94. Virtual Infrastructure View Object Icons

Icon	Object	Object Name
	VirtualCenter	VMWVirtualCenter
	Datacenter	VMWDatacenter
	Cluster	VMWCluster
	ESX Server	VMWESXServer
	Resource Pool	VMWResourcePool
	Virtual Machine	VMWVirtualMachine
	Datastore	VMWDatastore

At the right, the Topology view displays status indicators. For an individual object, the status indicator represents the alarm of highest severity that is outstanding for that object. For an object type container, the status indicator represents the alarm of highest severity that is outstanding for all objects of that type.

NOTE: A single virtual machine running at a high CPU utilization does not trigger an alarm for its parent ESX Server. An alarm is only triggered for the parent ESX Server if the server itself is running at a high CPU utilization.

Hierarchy Tab

The Hierarchy view represents the logical layout of VirtualCenter management servers, so it is not organized into groups of common objects.

Within the Hierarchy view, each VirtualCenter object is organized into a tree that has the same hierarchical structure as the VirtualCenter and displays the objects (datacenters, clusters, resource pools, virtual machines, folders, etc.) within the VirtualCenter as branches.

In the Hierarchy view, each VirtualCenter object is organized into a tree that has the same hierarchical structure as the corresponding VirtualCenter, displaying the objects (for example, datacenters, clusters, resource pools, virtual machines, and folders) within the VirtualCenter as branches.

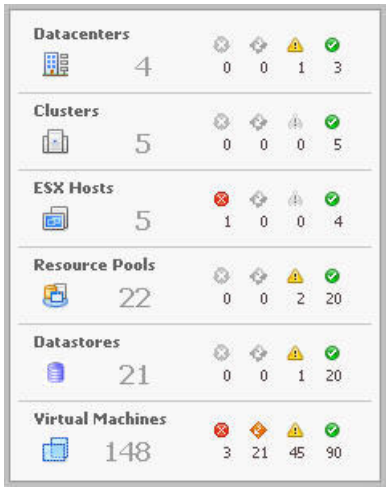
Each object in the Hierarchy view has a representative icon that is displayed at the left of the object's name. These icons are shown in the table in Topology Tab on page 151.

At the right, the Hierarchy view displays status indicators. Each status indicator represents the alarm of highest severity that is outstanding for the corresponding object.

Mouse-over Status Popups

When you hover the cursor over an object in the Virtual Infrastructure view, you see a popup that provides a summary of the present state of that object.

The following image shows the popup you see when you hover the cursor over a VirtualCenter object in the Virtual Infrastructure view.



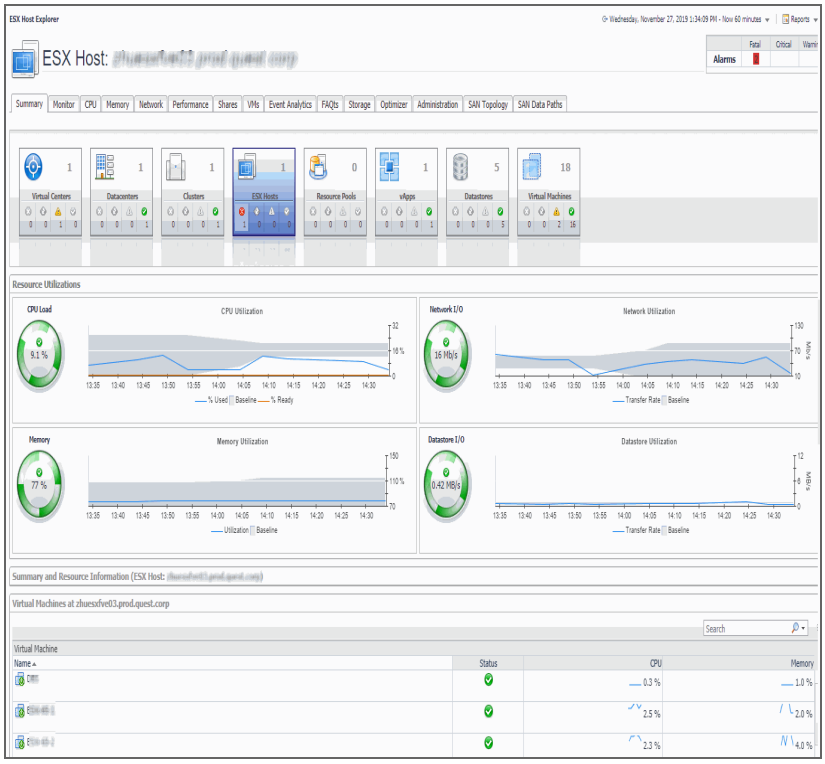
VMware Explorer Primary view

The VMware Explorer dashboard has a Primary view that takes up the entire display area of the Foglight for VMware browser interface. For more information about the VMware Explorer dashboard, see Investigating performance metrics on page 29.

Purpose

The VMware Explorer Primary view is the most content-intensive view in Foglight for VMware. It provides access to summary (of alarm, resource, and other) information for the object being viewed in the VMware Explorer dashboard, as well as detailed information on performance with respect to the four core ESX infrastructure resources: CPU, memory, disk, and network usage. This view provides a great deal of value to administrators who leverage Foglight for VMware to monitor their virtual infrastructure.

Figure 84. VMware Explorer Primary view



It provides navigation tabs that can be used to view a variety of valuable information pertaining to the object being viewed.

Content and Embedded Views

The metrics and the amount of detail displayed in the Primary view vary depending on the type of object you select.

The Primary view changes in appearance and content, depending on which navigation tab and embedded view you have selected.

The VMware Explorer Primary view heading, located at the top of the VMware Explorer Primary view, consists of three main components: an icon and text that specify the type of selected object or object container (from this point on, these two are referred to simply as object, unless otherwise specified), an alarm summary for the selected object, and navigation tabs.

The alarm summary at the right of the Primary view heading shows you the number of alarms at each severity level that are outstanding for the selected object. When you click an alarm count, you get a popup that lists the active alarms for the object.

The navigation tabs are located immediately below the selected object's name. These navigation tabs vary from object to object, but generally contain a tab to an object summary (typically the default view), a tab to an object performance overview, and one or more tabs to other relevant information.

The Primary view changes in appearance and content, depending on which navigation tab and embedded view you have selected. For example, if you select an object type container from the Topology view, the Summary tab in the Primary view displays a consumption graph and a table that are representative of the group of objects within that container. However, if you select a Resource Pools container from the Topology view, the Summary tab in the Primary view displays a Resource Pools Relationship Tree that contains every resource pool that belongs to the clusters within the associated VirtualCenter.

If you select an individual resource pool from the Virtual Infrastructure view, the Summary tab in the Primary view displays summary and utilization information for that resource pool. This is typically the type of information you see for the Summary tab when you select any individual object from the Virtual Infrastructure view.

The metrics and the amount of detail displayed in the Primary view vary depending on the type of object you select.

The VMware Explorer Primary view contains a combination of a number of different embedded views. For more information, see the following topics:

- Administration tab on page 78
- Cost tab on page 81
- CPU tab on page 83
- Event Analytics tab on page 85
- FAQts tab on page 201
- Memory tab on page 90
- Monitor tab on page 92
- Performance tab on page 113
- Processes tab on page 116
- Related Objects views on page 117
- Resource Pools Relationship Tree view on page 118
- Shares tab on page 119
- Storage tab (Cluster) on page 122
- Storage tab (Datacenter) on page 124
- Storage tab (ESX Host) on page 125
- Storage tab (Virtual Machine) on page 129

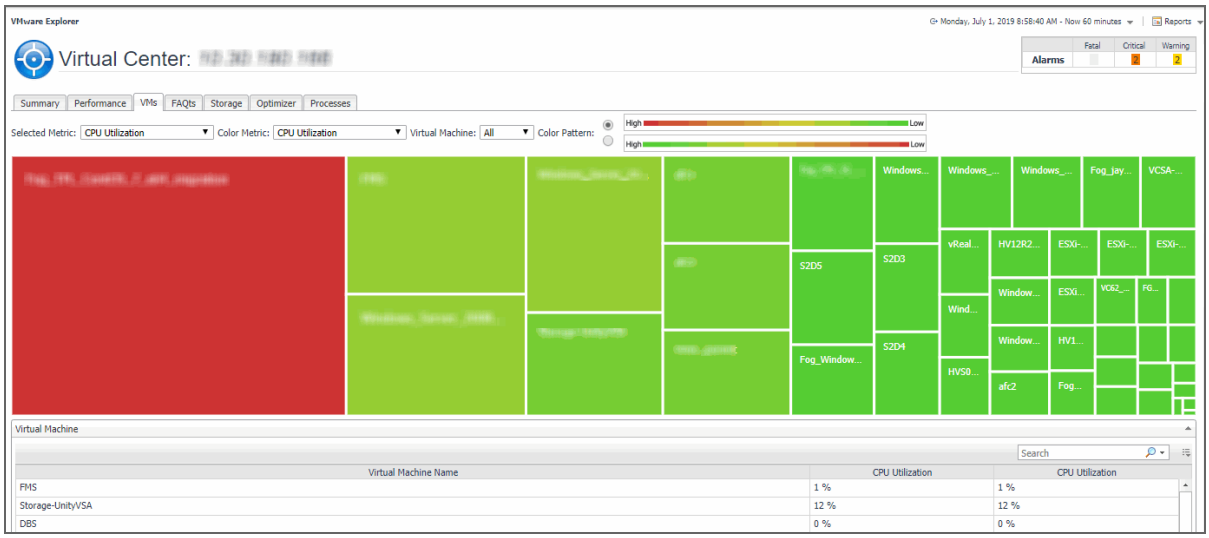
- Summary tab on page 131

VMs tab

Purpose

The VMware Explorer's **VMs** tab is consisted by a Heat Map Chart and a Metric Table.

Figure 85. VMware Explorer VMs tab



How to Get Here

1. Open the VMware Explorer.
2. On the Virtual Infrastructure view, that appears on the navigation panel, select any node, except an individual virtual machine node.
3. In the VMware Explorer, open the VMs tab.

Description of Embedded Views

- Heat Map Chart

  Heat maps will be refreshed automatically when you change either of the following fields:

  - Selected Metric: Populates a rectangle based upon the selected metrics. For example, if you select Memory Consumed from the Selected Metric drop-down list, the rectangle area will be populated based on the used memory for the selected topology object.
  - Virtual Machine: Select to display all virtual machines, or virtual machines with alarms.
  - Rendering related metrics: For example, if you select CPU Utilization and Red to Green, the rectangle of the topology object that has larger value of CPU Utilization will be rendered in red.
    - Color Metric: Renders the color of rectangle based upon the selected color metric.
    - Color Pattern: Offers two patterns, Red to Green (larger value shows in red) or Green to Red (larger value shows in green).

- Metric Table

  Metric table lists the metrics of the virtual machine. The column values will vary with the Selected Metric and Color Metric.

VMware Modeler views

The VMware Modeler dashboard contains the following view:

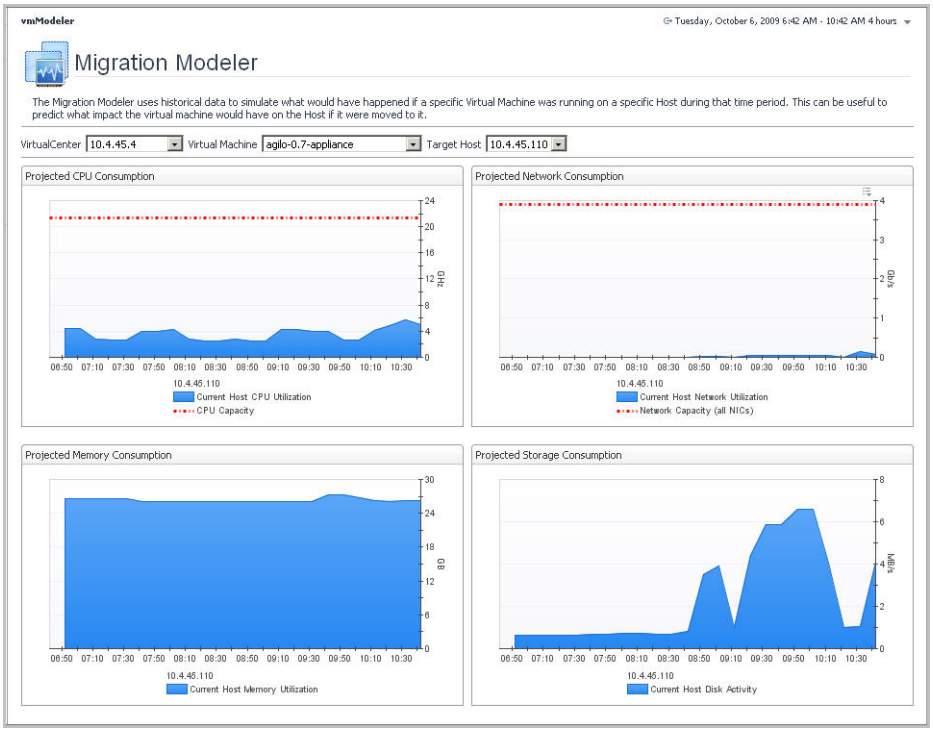
- Migration Modeler view

Migration Modeler view

Purpose

The **Migration Modeler** view uses the collected data to show the effect that a virtual machine may have on an ESX host during a selected time period. This view can be used to predict potential performance impacts of moving virtual machines to specific physical ESX hosts.

Figure 86. Migration Modeler view



How to Get Here

This view appears on the VMware Modeler dashboard.

Description of Embedded Views

This view is made up of the following embedded views:

- Projected CPU Consumption
- Projected Network Consumption
- Projected Memory Consumption
- Projected Storage Consumption

Table 95. Projected CPU Consumption

Description	Shows the projected CPU consumption for the ESX host.
Data displayed	• **CPU Capacity**. The ESX host's CPU processing speed. • **Current Host CPU Utilization**. The amount of the ESX host's CPU resources that is used to execute system code and user programs during the selected time period.

Table 96. Projected Network Consumption

Description	Shows the projected network utilization for the ESX host.
Data displayed	• **Current Host Network Utilization**. The rate at which data is transferred from the ESX host to and from the network during the selected time period. • **Network Capacity (all NICs)**. The ESX host's network I/O capacity provided by all of the available network interface cards combined.

Table 97. Projected Memory Consumption

Description	Shows the projected memory consumption for the ESX host.
Data displayed	• **Current Host Memory Utilization**. The amount of the ESX host's memory resources that is used during the selected time period. • **Memory Capacity**. The amount of the ESX host's memory resources.

Table 98. Projected Storage Consumption

Description	Shows the projected disk utilization for the ESX host.
Data displayed	• **Current Host Disk Activity**. The ESX host's disk I/O rate during the selected time period.

VMware VirtualCenter views

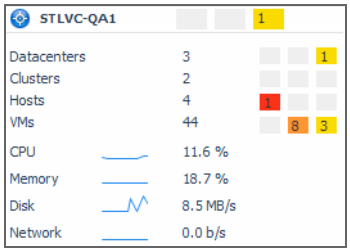
The VMware VirtualCenters dashboard shows a Virtual Center view for each virtual center that exists in your environment

Virtual Center view

Purpose

This view shows various details about the virtual center.

Figure 87. Virtual Center view



How to Get Here

One or more instances of this view appear on the VMware VirtualCenters dashboard.

Table 99. Description of the View

Description	Shows the details about the virtual center.
Data displayed	• **Clusters**. The number of all clusters associated with the virtual center, followed by the total counts of alarms associated with the clusters, broken down by alarm types (Normal, Warning, Critical, Fatal). • **CPU**. The current percentage of the overall virtual center's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **Datacenters**. The number of all datacenters associated with the virtual center, followed by the total counts of alarms associated with the datacenters, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Disk**. The overall datacenter's current disk I/O rate. • **Hosts**. The number of all hosts associated with the datacenter, including running and turned-off hosts. • **Memory**. The current percentage of the virtual center's memory usage. • **Network**. The current rate at which the virtual center transfers data from and to the network. • **Virtual center**. The name of the virtual center, followed by the total counts of alarms associated with the virtual center, broken down by alarm types (Normal, Warning, Critical, Fatal). • **VMs**. The number of all virtual machines associated with the virtual center, including running and powered-off virtual machines.

VMware Environment views

The VMware Environment dashboard contains the following views:

- Agents view
- Alarms view
- Cluster Summary view
- Summary - All Clusters view
- Clusters view
- Datacenter Summary view
- Summary - All Datacenters view
- Datacenters view
- Summary - Datastore view
- Summary - Datastore view
- Datastores view
- Datastore tab
- Datastore view
- ESX Host Summary view
- Summary - All ESX Hosts view
- ESX Hosts view
- FAQts tab

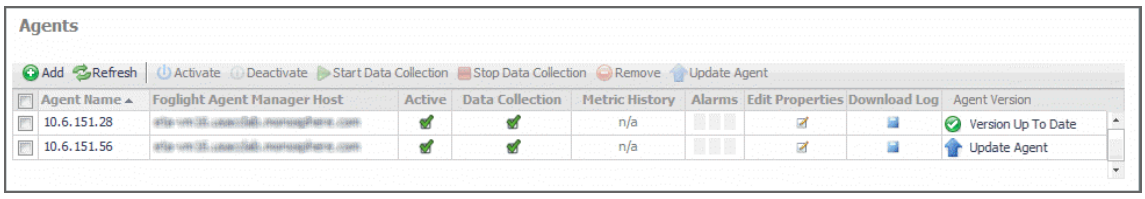
- Instances and Limits view
- OS Mapping view
- Metrics Collection Management View
- Quick-View
- Resource Pool Summary view
- Summary - All Resource Pools view
- Resource Pools view
- Virtual Center Summary view
- Summary (All Virtual Centers) view
- Virtual Centers view
- Virtual Environment Overview
- Virtual Machine Summary view
- Summary - All Virtual Machines view
- Virtual Machines view
- Summary - Standard Virtual Switch view
- Summary - Distributed Virtual Switch view
- Summary - Cisco Virtual Switch view
- Standard vSwitch Topology and Distributed vSwitch Topology views
- Summary - All Virtual Switches view
- Topology views
- Virtual Switches view

Agents view

Purpose

This view displays a list of the existing VMware Performance Agent instances and shows their status. Use it to verify that your agents are collecting data from the monitored environment.

Figure 88. Agents view



How to Get Here

1 On the VMware Environment dashboard, open the **Administration** tab.

The Agents view appears at the bottom of the **Administration** tab.

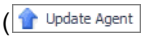
Description of the View

Data displayed

- **Active**. Indicates if the VMware Performance Agent process is running.
- **Agent Name**. The name of the VMware Performance Agent instance.

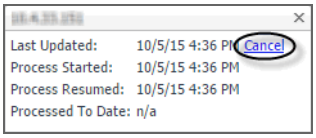
Description of the View

- **Agent Version**. Indicates if the agent is running the latest version of the agent package (

), or it needs to be updated (

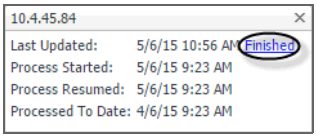
).
- **Alarms**. The total numbers of Warning, Critical, and Fatal alarms.
- **Data Collection**. Indicates if the VMware Performance Agent is collecting data from the monitored environment.
- **Download Log**. Allows you to download the agent log file.
- **Edit Properties**. Allows you to edit the agent's properties.
- **Foglight Agent Manager Host**. The name of the machine on which the Agent Manager and the VMware Performance Agent process are running.
- **Metric History**. The progress of the import of historical data. Each VMware Performance Agent monitors a single Virtual Center. When you create a VMware Performance Agent instance and the Agent Setup wizard determines that the Virtual Center was not previously monitored by this Foglight instance, it starts importing historical data into Foglight. This data is not immediately available as it takes some time to collect it. This process can import data collected over 30 days or less, depending on the amount of data available in the Virtual Center. This allows you to explore VMware metrics as soon as the data is imported, instead for waiting for the agent to collect some data from the Virtual Center. Historical data is intended for charting, trending, and general presentation purposes. It does not cause any alarms to fire.

  Click this column to start a metric history import, or to see its progress. When the import is in progress, you have an option to cancel it, if needed.

  Click **Cancel** in the dwell to cancel the import. You can resume it at a later time.

  When the metric history import is completed, this is indicated in the dwell.

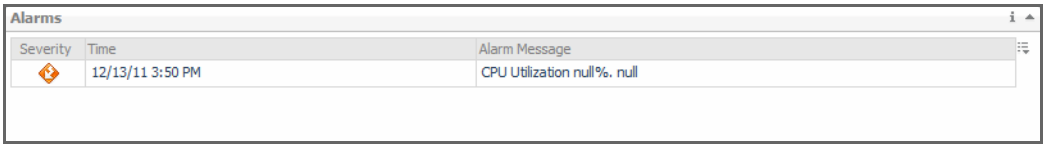
  

Alarms view

Purpose

This view displays a list of alarms generated against the objects or group of objects selected in the Quick-View. Use this view to quickly identify any potential problems related to a specific object.

Figure 89. Alarms view



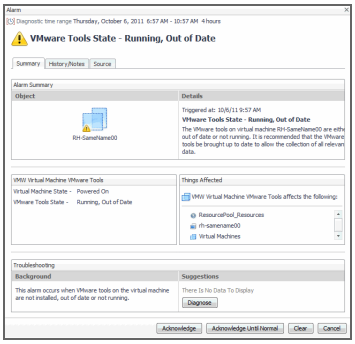
How to Get Here

1 On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the tile representing the type of the object whose alarms you want to view. For example, to view alarms associated with a specific ESX host, select the **ESX Hosts** tile.

2 In the Quick-View, in the left pane, expand the Summary node, and select the desired object. The Alarms view appears along the bottom of the Quick-View.

Table 100. Description of the View

Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. The alarm severity icon: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

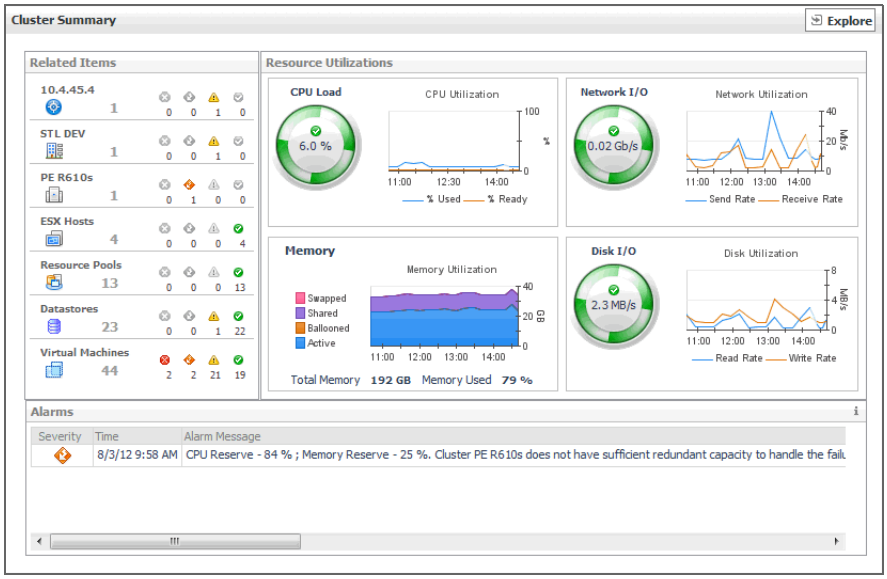


Cluster Summary view

Purpose

The **Cluster Summary** view shows the overall resource utilization and the amounts of system resource consumption for an ESX host cluster.

Figure 90. Cluster Summary view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Clusters** tile.
2. In the Quick-View, in the Clusters view, select a cluster node.

   The Cluster Summary view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 101. Alarms

Description	Lists the alarms generated against the selected cluster.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.

Table 101. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

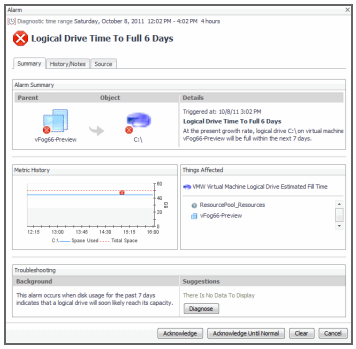


Table 102. Related Items

Description	Shows the numbers and states of the cluster, ESX hosts, and virtual machines, all related to the selected cluster.
Data displayed	• **Cluster**. The name of the selected cluster, followed by the related alarm counts. • **Datacenter**. The name of the datacenter associated with the selected cluster. • **Datastores**. The number of datastores that are associated with the selected cluster, followed by the related alarm counts. • **ESX Hosts**. The number of ESX hosts that are associated with the selected cluster, followed by the related alarm counts. • **Resource Pools**. The number of resource pools that are associated with the selected cluster, followed by the related alarm counts. • **Virtual Center**. The name of the virtual center associated with the selected cluster, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that are associated with the selected cluster, followed by the related alarm counts.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.

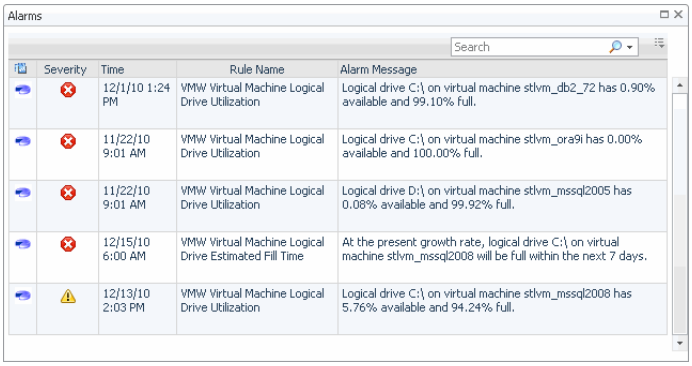
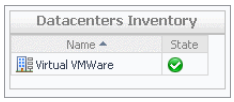


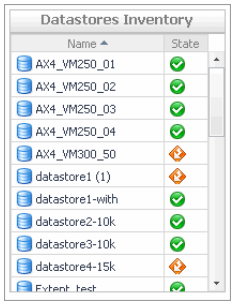
Table 102. Related Items

- **Cluster**. Displays the **Clusters Inventory** dwell, showing the name and state of the selected cluster.

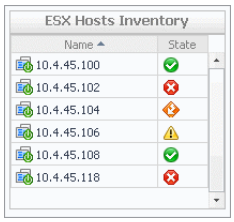
- **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the names and states of the datacenter associated with the selected cluster.



- **Datastores**. Displays the **Datastores Inventory** dwell, showing the names and states of all datastores that are associated with the selected cluster.



- **ESX Hosts**. Displays the **ESX Hosts Inventory** dwell, showing the names and states of all ESX hosts that are associated with the selected cluster.



- **Resource Pools**. Displays the **Resource Pools Inventory** dwell, showing the names and states of all resource pools that are associated with the selected cluster.

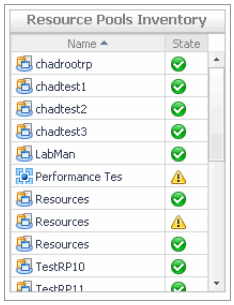


Table 102. Related Items

- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the virtual center associated with the selected cluster.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines that are associated with the selected cluster.

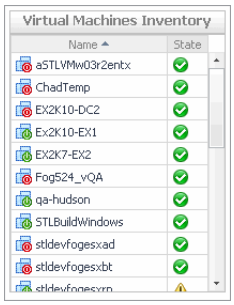


Table 103. Resource Utilizations

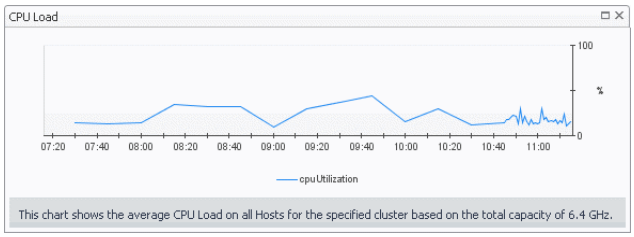
Description	Shows the resource consumption for the selected cluster, broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the CPU load, used by the ESX hosts that belong to the selected cluster to execute system code and user programs, based on the combined CPU capacity. • **CPU Utilization, % Used**. The percentage of the CPU utilization used by the ESX hosts that belong to the selected cluster to execute system code and user programs, during the selected time period. • **CPU Utilization, % Ready**. The percentage of the cluster's CPU resources that is ready to execute system code and user programs during the selected time period. • **Disk I/O**. The current disk I/O rate for all ESX hosts that belong to the selected cluster. • **Disk Utilization, Read Rate**. The rate at which all ESX hosts that belong to the cluster read data from the disk, during the selected time period. • **Disk Utilization, Write Rate**. The rate at which data is written to the disks of all ESX hosts that belong to the cluster, during the selected time period. • **Memory Utilization, Active**. The amount of the available memory used by all ESX hosts that belong to the cluster during the selected time period. • **Memory Utilization, Ballooned**. The amount of physical memory that is actively being used by the VMware Memory Control Driver to allow the guest OS to selectively swap memory. • **Memory Utilization, Shared**. The amount of the virtual machine memory that is freed up due to transparent page sharing. • **Memory Utilization, Swapped**. The amount of memory that is stored in disk swap space • **Network I/O**. The current rate at which data is transferred from all ESX hosts that belong to the selected cluster to and from the network. • **Network Utilization, Receive Rate**. The rate at which all ESX hosts that belong to the selected cluster receive data from the network, during the selected time period.

Table 103. Resource Utilizations

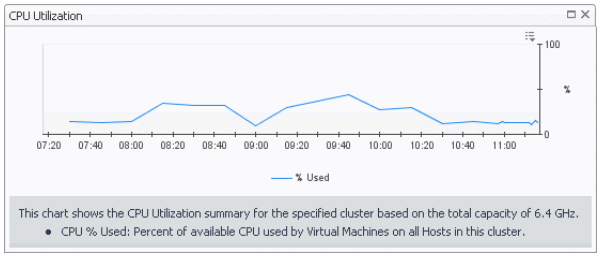
- **Network Utilization, Send Rate**. The rate at which data is transferred from all ESX hosts that belong to the selected cluster to the network, during the selected time period.

Where to go next Drill down on:

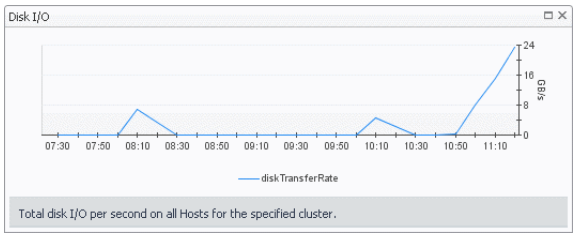
- **CPU Load** spinner. Displays the **CPU Load** dialog box.



- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.



- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.



- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.

- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.

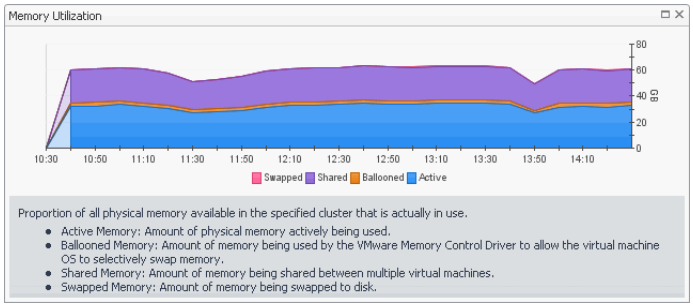
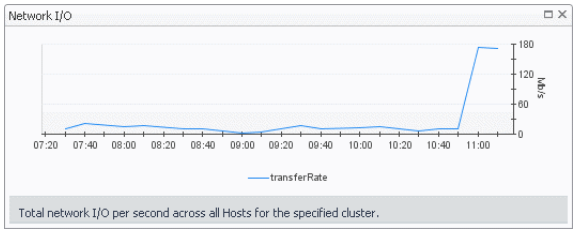
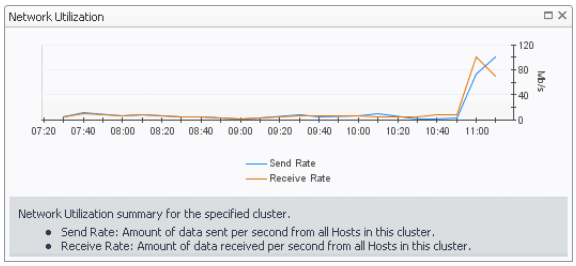


Table 103. Resource Utilizations

- **Network I/O** spinner. Displays the **Network I/O** dialog box.



- **Network Utilization** graph. Displays the **Network Utilization** dialog box.

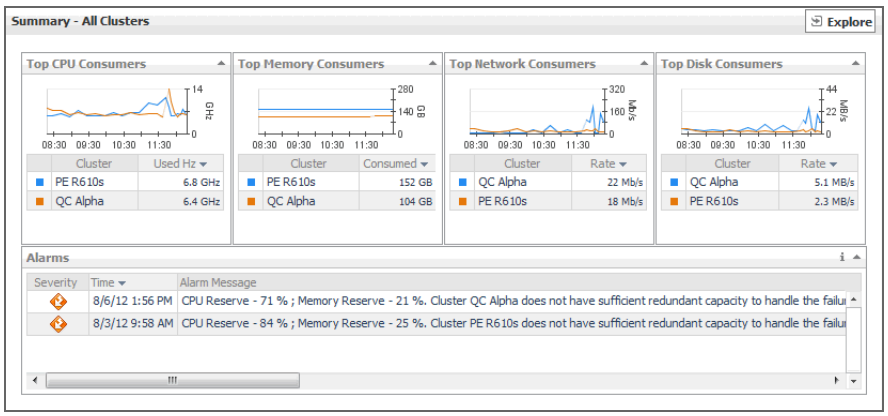


Summary - All Clusters view

Purpose

The **Summary - All Clusters** view displays overall resource utilization information for a group of clusters, and shows the elements that consume the highest amount of system resources.

Figure 91. Summary - All Clusters view



How to Get Here

1 On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Clusters** tile.

2 In the Quick-View, in the Clusters view, select the **Summary** node.

The Summary - All Clusters view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 104. Alarms

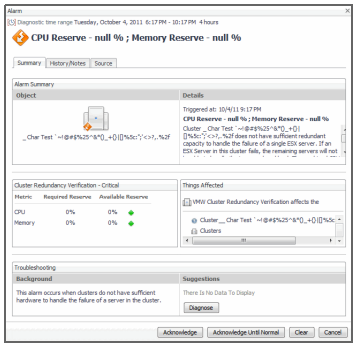
Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the Cluster Summary view on page 161. • **Severity**. Displays the **Alarm Created** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.  • **Time**. Links to the Cluster Summary view on page 161.

Table 105. Top CPU Consumers

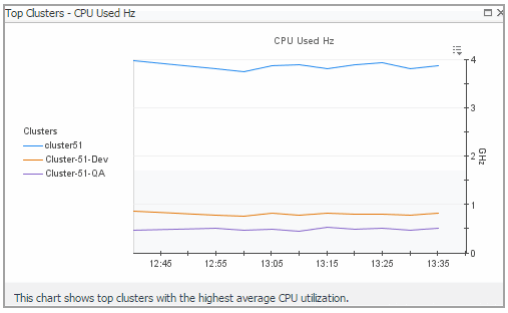
Description	Shows the top three clusters with the highest average CPU utilization.
Data displayed	• **Cluster**. The name of the cluster. • **Used Hz**. The amount of CPU processing speed used by each of the top three CPU consumers to execute system code and user programs, during the selected time range.
Where to go next	Drill down on: • **Cluster**. For more information, see Summary tab on page 131. • **Used Hz** (in the graph). Displays the **Top Clusters-CPU Used Hz** dialog box. 

Table 106. Top Disk Consumers

Description	Shows the top three clusters with the highest average disk utilization.
Data displayed	• **Cluster**. The name of the cluster. • **Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range.
Where to go next	Drill down on: • **Cluster**. For more information, see Summary tab on page 131. • **Rate** (in the graph). Displays the **Top Clusters-Disk Transfer Rate** dialog box.

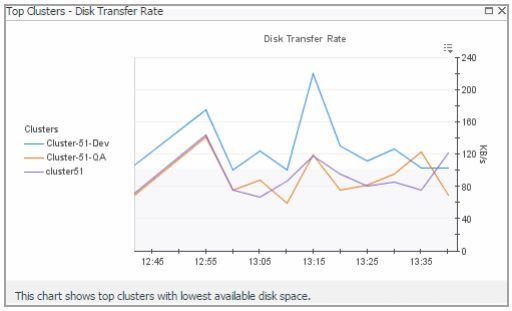


Table 107. Top Memory Consumers

Description	Shows the top three clusters with the highest average memory utilization.
Data displayed	• **Cluster**. The name of the cluster that is one of the top three memory consumers. • **Consumed**. The amount of memory the top three memory consumers use during the selected time range.
Where to go next	Drill down on: • **Cluster**. For more information, see Summary tab on page 131. • **Consumed**. Displays the **Top Clusters - Memory Consumed** dialog box.

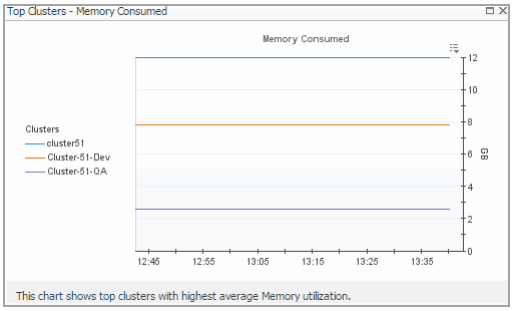
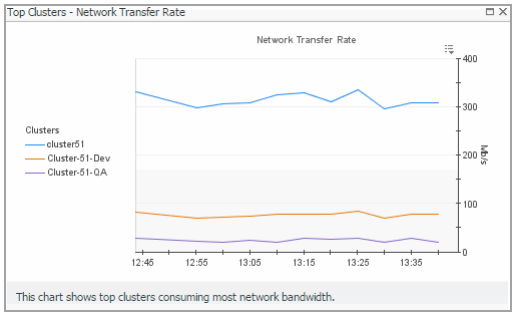


Table 108. Top Network Consumers

Description	Shows the top three clusters that are consuming most network bandwidth.
Data displayed	• **Cluster**. The name of the cluster that is one of the top three network consumers. • **Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range.
Where to go next	Drill down on:

Table 108. Top Network Consumers

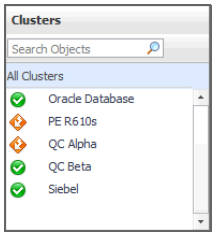
- **Cluster** (in the table). For more information, see Summary tab on page 131.
- **Rate**. Displays the **Top Clusters - Network Transfer Rate** dialog box.



Clusters view

The **Clusters** view is a tree view. It lists the clusters that exist in your environment and shows their state.

Figure 92. Clusters view



Selecting the **All Clusters** node displays overall resource utilization for all clusters in your integrated system and the elements that consume the highest amount of system resources in the Summary - All Clusters view on the right. Similarly, selecting a cluster node shows cluster-specific metrics in the Cluster Summary view on the right.

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Clusters** tile.

  The Clusters view appears in the Quick-View on the left.

Table 109. Description of the View

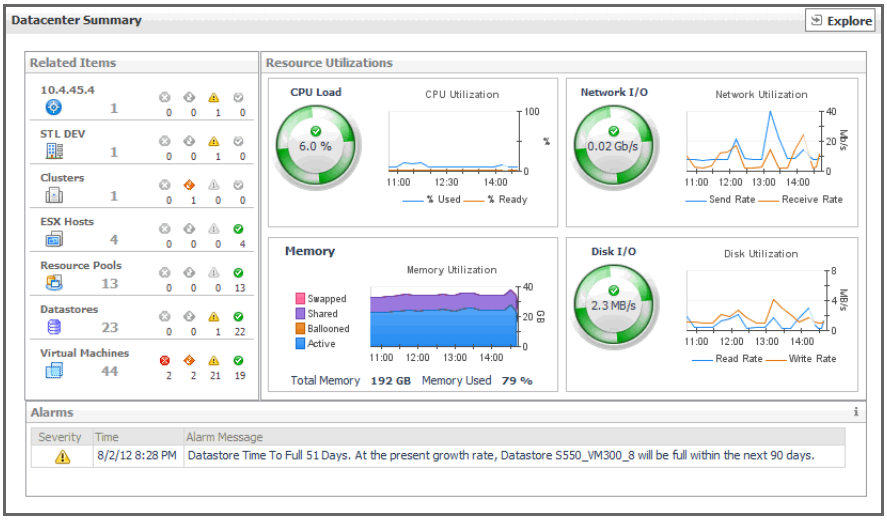
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated cluster. • **All Clusters**. A parent node for the cluster object instances that appear in this view. • **Cluster**. The cluster name.
Where to go next	Drill down on: • **All Clusters**. Shows the Summary - All Clusters view in the Quick-View. • **Cluster**. Shows the Cluster Summary view in the Quick-View.

Datacenter Summary view

Purpose

The **Datacenter Summary** view shows the overall resource utilization and the amounts of system resource consumption for a datacenter.

Figure 93. Datacenter Summary view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Servers** tile.
2. In the Quick-View, select a datacenter node in the Datacenters view.

   The Datacenter Summary view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 110. Alarms

Description	Lists the alarms generated against the selected datacenter.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.

Table 110. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

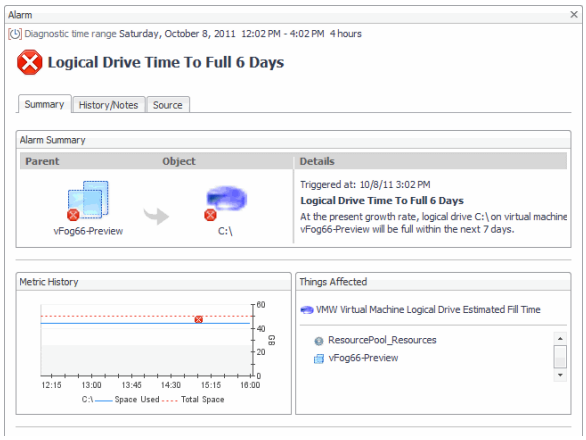


Table 111. Related Items

Description	Shows the numbers of the components that are associated with the selected datacenter and the related alarm counts.
Data displayed	• **Clusters**. The number of clusters that are associated with the selected datacenter, followed by the related alarm counts. • **Datacenter**. The name of the selected datacenter. • **Datastores**. The number of datastores that are associated with the selected datacenter, followed by the related alarm counts. • **ESX Hosts**. The number of ESX hosts that are associated with the selected datacenter, followed by the related alarm counts. • **Resource Pools**. The number of resource pools that are associated with the selected datacenter, followed by the related alarm counts. • **Virtual Center**. The name of the virtual center to which the selected datacenter belongs, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that are associated with the selected datacenter, followed by the related alarm counts.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.

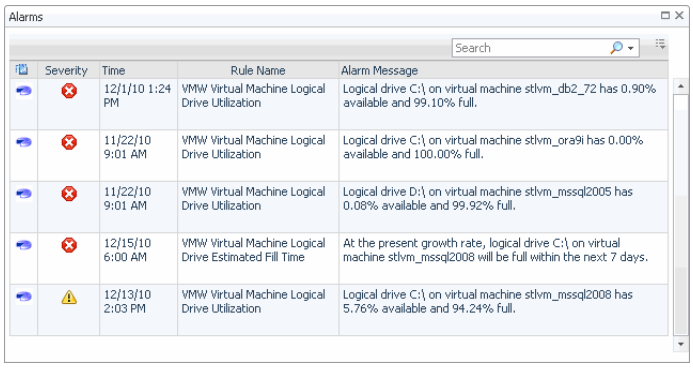
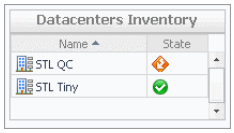


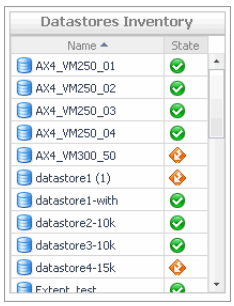
Table 111. Related Items

- **Clusters**. Displays the **Clusters Inventory** dwell, showing the names and states of all clusters that are associated with the selected datacenter.

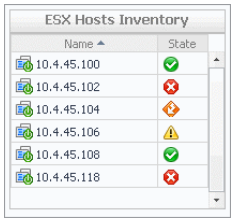
- **Datacenters**. Displays the **Datacenters Inventory** dwell, showing the names and states of all datacenters that are associated with the selected datacenter.



- **Datastores**. Displays the **Datastores Inventory** dwell, showing the names and states of all datastores that are associated with the selected datacenter.



- **ESX Hosts**. Displays the **ESX Hosts Inventory** dwell, showing the names and states of all ESX hosts that are associated with the selected datacenter.



- **Resource Pools**. Displays the **Resource Pools Inventory** dwell, showing the names and states of all resource pools that are associated with the selected datacenter.

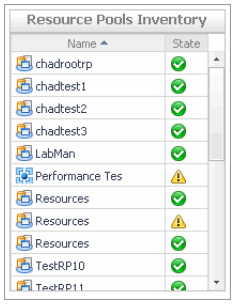


Table 111. Related Items

- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and states of the selected datacenter.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines that are associated with the selected datacenter.

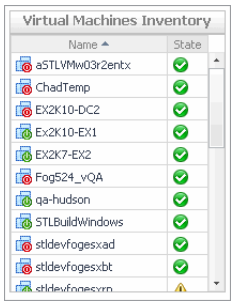
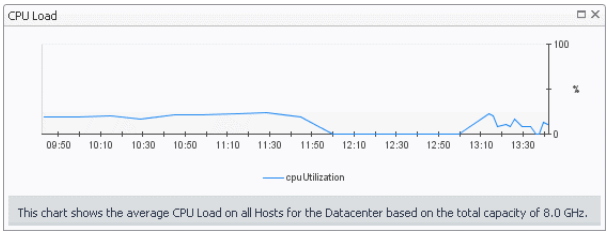


Table 112. Resource Utilizations

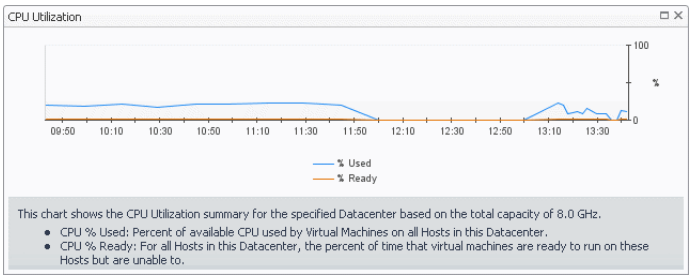
Description	Shows the resource consumption for the selected datacenter broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected datacenter's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, % Ready**. The percentage of the datacenter's CPU resources that is ready to execute system code and user programs during the selected time period. • **CPU Utilization, % Used**. The percentage of the datacenter's CPU utilization spent on executing system code and user programs during the selected time period. • **Disk I/O**. The current disk I/O rate for the selected datacenter. • **Disk Utilization, Read Rate**. The rate at which the datacenter reads data from the disk during the selected time period. • **Disk Utilization, Write Rate**. The rate at which the datacenter writes data to the disk during the selected time period. • **Memory Utilization, Active**. The amount of the available memory that the datacenter uses during the selected time period. • **Memory Utilization, Ballooned**. The amount of physical memory that is actively being used by the VMware Memory Control Driver to allow the guest OS to selectively swap memory. • **Memory Utilization, Shared**. The amount of the virtual machine memory that is freed up due to transparent page sharing. • **Memory Utilization, Swapped**. The amount of memory that is stored in disk swap space • **Network I/O**. The current rate at which the selected datacenter transfers data from and to the network. • **Network Utilization, Receive Rate**. The rate at which the selected datacenter receives data from the network during the selected time period. • **Network Utilization, Send Rate**. The rate at which the selected datacenter sends data to the network during the selected time period.
Where to go next	Drill down on:

Table 112. Resource Utilizations

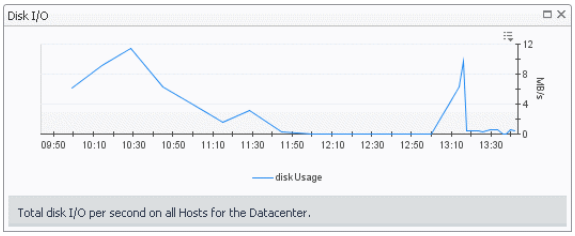
- **CPU Load** spinner. Displays the **CPU Load** dialog box.



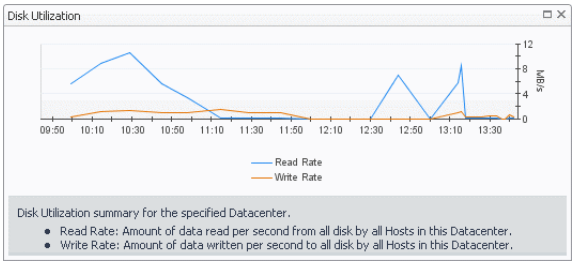
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.



- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.



- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.



- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.

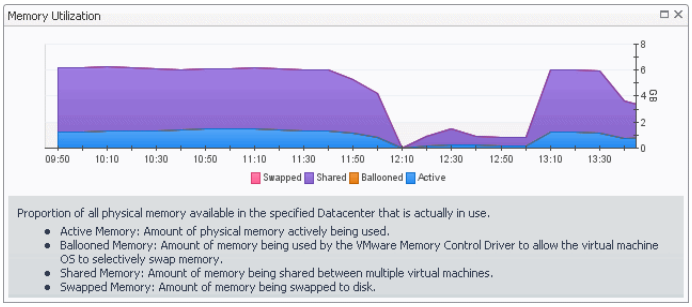
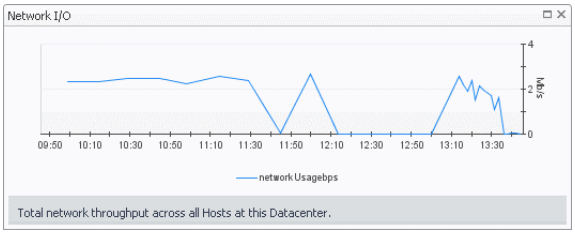
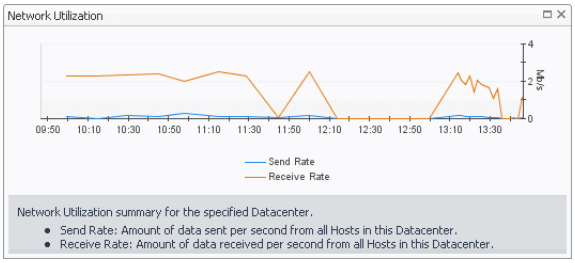


Table 112. Resource Utilizations

- **Network I/O** spinner. Displays the **Network I/O** dialog box.



- **Network Utilization** graph. Displays the **Network Utilization** dialog box.

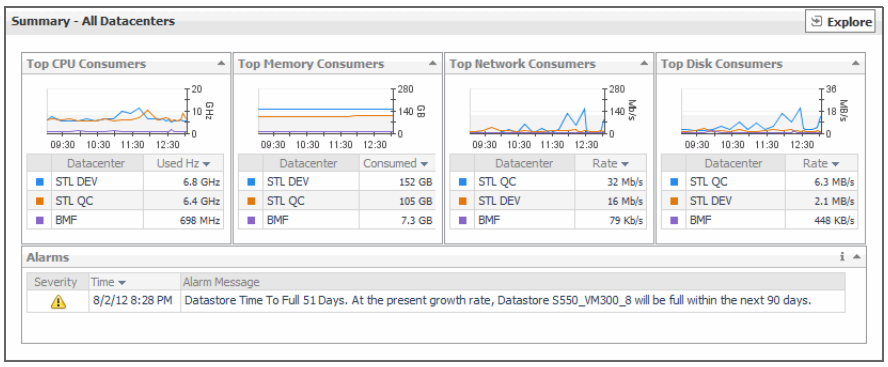


Summary - All Datacenters view

Purpose

The **Summary - All Datacenters** view displays overall resource utilization information for a group of datacenters and shows the elements that consume the highest amount of system resources.

Figure 94. Summary - All Datacenters view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Datacenters** tile.
2. In the Quick-View, click **All Datacenters** in the Datacenters view.

   The Summary - All Datacenters view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers

- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 113. Alarms

Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm is generated.
Where to go next	Drill down on: • **Alarm Message** or **Time**. Links to the view that shows additional information about the component affected by the alarm. • **Severity**. Displays the **Alarm Created** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

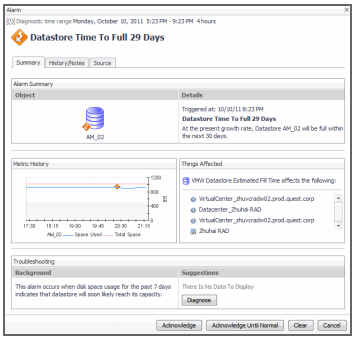


Table 114. Top CPU Consumers

Description	Shows the top three datacenters with the highest average CPU utilization.
Data displayed	• **Datacenter**. The name of the datacenter. • **Used Hz**.The amount of CPU processing speed each of the top three CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on: • **Datacenter**. For more information, see Summary tab on page 131. • **Used Hz** (in the graph). Displays the **Top Datacenters -CPU Used Hz** dialog box.

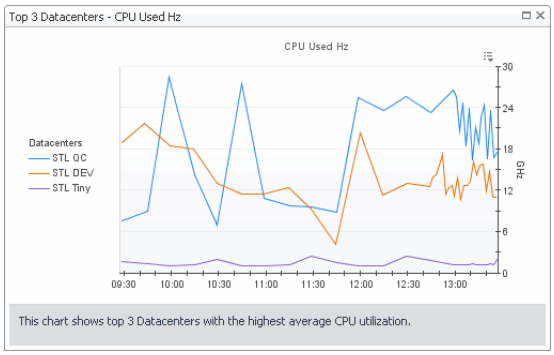


Table 115. Top Disk Consumers

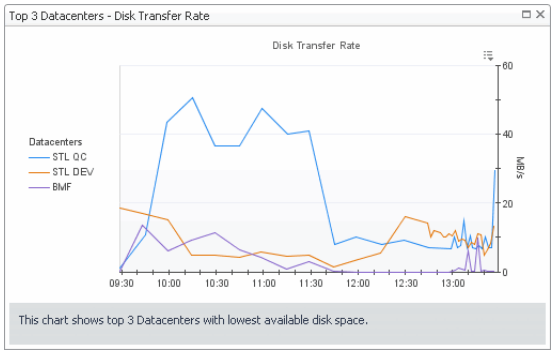
Description	Shows the top three datacenters with the lowest available disk space.
Data displayed	• **Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range. • **Datacenter**. The name of the datacenter.
Where to go next	Drill down on: • **Rate** (in the graph). Displays the **Top Datacenters - Disk Transfer Rate** dialog box.  • **Datacenter**. For more information, see Summary tab on page 131.

Table 116. Top Memory Consumers

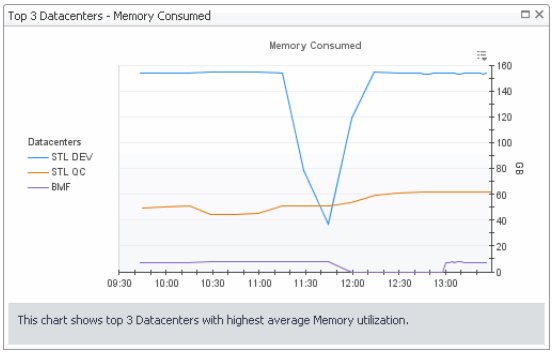
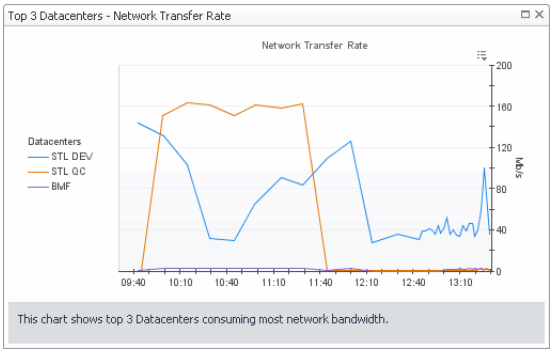
Description	Shows the top three datacenters with the highest average memory utilization.
Data displayed	• **Consumed**. The amount of memory the top three memory consumers use during the selected time range. • **Datacenter**. The name of the datacenter.
Where to go next	Drill down on: • **Consumed**. Displays the **Top Datacenters - Memory Consumed** dialog box.  • **Datacenter**. For more information, see Summary tab on page 131.

Table 117. Top Network Consumers

Description	Shows the top three datacenters that are consuming most network bandwidth.
Data displayed	• **Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range. • **Datacenter**. The name of the datacenter.
Where to go next	Drill down on:

Table 117. Top Network Consumers

- **Rate**. Displays the **Top Datacenters - Network Transfer Rate** dialog box.



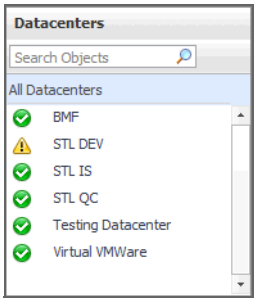
- **Datacenter** (in the table). For more information, see Summary tab on page 131.

Datacenters view

Purpose

This tree view lists the datacenters that exist in your environment and shows their state.

Figure 95. Datacenters view



Selecting **All Datacenters** displays overall resource utilization for all datacenters in your integrated system, and the elements that consume the highest amount of system resources in the Summary - All Datacenters view on the right. Similarly, selecting a datacenter node shows datacenter-specific metrics in the Datacenter Summary view on the right.

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Datacenters** tile.

  The Datacenters view appears in the Quick-View on the left.

Table 118. Description of the View

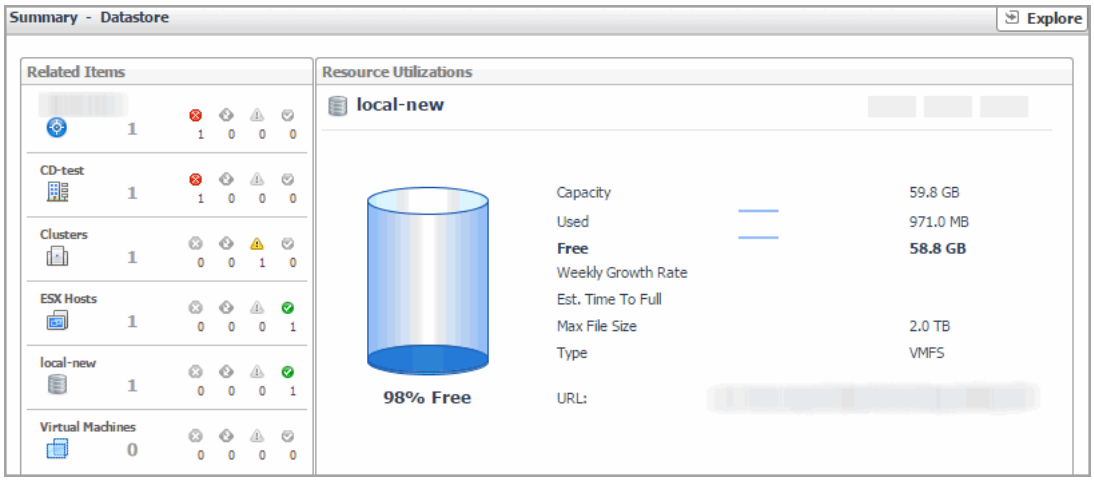
Data displayed	• **Alarm severity**. The state of the highest-severity alarm raised against the selected datacenter. • **All Datacenters**. A parent node for the datacenter object instances that appear in this view. • **Datacenter**. A datacenter name.
Where to go next	Drill down on: • **All Datacenters**. Shows the Summary - All Datacenters view in the Quick-View. • **Datacenter**. Shows the Datacenter Summary view in the Quick-View.

Summary - Datastore view

Purpose

The **Summary - Datastore** view shows the overall resource utilization and the amounts of system resource consumption for a physical datastore.

Figure 96. Summary - Datastore view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Datastores** tile.
2. In the Quick-View, select a datastore node in the Datastores view.

   The Summary - Datastore view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 119. Alarms

Description	Lists the alarms generated against the selected datastore.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.

Table 119. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

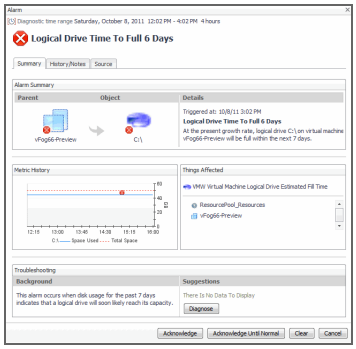


Table 120. Related Items

Description	Shows the numbers and states of the selected datastore and other components associated with this datastore.
Data displayed	• **Clusters**. The number of clusters associated with the selected datastore, followed by the related alarm counts. • **Datacenter**. The name of the datacenter associated with the selected datastore, followed by the related alarm counts. • **Datastore**. The name of the selected datastore, followed by the related alarm counts. • **ESX Hosts**. The number of hosts associated with the selected datastore, followed by the related alarm counts. • **Virtual Center**. The name of the virtual center associated with the selected datastore, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that are associated with the selected datastore, followed by the related alarm counts.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.

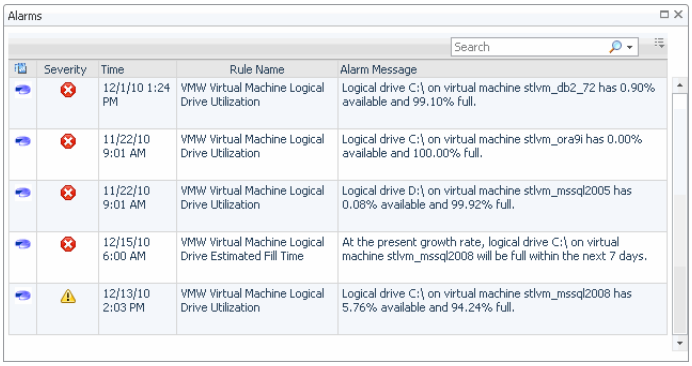
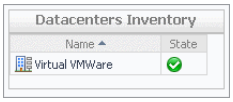


Table 120. Related Items

- **Clusters**. Displays the **Clusters Inventory** dwell, showing the names and states of the clusters associated with the selected datastore.

- **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the name and state of the datacenter associated with the selected datastore.



- **Datastore**. Displays the **Datastores Inventory** dwell, showing the name and state of the selected datastore.

- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the virtual center associated with the selected datastore.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines that are associated with the selected datastore.

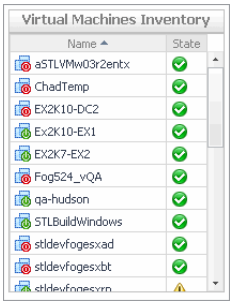


Table 121. Resource Utilizations

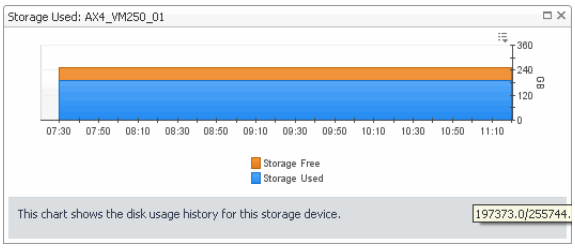
Description	Shows the resource consumption for the selected datastore broken down into four simple views.
Data displayed	• **Capacity**. The total space allocated to this datastore. • **Datastore**. The name of the selected datastore, followed by the related alarm counts. • **Est. Time Until Full**. The estimated amount of time until which this datastore will become full. • **Free**. The amount of free space for this datastore. • **Max File Size**. The maximum file size for this datastore. • **Percent Free**. The percent of free space for this datastore. • **Type**. The datastore type. • **URL**. The datastore URL.

Table 121. Resource Utilizations

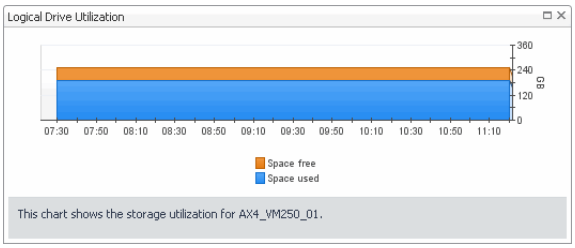
- **Used**. The amount of used space for this datastore.
- **Weekly Growth Rate**. The average amount of space the datastore expands every week.

Where to go next Drill down on:

- **Free** or **Percent Free**. Displays the **Storage Used** dialog box.



- **Used**. Displays the **Logical Drive Utilization** dialog box.

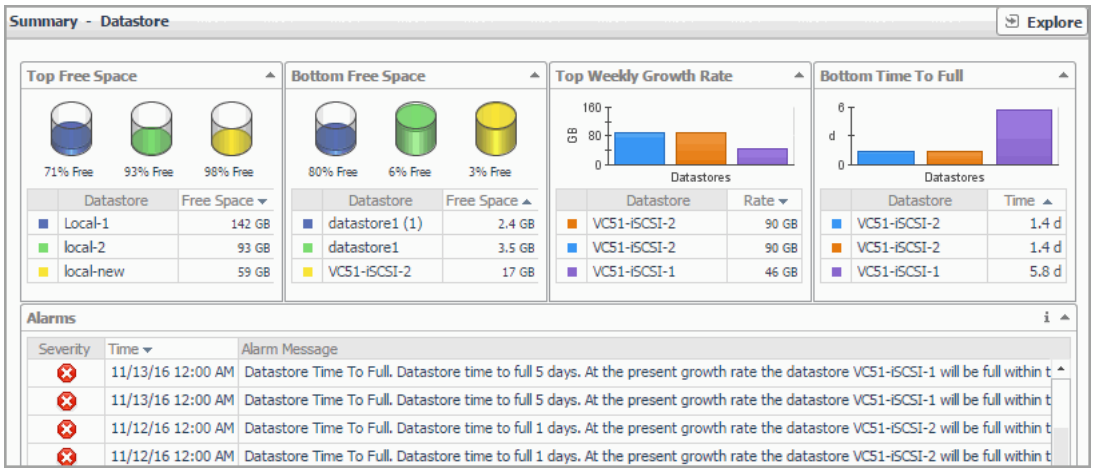


Summary - Datastore view

Purpose

The **Summary - Datastores** view displays overall resource utilization information for a group of physical datastores and shows the elements that consume the highest amount of system resources.

Figure 97. Summary - Datastore view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Datastores** tile.
2. In the Quick-View, select the **All Datastores** node in the Datastores view.

The Summary - Datastore view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Bottom Free Space
- Bottom Time Until Full
- Top Free Space
- Top Weekly Growth Rate

Table 122. Alarms

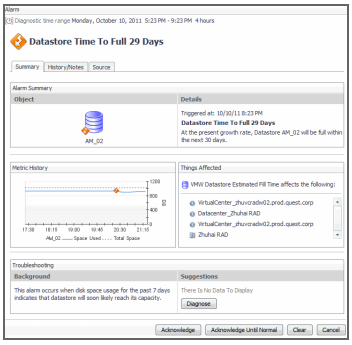
Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the Summary - Datastore view on page 180. • **Severity**. Displays the **Alarm Created** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.  • **Time**. Links to the Summary - Datastore view on page 180.

Table 123. Bottom Free Space

Description	Shows the three datastores with the lowest amount of free space.
Data displayed	• **Datastore**. The name of the datastore. • **Free space**.The amount of free space for this datastore.
Where to go next	Drill down on: • **Datastore**. For more information, see Datastore tab on page 186.

Table 124. Bottom Time Until Full

Description	Shows the three datastores with the highest amount of time until they reach their full capacity, based on the current trend.
Data displayed	• **Datastore**. The name of the datastore. • **Time**.The estimated amount of time after which this datastore becomes full.

Table 124. Bottom Time Until Full

Where to go next	Drill down on: • **Datastore**. For more information, see Datastore tab on page 186.

Table 125. Top Free Space

Description	Shows the three datastores with the highest amount of free space.
Data displayed	• **Datastore**. The name of the datastore. • **Free space**.The amount of free space for this datastore.
Where to go next	Drill down on: • **Datastore**. For more information, see Datastore tab on page 186.

Table 126. Top Weekly Growth Rate

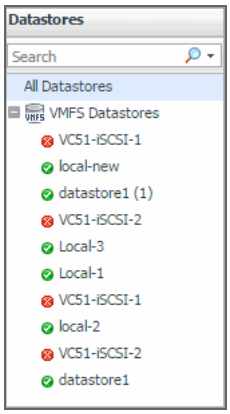
Description	Shows the three datastores with the highest weekly growth rate.
Data displayed	• **Datastore**. The name of the datastore. • **Rate**.The average amount of space the datastore expands every week.
Where to go next	Drill down on: • **Datastore**. For more information, see Datastore tab on page 186.

Datastores view

Purpose

This view is a tree view. It lists the datastores that exist in your environment and shows their state.

Figure 98. Datastores view



Selecting the **All Datastores** node displays overall resource utilization for all datastores in your integrated system, and the elements that consume the highest amount of system resources in the **Summary - Datastore** view on the right. Similarly, selecting a datastore node shows datastore-specific metrics in the **Summary- Datastore** view on the right.

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Quick-View, select the **Datastores** tile.

  The Datastores view appears in the Quick-View on the left.

Table 127. Description of the View

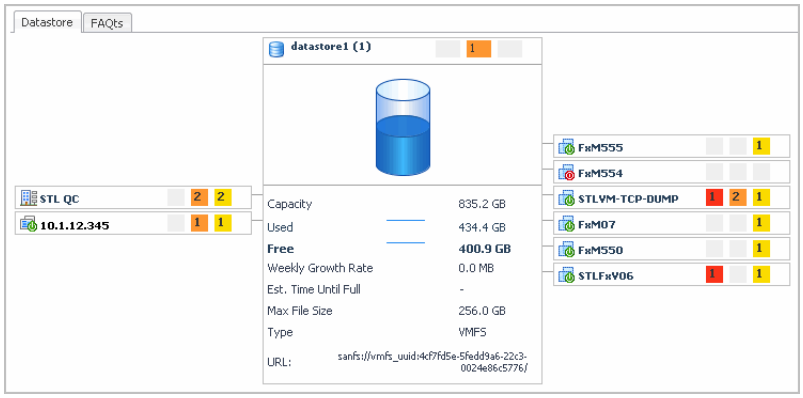
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated datastore. • **All Datastores**. A parent node for the datastore object instances that appear in this view. • **Datastore classifications**. The datastore classifications, which include the following options: vSan Datastores, VMFS Datastores, NFS Datastores, and VVOL Datastore. Clicking a classification node shows all available datastores that belong to this classification.
Where to go next	Drill down on: • **All Datastores**. Shows the Summary - Datastore view in the Quick-View. • **Datastore classifications**. Shows the Summary - Datastore view in the Quick-View.

Datastore tab

Purpose

The **Datastore** tab shows the overall resource utilization and the amounts of system resource consumption for a physical datastore, the related components, and their alarm state.

Figure 99. **Datastore tab**



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Datastores** tile.
2. In the Quick-View, in the Datastores view, select a datastore node.
3. In the Summary - Datastore view that appears, click a datastore.

   The Datastore tab appears in the display area.

Description of Embedded Views

This view is made up of the following embedded views:

- Related Components Views
- Resource Utilizations

Table 128. Related Components Views

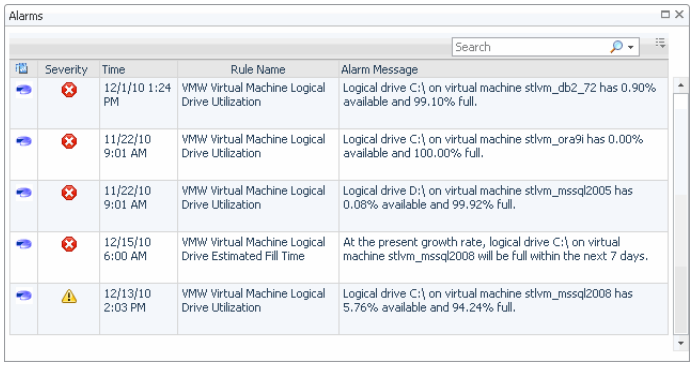
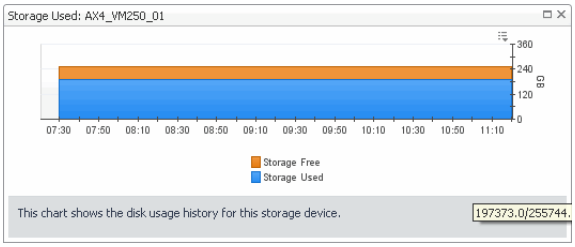
Description	Shows the numbers and states of the components associated with this datastore.
Data displayed	• **Datacenter**. The name of the datacenter associated with this datastore, followed by the related alarm counts. • **Virtual Center**. The name of the virtual center associated with this datastore, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that are associated with the selected datastore, followed by the related alarm counts.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.  • **Datacenter**, **Virtual Center**, or a **Virtual Machine**. For more information, see Summary tab on page 131.

Table 129. Resource Utilizations

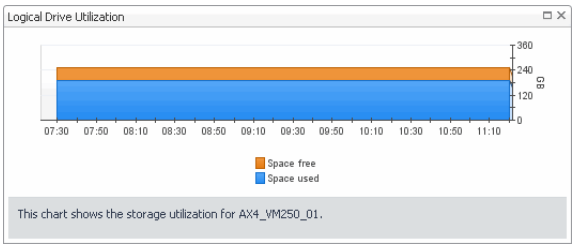
Description	Shows the resource consumption for the selected datastore broken down into four simple views.
Data displayed	• **Capacity**. The total space allocated to this datastore. • **Datastore**. The name of the selected datastore, followed by the related alarm counts. • **Est. Time Until Full**. The estimated amount of time after which this datastore becomes full. • **Free**. The amount of free space for this datastore. • **Max File Size**. The maximum file size for this datastore. • **Percent Free**. The percent of free space for this datastore. • **Type**. The datastore type. • **URL**. The datastore URL. • **Used**. The amount of used space for this datastore. • **Weekly Growth Rate**. The average amount of space the datastore expands every week.
Where to go next	Drill down on:

Table 129. Resource Utilizations

- **Free** or **Percent Free**. Displays the **Storage Used** dialog box.



- **Used**. Displays the **Logical Drive Utilization** dialog box.

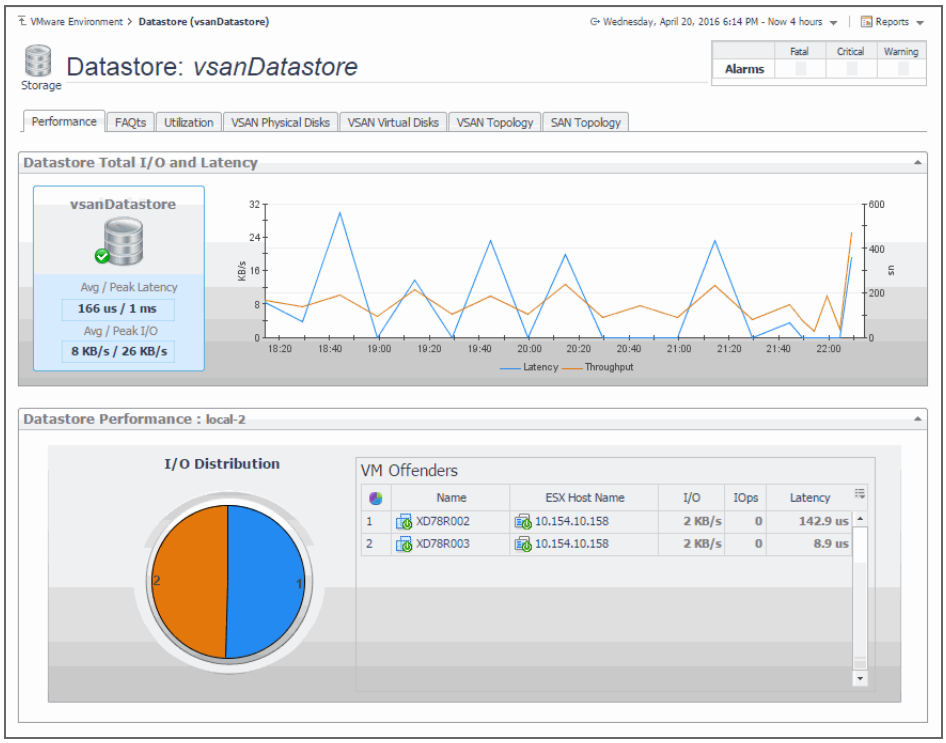


Datastore view

Purpose

The **Datastore** view shows the performance and utilization metrics for a selected datastore.

Figure 100. Datastore view



NOTE: The V**SAN Physical Disks**, **VSAN Virtual Disks**, and **VSAN Topology** tabs appear in this view only if a VSAN Datastore is selected. For more information about VSAN datastores, see VSAN datastores on page 9.

How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Datastores** tile.
2. In the Quick-View, in the Datastores view, select a datastore node.
3. In the Summary - Datastore view that appears, click **Explore**.

   The Datastore view appears in the display area.

Description of Embedded Views

This view is made up of the following embedded views:

- FAQts tab
- Datastore Capacity (Utilization tab)
- Datastore Capacity table (Utilization tab)
- Datastore Performance (Performance tab)
- Datastore Total I/O and Latency (Performance tab)
- Local VMware Disk: VM Objects On Disk (VSAN Physical Disks tab, VSAN datastores only)
- Physical Disk Placement (VSAN Virtual Disks tab, VSAN datastores only)
- Physical Disks (VSAN Physical Disks tab, VSAN datastores only)
- SAN Topology tab
- Virtual Disks (VSAN Virtual Disks tab, VSAN datastores only)
- VSAN Topology tab (VSAN datastores only)

Table 130. FAQts tab

Description	Shows answers to common questions about your environment. For complete details about the information that appears on this tab, see FAQts tab on page 89.

Table 131. Datastore Capacity (Utilization tab)

Description	Contains information about the selected datastore data capacity. • **Datastore, In Use**. The percentage of disk space in use. • **Datastore, Name**. The datastore name. • **Current Utilization, Allocated**. The percentage of the total disk space that is allocated to the virtual machines associated with the selected datastore. • **Current Utilization, Available Space**. The amount of the datastore disk space that is available for use. • **Current Utilization, Capacity**. The total amount of the datastore disk space, including the space in use and the available space. • **Current Utilization, In use**. The percentage of the total disk space that is currently in use.

Table 132. Datastore Capacity table (Utilization tab)

Description	Lists the virtual machines associated with the selected datastore. • **Name**. The virtual machine name • **Space Allocated**. The amount of disk space allocated to the virtual machine. • **Space Used**. The amount of disk space the virtual machine currently uses. • **Weekly Growth Rate**. The estimated growth pattern of the used disk space for the virtual machine.
Where to go next	Drill down on: • **Name**. For more information, see Summary tab on page 131.

Table 133. Datastore Performance (Performance tab)

Description	Shows the levels of disk resources used by the virtual machines associated with the selected datastore.
Data displayed	• **I/O Distribution**. A pie chart indicating how much disk space the individual virtual machines are using. • **VM Offenders, ESX Host Name**. The name of the ESX host on which the virtual machine is running. • **VM Offenders, I/O**. The rate at virtual machine writes or reads data from the disk associated with the selected datastore. • **VM Offenders, IOps**. The number of disk I/O operations the virtual machine processes per second. • **VM Offenders, Latency**. The data transfer latency. • **VM Offenders, Name**. The name of the virtual machine.
Where to go next	Drill down on: • **VM Offenders, ESX Host Name** or **VM Offenders, Name**. For more information, see Summary tab on page 131.

Table 134. Datastore Total I/O and Latency (Performance tab)

Description	Shows the disk latency and throughput rates for the selected datastore.
Data displayed	• **Datastore, Avg/Peak Latency**. The average and peak latency rates for the selected datastore. • **Datastore, I/O**. The data transfer rates for the selected datastore. • **Latency**. The datastore latency rates over the selected time range. • **Throughput**. The datastore disk throughput rates over the selected time range.

Table 135. Local VMware Disk: VM Objects On Disk (VSAN Physical Disks tab, VSAN datastores only)

Description	Lists the visual machines associated with the selected disk in the **Physical Disks** view. **NOTE:** This view appears on the V**SAN Physical Disks** tab. This tab is only available when a VSAN Datastore is selected. For more information about VSAN datastores, see VSAN datastores on page 9. • **Object Type**. The type of the topology object representing the virtual machine. • **Parent VM**. The name of the virtual machine associated with the selected disk. • **VM Object**. The topology object representing the virtual machine.
Where to go next	Drill down on: • **Parent VM**. For more information, see Summary tab on page 131.

Table 136. Physical Disk Placement (VSAN Virtual Disks tab, VSAN datastores only)

Description	Lists the visual machines associated with the selected virtual machine in the **Virtual Disks** view. **NOTE:** This view appears on the V**SAN Virtual Disks** tab. This tab is only available when a VSAN Datastore is selected. For more information about VSAN datastores, see VSAN datastores on page 9.
Data displayed	• **Component State**. The virtual machine state, for example, `ACTIVE`. • **Flash Disk Name**. The name of the flash disk associated with the virtual machine. • **Flash Disk UUID**. The universally unique identifies (UUID) of the flash disk associated with the virtual machine. • **HDD Disk Name**. The name of the hard disk associated with the virtual machine. • **HDD Disk UUID**. The universally unique identifies (UUID) of the hard disk associated with the virtual machine. • **Host**. The name of the ESX host on which the virtual machine is running. • **Type**. The type of the virtual machine such as `Component` or `Witness`.
Where to go next	Drill down on: • **Host**. For more information, see Summary tab on page 131.

Table 137. Physical Disks (VSAN Physical Disks tab, VSAN datastores only)

Description	Lists the physical disks associated with the selected VSAN datastore. **NOTE:** This view appears on the V**SAN Physical Disks** tab. This tab is only available when a VSAN Datastore is selected. For more information about VSAN datastores, see VSAN datastores on page 9.
Data displayed	• **Capacity**. The total space on the disk, including the available space and the space in use. • **Capacity Reserved**. The amount of space on disk that is reserved for some special purpose, for example, when the disk becomes full, or for some specific privileged processes. • **Capacity Used**. The amount of disk space on that is currently used. • **Disk Group**. The disk group to which the disk belongs. • **Drive Type**. The disk type. For example, `HDD` or `Flash`. • **Name**. A navigation tree with an ESX host as the root, and physical disks as child nodes. • **Operational Status**. The current operational disk status. • **VSAN Health Status**. The status of the VSAN the disk is associated with.

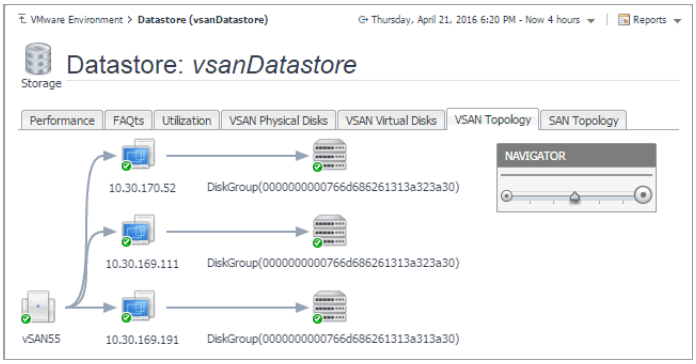
Table 138. SAN Topology tab

Description	This view appears only if you have Foglight for Storage Management installed and enabled. For more information, see the Foglight for Storage Management documentation.

Table 139. Virtual Disks (VSAN Virtual Disks tab, VSAN datastores only)

Description	Lists the virtual machines associated with the selected VSAN datastore. **NOTE:** This view appears on the V**SAN Virtual Disks** tab. This tab is only available when a VSAN Datastore is selected. For more information about VSAN datastores, see VSAN datastores on page 9.
Data displayed	• **Name**. A navigation tree with a virtual machine as the root, and virtual machine topology objects as child nodes. • **Object Type**. The type of the topology object representing the virtual machine.

Table 140. VSAN Topology tab (VSAN datastores only)

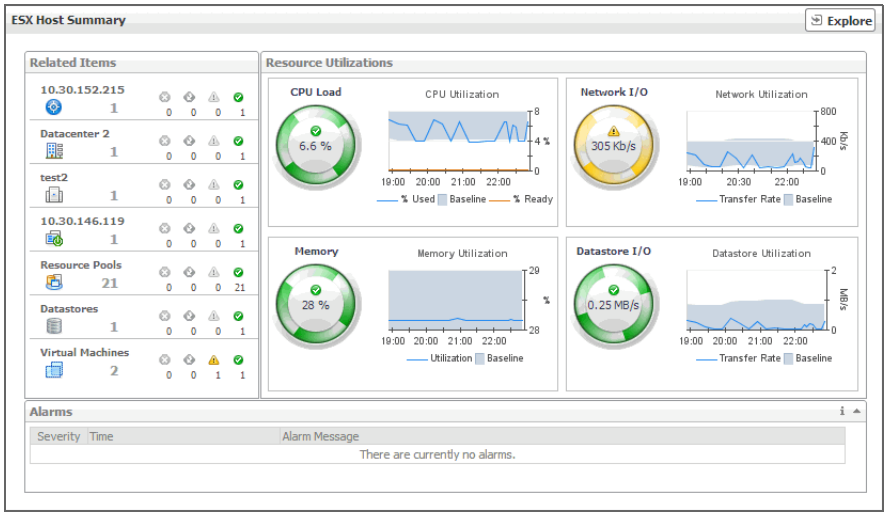
Description	Visualizes the relationships between the selected VSAN datastore and other objects in your environment through an interactive dependency map. The map illustrates how different components relate to each other, and the levels of the available resources available to them.  Topology views are also available for other components on the VMware Environment dashboard. For complete information about topology views, see Topology views on page 250.

ESX Host Summary view

Purpose

The **ESX Host Summary** view shows the overall resource utilization and the amounts of system resource consumption for a physical ESX host.

Figure 101. ESX Host Summary view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **ESX Hosts** tile.
2. In the Quick-View, select a ESX host node in the ESX Hosts view.

   The ESX Host Summary view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 141. Alarms

Description	Lists the alarms generated against the selected ESX host.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

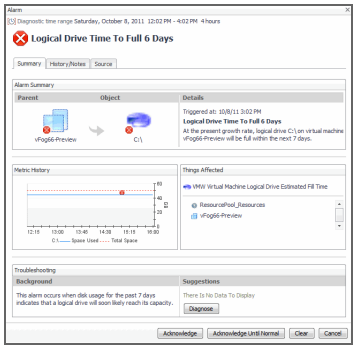


Table 142. Related Items

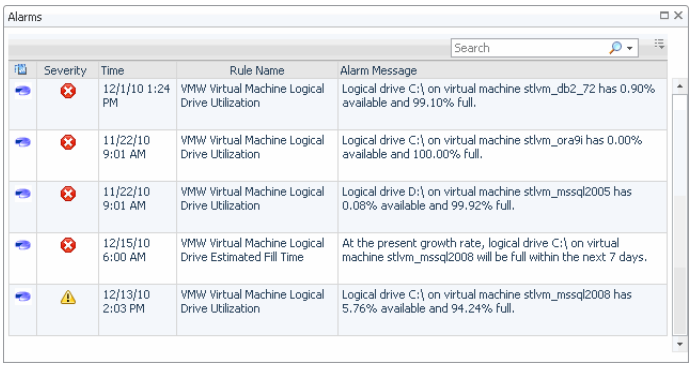
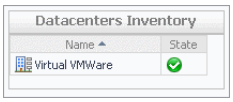
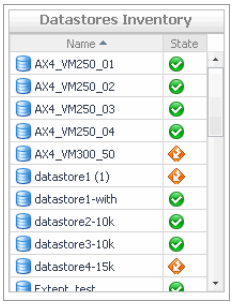
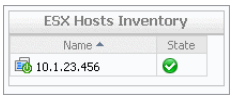
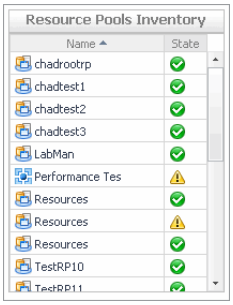
Description	Shows the numbers and states of the selected ESX host and other components associated with the host.
Data displayed	• **Datacenter**. The name of the datacenter associated with the selected ESX host. • **Datastores**. The number of datastores that are associated with the selected ESX host, followed by the related alarm counts. • **ESX Hosts**. The name of the selected host, followed by the related alarm counts. • **Resource Pools**. The number of resource pools that are associated with the selected ESX host, followed by the related alarm counts. • **Virtual Center**. The name of the virtual center associated with the selected ESX host, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that are associated with the selected ESX host, followed by the related alarm counts.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.  • **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the name and state of the datacenter associated with the selected ESX host.  • **Datastores**. Displays the **Datastores Inventory** dwell, showing the names and states of all datastores that are associated with the selected ESX host.  • **ESX Host**. Displays the **ESX Hosts Inventory** dwell, showing the name and state of the selected ESX host. 

Table 142. Related Items

- **Resource Pools**. Displays the **Resource Pools Inventory** dwell, showing the names and states of all resource pools that are associated with the selected ESX host.



- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the virtual center associated with the selected ESX host.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines that are associated with the selected ESX host.

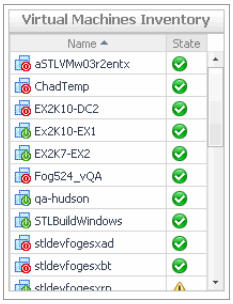


Table 143. Resource Utilizations

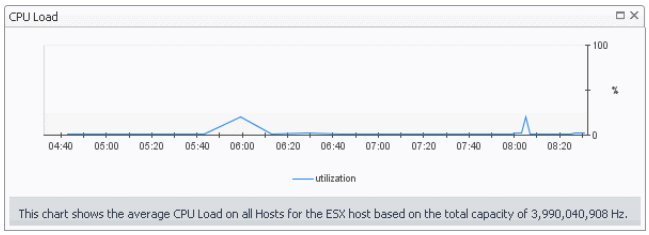
Description	Shows the resource consumption for the selected ESX host broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected ESX host's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data. • **CPU Utilization, % Ready**. The percentage of the ESX host's CPU resources that is ready to execute system code and user programs during the selected time period. • **CPU Utilization, % Used**. The percentage of the CPU utilization used by ESX hosts to execute system code and user programs, during the selected time period. • **Datastore I/O**. The current datastore I/O rate for the selected ESX host. • **Datastore Utilization, Baseline**. An envelope indicating the expected datastore utilization range based on historical data. • **Datastore Utilization, Transfer Rate**. The rate at which data was read from and written to the datastore of the selected ESX host during the specified time period. • **Memory Utilization, Baseline**. An envelope indicating the expected memory utilization range based on historical data.

Table 143. Resource Utilizations

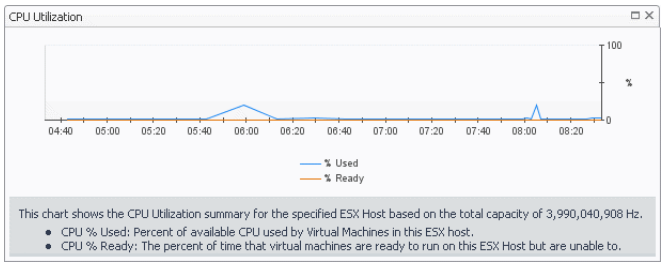
- **Memory Utilization, Utilization**. The current percentage of the average memory usage by the selected ESX host, based on the total memory capacity.
- **Network I/O**. The current rate at which the selected ESX host transfers data from and to the network.
- **Network Utilization, Baseline**. An envelope indicating the expected network utilization range based on historical data.
- **Network Utilization, Transfer Rate**. The rate at which the selected ESX host transfers data to and from the network during the selected time period.

Where to go next Drill down on:

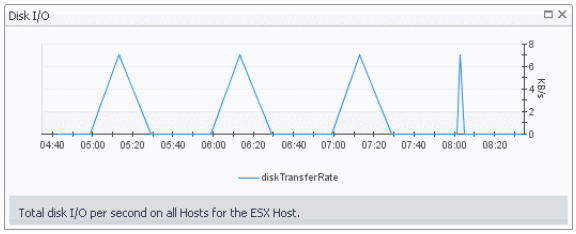
- **CPU Load** spinner. Displays the **CPU Load** dialog box.



- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.



- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.



- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.

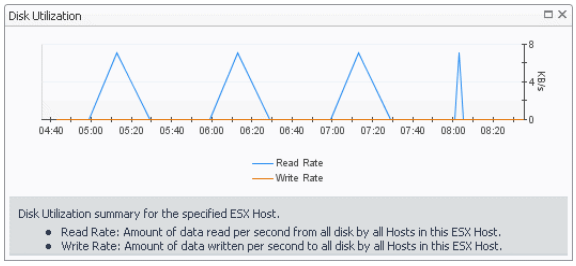
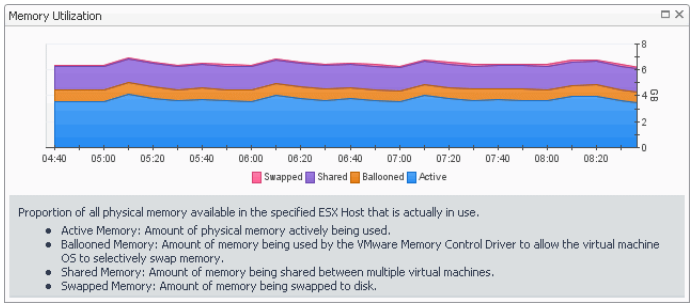
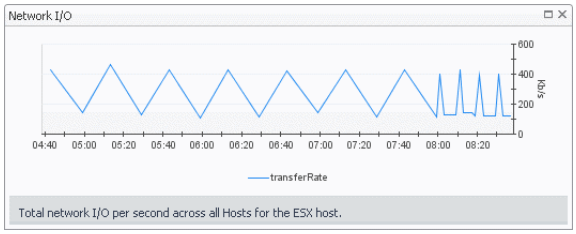


Table 143. Resource Utilizations

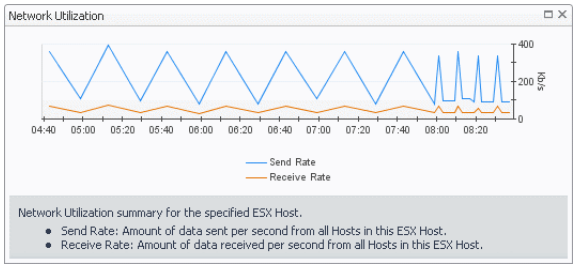
- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.



- **Network I/O** spinner. Displays the **Network I/O** dialog box.



- **Network Utilization** graph. Displays the **Network Utilization** dialog box.

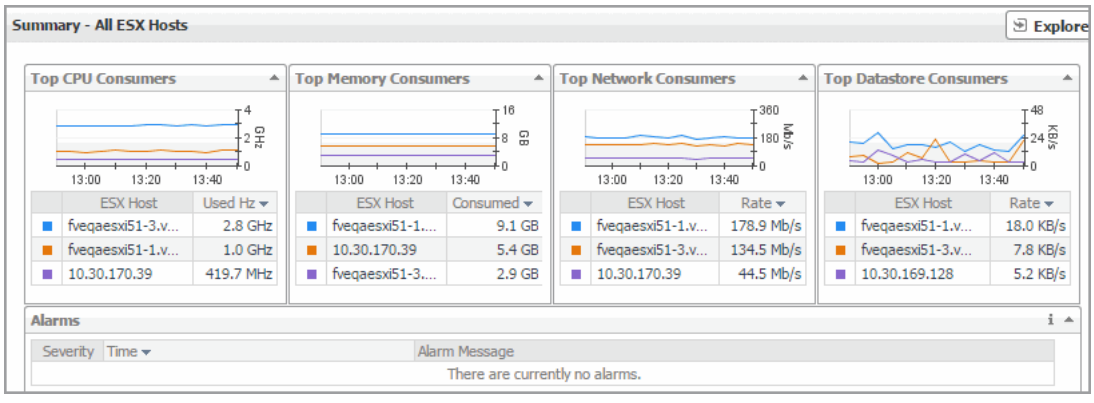


Summary - All ESX Hosts view

Purpose

The **Summary - All ESX Hosts** view displays overall resource utilization information for a group of physical ESX hosts and shows the elements that consume the highest amount of system resources.

Figure 102. Summary - All ESX Hosts view



How to Get Here

1 On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **ESX Hosts** tile.

2 In the Quick-View, select the **Summary** node in the ESX Hosts view.

The Summary - All ESX Hosts view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Datastore Consumers
- Top Memory Consumers
- Top Network Consumers

Table 144. Alarms

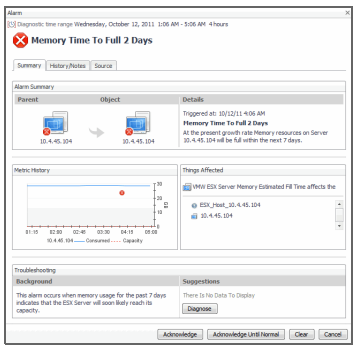
Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the ESX Host Summary view on page 192. • **Severity**. Displays the **Alarm Created** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.  • **Time**. Links to the ESX Host Summary view on page 192.

Table 145. Top CPU Consumers

Description	Shows the top three ESX hosts with the highest average CPU utilization.
Data displayed	• **ESX Host**. The name of the ESX host. • **Used Hz**.The amount of CPU processing speed each of the top three CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on:

Table 145. Top CPU Consumers

- **ESX Host**. For more information, see Summary tab on page 131.
- **Used Hz** (in the graph). Displays the **Top ESX Hosts - CPU Used Hz** dialog box.

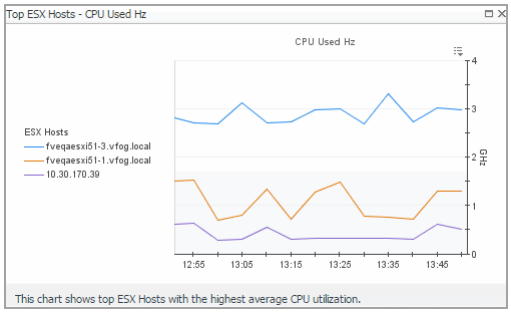
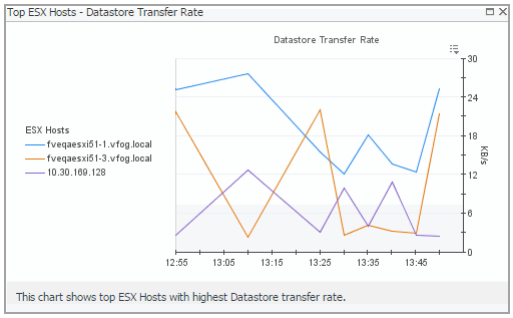


Table 146. Top Datastore Consumers

Description	Shows the top three ESX hosts with the lowest available disk space.
Data displayed	• **Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range. • **ESX Host**. The name of the ESX host.
Where to go next	Drill down on: • **Rate** (in the graph). Displays the **Top ESX Hosts - Datastore Transfer Rate** dialog box.



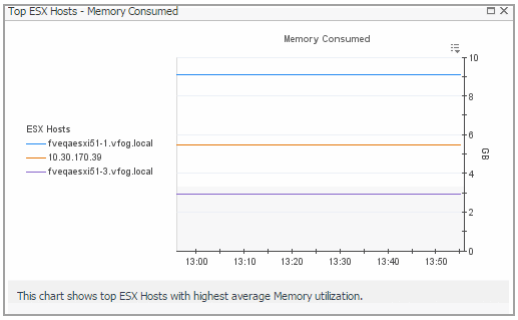
- **ESX Host**. For more information, see Summary tab on page 131.

Table 147. Top Memory Consumers

Description	Shows the top three ESX hosts with the highest average memory utilization.
Data displayed	• **Consumed**. The amount of memory the top three memory consumers use during the selected time range. • **ESX Host**. The name of the ESX host that is one of the top three memory consumers.
Where to go next	Drill down on:

Table 147. Top Memory Consumers

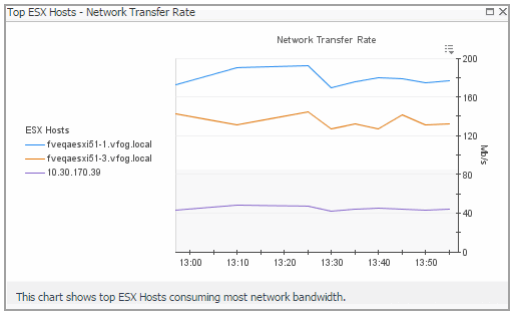
- **Consumed**. Displays the **Top ESX Hosts - Memory Consumed** dialog box.



- **ESX Host**. For more information, see Summary tab on page 131.

Table 148. Top Network Consumers

Description	Shows the top three ESX hosts that are consuming most network bandwidth.
Data displayed	• **Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range. • **ESX Host**. The name of the ESX host that is one of the top three network consumers.
Where to go next	Drill down on: • **Rate**. Displays the **Top ESX Hosts - Network Transfer Rate** dialog box.



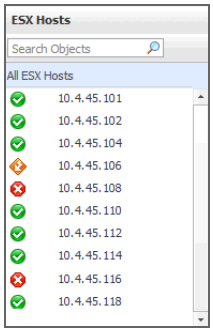
- **ESX Host** (in the table). For more information, see Summary tab on page 131.

ESX Hosts view

Purpose

This tree view lists the ESX hosts that exist in your environment and shows their state.

Figure 103. ESX Hosts view



Selecting the **All ESX Hosts** node displays overall resource utilization for all ESX hosts in your integrated system, and the elements that consume the highest amount of system resources in the **Summary - All ESX Hosts** view on the right. Similarly, selecting a ESX host node shows ESX host-specific metrics in the **ESX Host Summary** view on the right.

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Quick-View, select the **ESX Hosts** tile.

  The ESX Hosts view appears in the Quick-View on the left.

Table 149. Description of the View

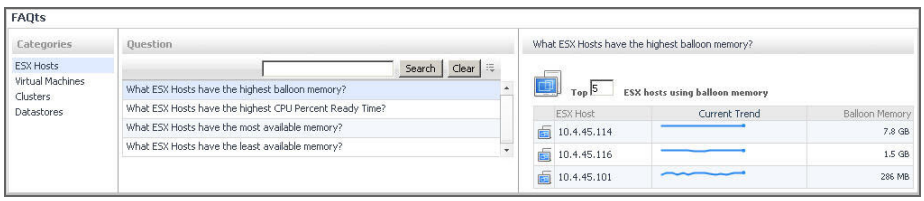
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated ESX host. • **All ESX Hosts**. A parent node for the ESX host object instances that appear in this view. • **ESX Host**. The ESX host name.
Where to go next	Drill down on: • **All ESX Hosts**. Shows the Summary - All ESX Hosts view in the Quick-View. • **ESX Host**. Shows the ESX Host Summary view in the Quick-View.

FAQts tab

Purpose

Through three embedded views (the Categories, Question, and Answer views), the **FAQts** tab enables you to ask Foglight for VMware questions and provides the answers to those questions.

Figure 104. FAQts tab



How to Get Here

The **FAQts** view appears on both the Virtual Environment Summary and VMware Explorer dashboards as a navigation tab.

Description of Embedded Views

The FAQts view is made up of the following embedded views:

- Answer
- Categories
- Questions

Answer

This view provides an answer to the question selected in the Questions view. The answer appears in the following form:

Top *x <objects of category>…*

where *x* is the number of objects of the category you provided in the Categories view.

Specify *x* by entering a number. The answer is relative to the subset of the infrastructure you are viewing in the dashboard. For example, the top 5 datastores are different for each individual cluster in the infrastructure.

Categories

This view lists the categories for which questions can be answered for you by Foglight for VMware.

Click a category in the list to select it.

Questions

This view lists the questions, for the category selected in the Categories, that can be answered for you by Foglight for VMware.

Click a question in the list to select it.

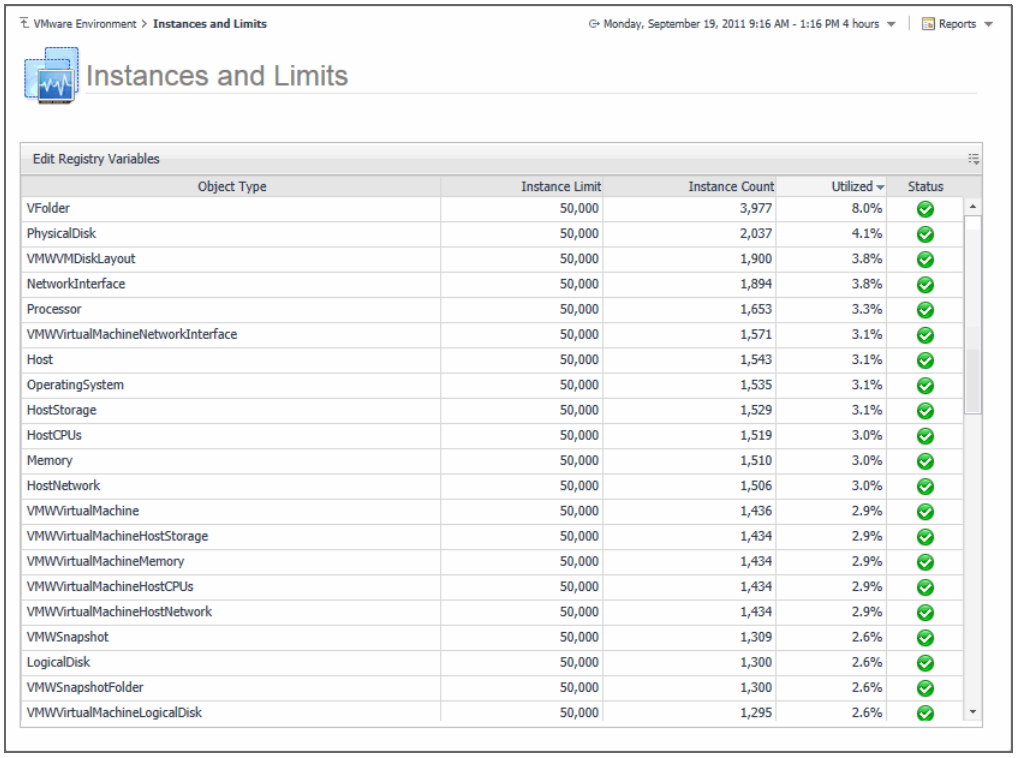
If the list of questions is long and you want to narrow it down, search for a particular text string using the **Search** box.

Instances and Limits view

Purpose

This view displays the list of the existing VMware object types. This information can give you insight into the size of your database and whether additional adjustments are required to improve your system performance.

Figure 105. Instances and Limits view



Object Type	Instance Limit	Instance Count	Utilized	Status
VFolder	50,000	3,977	8.0%	
PhysicalDisk	50,000	2,037	4.1%	
VMWVMDiskLayout	50,000	1,900	3.8%	
NetworkInterface	50,000	1,894	3.8%	
Processor	50,000	1,653	3.3%	
VMWVirtualMachineNetworkInterface	50,000	1,571	3.1%	
Host	50,000	1,543	3.1%	
OperatingSystem	50,000	1,535	3.1%	
HostStorage	50,000	1,529	3.1%	
HostCPUs	50,000	1,519	3.0%	
Memory	50,000	1,510	3.0%	
HostNetwork	50,000	1,506	3.0%	
VMWVirtualMachine	50,000	1,436	2.9%	
VMWVirtualMachineHostStorage	50,000	1,434	2.9%	
VMWVirtualMachineMemory	50,000	1,434	2.9%	
VMWVirtualMachineHostCPUs	50,000	1,434	2.9%	
VMWVirtualMachineHostNetwork	50,000	1,434	2.9%	
VMWSnapshot	50,000	1,309	2.6%	
LogicalDisk	50,000	1,300	2.6%	
VMWSnapshotFolder	50,000	1,300	2.6%	
VMWVirtualMachineLogicalDisk	50,000	1,295	2.6%	

How to Get Here

- On the VMware Environment dashboard, on the **Administration** tab, click **Review Instances and Limits**.

  The Instances and Limits view appears in the display area.

Table 150. Description of the View

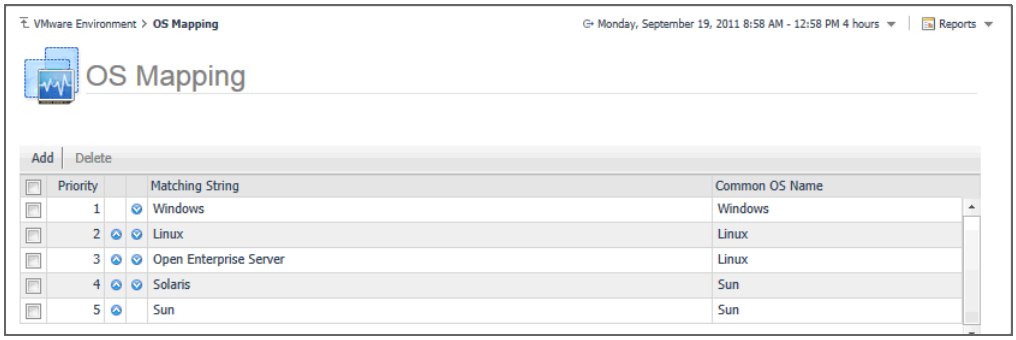
Data displayed	• **Instance Count**. The current number of object instances of this type. • **Instance Limit**. The maximum number of object instances of this type that can be instantiated. • **Object Type**. The type of the topology object. • **Status**. The current status representing the highest severity level associated with an instance of that type. • **Utilized**. The percentage of the object limit instance that is currently utilized.

OS Mapping view

Purpose

You configure OS mapping rules using the OS Mapping view. OS mapping is the mapping of the various versions and editions of a particular operating system to a common OS name. This helps Foglight for VMware manage the variety of versions and editions of each OS.

Figure 106. OS Mapping view



How to Get Here

- On the VMware Environment dashboard, on the **Administration** tab, click **Configure OS Mapping**.

  The OS Mapping view appears in the display area.

Table 151. Description of the View

Data displayed	• **Common OS Name**. The OS name. • **Matching String**. The OS name to be matched against existing OS names. • **Priority**. The matching priority. Selecting a mapping and clicking ▲ or ▼ allows you to edit the priority sequence.

Metrics Collection Management View

Purpose

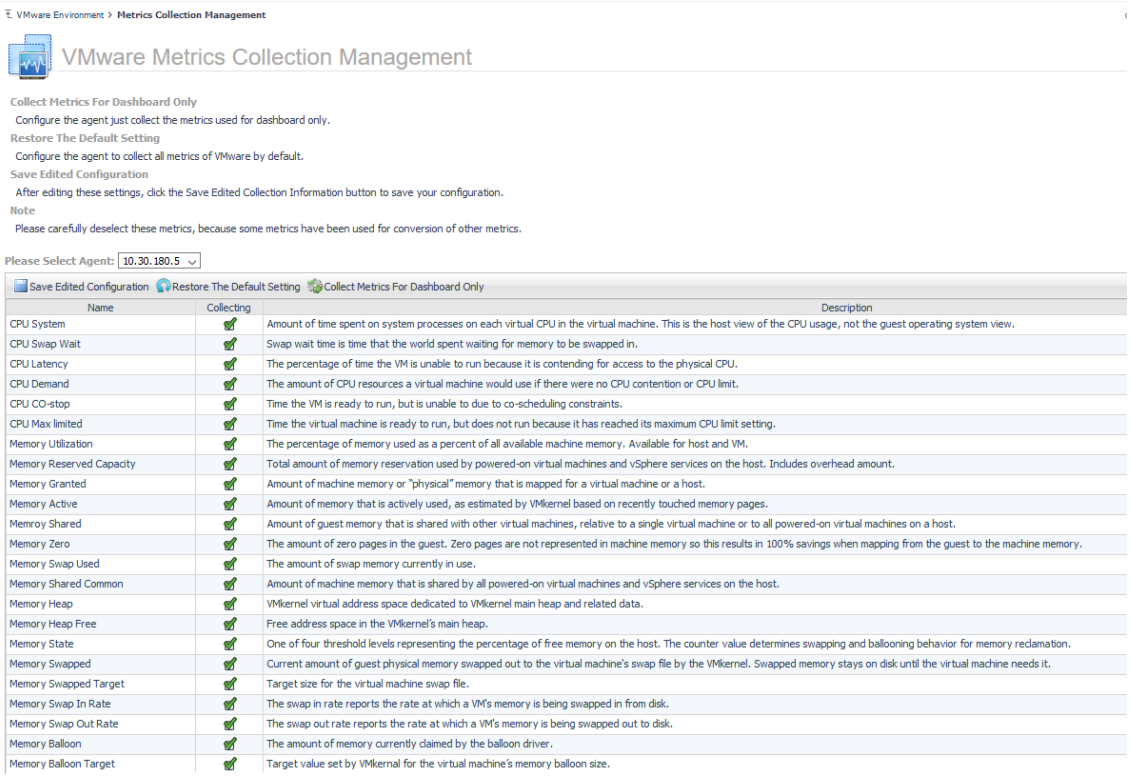
The Metrics Collection Management view is used to configure the metrics collect by agent. VMware agent has collect total 99 metrics from vCenter, but some metrics are not used to VMware dashboard and relate products (Capacity Director, Optimizer and so on), less metrics collection can reduce the pressure of collection from vCenter and improve performance for agent on large environment. This view is for this purpose and user can disable the collection of these metrics at this view.

- **Please select agent:** select the agent which need configure.
- **Collect Metrics For Dashboard Only:** Configure the agent just collect the metrics used for dashboard only.
- **Restore The Default Setting:** Configure the agent to collect all metrics of VMware by default.
- **Save Edited Configuration:** After editing these settings, click the Save Edited Collection Information button to save your configuration.

How to Get Here

- On the VMware Environment dashboard, on the Administration tab, on the Advanced Options sub tab, click Metrics Collection Management. The Metrics Collection Management View in the display area.

Figure 107. VMware Metrics Collection Management view



Name	Collecting	Description
CPU System	✓	Amount of time spent on system processes on each virtual CPU in the virtual machine. This is the host view of the CPU usage, not the guest operating system view.
CPU Swap Wait	✓	Swap wait time is time that the world spent waiting for memory to be swapped in.
CPU Latency	✓	The percentage of time the VM is unable to run because it is contending for access to the physical CPU.
CPU Demand	✓	The amount of CPU resources a virtual machine would use if there were no CPU contention or CPU limit.
CPU CO-stop	✓	Time the VM is ready to run, but is unable to due to co-scheduling constraints.
CPU Max limited	✓	Time the virtual machine is ready to run, but does not run because it has reached its maximum CPU limit setting.
Memory Utilization	✓	The percentage of memory used as a percent of all available machine memory. Available for host and VM.
Memory Reserved Capacity	✓	Total amount of memory reservation used by powered-on virtual machines and vSphere services on the host. Includes overhead amount.
Memory Granted	✓	Amount of machine memory or "physical" memory that is mapped for a virtual machine or a host.
Memory Active	✓	Amount of memory that is actively used, as estimated by VMkernel based on recently touched memory pages.
Memroy Shared	✓	Amount of guest memory that is shared with other virtual machines, relative to a single virtual machine or to all powered-on virtual machines on a host.
Memory Zero	✓	The amount of zero pages in the guest. Zero pages are not represented in machine memory so this results in 100% savings when mapping from the guest to the machine memory.
Memory Swap Used	✓	The amount of swap memory currently in use.
Memory Shared Common	✓	Amount of machine memory that is shared by all powered-on virtual machines and vSphere services on the host.
Memory Heap	✓	VMkernel virtual address space dedicated to VMkernel main heap and related data.
Memory Heap Free	✓	Free address space in the VMkernel's main heap.
Memory State	✓	One of four threshold levels representing the percentage of free memory on the host. The counter value determines swapping and ballooning behavior for memory reclamation.
Memory Swapped	✓	Current amount of guest physical memory swapped out to the virtual machine's swap file by the VMkernel. Swapped memory stays on disk until the virtual machine needs it.
Memory Swapped Target	✓	Target size for the virtual machine swap file.
Memory Swap In Rate	✓	The swap in rate reports the rate at which a VM's memory is being swapped in from disk.
Memory Swap Out Rate	✓	The swap out rate reports the rate at which a VM's memory is being swapped out to disk.
Memory Balloon	✓	The amount of memory currently claimed by the balloon driver.
Memory Balloon Target	✓	Target value set by VMkernal for the virtual machine's memory balloon size.

Data displayed

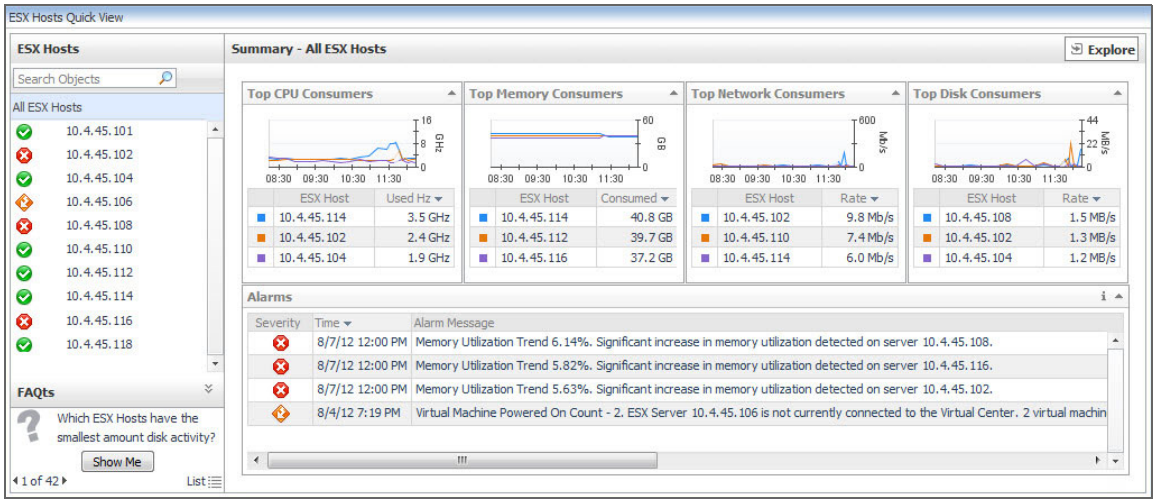
- **Name:** The metrics name.
- **Collecting:** Agent collect this metric or not, agent collect it when it selected.
- **Description:** The description of metric.

Quick-View

Purpose

The Quick-View displays summary information about the objects you select from the Virtual Environment Overview, which is also available on the Virtual Environment Summary dashboard.

Figure 108. Quick-View



The Quick-View is made up of two embedded views—the Object Tree view and the Object Summary view. Depending on what is selected in the Object Tree view, the Object Summary view, located at the right of the Quick-View, displays summary information for either a single object or for a group of objects of a particular type.

How to Get Here

- On the VMware Environment dashboard, open the **Monitoring** tab.

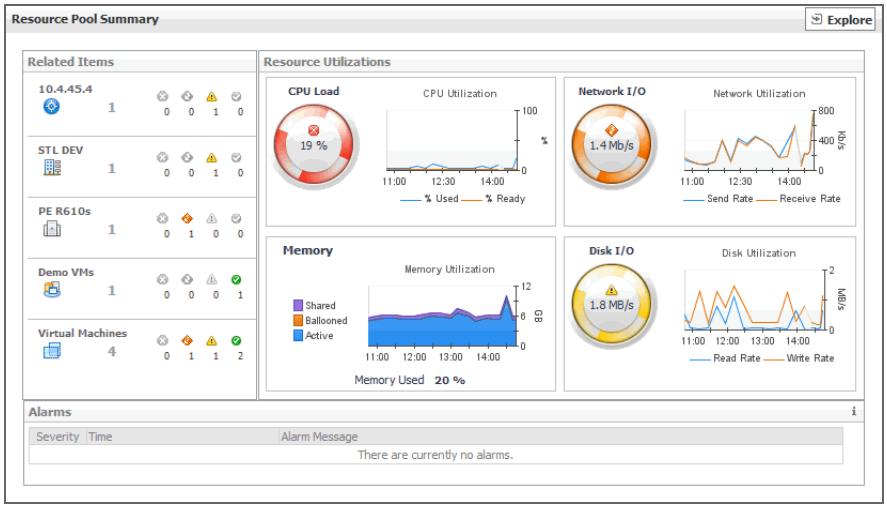
  The Quick-View appears in the middle of the display area.

Resource Pool Summary view

Purpose

The **Resource Pool Summary** view shows the overall resource utilization and the amounts of system resource consumption for a physical resource pool.

Figure 109. Resource Pool Summary view



How to Get Here

1 On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Resource Pools** tile.

2 In the Quick-View, select a resource pool node in the Resource Pools view.

The Resource Pool Summary view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 152. Alarms

Description	Lists the alarms generated against the selected resource pool.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

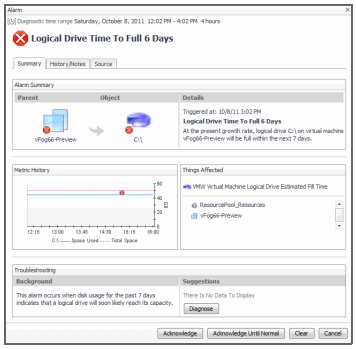
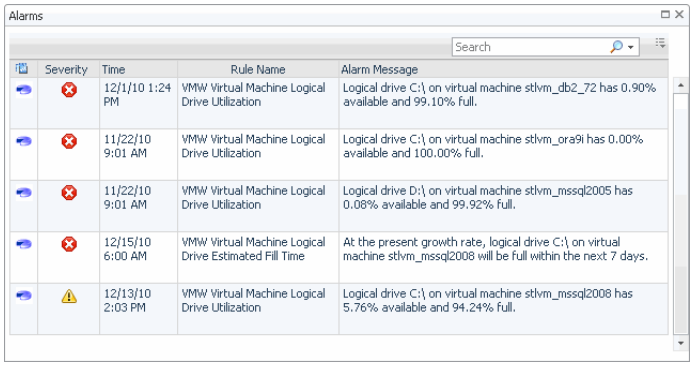


Table 153. Related Items

Description	Shows the numbers and states of the selected resource pool and other components associated with the resource pool.
Data displayed	• **Cluster**. The name of the cluster associated with the selected resource pool, followed by the related alarm counts. • **Datacenter**. The name of the datacenter associated with the selected resource pool, followed by the related alarm counts. • **Resource Pools**. The name of the selected resource pool, followed by the related alarm counts. • **Virtual Center**. The name of the virtual center associated with the selected resource pool, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that are associated with the selected resource pool, followed by the related alarm counts.
Where to go next	Drill down on:

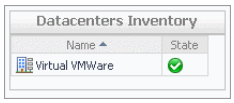
Table 153. Related Items

- **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.

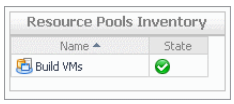


- **Cluster**. Displays the **Clusters Inventory** dwell, showing the name and state of the cluster associated with the selected resource pool.

- **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the name and state of the datacenter associated with the selected resource pool.



- **Resource Pool**. Displays the **Resource Pools Inventory** dwell, showing the name and state of the selected resource pool.



- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the virtual center associated with the selected resource pool.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines that are associated with the selected resource pool.

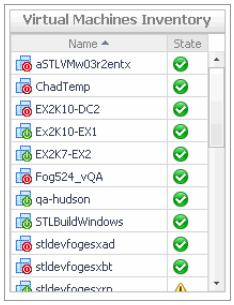


Table 154. Resource Utilizations

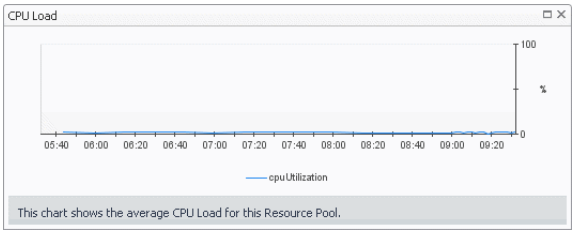
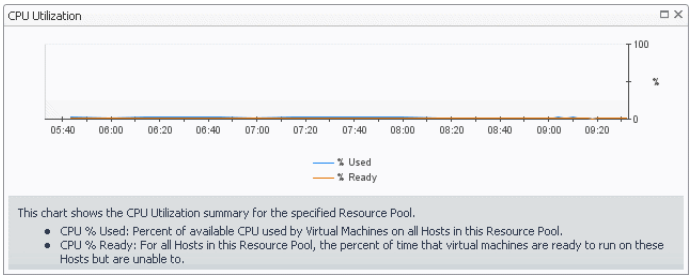
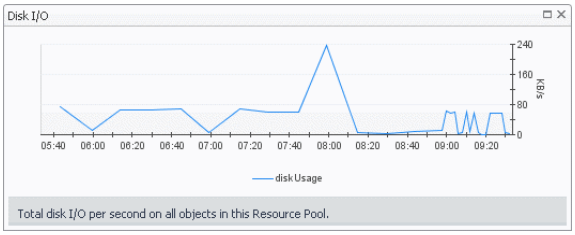
Description	Shows the resource consumption for the selected resource pool broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected resource pool's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, % Ready**. The percentage of the resource pool's CPU resources that is ready to execute system code and user programs during the selected time period. • **CPU Utilization, % Used**. The percentage of the CPU utilization used by the resource pool to execute system code and user programs, during the selected time period. • **Disk I/O**. The current disk I/O rate for the selected resource pool. • **Disk Utilization, Read Rate**. The rate at which the resource pool reads data from the disk during the selected time period. • **Disk Utilization, Write Rate**. The rate at which the resource pool writes data to the disk during the selected time period. • **Memory Usage**. The current percentage of the average memory usage by the selected resource pool, based on the total memory capacity. • **Memory Utilization, Active**. The amount of the available memory used by the selected resource pool during the selected time period. • **Memory Utilization, Ballooned**. The amount of physical memory that is actively being used by the VMware Memory Control Driver to allow the guest OS to selectively swap memory. • **Memory Utilization, Shared**. The amount of the virtual machine memory that is freed up due to transparent page sharing. • **Memory Utilization, Swapped**. The amount of memory that is stored in disk swap space • **Network I/O**. The current rate at which the selected resource pool transfers data from and to the network. • **Network Utilization, Receive Rate**. The rate at which the selected resource pool receives data from the network during the selected time period. • **Network Utilization, Send Rate**. The rate at which the selected resource pool sends data to the network during the selected time period.
Where to go next	Drill down on: • **CPU Load** spinner. Displays the **CPU Load** dialog box. 

Table 154. Resource Utilizations

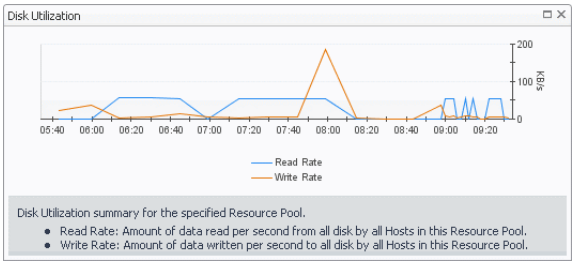
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.



- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.



- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.



- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.

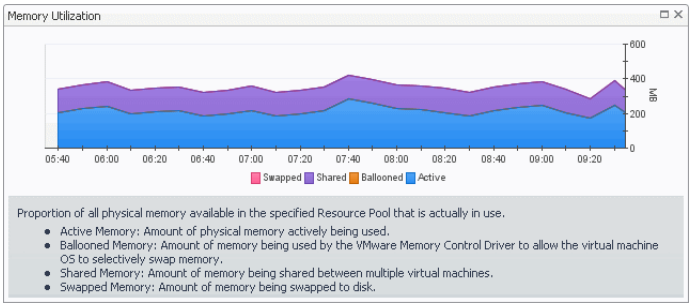
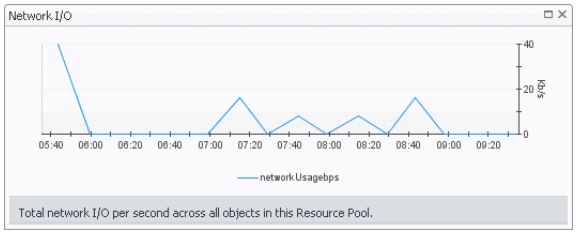
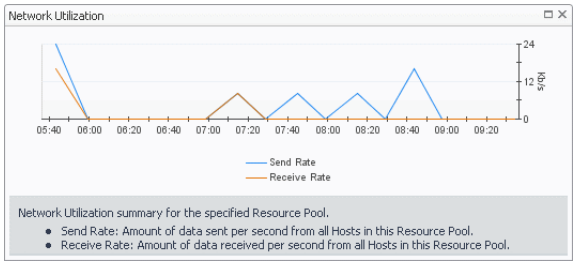


Table 154. Resource Utilizations

- **Network I/O** spinner. Displays the **Network I/O** dialog box.



- **Network Utilization** graph. Displays the **Network Utilization** dialog box.

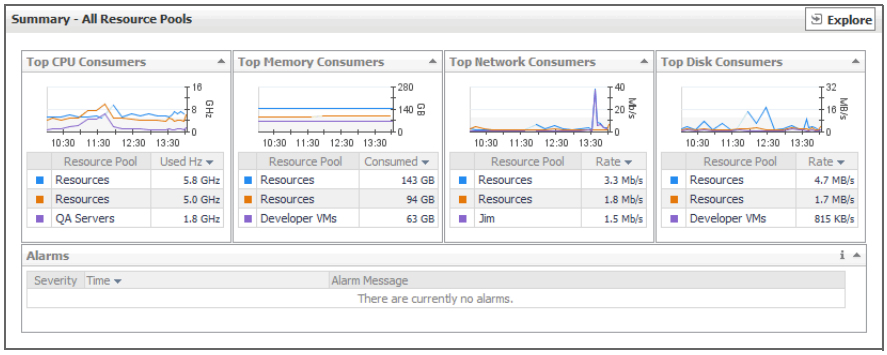


Summary - All Resource Pools view

Purpose

The **Summary - All Resource Pools** view displays overall resource utilization information for a group of physical resource pools and shows the elements that consume the highest amount of system resources.

Figure 110. Summary - All Resource Pools view



How to Get Here

1 On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Resource Pools** tile.

2 In the Quick-View, select the **Summary** node in the Resource Pools view.

The Summary - All Resource Pools view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers

- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 155. Alarms

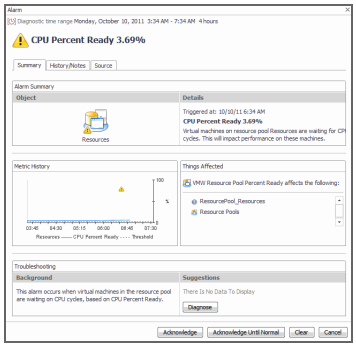
Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the Resource Pool Summary view on page 206. • **Severity**. Displays the **Alarm Created** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.  • **Time**. Links to the Resource Pool Summary view on page 206.

Table 156. Top CPU Consumers

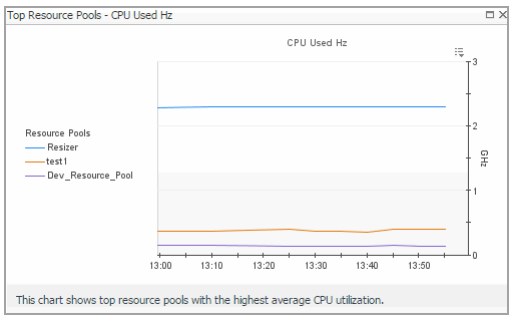
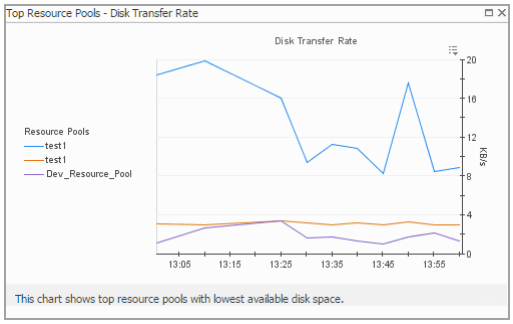
Description	Shows the top three resource pools with the highest average CPU utilization.
Data displayed	• **Resource Pool**. The name of the resource pool. • **Used Hz**.The amount of CPU processing speed each of the top three CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on: • **Resource Pool**. For more information, see Summary tab on page 131. • **Used Hz** (in the graph). Displays the **Top Resource Pools-CPU Used Hz** dialog box. 

Table 157. Top Disk Consumers

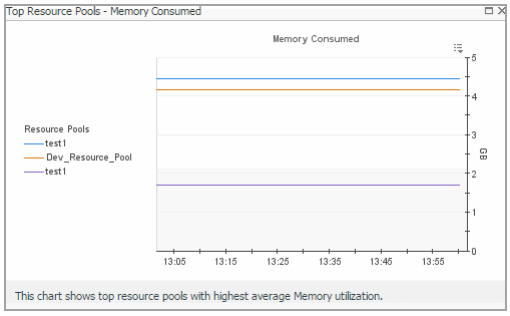
Description	Shows the top three resource pools with the lowest available disk space.
Data displayed	• **Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range. • **Resource Pool**. The name of the resource pool.
Where to go next	Drill down on: • **Rate** (in the graph). Displays the **Top Resource Pools - Disk Transfer Rate** dialog box.



- **Resource Pool**. For more information, see Summary tab on page 131.

Table 158. Top Memory Consumers

Description	Shows the top three resource pools with the highest average memory utilization.
Data displayed	• **Consumed**. The amount of memory the top three memory consumers use during the selected time range. • **Resource Pool**. The name of the resource pool that is one of the top three memory consumers.
Where to go next	Drill down on: • **Consumed**. Displays the **Top Resource Pools - Memory Consumed dialog** box.



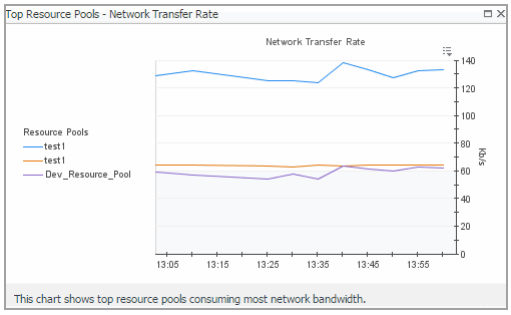
- **Resource Pool**. For more information, see Summary tab on page 131.

Table 159. Top Network Consumers

Description	Shows the top three resource pools that are consuming most network bandwidth.
Data displayed	• **Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range. • **Resource Pool**. The name of the resource pool that is one of the top three network consumers.
Where to go next	Drill down on:

Table 159. Top Network Consumers

- **Rate**. Displays the **Top Resource Pools - Network Transfer Rate** dialog box.



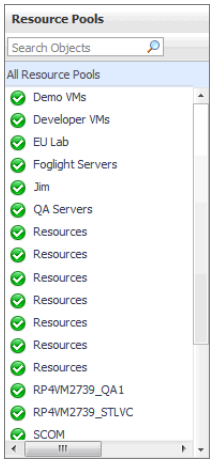
- **Resource Pool** (in the table). For more information, see Summary tab on page 131.

Resource Pools view

Purpose

This view is a tree view. It lists the resource pools that exist in your environment and shows their state.

Figure 111. Resource Pools view



Selecting the **All Resource Pools** node displays overall resource utilization for all resource pools in your integrated system, and the elements that consume the highest amount of system resources in the **Summary - All Resource Pools** view on the right. Similarly, selecting a resource pool node shows resource pool-specific metrics in the **Resource Pool Summary** view on the right.

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Quick-View, select the **Resource Pools** tile.

  The Resource Pools view appears in the Quick-View on the left.

Table 160. Description of the View

Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated resource pool. • **All Resource Pools**. A parent node for the resource pool object instances that appear in this view. • **Resource Pool**. The resource pool name.

Table 160. Description of the View

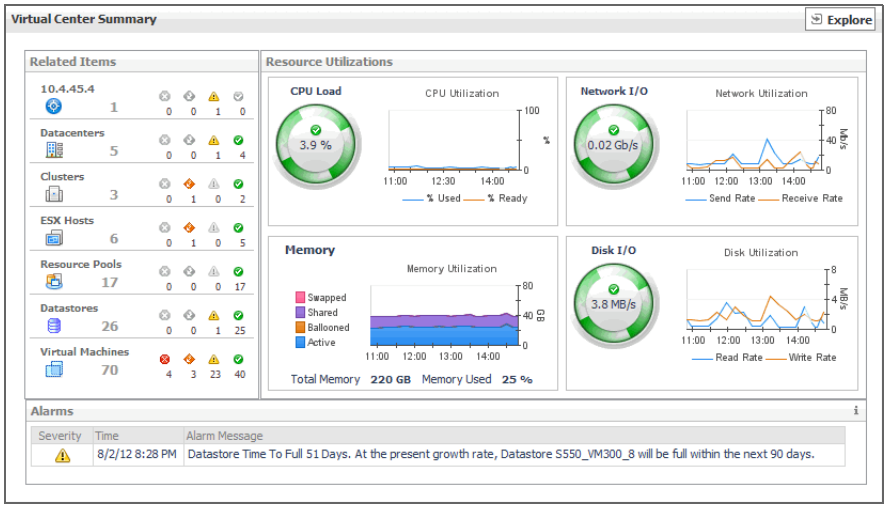
Where to go next	Drill down on: • **All Resource Pools**. Shows the Summary - All Resource Pools view in the Quick-View. • **Resource Pool**. Shows the Resource Pool Summary view in the Quick-View.

Virtual Center Summary view

Purpose

The **Virtual Center Summary** view shows the overall resource utilization and the amounts of system resource consumption for a virtual center.

Figure 112. Virtual Center Summary view



How to Get Here

1 On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Servers** tile.

2 In the Quick-View, select a virtual center node in the Virtual Centers view.

The Virtual Center Summary view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 161. Alarms

Description	Lists the alarms generated against the selected virtual center.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.

Table 161. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

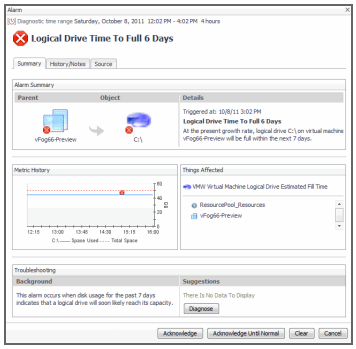


Table 162. Related Items

Description	Shows the numbers of the components that belong to the selected virtual center and the related alarm counts.
Data displayed	• **Clusters**. The number of clusters that belong to the selected virtual center, followed by the related alarm counts. • **Datacenters**. The number of datacenters that belong to the selected virtual center, followed by the related alarm counts. • **Datastores**. The number of datastores that belong to the selected virtual center, followed by the related alarm counts. • **ESX Hosts**. The number of ESX hosts that belong to the selected virtual center, followed by the related alarm counts. • **Resource Pools**. The number of resource pools that belong to the selected virtual center, followed by the related alarm counts. • **Virtual Center**. The name of the selected virtual center, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that belong to the selected virtual center, followed by the related alarm counts.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.

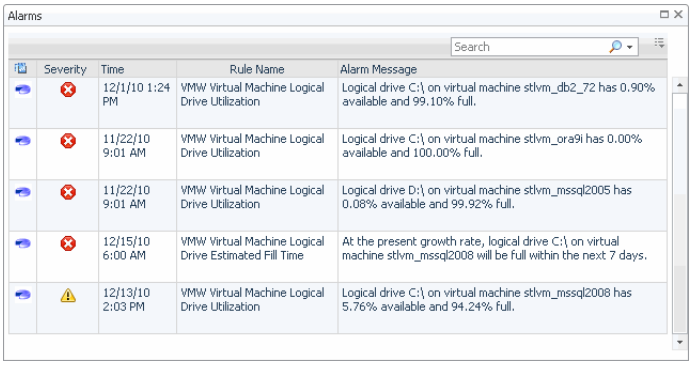
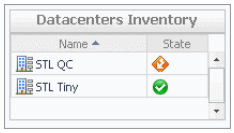


Table 162. Related Items

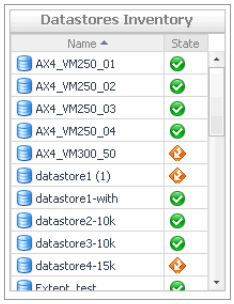
Data displayed

- **Clusters**. Displays the **Clusters Inventory** dwell, showing the names and states of all clusters that belong to the selected virtual center.

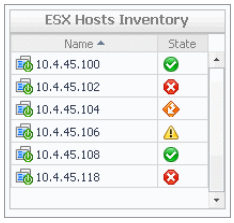
- **Datacenters**. Displays the **Datacenters Inventory** dwell, showing the names and states of all datacenters that belong to the selected virtual center.



- **Datastores**. Displays the **Datastores Inventory** dwell, showing the names and states of all datastores that belong to the selected virtual center.



- **ESX Hosts**. Displays the **ESX Hosts Inventory** dwell, showing the names and states of all ESX hosts that belong to the selected virtual center.



- **Resource Pools**. Displays the **Resource Pools Inventory** dwell, showing the names and states of all clusters that belong to the selected virtual center.

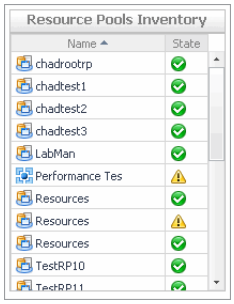


Table 162. Related Items

- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and states of the selected virtual center.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the names and states of all virtual machines name that belong to the selected virtual center.

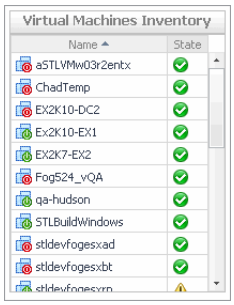
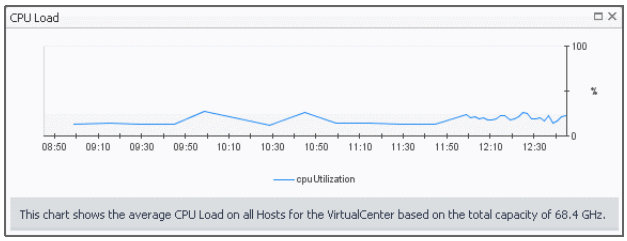


Table 163. Resource Utilizations

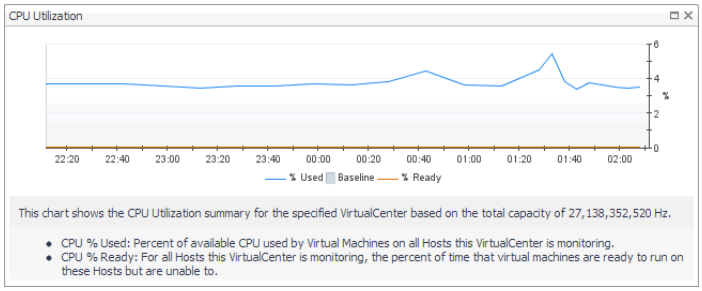
Description	Shows the resource consumption for the selected virtual center broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected virtual center's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, % Ready**. The percentage of the virtual center's CPU resources that is ready to execute system code and user programs during the selected time period. • **CPU Utilization, % Used**. The percentage of the virtual center's CPU utilization spent on executing system code and user programs during the selected time period. • **Disk I/O**. The current disk I/O rate for the selected virtual center. • **Disk Utilization, Read Rate**. The rate at which the virtual center reads data from the disk during the selected time period. • **Disk Utilization, Write Rate**. The rate at which the virtual center writes data to the disk during the selected time period. • **Memory Utilization, Active**. The amount of the available memory that the virtual center uses during the selected time period. • **Memory Utilization, Ballooned**. The amount of physical memory that is actively being used by the VMware Memory Control Driver to allow the guest OS to selectively swap memory. • **Memory Utilization, Shared**. The amount of the virtual machine memory that is freed up due to transparent page sharing. • **Memory Utilization, Swapped**. The amount of memory that is stored in disk swap space • **Network I/O**. The current rate at which the selected virtual center transfers data from and to the network. • **Network Utilization, Receive Rate**. The rate at which the selected virtual center receives data from the network during the selected time period. • **Network Utilization, Send Rate**. The rate at which the selected virtual center sends data to the network during the selected time period.
Where to go next	Drill down on:

Table 163. Resource Utilizations

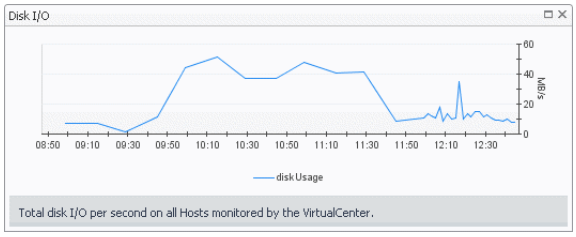
- **CPU Load** spinner. Displays the **CPU Load** dialog box.



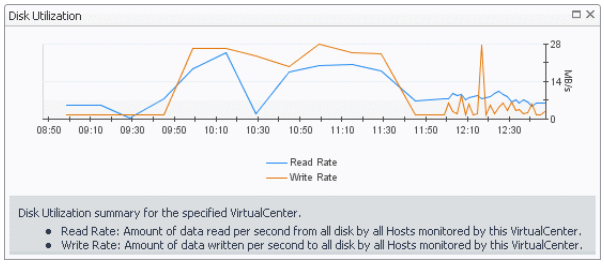
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.



- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.



- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.



- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.

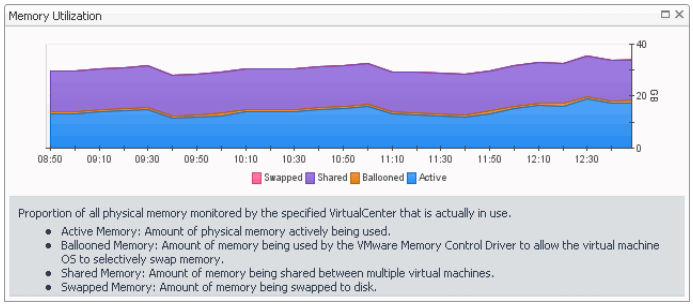
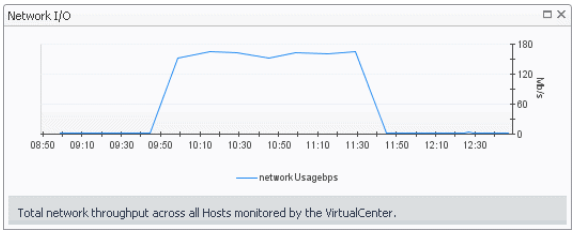
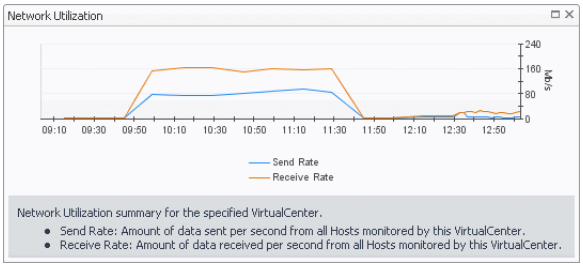


Table 163. Resource Utilizations

- **Network I/O** spinner. Displays the **Network I/O** dialog box.



- **Network Utilization** graph. Displays the **Network Utilization** dialog box.

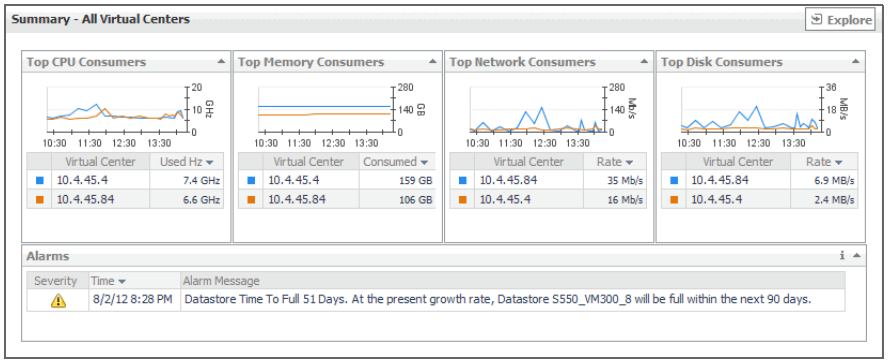


Summary (All Virtual Centers) view

Purpose

The **Summary - All Virtual Centers** view displays overall resource utilization information for a group of virtual centers and shows the elements that consume the highest amount of system resources.

Figure 113. Summary (All Virtual Centers) view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Centers** tile.
2. In the Quick-View, select the **Summary** node in the Virtual Centers view.

   The Summary (All Virtual Centers) view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers

- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 164. Alarms

Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message** or **Time**. Links to the view that shows additional information about the component affected by the alarm. • **Severity**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

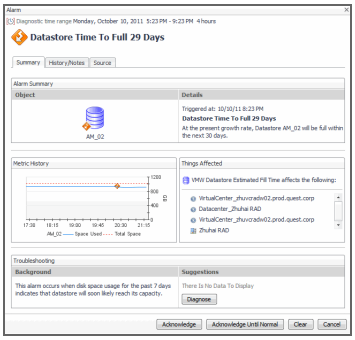
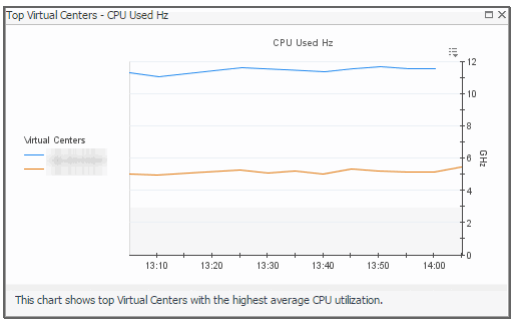


Table 165. Top CPU Consumers

Description	Shows the top three virtual centers with the highest average CPU utilization.
Data displayed	• **Used Hz**.The amount of CPU processing speed each of the top three CPU consumers spend on executing system code and user programs, during the selected time range. • **Virtual Center**. The name of the virtual center.
Where to go next	Drill down on: • **Used Hz** (in the graph). Displays the **Top Virtual Centers -CPU Used Hz** dialog box.



- **Virtual Center**. For more information, see Summary tab on page 131.

Table 166. Top Disk Consumers

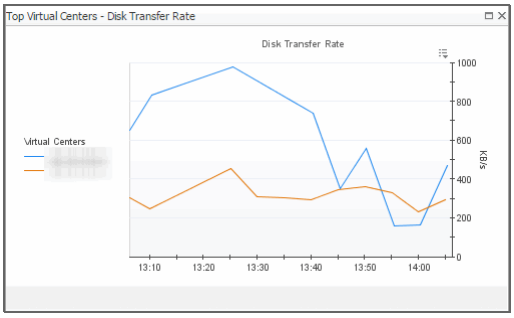
Description	Shows the top three virtual centers with the lowest available disk space.
Data displayed	• **Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range. • **Virtual Center**. The name of the virtual center.
Where to go next	Drill down on: • **Rate** (in the graph). Displays the **Top Virtual Centers - Disk Transfer Rate** dialog box.  • **Virtual Center**. For more information, see Summary tab on page 131.

Table 167. Top Memory Consumers

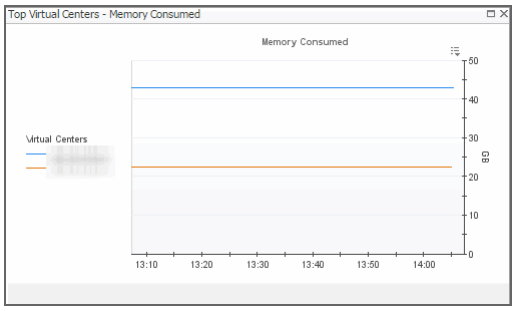
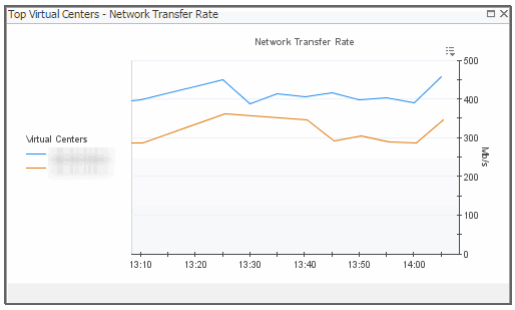
Description	Shows the top three virtual centers with the highest average memory utilization.
Data displayed	• **Consumed**. The amount of memory the top three memory consumers use during the selected time range. • **Virtual Center**. The name of the virtual center.
Where to go next	Drill down on: • **Consumed**. Displays the **Top Virtual Centers - Memory Consumed dialog** box.  • **Virtual Center**. For more information, see Summary tab on page 131.

Table 168. Top Network Consumers

Description	Shows the top three virtual centers that are consuming most network bandwidth.
Data displayed	• **Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range. • **Virtual Center**. The name of the virtual center.
Where to go next	Drill down on:

Table 168. Top Network Consumers

- **Rate**. Displays the **Top Virtual Centers - Network Transfer Rate** dialog box.



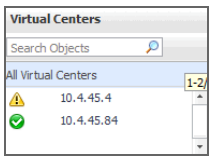
- **Virtual Center** (in the table). For more information, see Summary tab on page 131.

Virtual Centers view

Purpose

This view is a tree view. It lists the virtual centers that exist in your environment and shows their state.

Figure 114. **Virtual Centers view**



Selecting the **All Virtual Centers** node displays overall resource utilization for all virtual centers in your integrated system, and the elements that consume the highest amount of system resources in the Summary (All Virtual Centers) view on the right. Similarly, selecting a server node shows server-specific metrics in the Virtual Center Summary view on the right.

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Centers** tile.

  The Virtual Centers view appears in the Quick-View on the left.

Table 169. Description of the View

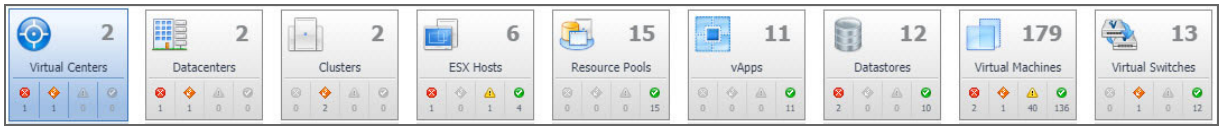
Data displayed	• **Alarm severity**. The state of the highest-severity alarm raised against the selected virtual center. • **All Virtual Centers**. A parent node for the virtual center object instances that appear in this view. • **Virtual Center**. A virtual center name.
Where to go next	Drill down on: • **All Virtual Centers**. Shows the Summary (All Virtual Centers) view in the Quick-View. • **Virtual Center**. Shows the Virtual Center Summary view in the Quick-View.

Virtual Environment Overview

Purpose

The Virtual Environment Overview provides you with an overview of the selected virtual environment.

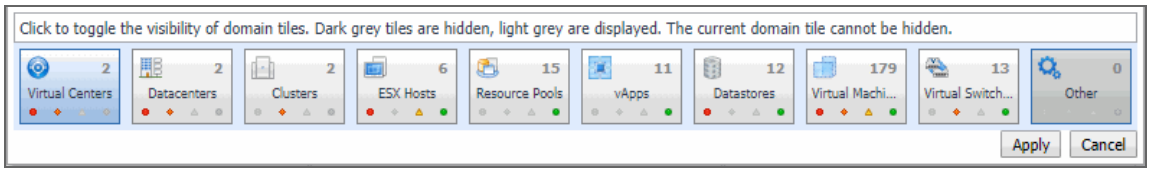
Figure 115. Virtual Environment Overview



The overview has a tile for each type of object in your virtual infrastructure. Each tile shows the number of instances the corresponding object type that exist in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).

You can move the tiles by dragging and dropping until you achieve the desired layout. To hide one or more tiles, on the tool bar on the right, click Edit , and in the popup that appears, click a tile that you want to hide.

Figure 116. Virtual Environment popup



Click the object type icon, the object type name, or the object count, to view summary information for that entire object type in the Quick-View. Click an alarm state (for example, warning) on a tile to view summary information in the Quick-View for the objects of that type that are in the selected alarm state.

If an alarm state has a count of zero, then you can not select that alarm state.

How to Get Here

- On the VMware Environment dashboard, open the **Monitoring** tab.

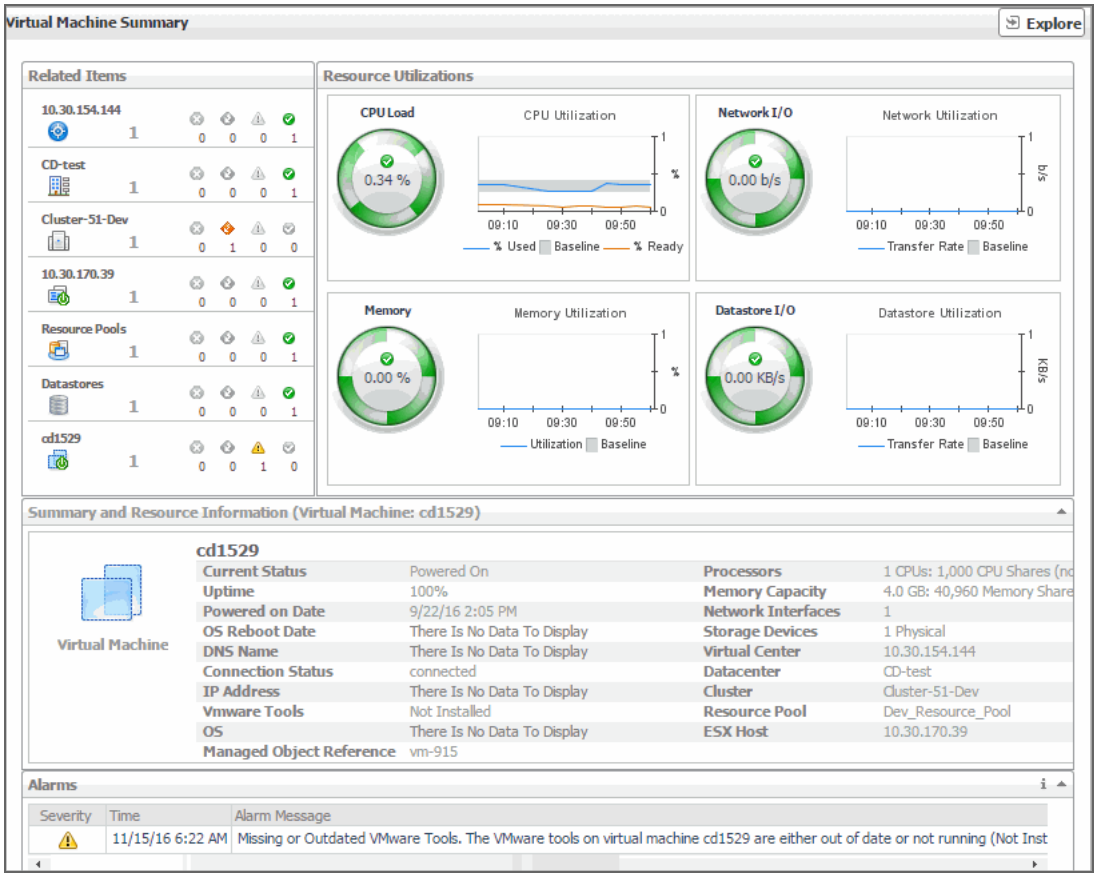
  The Virtual Environment Overview is located at the top of the display area.

Virtual Machine Summary view

Purpose

The **Virtual Machine Summary** view shows the overall resource utilization and the amounts of system resource consumption for a virtual machine.

Figure 117. Virtual Machine Summary view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Machines** tile.
2. In the Quick-View, select a Virtual Machine node in the Virtual Machines view.

   The Virtual Machine Summary view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Summary and Resource Information
- Related Items
- Resource Utilizations

Table 170. Alarms

Description	Lists the alarms generated against the selected virtual machine.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.

Table 170. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

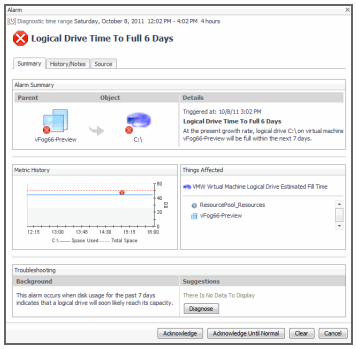


Table 171. Summary and Resource Information

Description	Lists the summary and resource information of the selected virtual machine.
Data displayed	• **Current Status**. The current status of the selected virtual machine: `Turned off` or `Powered On`. • **Processors**. The number of CPUs used by the selected virtual machine. • **Uptime**. The percentage of time during which the virtual machine is running. • **Memory Capacity**. The amount of memory resources allocated to the selected virtual machine. • **Powered on Date.** The date on which the selected virtual machine is powered. • **Network Interface.** The number of network interface cards that exist on the selected virtual machine. • **OS Reboot Date**. The date when rebooting the operating system. • **Storage Devices**. The number of physical and logical disks associated with the virtual machine. • **DNS Name**. The fully qualified DNS name of the selected virtual machine. • **Virtual Center**. The IP address of the Virtual Center to which the virtual machine belongs. • **Connection Status**. The virtual machine's connection status. • **Datacenter**. The name of the datacenter associated with the virtual machine. • **IP Address**. The IP address of the virtual machine. • **Cluster**. The name of the cluster associated with the virtual machine. • **Vmware Tools**. The name of VMware applications used to manage the virtual machine. • **Resource Pool**. The name of resource pools associated with the virtual machine. • **OS**. The name of the operating system used by the selected virtual machine. • **ESX Host**. The IP address of the ESX host on which the virtual machine is running. • **Managed Object Reference**. Identifies the virtual switch in your monitored environment.

Table 172. Related Items

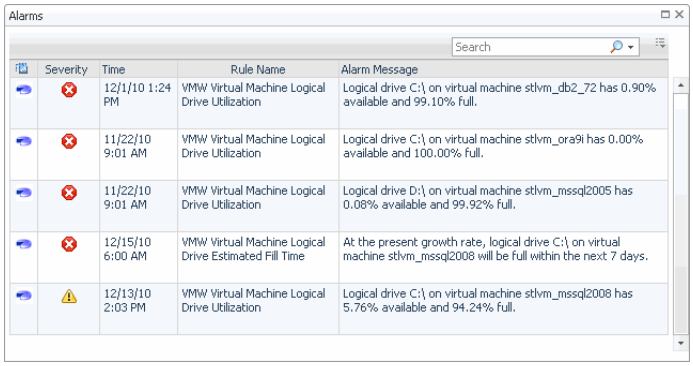
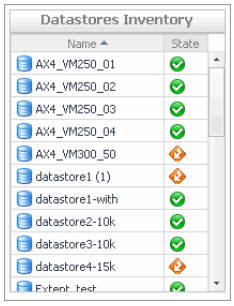
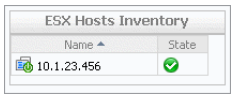
Description	Shows the numbers and states of the selected virtual machine and other components associated with it.
Data displayed	• **Cluster**. The name of the cluster associated with the selected virtual machine, followed by the related alarm counts. • **Datacenter**. The name of the datacenter associated with the selected virtual machine, followed by the related alarm counts. • **Datastores**. The number of datastores that are associated with the selected virtual machine, followed by the related alarm counts. • **ESX Host**. The name of the ESX host on which the selected virtual machine is running, followed by the related alarm counts. • **Resource Pools**. The number of resource pools that are associated with the selected virtual machine, followed by the related alarm counts. • **Virtual Center**. The name of the virtual center associated with the selected virtual machine, followed by the related alarm counts. • **Virtual Machine**. The number of the selected virtual machine, followed by the related alarm counts.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message.  • **Cluster**. Displays the **Clusters Inventory** dwell, showing the name and state of the cluster associated with the selected virtual machine. • **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the name and state of the datacenter associated with the selected virtual machine.

Table 172. Related Items

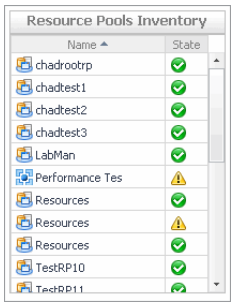
- **Datastores**. Displays the **Datastores Inventory** dwell, showing the names and states of all datastores that are associated with the selected virtual machine.



- **ESX Host**. Displays the **ESX Hosts Inventory** dwell, showing the name and state of the ESX host associated with the selected virtual machine.



- **Resource Pools**. Displays the **Resource Pools Inventory** dwell, showing the names and states of all resource pools that are associated with the selected virtual machine.



- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the virtual center associated with the selected virtual machine.

- **Virtual Machine**. Displays the **Virtual Machines Inventory** dwell, showing the name and state of the selected virtual machine.

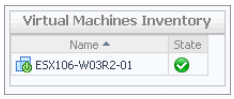


Table 173. Resource Utilizations

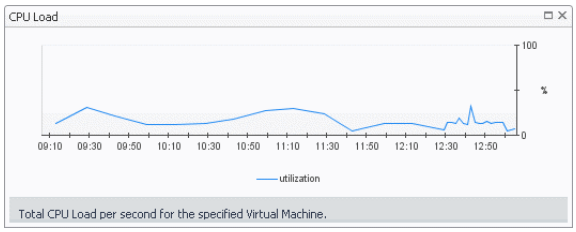
Description	Shows the resource consumption for the selected virtual machine broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected virtual machine's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data.

Table 173. Resource Utilizations

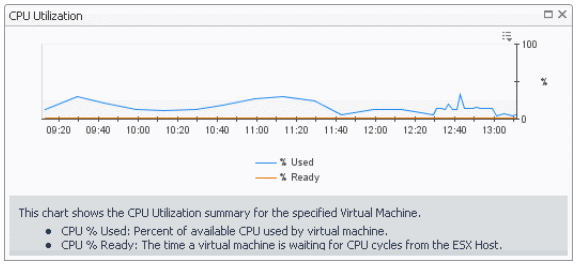
- **CPU Utilization, % Ready**. The percentage of the virtual machine's CPU resources that is ready to execute system code and user programs during the selected time period.
- **CPU Utilization, % Used**. The percentage of the CPU utilization used by the virtual machine to execute system code and user programs, during the selected time period.
- **Disk I/O**. The current disk I/O rate for the selected virtual machine.
- **Disk Utilization, Baseline**. An envelope indicating the expected disk utilization range based on historical data.
- **Disk Utilization, Transfer Rate**. The rate at which the virtual machine reads and writes data to the disk during the selected time period.
- **Memory Usage**. The current percentage of the average memory usage by the selected virtual machine, based on the total memory capacity.
- **Memory Utilization, Baseline**. An envelope indicating the expected memory utilization range based on historical data.
- **Memory Utilization, Utilization**. The percentage of memory used by the virtual machine during the selected time period.
- **Network I/O**. The current rate at which the selected virtual machine transfers data from and to the network.
- **Network Utilization, Baseline**. An envelope indicating the expected network utilization range based on historical data.
- **Network Utilization, Transfer Rate**. The rate at which the selected virtual machine receives and sends data to the network during the selected time period.

Where to go next Drill down on:

- **CPU Load** spinner. Displays the **CPU Load** dialog box.



- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.



- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.

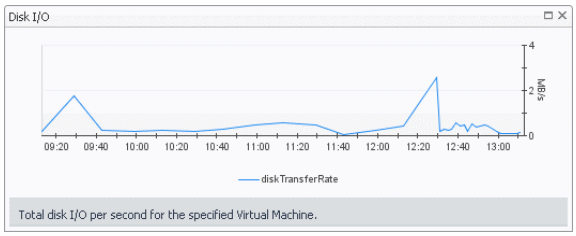
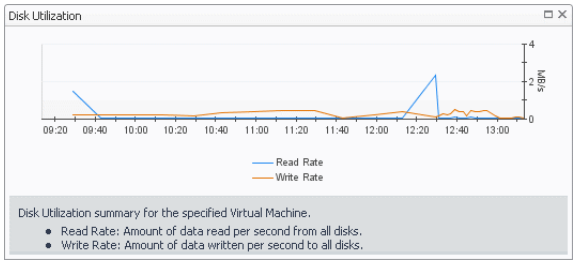
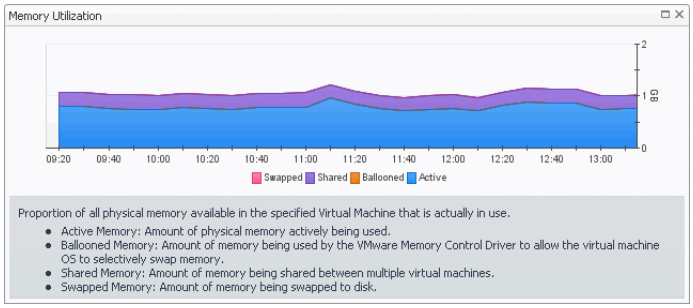


Table 173. Resource Utilizations

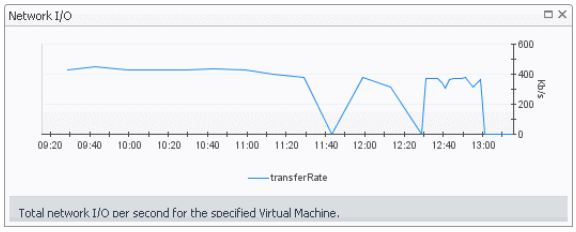
- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.



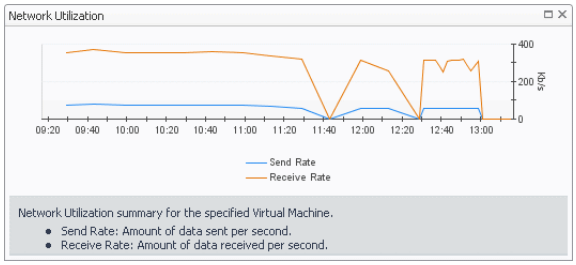
- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.



- **Network I/O** spinner. Displays the **Network I/O** dialog box.



- **Network Utilization** graph. Displays the **Network Utilization** dialog box.

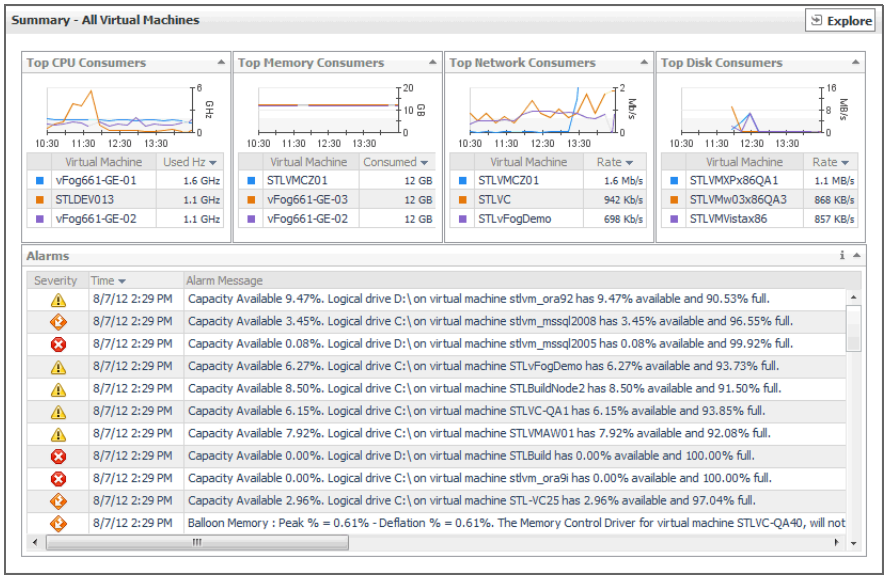


Summary - All Virtual Machines view

Purpose

The **Summary - All Virtual Machines** view displays overall resource utilization information for a group of virtual machines and shows the elements that consume the highest amount of system resources.

Figure 118. Summary - All Virtual Machines view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Machines** tile.
2. In the Quick-View, select the **Summary** node in the Virtual Machines view.

   The Summary - All Virtual Machines view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 174. Alarms

Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.

Table 174. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

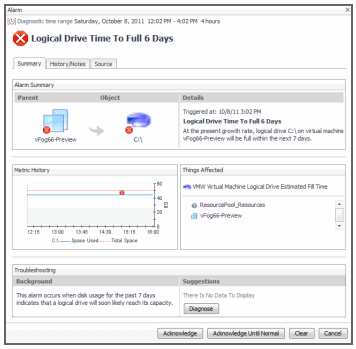


Table 175. Top CPU Consumers

Description	Shows the top three virtual machines with the highest average CPU utilization.
Data displayed	• **Virtual Machine**. The name of the virtual machine. • **Used Hz**.The amount of CPU processing speed each of the top three CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on: • **Virtual Machine**. For more information, see Summary tab on page 131. • **Used Hz** (in the graph). Displays the **Top Virtual Machines-CPU Used Hz** dialog box.

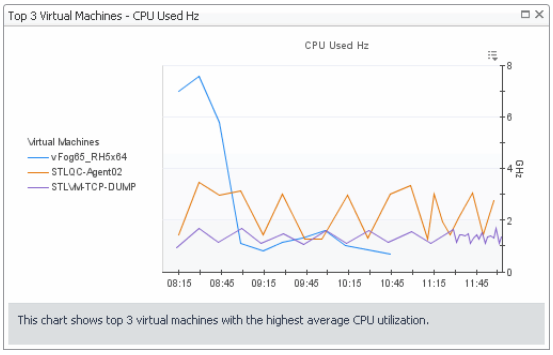


Table 176. Top Disk Consumers

Description	Shows the top three virtual machines with the lowest available disk space.
Data displayed	• **Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range. • **Virtual Machine**. The name of the virtual machine.
Where to go next	Drill down on:

Table 176. Top Disk Consumers

- **Rate** (in the graph). Displays the **Top Virtual Machines - Disk Transfer Rate** dialog box.

- **Virtual Machine**. For more information, see Summary tab on page 131.

Table 177. Top Memory Consumers

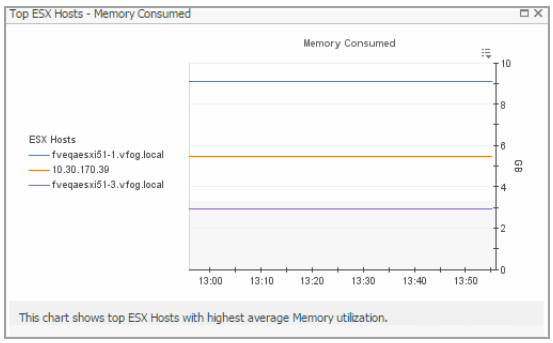
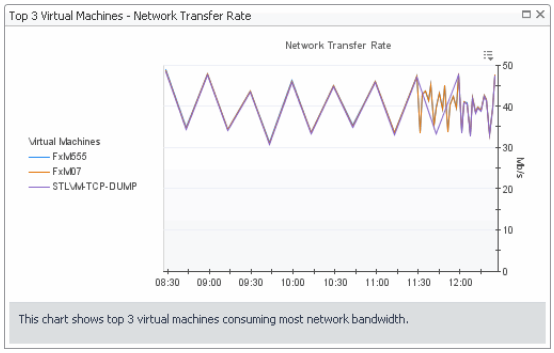
Description	Shows the top three virtual machines with the highest average memory utilization.
Data displayed	• **Consumed**. The amount of memory the top three memory consumers use during the selected time range. • **Virtual Machine**. The name of the virtual machine that is one of the top three memory consumers.
Where to go next	Drill down on: • **Consumed**. Displays the **Top Virtual Machines - Memory Consumed dialog** box.  • **Virtual Machine**. For more information, see Summary tab on page 131.

Table 178. Top Network Consumers

Description	Shows the top three virtual machines that are consuming most network bandwidth.
Data displayed	• **Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range. • **Virtual Machine**. The name of the virtual machine that is one of the top three network consumers.
Where to go next	Drill down on:

Table 178. Top Network Consumers

- **Rate**. Displays the **Top 3 Virtual Machines - Network Transfer Rate** dialog box.



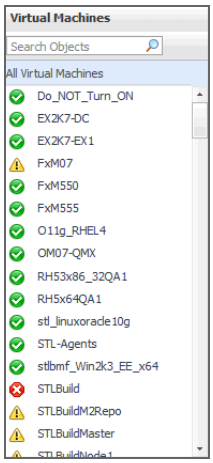
- **Virtual Machine** (in the table). For more information, see Summary tab on page 131.

Virtual Machines view

Purpose

This view is a tree view. It lists the virtual machines that exist in your environment and shows their state.

Figure 119. Virtual Machines view



Selecting the **All Virtual Machines** node displays overall resource utilization for all virtual machines in your integrated system, and the elements that consume the highest amount of system resources in the Summary - All Virtual Machines view on the right. Similarly, selecting a Virtual Machine node shows Virtual Machine-specific metrics in the Virtual Machine Summary view view on the right.

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Quick-View, select the **Virtual Machines** tile.

  The Virtual Machines view appears in the Quick-View on the left.

Table 179. Description of the View

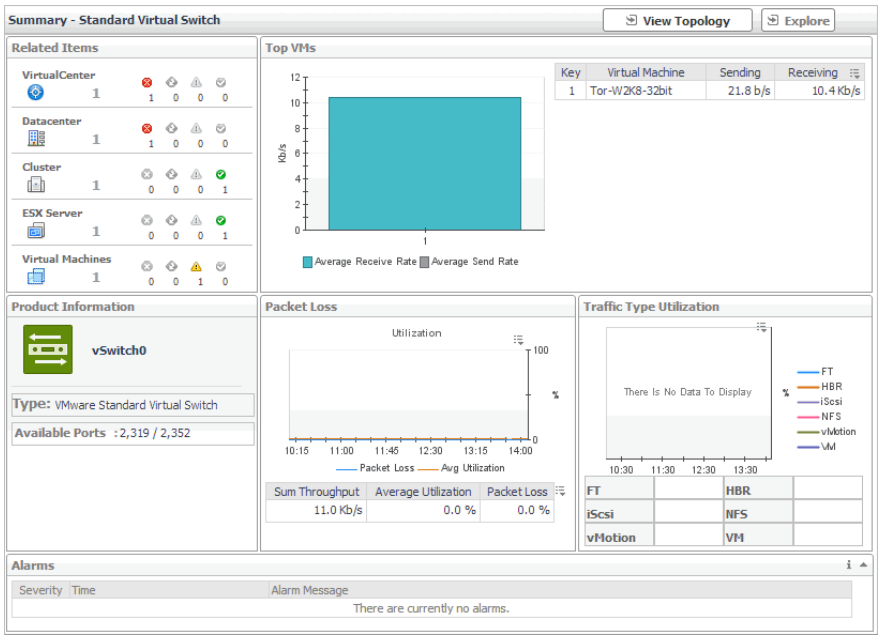
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated virtual machine. • **All Virtual Machines**. A parent node for the virtual machine object instances that appear in this view. • **Virtual Machine**. The virtual machine name.
Where to go next	Drill down on: • **All Virtual Machines**. Shows the Summary - All Virtual Machines view in the Quick-View. • **Virtual Machine**. Shows the Virtual Machine Summary view in the Quick-View.

Summary - Standard Virtual Switch view

Purpose

The **Summary - Standard Virtual Switch** view illustrates the overall network utilization and the levels of overall network packet loss for a selected standard virtual switch.

Figure 120. Summary - Standard Virtual Switch view



How to Get Here

1 On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Switches** tile.

2 In the Quick-View, in the Virtual Switches view, under **Standard Virtual Switches**, select a virtual switch.

The Summary - Standard Virtual Switch view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms

- Packet Loss
- Product Information
- Related Items
- Top VMs
- Traffic Type Utilization

Table 180. Alarms

Description	Lists the alarms generated against the selected virtual machine.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight, see the *Foglight User Help*.

Table 181. Packet Loss

Description	Displays the utilization of the selected switch along with packet loss data. This view illustrates the overall switch efficiency.
Data displayed	• **Utilization chart, Avg Utilization**. The average percentage of the network resources available to the switch that are in use over the selected time period. • **Utilization chart, Packet Loss**. The average percentage of time the data packets sent to the monitored switch are not echoed back over the selected time period. • **Utilization table, Average Utilization**. The average percentage of the network resources available to the switch that are currently in use. • **Utilization table, Packet Loss**. The average percentage of time the data packets sent to the monitored switch are not echoed back. • **Utilization table, Sum Throughput**. The current rate of network throughput for the selected switch.
Where to go next	Drill down on: • **Packet Loss, Utilization chart**. Displays the **Utilization** dialog box.

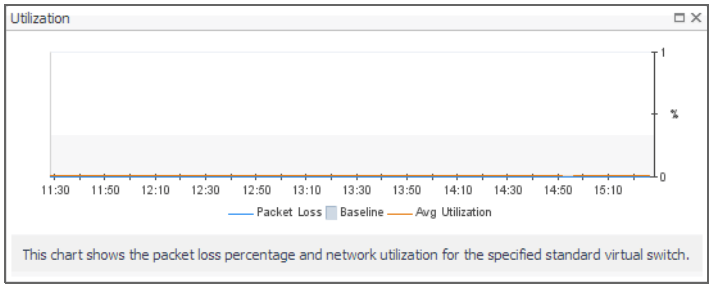


Table 182. Product Information

Description	Shows the name of the selected switch along with some basic configuration information.
Data displayed	• **Available Ports**. The number of switch ports that are available for use out of the total number of ports. • **Type**. The type of the switch: **VMware Standard Virtual Switch**.

Table 182. Product Information

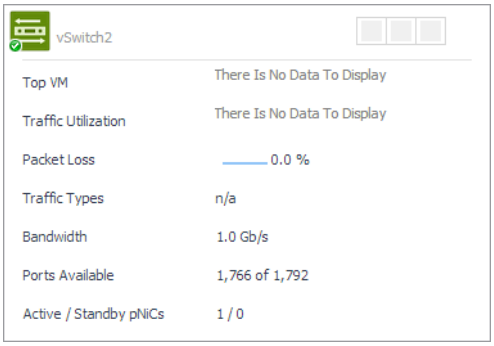
Where to go next	Drill down on: • **Product Information**. Displays a dwell, providing additional configuration information about the selected standard virtual switch. 

Table 183. Related Items

Description	Shows the numbers and states of the objects in your environment associated with the selected switch.
Data displayed	• **Cluster**. Represents the cluster associated with the selected switch, followed by the counts of alarms generated against that cluster in each severity state. • **Datacenter**. Represents the datacenter associated with the selected switch, followed by the counts of alarms generated against that datacenter in each severity state. • **Virtual Center**. Represents the virtual center associated with the selected switch, followed by the counts of alarms generated against that virtual center in each severity state. • **Virtual Machine**. Represents the virtual machines associated with the selected switch, followed by the counts of alarms generated against those virtual machines in each severity state.
Where to go next	Drill down on: • **Alarm count**. Displays the **Alarms** dialog box that shows a list of all related alarms. For each alarm entry, it shows its severity, the time at which it was triggered, the rule name that triggered the alarm, and the alarm message. • **Cluster**. Displays the **Clusters Inventory** dwell, showing the name and state of the cluster associated with the selected switch. • **Datacenter**. Displays the **Datacenters Inventory** dwell, showing the name and state of the datacenter associated with the selected switch.

Table 183. Related Items

- **Virtual Center**. Displays the **Virtual Centers Inventory** dwell, showing the name and state of the virtual center associated with the selected switch.

- **Virtual Machines**. Displays the **Virtual Machines Inventory** dwell, showing the name and state of each virtual machine associated with the selected switch.

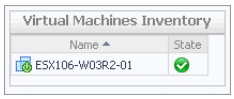


Table 184. Top VMs

Description	Identifies the virtual machines with the highest network transfer rate.
Data displayed	• **Top VM chart, Average Receive Rate**. The average inbound data transfer rate for the monitored switch over the selected time period. • **Top VM chart, Average Send Rate**. The average outbound data transfer rate for the monitored switch over the selected time period. • **Top VM table, Key**. The place of the virtual machine in the list of top consumers. • **Top VM table, Receiving**. The average inbound data transfer rate for a virtual machine whose network traffic is managed by the selected switch. • **Top VM table, Sending**. The average outbound data transfer rate for a virtual machine whose network traffic is managed by the selected switch. • **Top VM table, Virtual Machine**. The name of the virtual machine identified amongst top network consumers.

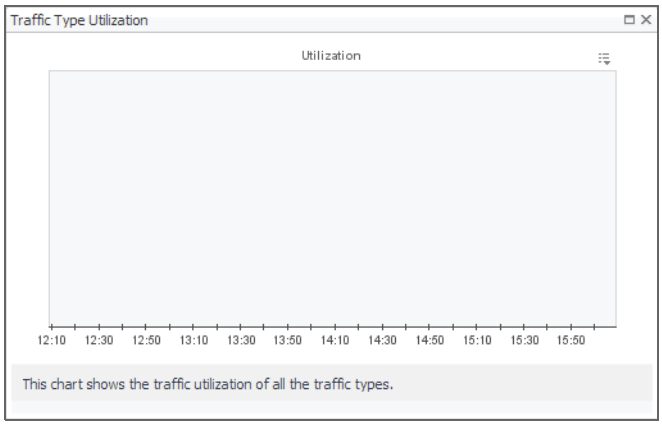
Table 185. Traffic Type Utilization

Description	Illustrates how different types of data traffic are represented in the overall network traffic managed by the selected switch. The current percentages of different type of network traffic appear in the table, while the chart displays the values captured over the selected time period.
Data displayed	• **FT**. The percentage of network traffic resulting from VMware Fault Tolerance (FT) operations, processed by the selected switch. • **HBR**. The percentage of network traffic resulting from host-based replication (HBR) operations, processed by the selected switch. • **iScsi**. The percentage of iSCSI (Internet Small Computer System Interface) network traffic processed by the selected switch. • **NFS**. The percentage of network traffic resulting from Network File System (NFS) operations, processed by the selected switch. • **vMotion**. The percentage of network traffic resulting from VMware vMotion operations, processed by the selected switch. • **VM**. The percentage of network traffic between virtual machines managed by the selected switch.

Table 185. Traffic Type Utilization

Where to go next Drill down on:

- **Traffic Type Utilization chart**. Displays the **Traffic Type Utilization** dialog box.

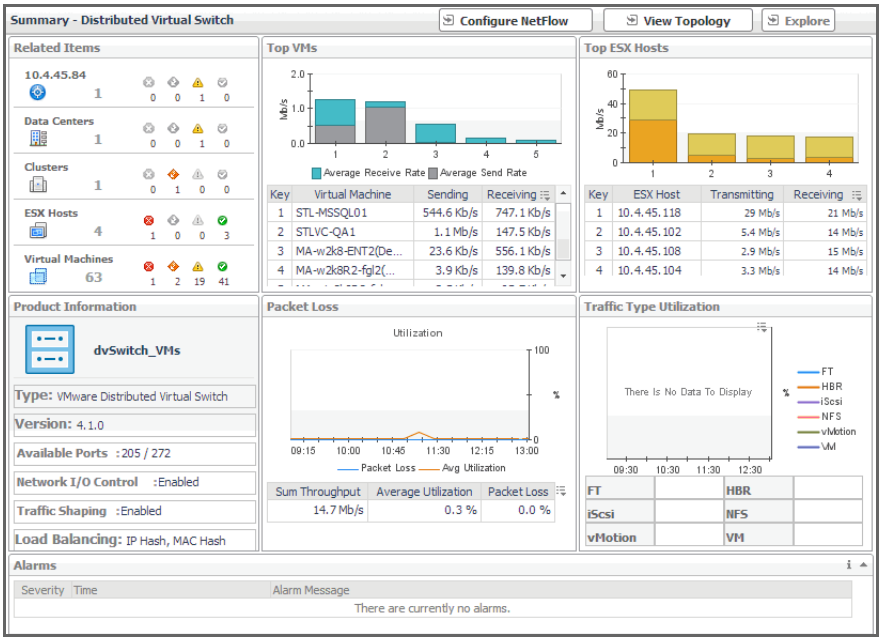


Summary - Distributed Virtual Switch view

Purpose

The **Summary - Distributed Virtual Switch** view illustrates the overall network utilization and the levels of overall network packet loss for a selected distributed virtual switch.

Figure 121. Summary - Distributed Virtual Switch view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Switches** tile.
2. In the Quick-View, in the Virtual Switches view, under **Distributed Virtual Switches**, select a virtual switch.

   The Summary - Distributed Virtual Switch view appears on the right.

Configuring NetFlow

NetFlow is a network protocol that enables distributed virtual switches to collect IP traffic information as the data flow enters or exits an interface. These statistics can later be exported and serve as a basis for potential traffic analysis. You can enable this feature on desired distributed virtual switches.

The NetFlow data can be collected from your monitored environment only if your VMware user account includes the following privileges:

- `DVPortgroup.Modify`
- `DVSwitch.Modify`
- `DVSwitch.PortSetting`

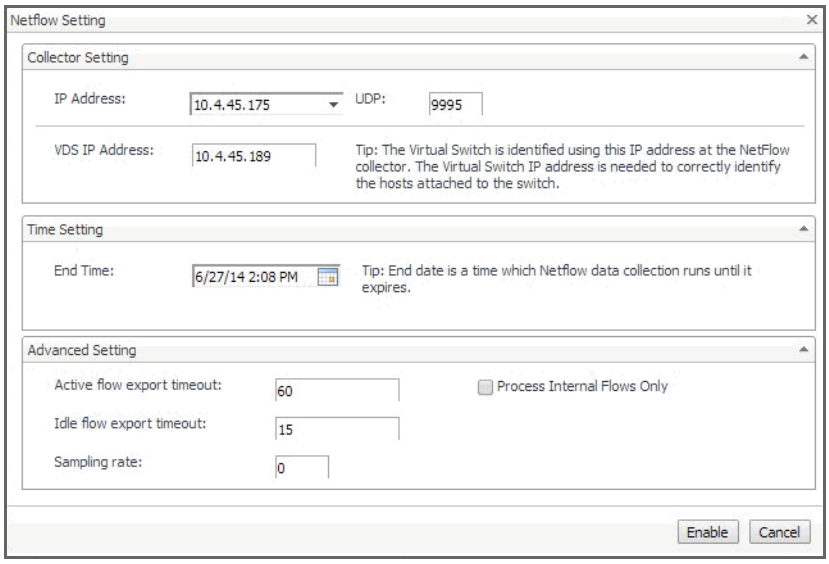
For additional information about these privileges, see your VMware documentation.

To enable NetFlow:

1 In the Summary - Distributed Virtual Switch view, click **Configure NetFlow**.

The **Netflow Setting** dialog box appears.

Figure 122. Netflow Setting dialog box



2 In the **Netflow Setting Dialog** box, provide the following information:

- **IP Address** and **UDP**: Type the IP address and port number of the NetFlow collector.
- **VDS IP Address**: Type the IP address of the distributed virtual switch.
- **End Time**: Select the time when you want the collector to stop obtaining NetFlow data.
- **Active flow export timeout**: Type the number of seconds after which an active data flow times out.
- **Idle flow export timeout**: Type the number of seconds after which an idle data flow times out.
- **Sampling rate**: Type a number indicating how often you want to collect data packets. For example, a value of 2 instructs the collector to obtain data from every second packet.
- **Process Internal Flows**: Select this check box if you want to collect data only during network activities between virtual machines on the same host.

3 Click **Enable**.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Packet Loss
- Product Information
- Related Items
- Top ESX Hosts
- Top VMs
- Traffic Type Utilization

Alarms

For complete information about this view, see Alarms on page 236.

Packet Loss

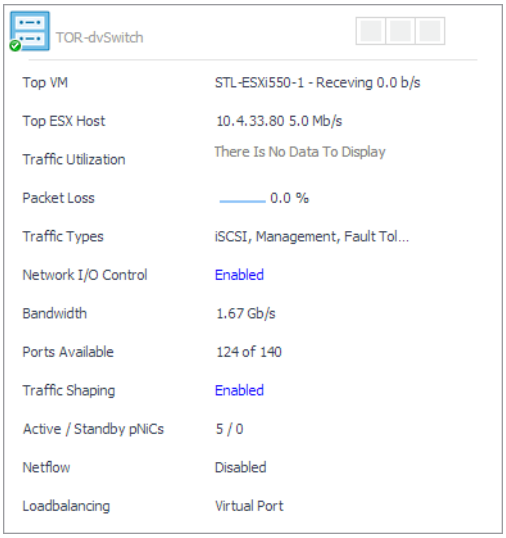
For complete information about this view, see Packet Loss on page 236.

Table 186. Product Information

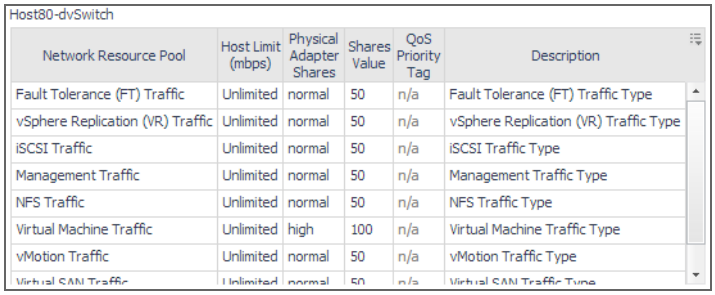
Description	Shows the name of the selected switch along with some basic configuration information.
Data displayed	• **Available Ports**. The number of switch ports that are available for use out of the total number of ports. • **Load Balancing**. One or more load balancing policies, indicating how the switch routes network traffic in case of an adapter failure. For example, an uplink may choose a route based on the originating virtual port, IP hash, source MAC hash, physical NIC load, or use a specified fail over order. For more information about these policies, see your VMware documentation. • **Network I/O Control**. Indicates if the selected switch can use network resource pools to prioritize network traffic. • **Traffic Shaping**. Indicates if the traffic shaping policy is enabled or disabled on the selected switch. A traffic shaping policy can restrict the network bandwidth to a port or if a port is configured to temporarily allow transmission of data at higher than normal speeds. For more information about these policies, see your VMware documentation. • **Type**. The type of the switch: **VMware Distributed Virtual Switch**. • **Version**. The version number of the distributed switch component in your virtual environment.

Table 186. Product Information

Where to go next	Drill down on: • **Product Information**. Displays a dwell, providing additional configuration information about the selected distributed virtual switch.



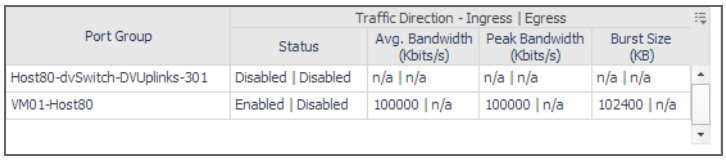
To find out more about the network I/O traffic passing through the selected switch, in the dwell, on the right of **Network I/O Control**, click **Enabled**.



Host80-dvSwitch

Network Resource Pool	Host Limit (mbps)	Physical Adapter Shares	Shares Value	QoS Priority Tag	Description
Fault Tolerance (FT) Traffic	Unlimited	normal	50	n/a	Fault Tolerance (FT) Traffic Type
vSphere Replication (VR) Traffic	Unlimited	normal	50	n/a	vSphere Replication (VR) Traffic Type
iSCSI Traffic	Unlimited	normal	50	n/a	iSCSI Traffic Type
Management Traffic	Unlimited	normal	50	n/a	Management Traffic Type
NFS Traffic	Unlimited	normal	50	n/a	NFS Traffic Type
Virtual Machine Traffic	Unlimited	high	100	n/a	Virtual Machine Traffic Type
vMotion Traffic	Unlimited	normal	50	n/a	vMotion Traffic Type
Virtual SAN Traffic	Unlimited	normal	50	n/a	Virtual SAN Traffic Type

To find out more about the traffic shaping policy, on the right of **Traffic Shaping**, click **Enabled**.



Port Group	Traffic Direction - Ingress | Egress			
	Status	Avg. Bandwidth (Kbits/s)	Peak Bandwidth (Kbits/s)	Burst Size (KB)
Host80-dvSwitch-DVUplinks-301	Disabled | Disabled	n/a | n/a	n/a | n/a	n/a | n/a
VM01-Host80	Enabled | Disabled	100000 | n/a	100000 | n/a	102400 | n/a

Related Items

For complete information about this view, see Related Items on page 237.

Top ESX Hosts

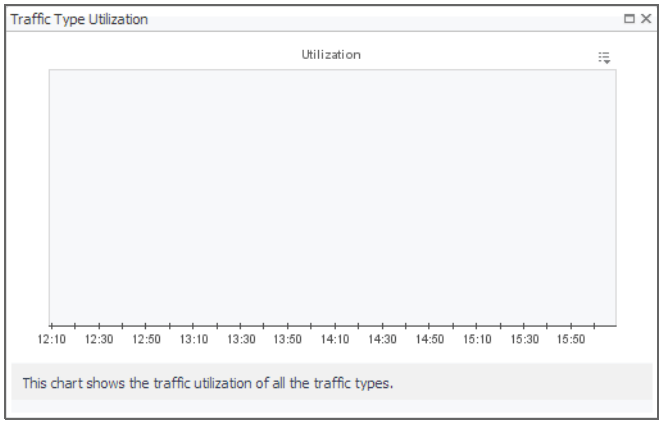
Description	Identifies the ESX hosts with the highest network transmission rate.
Data displayed	• **Top ESX chart**. For each identified ESX host, the bar chart displays the inbound and outbound transfer rates. • **Top ESX table, ESX Host**. The name of the ESX host identified amongst top network consumers. • **Top ESX table, Key**. The place of the ESX host in the list of top consumers.

Top ESX Hosts

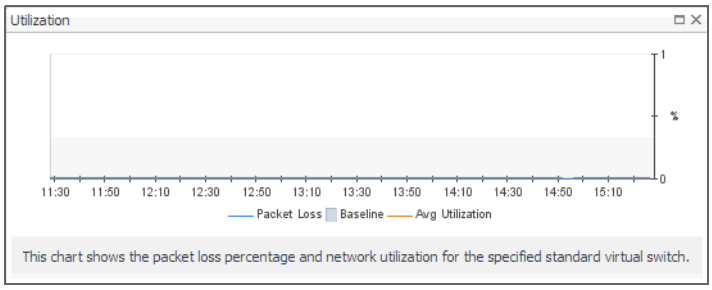
- **Top ESX table, Receiving**. The average inbound data transfer rate for an ESX host whose network traffic is managed by the selected switch.
- **Top ESX table, Transmitting**. The average outbound data transfer rate for an ESX host whose network traffic is managed by the selected switch.

Where to go next Drill down on:

- **Traffic Type Utilization chart**. Displays the **Traffic Type Utilization** dialog box.



- **Packet Loss, Utilization chart**. Displays the **Utilization** dialog box.



Top VMs

For complete information about this view, see Top VMs on page 238.

Traffic Type Utilization

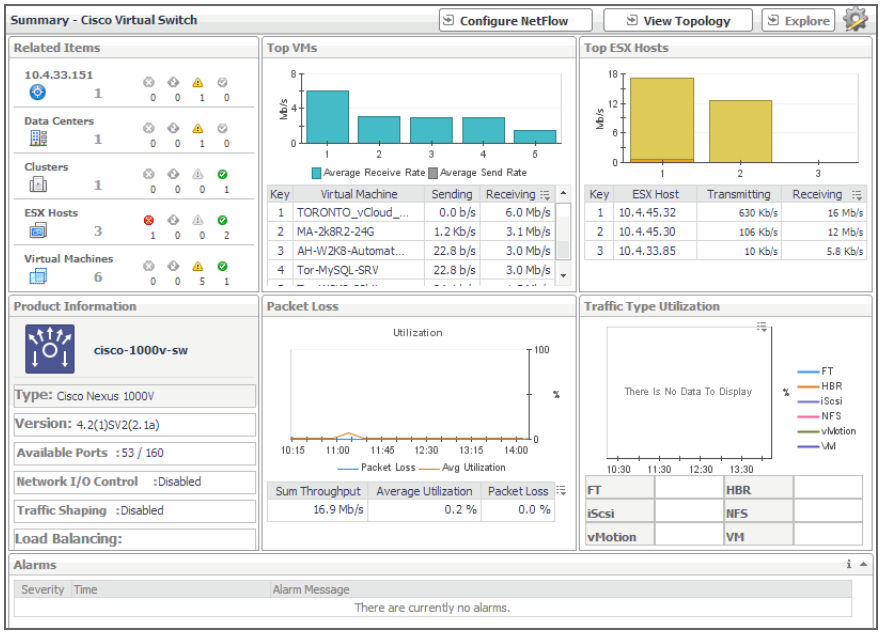
For complete information about this view, see Top VMs on page 238.

Summary - Cisco Virtual Switch view

Purpose

The **Summary - Cisco Virtual Switch** view illustrates the overall network utilization and the levels of overall network packet loss for a selected Cisco virtual switch.

Figure 123. Summary - Cisco Virtual Switch view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Switches** tile.
2. In the Quick-View, in the Virtual Switches view, under **Cisco Virtual Switches**, select a virtual switch.

   The Summary - Cisco Virtual Switch view appears on the right.

Configuring NetFlow

NetFlow is a network protocol that enables distributed virtual switches to collect IP traffic information as the data flow enters or exits an interface. These statistics can later be exported and serve as a basis for potential traffic analysis. You can enable this feature on desired Cisco virtual switches.

The NetFlow data can be collected from your monitored environment only if your VMware user account includes the following privileges:

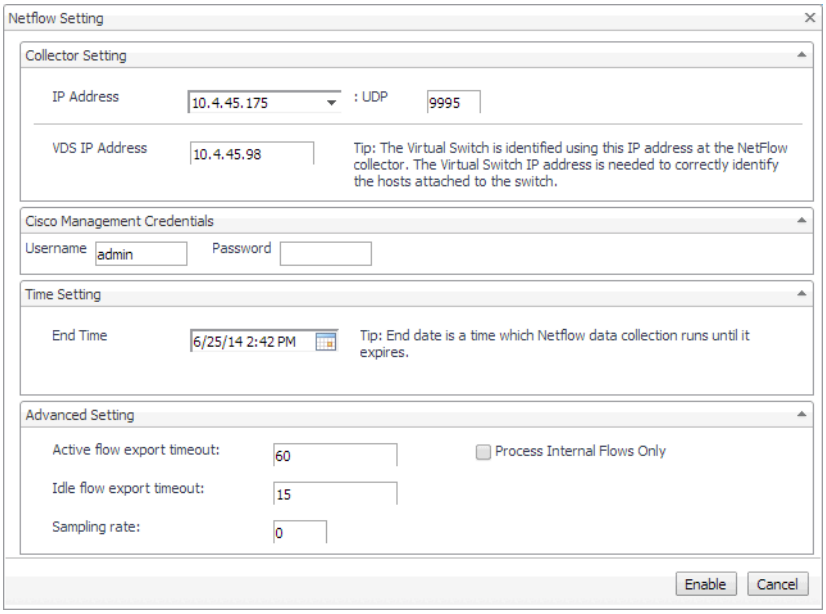
- `DVPortgroup.Modify`
- `DVSwitch.Modify`
- `DVSwitch.PortSetting`

For additional information about these privileges, see your VMware documentation.

To enable NetFlow:

1. In the Summary - Distributed Virtual Switch view, click **Configure NetFlow**.

   The **Netflow Setting Dialog** box appears.

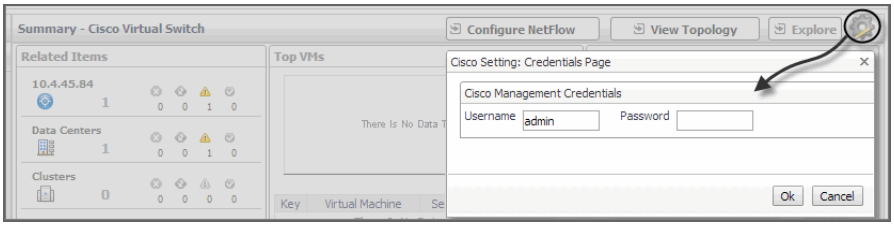


2 In the **Netflow Setting Dialog** box, provide the following information:

- **IP Address** and **UDP**: Type the IP address and port number of the NetFlow collector.
- **VDS IP Address**: Type the IP address of the distributed virtual switch.
- **Username** and **Password**: Type the credentials needed to access the Cisco virtual switch.

> **TIP:** Cisco virtual switch credentials can also be updated using the **Configure Switch** button on the **Summary - Cisco Virtual Switch** view.

Figure 124. Accessing the Cisco credentials page



- **End Time**: Select the time when you want the collector to stop obtaining NetFlow data.
- **Active flow export timeout**: Type the number of seconds after which an active data flow times out.
- **Idle flow export timeout**: Type the number of seconds after which an idle data flow times out.
- **Sampling rate**: Type a number indicating how often you want to collect data packets. For example, a value of 2 instructs the collector to obtain data from every second packet.
- **Process Internal Flows**: Select this check box if you want to collect data only during network activities between virtual machines on the same host.

3 Click **Enable**.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Packet Loss
- Product Information

- Related Items
- Top ESX Hosts
- Top VMs
- Traffic Type Utilization

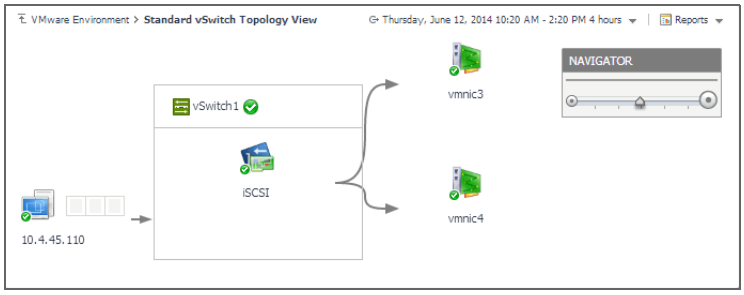
For more information about these views, see Description of Embedded Views on page 240

Standard vSwitch Topology and Distributed vSwitch Topology views

Purpose

The **Standard vSwitch Topology View** and **Distributed vSwitch Topology View** visualize the relationships between the objects in your environment through an interactive dependency map. The map illustrates how different components relate to each other, and the levels of the available resources available to them.

Figure 125. Standard vSwitch Topology and Distributed vSwitch Topology views



Topology views are also available for other components on the VMware Environment dashboard. For complete information about topology views, see Topology views on page 250.

How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Switches** tile.
2. To display a standard virtual switch in the **Standard vSwitch Topology View**, complete the following steps.
   a. In the Quick-View, in the Virtual Switches view, under **Standard Virtual Switches**, select a virtual switch.
   b. In the Summary - Standard Virtual Switch view that appears on the right, click **View Topology**.

   The **Standard vSwitch Topology View** appears in the display area.
3. To display a distributed virtual switch in the **Distributed vSwitch Topology View**, complete one of the following procedures.
   a. In the Quick-View, in the Virtual Switches view, under **Distributed Virtual Switches**, select a virtual switch.
   b. In the Summary - Distributed Virtual Switch view that appears on the right, click **View Topology**.

   The **Distributed vSwitch Topology View** appears in the display area.
4. To display a Cisco virtual switch in the **Distributed vSwitch Topology View**, complete one of the following procedures.
   a. In the Quick-View, in the Virtual Switches view, under **Cisco Virtual Switches**, select a virtual switch.
   b. In the Summary - Cisco Virtual Switch view that appears on the right, click **View Topology**.

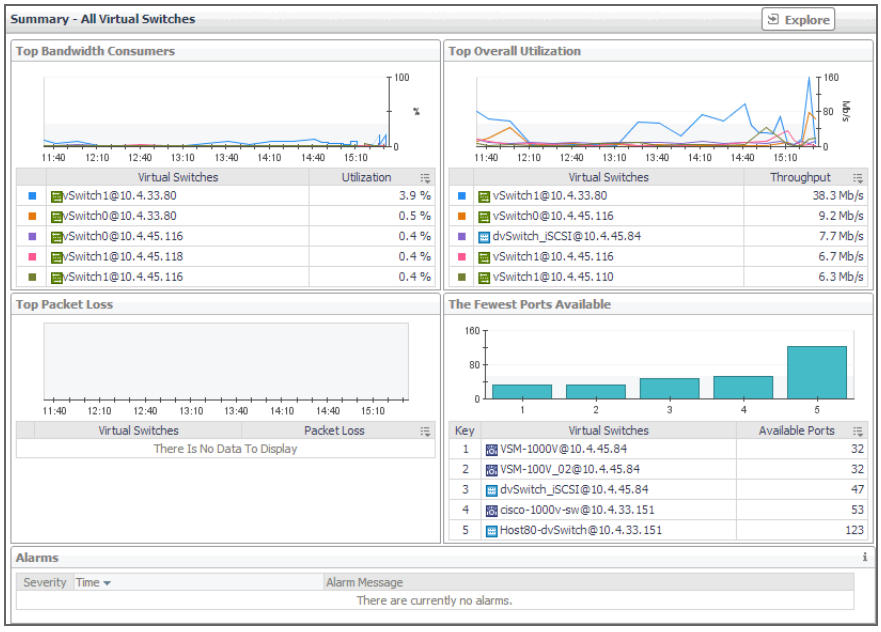
The **Distributed vSwitch Topology View** appears in the display area.

Summary - All Virtual Switches view

Purpose

The **Summary - All Virtual Switches** view displays overall resource utilization information for a group of virtual switches and identifies the elements that consume the highest amount of system resources and may cause potential performance bottlenecks.

Figure 126. Summary - All Virtual Switches view



How to Get Here

1. On the VMware Environment dashboard, on the **Monitoring** tab, in the Virtual Environment Overview, select the **Virtual Switches** tile.
2. In the Quick-View, in the Virtual Switches view, select **All Virtual Switches**.

   The Summary - All Virtual Switches view appears on the right.

Description of Embedded Views

This view is made up of the following embedded views:

- Alarms
- Top Bandwidth Consumers
- The Fewest Ports Available
- Top Overall Utilization
- Top Packet Loss

Alarms

For complete information about this view, see Alarms on page 236.

Table 187. Top Bandwidth Consumers

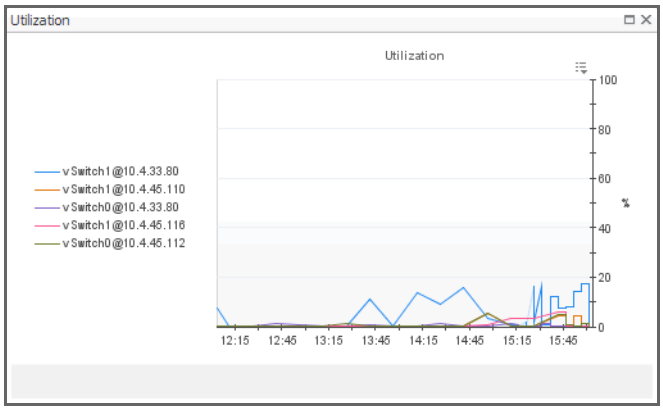
Description	Identifies the virtual switches with the highest percentage of network utilization.
Data displayed	• **Top Bandwidth Consumers chart**. For each identified virtual switch, the chart displays the percentage of network resources available to it that are in use over the selected time period. • **Top Bandwidth Consumers table, Virtual Switches**. The name of the virtual identified amongst top bandwidth consumers. • **Top Bandwidth Consumers table, Utilization**. The percentage of network resources available to it the switch that is currently in use.
Where to go next	Drill down on: • **Top Bandwidth Consumers chart**. Displays the **Utilization** dialog box.  • **Any switch in the Top Bandwidth Consumers table**. Links to the Summary - Standard Virtual Switch view, Summary - Distributed Virtual Switch view, or Summary - Cisco Virtual Switch view, depending on the selected virtual switch type.

Table 188. The Fewest Ports Available

Description	Identifies the virtual switches with the fewest numbers of available ports.
Data displayed	• **The Fewest Ports Available chart**. For each identified virtual switch, the chart displays the number of available ports. • **The Fewest Ports Available table, Available Ports**. The number of ports that the virtual switch has available. • **The Fewest Ports Available table, Key**. The place of the virtual switch in the list of fewest available hosts. • **The Fewest Ports Available table, Virtual Switches**. The name of the identified virtual switch.
Where to go next	Drill down on: • **Any switch in the The Fewest Ports Available table**. Links to the Summary - Standard Virtual Switch view, Summary - Distributed Virtual Switch view, or Summary - Cisco Virtual Switch view, depending on the selected virtual switch type.

Table 189. Top Overall Utilization

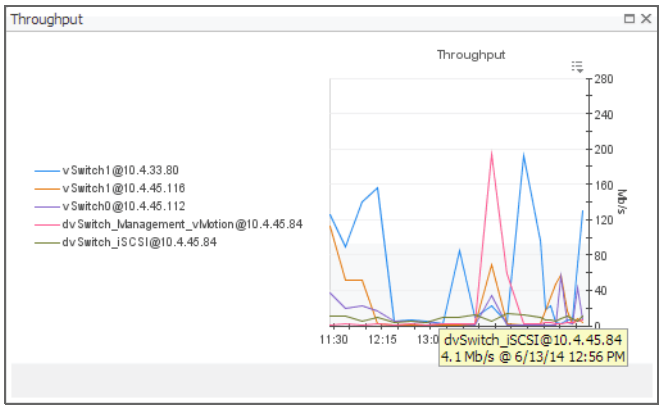
Description	Identifies the virtual switches with the highest network transfer rates.
Data displayed	• **Top Overall Utilization chart**. For each identified virtual switch, the chart displays the network throughput rate over the selected time period. • **Top Overall Utilization table, Virtual Switches**. The name of the virtual switch identified amongst top network consumers.

Table 189. Top Overall Utilization

- **Top Overall Utilization table, Throughput**. The current rate of network throughput for the selected switch.

Where to go next Drill down on:

- **Top Overall Utilization chart**. Displays the **Utilization** dialog box.



- **Any switch in the Top Overall Utilization table**. Links to the Summary - Standard Virtual Switch view, Summary - Distributed Virtual Switch view, or Summary - Cisco Virtual Switch view, depending on the selected virtual switch type.

Table 190. Top Packet Loss

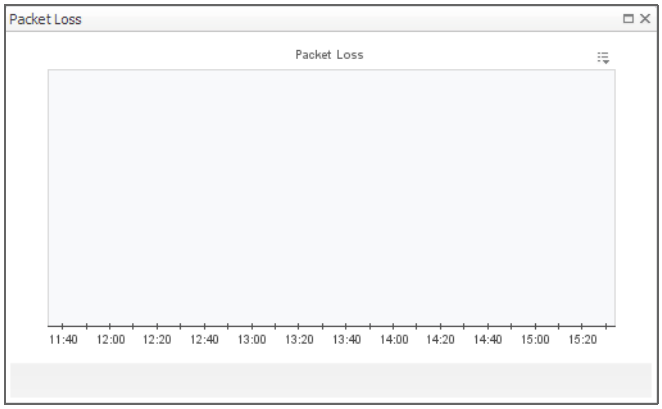
Description Identifies the virtual switches with the highest percentage of data packet loss.

Data displayed

- **Top Packet Loss chart**. Identifies the virtual switches with the highest percentage of packet loss over the selected time period.
- **Top Packet Loss table, Packet Loss**. The average percentage of time the data packets sent to the identified virtual switch are not echoed back.
- **Top Packet Loss table, Virtual Switches**. The name of the identified virtual switch.

Where to go next Drill down on:

- **Top Packet Loss chart**. Displays the **Packet Loss** dialog box.



- **Any switch in the Top Packet Loss table**. Links to the Summary - Standard Virtual Switch view, Summary - Distributed Virtual Switch view, or Summary - Cisco Virtual Switch view, depending on the selected virtual switch type.

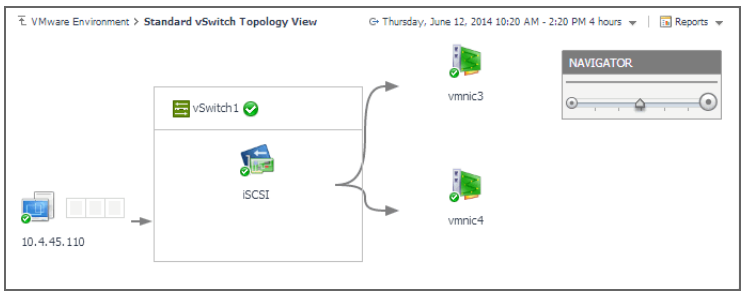
Topology views

Purpose

A typical VMware environment consists of many interrelated components. Understanding the dependencies between specific components in your monitored environment and the levels of resources they consume allows you to better understand resource-related issues, potentially affecting the stability of your system. This can help you predict the impact a potential outage may have on your environment, and to prevent such events, by reallocating resources where they are most needed.

The VMware Environment dashboard includes several topology views that visualize the relationships between the objects in your environment through an interactive dependency map. The map illustrates how different components relate to each other, and the levels of the available resources available to them.

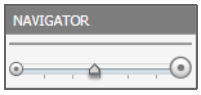
Figure 127. Topology view



The complexity of the information appearing in a dependency map depends on the selected object and the dependencies that object has with other objects within your integrated infrastructure.

In a large multi-component environment, dependency maps are likely complex and may not fit your screen. The **NAVIGATOR** in the top-right corner allows you to easily set the zoom level by dragging the slider into the appropriate position.

Figure 128. Navigator view



In a dependency map, some objects are represented with container tiles, others with single-object tiles or just icons. Every object in the map includes an indicator of its health.

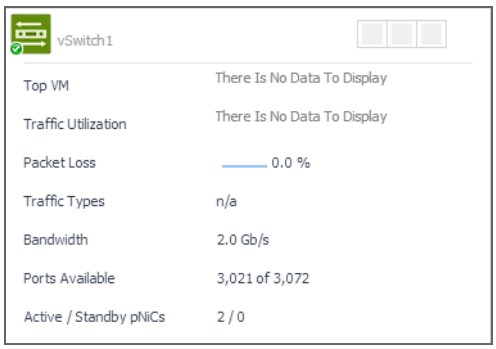
Figure 129. Object health indicators

Dependencies between the objects in a map are illustrated with single-directional arrows. The color of the arrow reflects the alarm state of the target object: gray for Normal, yellow for Warning, orange for Critical, and red for the Fatal state.

Figure 130. Object dependencies

To find out more about an object appearing in the dependency map, click the object icon. A dwell appears, displaying more details about that object. The type and range of information appearing in the dialog box depends on the selected object's type. For example, drilling down on a virtual switch shows the switch name, alarm counts top virtual machine consumers, levels of traffic utilization, percentage of packet loss, current traffic types, available bandwidth, the numbers of available and all ports, and the number of active versus standby NICs.

Figure 131. Drilldown view

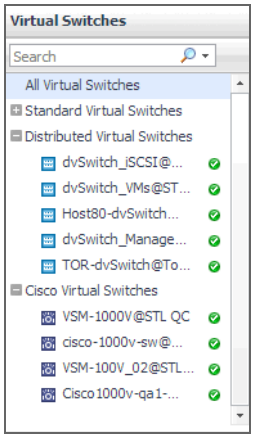


Virtual Switches view

Purpose

This view is a tree view. It lists the virtual switches that exist in your environment and shows their state.

Figure 132. Virtual Switches view



Selecting the **All Virtual Switches** node displays overall performance statistics for all virtual switches in your integrated system, and identifies the elements that consume the highest amount of system resources in the Summary - All Virtual Switches view on the right. Similarly, selecting a virtual switch node shows Virtual Machine-

specific metrics in the Summary - Standard Virtual Switch view, Summary - Distributed Virtual Switch view, or Summary - Cisco Virtual Switch view on the right. The type of the displayed view reflects the type of the selected virtual switch (standard, distributed, or Cisco).

How to Get Here

- On the VMware Environment dashboard, on the **Monitoring** tab, in the Quick-View, select the **Virtual Switches** tile.

  The Virtual Switches view appears in the Quick-View on the left.

Table 191. Description of the View

Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated virtual switch. • **All Virtual Switches**. A parent node for the virtual switch object instances that appear in this view. • **Virtual Switches**. The virtual machine name.
Where to go next	Drill down on: • **All Virtual Machines**. Shows the Summary - All Virtual Switches view in the Quick-View. • **Virtual Machine**. Shows the Summary - Standard Virtual Switch view, Summary - Distributed Virtual Switch view, or Summary - Cisco Virtual Switch view in the Quick-View.

Other views

Other views include:

- Action panel

Action panel

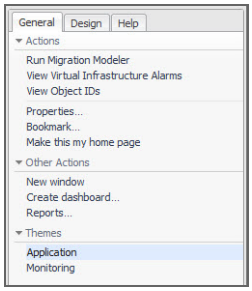
Purpose

The action panel provides you with easy access to a number of useful actions and tasks. However, it only provides additional Foglight for VMware related actions when you are viewing the VMware Explorer dashboard.

The actions available in the action panel vary depending on the object displayed in the VMware Explorer dashboard.

The following image shows an example of a typical VMware Explorer dashboard action panel.

Figure 133. Action panel



Under Actions, the action panel may provide the following related actions:

- Run Migration Modeler

- View Virtual Infrastructure Alarms
- View Object IDs

For more information about the action panel with respect to Foglight for VMware and the associated actions, see Accessing VMware actions and tasks on page 36.

How to Get Here

The action panel is located at the far right of the Foglight for VMware browser interface.

Rules

Foglight® for VMware allows you to create flexible rules that can be applied to complex, interrelated data from multiple sources within your distributed system. You can associate several different actions with a rule, configure a rule so that it does not fire repeatedly, and associate a rule with schedules to define when it should and should not be evaluated.

Different types of data can be used in rules, including registry variables, raw metrics, derived metrics, and topology object properties.

There are two types of rules in Foglight for VMware: simple rules and multiple-severity rules. A simple rule has a single condition, and can be in one of three states: *Fire*, *Undefined*, or *Normal*. A multiple-severity rule can have up to five severity levels: *Undefined*, *Fatal*, *Critical*, *Warning*, and *Normal*.

Rule conditions are regularly evaluated against monitoring data (metrics and topology object properties collected from your monitored environment and transformed into a standard format). Therefore, the state of the rule can change if the data changes. For example, if a set of monitoring data matches a simple rule's condition, the rule enters the *Fire* state. If the next set does not match the condition, the rule exits the *Fire* state and enters the *Normal* state.

A rule condition is a type of expression that can be true or false. When it evaluates to true, the rule is said to fire, causing any actions that are associated with the rule or severity level to be performed. You can configure a rule to perform one or more actions upon entering or exiting each state. When a multiple-severity rule fires, an alarm also appears in Foglight for VMware.

For more information see the *Foglight for VMware Administration and Configuration Help.*

Foglight for VMware provides an effective monitoring solution for the VMware infrastructure. The rules included in Foglight for VMware alert you to virtual infrastructure problems.

When service degradations are detected, Foglight for VMware sends alerts to the event console. Optionally, Foglight for VMware can be configured to send emails, pager messages, or perform other actions you define. Performance data can be viewed, analyzed and reported using Foglight for VMware.

Foglight for VMware includes a number of predefined rules that capture the expert knowledge of our virtualization specialists and are used to monitor the health of your virtual infrastructure. Foglight for VMware allows you to modify these rules or create your own flexible rules that can be applied to complex, interrelated data from multiple sources within your distributed system.

In this chapter, rule descriptions are organized into logical groupings. To see a rule description, select the appropriate grouping from the sections listed below.

Many of the rules listed and described in this chapter have thresholds (standard deviations, utilization percentages, etc.) defined within them. Those thresholds are default values predefined in the registry.

Foglight for VMware includes the following groups of rules:

- Agent Rules
- Cluster Rules
- Datacenter Rules
- Datastore Rules

- Resource Pool Rules
- ESX Server Rules
- VirtualCenter Rules
- Virtual Machine Rules
- VMW Stale Data Management Rule
- Virtual Switch Rules

NOTE: Unless otherwise noted, the following views display alarms triggered by most rules included with Foglight for VMware:

- Alarms List view on page 75
- Alarms Overview on page 75
- Action panel on page 252
- Quick-View on page 205
- Related Objects views on page 117
- Summary tab on page 131
- Virtual Environment Overview on page 224
- VMware Explorer Primary view on page 153
- Virtual Infrastructure view on page 151

Agent Rules

This section lists and describes the agent rules.

Rules in this section:

- VMW Agent Data Updates on page 254
- VMW Agent Messages on page 255
- VMW Agent Updates on page 255

VMW Agent Data Updates

Purpose

An alarm fires when the agent does not report on data (dataType) in the appropriate amount of time (timeDiffSecs).

Scope

VMWAgentDataUpdate

Table 192. Rule Definition

Conditions	State	Action
The agent reports on the data in the appropriate amount of time.	Normal	None
The agent does not report on the data in the appropriate amount of time.	Critical	Send email to VMware administrator

Views Displaying Alarms Based on this Rule

- Agents view on page 159
- Alarms Overview on page 75
- Alarms List view on page 75

VMW Agent Messages

Purpose

This rule converts agent messages into Foglight alarms.

Scope

VMWAgent

Table 193. Rule Definition

Conditions	State	Action
There are no agent messages with a severity value of either 2, 3, or 4.	Normal	None
When there is an agent message with a severity value of 2, an alarm fires displaying the message.	Warning	None
When there is an agent message with a severity value of 3, an alarm fires displaying the message.	Critical	Send email to VMware administrator
When there is an agent message with a severity value of 4, an alarm fires displaying the message.	Fatal	Send email to VMware administrator

Views Displaying Alarms Based on this Rule

- Agents view on page 159
- Alarms Overview on page 75
- Alarms List view on page 75

VMW Agent Updates

Purpose

An alarm fires when the agent does not report any data in the specified amount of time (timeDiffSecs).

Scope

VMWAgent

Table 194. Rule Definition

Conditions	State	Action
The agent reports data in the specified amount of time.	Normal	None
The agent does not report any data in the specified amount of time.	Critical	Send email to VMware administrator

Views Displaying Alarms Based on this Rule

- Agents view on page 159
- Alarms Overview on page 75
- Alarms List view on page 75

Cluster Rules

This section lists and describes the cluster rules.

Rule in this section:

- VMW Cluster CPU Estimated Fill Time on page 256
- VMW Cluster CPU Utilization on page 256
- VMW Cluster Disk IO on page 257
- VMW Cluster Memory Estimated Fill Time on page 257
- VMW Cluster Memory Utilization on page 258
- VMW Cluster Network IO on page 258
- VMW Cluster Percent Ready on page 258
- VMW Cluster Redundancy Verification on page 259

VMW Cluster CPU Estimated Fill Time

Purpose

This rule determines when the cluster CPU is likely to reach its capacity, based on its present growth rate.

Scope

VMWCluster

Table 195. Rule Definition

Conditions	State	Action
At the present growth rate, the cluster CPU will not reach its capacity within 90 days.	Normal	None
At the present growth rate, the cluster CPU will reach its capacity in 90 days or less.	Warning	None
At the present growth rate, the cluster CPU will reach its capacity in 30 days or less.	Critical	Send email to VMware administrator
At the present growth rate, the cluster CPU will reach its capacity in 7 days or less.	Fatal	Send email to VMware administrator

VMW Cluster CPU Utilization

Purpose

This rule monitors for spikes, dramatic drops, and sustained high levels in CPU utilization for a cluster. This rule is disabled by default, and can be enabled as required.

Scope

VMWCluster

Table 196. Rule Definition

Conditions	State	Action
The CPU utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean CPU utilization and the CPU utilization is at 75 percent or less.	Normal	None

Table 196. Rule Definition

The CPU utilization is more than 2.2 but no more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 75 percent but not greater than 83 percent.	Warning	None
The CPU utilization is more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 83 percent.	Critical	Send email to VMware administrator

VMW Cluster Disk IO

Purpose

This rule monitors for spikes and dramatic drops in disk IO for a cluster. This rule is disabled by default, and can be enabled as required.

Scope

VMWCluster

Table 197. Rule Definition

Conditions	State	Action
The disk usage is no more than 2.2 standard deviations (NumSTDevs) from the mean disk usage.	Normal	None
The disk usage is more than 2.2 but no more than 2.8 standard deviations from the mean disk usage.	Warning	None
The disk usage is more than 2.8 standard deviations from the mean disk usage.	Critical	None

VMW Cluster Memory Estimated Fill Time

Purpose

This rule determines when the cluster memory is likely to reach its capacity, based on its present growth rate.

Scope

VMWCluster

Table 198. Rule Definition

Conditions	State	Action
At the present growth rate, the cluster memory will not reach its capacity within 90 days.	Normal	None
At the present growth rate, the cluster memory will reach its capacity in 90 days or less.	Warning	None
At the present growth rate, the cluster memory will reach its capacity in 30 days or less.	Critical	Send email to VMware administrator
At the present growth rate, the cluster memory will reach its capacity in 7 days or less.	Fatal	Send email to VMware administrator

VMW Cluster Memory Utilization

Purpose

This rule monitors for spikes and dramatic drops in memory utilization for a cluster. This rule is disabled by default, and can be enabled as required.

Scope

VMWCluster

Table 199. Rule Definition

Conditions	State	Action
The memory utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean memory utilization.	Normal	None
The memory utilization is more than 2.2 but no more than 2.8 standard deviations from the mean memory utilization.	Warning	None
The memory utilization is more than 2.8 standard deviations from the mean memory utilization.	Critical	None

VMW Cluster Network IO

Purpose

This rule monitors for spikes and dramatic drops in network IO for a cluster. This rule is disabled by default, and can be enabled as required.

Scope

VMWCluster

Table 200. Rule Definition

Conditions	State	Action
The network usage is no more than 2.2 standard deviations (NumSTDevs) from the mean network usage.	Normal	None
The network usage is more than 2.2 but no more than 2.8 standard deviations from the mean network usage.	Warning	None
The network usage is more than 2.8 standard deviations from the mean network usage.	Critical	None

VMW Cluster Percent Ready

Purpose

This rule fires an alarm to report that when a virtual machine within the cluster is requesting CPU cycles from the ESX Server on which it is running, it is not receiving them some percentage of the time. This impacts the performance on the virtual machine.

This rule is disabled by default, and can be enabled, as required.

Scope

VMWCluster

Table 201. Rule Definition

Conditions	State	Action
When the virtual machine requests CPU cycles, it is only not receiving them 2 percent or less of the time.	Normal	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 2 percent but no greater than 8 percent of the time.	Warning	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 8 percent but no greater than 12 percent of the time.	Critical	Send email to VMware administrator
When the virtual machine requests CPU cycles, it is not receiving them greater than 12 percent of the time.	Fatal	Send email to VMware administrator

VMW Cluster Redundancy Verification

Purpose

This rule fires an alarm to report that if an ESX Server within the cluster fails, the remaining servers in the cluster may not or do not have enough available CPU and/or memory to handle the increased workload.

Scope

VMWCluster

Table 202. Rule Definition

Conditions	State	Action
The cluster has sufficient redundant CPU and memory capacity to handle the failure of a single ESX Server.	Normal	None
Although the cluster can handle the failure of a single ESX Server, either the resulting combined CPU utilization or the resulting combined memory utilization on the remaining servers, or both, would be beyond the warning threshold. The resulting alarm message will indicate the values of both of the new combined utilizations.	Warning	None
If an ESX Server within the cluster fails, the remaining servers do not have the capacity to handle the increased workload. The resulting alarm message will indicate the values of both of the new combined utilizations.	Critical	None

Datacenter Rules

This section lists and describes the datacenter rules. These rules are disabled by default, and can be enabled as required.

Rule in this section:

- VMW Datacenter CPU Utilization on page 260
- VMW Datacenter Disk IO on page 260
- VMW Datacenter Memory Utilization on page 260
- VMW Datacenter Network IO on page 261
- VMW Datacenter Percent Ready on page 261

VMW Datacenter CPU Utilization

Purpose

This rule monitors for spikes, dramatic drops, and sustained high levels in CPU utilization for a datacenter.

Scope

VMWDatacenter

Table 203. Rule Definition

Conditions	State	Action
The CPU utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean CPU utilization and the CPU utilization is at 90 percent or less.	Normal	None
The CPU utilization is more than 2.2 but no more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 90 percent but not greater than 93 percent.	Warning	None
The CPU utilization is more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 93 percent.	Critical	Send email to VMware administrator

VMW Datacenter Disk IO

Purpose

This rule monitors for spikes and dramatic drops in disk IO for a datacenter.

Scope

VMWDatacenter

Table 204. Rule Definition

Conditions	State	Action
The disk usage is no more than 2.2 standard deviations (NumSTDevs) from the mean disk usage.	Normal	None
The disk usage is more than 2.2 but no more than 2.8 standard deviations from the mean disk usage.	Warning	None
The disk usage is more than 2.8 standard deviations from the mean disk usage.	Critical	None

VMW Datacenter Memory Utilization

Purpose

This rule monitors for spikes and dramatic drops in memory utilization for a datacenter.

Scope

VMWDatacenter

Table 205. Rule Definition

Conditions	State	Action
The memory utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean memory utilization.	Normal	None
The memory utilization is more than 2.2 but no more than 2.8 standard deviations from the mean memory utilization.	Warning	None
The memory utilization is more than 2.8 standard deviations from the mean memory utilization.	Critical	None

VMW Datacenter Network IO

Purpose

This rule monitors for spikes and dramatic drops in network IO for a datacenter.

Scope

VMWDatacenter

Table 206. Rule Definition

Conditions	State	Action
The network usage is no more than 2.2 standard deviations (NumSTDevs) from the mean network usage.	Normal	None
The network usage is more than 2.2 but no more than 2.8 standard deviations from the mean network usage.	Warning	None
The network usage is more than 2.8 standard deviations from the mean network usage.	Critical	None

VMW Datacenter Percent Ready

Purpose

This rule fires an alarm to report that when a virtual machine within the datacenter is requesting CPU cycles from the ESX Server on which it is running, it is not receiving them some percentage of the time. This will impact performance on the virtual machine.

Scope

VMWDatacenter

Table 207. Rule Definition

Conditions	State	Action
When the virtual machine requests CPU cycles, it is only not receiving them 2 percent or less of the time.	Normal	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 2 percent but no greater than 8 percent of the time.	Warning	None

Table 207. Rule Definition

When the virtual machine requests CPU cycles, it is not receiving them greater than 8 percent but no greater than 12 percent of the time.	Critical	Send email to VMware administrator
When the virtual machine requests CPU cycles, it is not receiving them greater than 12 percent of the time.	Fatal	Send email to VMware administrator

Datastore Rules

This section describes datastore rules.

Rules in this section:

- VMW Datastore Estimated Fill Time on page 262
- VMW Datastore Inactive on page 262

VMW Datastore Estimated Fill Time

Purpose

This rule determines when the datastore is likely to reach its capacity, based on its present growth rate.

Scope

VMWDatastore

Table 208. Rule Definition

Conditions	State	Action
At the present growth rate, the datastore will not reach its capacity within 90 days.	Normal	None
At the present growth rate, the datastore will reach its capacity in 90 days or less.	Warning	None
At the present growth rate, the datastore will reach its capacity in 30 days or less.	Critical	Send email to VMware administrator
At the present growth rate, the datastore will reach its capacity in 7 days or less.	Fatal	Send email to VMware administrator

VMW Datastore Inactive

Purpose

This rule detects when a datastore becomes inactive in vSphere.

Scope

VMWDatastore

Table 209. Rule Definitions

Conditions	State	Action
The datastore is currently active.	Normal	None
The datastore is currently inactive.	Warning	None

Views Displaying Alarms Based on this Rule

- Alarms List view on page 75
- Alarms Overview on page 75
- Quick-View on page 205
- Virtual Environment Overview on page 224

Resource Pool Rules

This section lists and describes the resource pool rules.

Rule in this section:

- VMW Resource Pool CPU Utilization on page 263
- VMW Resource Pool Disk IO on page 264
- VMW Resource Pool Memory Utilization on page 264
- VMW Resource Pool Network IO on page 264
- VMW Resource Pool Percent Ready on page 265

VMW Resource Pool CPU Utilization

Purpose

This rule monitors for spikes, dramatic drops, and sustained high levels in CPU utilization for a resource pool.

Scope

VMWResourcePool

Table 210. Rule Definition

Conditions	State	Action
The CPU utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean CPU utilization and the CPU utilization is at 75 percent or less.	Normal	None
The CPU utilization is more than 2.2 but no more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 75 percent but not greater than 83 percent.	Warning	None
The CPU utilization is more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 83 percent.	Critical	Send email to VMware administrator

VMW Resource Pool Disk IO

Purpose

This rule monitors for spikes and dramatic drops in disk IO for a resource pool.

Scope

VMWResourcePool

Table 211. Rule Definition

Conditions	State	Action
The disk usage is no more than 2.2 standard deviations (NumSTDevs) from the mean disk usage.	Normal	None
The disk usage is more than 2.2 but no more than 2.8 standard deviations from the mean disk usage.	Warning	None
The disk usage is more than 2.8 standard deviations from the mean disk usage.	Critical	None

Views Displaying Alarms Based on this Rule

The views listed in Rules on page 253, in addition to the Resource Pools Relationship Tree view on page 118.

VMW Resource Pool Memory Utilization

Purpose

This rule monitors for spikes and dramatic drops in memory utilization for a resource pool.

Scope

VMWResourcePool

Table 212. Rule Definition

Conditions	State	Action
The memory utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean memory utilization.	Normal	None
The memory utilization is more than 2.2 but no more than 2.8 standard deviations from the mean memory utilization.	Warning	None
The memory utilization is more than 2.8 standard deviations from the mean memory utilization.	Critical	None

Views Displaying Alarms Based on this Rule

The views listed in Rules on page 253, in addition to the Resource Pools Relationship Tree view on page 118.

VMW Resource Pool Network IO

Purpose

This rule monitors for spikes and dramatic drops in network IO for a resource pool.

Scope

VMWResourcePool

Table 213. Rule Definition

Conditions	State	Action
The network usage is no more than 2.2 standard deviations (NumSTDevs) from the mean network usage.	Normal	None
The network usage is more than 2.2 but no more than 2.8 standard deviations from the mean network usage.	Warning	None
The network usage is more than 2.8 standard deviations from the mean network usage.	Critical	None

Views Displaying Alarms Based on this Rule

The views listed in Rules on page 253, in addition to the Resource Pools Relationship Tree view on page 118

VMW Resource Pool Percent Ready

Purpose

This rule fires an alarm to report that when a virtual machine within the resource pool is requesting CPU cycles from the ESX Server on which it is running, it is not receiving them some percentage of the time. This will impact performance on the virtual machine.

Scope

VMWResourcePool

Table 214. Rule Definition

Conditions	State	Action
When the virtual machine requests CPU cycles, it is only not receiving them 2 percent or less of the time.	Normal	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 2 percent but no greater than 8 percent of the time.	Warning	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 8 percent but no greater than 12 percent of the time.	Critical	Send email to VMware administrator
When the virtual machine requests CPU cycles, it is not receiving them greater than 12 percent of the time.	Fatal	Send email to VMware administrator

Views Displaying Alarms Based on this Rule

The views listed in Rules on page 253, in addition to the Resource Pools Relationship Tree view on page 118

ESX Server Rules

This section lists and describes the ESX Server rules.

Rules in this section:

- VMW ESX Host Connected - No metrics rule on page 266
- VMW ESX Server Balloon Memory Deflation on page 266

- VMW ESX Server Consumed Vs. Granted Memory on page 267
- VMW ESX Server CPU 0 High Utilization on page 267
- VMW ESX Server CPU Estimated Fill Time on page 268
- VMW ESX Server CPU Utilization on page 268
- VMW ESX Server Disconnected on page 269
- VMW ESX Server Disk IO on page 269
- VMW ESX Server Heap Free Memory on page 269
- VMW ESX Server Memory Estimated Fill Time on page 270
- VMW ESX Server Memory Utilization on page 270
- VMW ESX Server Memory Utilization Upward Trend on page 271
- VMW ESX Server Network IO on page 271
- VMW ESX Server Queue Latency on page 272
- VMW ESX Server Queue Latency Deviation on page 272
- VMW ESX Server Total Latency on page 273
- VMW ESX Server Total Latency Deviation on page 273

VMW ESX Host Connected - No metrics rule

Purpose

This rule monitors ESX hosts that are powered on, connected, not in maintenance mode, yet do not return performance metrics.

Scope

VMWESXServerMemory

Table 215. Rule Definition

Conditions	State	Action
ESX hosts are connected and returning performance metrics.	Normal	None
An ESX host is in an unknown state. It is powered on and connected, but it is not returning any response from requests for performance metrics.	Critical	Send email to VMware administrator

VMW ESX Server Balloon Memory Deflation

Purpose

This rule monitors for servers working excessively to reclaim memory. To better balance memory utilization across servers within a cluster, you can add more physical resources to a server or you can use VMotion to move a virtual machine from one server to another.

Scope

VMWESXServerMemory

Table 216. Rule Definition

Conditions	State	Action
The balloon has not been growing excessively and is deflating normally.	Normal	None
The balloon has reached 20 percent of the server's memory over the course of the last 90 minutes and has failed to deflate to less than 5 percent over the last 15 minutes.	Warning	None
The balloon has reached 20 percent of the server's memory over the course of the last 90 minutes and has failed to deflate to less than 12 percent over the last 15 minutes.	Critical	Send email to VMware administrator

VMW ESX Server Consumed Vs. Granted Memory

Purpose

This rule compares the amount of memory that is being requested by the virtual machines on an ESX Server to the amount of memory available on the ESX Server.

If the application workload of the ESX Server is requesting an excessive amount of the available memory resources, you must either add memory to the ESX Server or use VMotion to better balance the virtual machines across the servers within the cluster.

Scope

VMWESXServerMemory

Table 217. Rule Definition

Conditions	State	Action
The virtual machines on the server are requesting just 75 percent or less of the memory the server has available.	Normal	None
The virtual machines on the server are requesting more than 75 percent but no more than 83 percent of the memory the server has available.	Warning	None
The virtual machines on the server are requesting more than 83 percent but no more than 90 percent of the memory the server has available.	Critical	Send email to VMware administrator
The virtual machines on the server are requesting more than 90 percent of the memory the server has available.	Fatal	Send email to VMware administrator

VMW ESX Server CPU 0 High Utilization

Purpose

This rule monitors for situations in which an incomplete SOAP message sent to the Web services API results in a dramatic increase in CPU usage on CPU 0 within an ESX Server or VirtualCenter.

Scope

VMWESXServerProcessor

Table 218. Rule Definition

Conditions	State	Action
The CPU usage on CPU 0 is not greater than 95 percent.	Normal	None
The CPU usage on CPU 0 is greater than 95 percent.	Fatal	None

VMW ESX Server CPU Estimated Fill Time

Purpose

This rule determines when the ESX Server CPU is likely to reach its capacity, based on its present growth rate.

Scope

VMWESX Server

Table 219. Rule Definition

Conditions	State	Action
At the present growth rate, the ESX Server CPU will not reach its capacity within 90 days.	Normal	None
At the present growth rate, the ESX Server CPU will reach its capacity in 90 days or less.	Warning	None
At the present growth rate, the ESX Server CPU will reach its capacity in 30 days or less.	Critical	Send email to VMware administrator
At the present growth rate, the ESX Server CPU will reach its capacity in 7 days or less.	Fatal	Send email to VMware administrator

VMW ESX Server CPU Utilization

Purpose

This rule monitors for spikes, dramatic drops, and sustained high levels in CPU utilization for an ESX Server.

Scope

VMWESXServerCPUs

Table 220. Rule Definition

Conditions	State	Action
The CPU utilization is no more than 2.2 standard deviations from the mean CPU utilization and the CPU utilization is at 90 percent or less.	Normal	None
The CPU utilization is more than 2.2 but no more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 90 percent but not greater than 93 percent.	Warning	None
The CPU utilization is more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 93 percent.	Critical	Send email to VMware administrator

VMW ESX Server Disconnected

Purpose

This rule checks for a loss of connectivity between the VirtualCenter and an ESX Server that had virtual machines running on it.

Scope

VMWESXServer

Table 221. Rule Definition

Conditions	State	Action
The ESX Server, which has virtual machines running on it, is currently connected to the VirtualCenter.	Normal	None
The ESX Server, which had virtual machines running on it, is no longer connected to the VirtualCenter.	Critical	Send email to VMware administrator

VMW ESX Server Disk IO

Purpose

This rule monitors for spikes and drops in disk IO for an ESX Server.

Scope

VMWESXServerStorage

Table 222. Rule Definition

Conditions	State	Action
The disk usage is no more than 2.2 standard deviations (NumSTDevs) from the mean disk usage.	Normal	None
The disk usage is more than 2.2 but no more than 2.8 standard deviations from the mean disk usage.	Warning	None
The disk usage is more than 2.8 standard deviations from the mean disk usage.	Critical	None

VMW ESX Server Heap Free Memory

Purpose

This rule monitors heap memory in the vmkernal and fires an alarm when the heap memory for a particular ESX Server drops below a predefined amount.

If the amount of heap memory in the vmkernal for a particular ESX Server drops to the critical level, you may want to add more physical memory to the server or use VMotion to better balance memory utilization across servers within the cluster.

Scope

VMWESXServerMemory

Table 223. Rule Definition

Conditions	State	Action
The amount of free memory in the vmkernal for the ESX Server is 7,680 KB or more.	Normal	None
The amount of free memory in the vmkernal for the ESX Server is less than 7,680 KB but not less than 3,584 KB.	Critical	Send email to VMware administrator
The amount of free memory in the vmkernal for the ESX Server is less than 3,584 KB.	Fatal	Send email to VMware administrator

VMW ESX Server Memory Estimated Fill Time

Purpose

This rule determines when the ESX Server memory is likely to reach its capacity, based on its present growth rate.

Scope

VMWESX Server

Table 224. Rule Definition

Conditions	State	Action
At the present growth rate, the ESX Server memory will not reach its capacity within 90 days.	Normal	None
At the present growth rate, the ESX Server memory will reach its capacity in 90 days or less.	Warning	None
At the present growth rate, the ESX Server memory will reach its capacity in 30 days or less.	Critical	Send email to VMware administrator
At the present growth rate, the ESX Server memory will reach its capacity in 7 days or less.	Fatal	Send email to VMware administrator

VMW ESX Server Memory Utilization

Purpose

This rule monitors for spikes and dramatic drops in memory utilization for an ESX Server.

Scope

VMWESXServerMemory

Table 225. Rule Definition

Conditions	State	Action
The memory utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean memory utilization.	Normal	None

Table 225. Rule Definition

The memory utilization is more than 2.2 but no more than 2.8 standard deviations from the mean memory utilization.	Warning	None
The memory utilization is more than 2.8 standard deviations from the mean memory utilization.	Critical	None

VMW ESX Server Memory Utilization Upward Trend

Purpose

This rule monitors for upward trends in memory utilization for an ESX Server.

Scope

VMWESXServerMemory

Table 226. Rule Definition

Conditions	State	Action
Over the last ten minutes the mean memory has not increased (relative to the historical mean memory) by any more than 1 percent.	Normal	None
Over the last ten minutes the mean memory has increased (relative to the historical mean memory) by more than 1 percent but not by more than 2 percent.	Warning	None
Over the last ten minutes the mean memory has increased (relative to the historical mean memory) by more than 2 percent but not by more than 3 percent.	Critical	None
Over the last ten minutes the mean memory has increased (relative to the historical mean memory) by more than 3 percent.	Fatal	None

VMW ESX Server Network IO

Purpose

This rule monitors for spikes and dramatic drops in network IO for an ESX Server.

Scope

VMWESXServerNetwork

Table 227. Rule Definition

Conditions	State	Action
The network usage is no more than 2.2 standard deviations (NumSTDevs) from the mean network usage.	Normal	None
The network usage is more than 2.2 but no more than 2.8 standard deviations from the mean network usage.	Warning	None
The network usage is more than 2.8 standard deviations from the mean network usage.	Critical	None

VMW ESX Server Queue Latency

Purpose

This rule fires when the Queue Command Latency for a physical disk in a VMware ESX Server exceeds the normal operating range. The Queue Command Latency for a collection interval is the time spent, per SCSI command, in the VM kernel queue.

Scope

VMWESXServerPhysicalDisk

Table 228. Rule Definition

Conditions	State	Action
The Queue Command Latency for a physical disk on all monitored ESX hosts does not exceed the number of milliseconds set by the `VMW:diskQueueLatency.warning` registry variable. The global default value of this variable is 25.	Normal	None
The Queue Command Latency for a physical disk on a monitored ESX host has exceeded the number of milliseconds set by the `VMW:diskQueueLatency.warning` registry variable. The global default value of this variable is 25.	Warning	None
The Queue Command Latency for a physical disk on a monitored ESX host has exceeded the number of milliseconds set by the `VMW:diskQueueLatency.critical` registry variable. The global default value of this variable is 35.	Critical	Send email to VMware administrator
The Queue Command Latency for a physical disk on a monitored ESX host has exceeded the number of milliseconds set by the `VMW:diskQueueLatency.fatal` registry variable. The global default value of this variable is 40.	Fatal	Send email to VMware administrator

VMW ESX Server Queue Latency Deviation

Purpose

This rule fires when the Queue Command Latency for a physical disk in a VMware ESX Server exceeds the normal operating range, using the standard deviation. The Queue Command Latency for a collection interval is the time spent, per SCSI command, in the VM kernel queue.

Scope

VMWESXServerPhysicalDisk

Table 229. Rule Definition

Conditions	State	Action
The Queue Command Latency for a physical disk on all monitored ESX is within the normal operating range.	Normal	None
The Queue Command Latency for a physical disk on a monitored ESX host has entered the Warning state, when calculated using the standard deviation.	Warning	None
The Queue Command Latency for a physical disk on a monitored ESX host has entered the Critical state, when calculated using the standard deviation.	Critical	Send email to VMware administrator

VMW ESX Server Total Latency

Purpose

This rule fires when the total command latency (that is, the time taken during the collection interval to process a SCSI command issued by the guest OS to the virtual machine or the sum of kernelLatency and deviceLatency, based on data from the seven days prior to yesterday) of an ESX Server physical disk exceeds the normal operating range.

Scope

VMWESXServerPhysicalDisk

Table 230. Rule Definition

Conditions	State	Action
The total command latency is less than 25 milliseconds.	Normal	None
The total command latency is 25 milliseconds or greater, but no greater than 34 milliseconds.	Warning	None
The total command latency is 35 milliseconds or greater, but no greater than 39 milliseconds.	Critical	Send email to VMware administrator
The total command latency is 40 milliseconds or greater.	Fatal	Send email to VMware administrator

VMW ESX Server Total Latency Deviation

Purpose

This rule fires when the total command latency (that is, the time taken during the collection interval to process a SCSI command issued by the guest OS to the virtual machine or the sum of kernelLatency and deviceLatency, based on data from the seven days prior to yesterday) of an ESX Server physical disk exceeds the normal operating range, using deviation.

Scope

VMWESXServerPhysicalDisk

Table 231. Rule Definition

Conditions	State	Action
The total command latency is no more than 2.2 standard deviations from the mean total command latency.	Normal	None
The total command latency is more than 2.2 but no more than 2.8 standard deviations from the mean total command latency.	Warning	None
The total command latency is more than 2.8 standard deviations from the mean total command latency.	Critical	Send email to VMware administrator

VirtualCenter Rules

This section lists and describes the VirtualCenter rules. These rules are disabled by default, and can be enabled as required.

Rules in this section:

- VMW VirtualCenter CPU Utilization on page 274

- VMW VirtualCenter Disk IO on page 274
- VMW VirtualCenter Memory Utilization on page 275
- VMW VirtualCenter Network IO on page 276
- VMW VirtualCenter Percent Ready on page 276

VMW VirtualCenter CPU Utilization

Purpose

This rule monitors for spikes, dramatic drops, and sustained high levels in CPU utilization for a VirtualCenter.

Scope

VMWVirtualCenter

Table 232. Rule Definition

Conditions	State	Action
The CPU utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean CPU utilization and the CPU utilization is at 90 percent or less.	Normal	None
The CPU utilization is more than 2.2 but no more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 90 percent but not greater than 93 percent.	Warning	None
The CPU utilization is more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 93 percent.	Critical	Send email to VMware administrator

Views Displaying Alarms Based on this Rule

- Action panel on page 252
- Alarms List view on page 75
- Alarms Overview on page 75
- Quick-View on page 205
- Related Objects views on page 117
- Virtual Environment Overview on page 224
- Virtual Infrastructure view on page 151
- VMware Explorer Primary view on page 153

VMW VirtualCenter Disk IO

Purpose

This rule monitors for spikes and dramatic drops in disk IO for a VirtualCenter.

Scope

VMWVirtualCenter

Table 233. Rule Definition

Conditions	State	Action
The disk usage is no more than 2.2 standard deviations (NumSTDevs) from the mean disk usage.	Normal	None
The disk usage is more than 2.2 but no more than 2.8 standard deviations from the mean disk usage.	Warning	None
The disk usage is more than 2.8 standard deviations from the mean disk usage.	Critical	None

Views Displaying Alarms Based on this Rule

- Action panel on page 252
- Alarms List view on page 75
- Alarms Overview on page 75
- Quick-View on page 205
- Related Objects views on page 117
- Virtual Environment Overview on page 224
- Virtual Infrastructure view on page 151
- VMware Explorer Primary view on page 153

VMW VirtualCenter Memory Utilization

Purpose

This rule monitors for spikes and dramatic drops in memory utilization for a VirtualCenter.

Scope

VMWVirtualCenter

Table 234. Rule Definition

Conditions	State	Action
The memory utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean memory utilization.	Normal	None
The memory utilization is more than 2.2 but no more than 2.8 standard deviations from the mean memory utilization.	Warning	None
The memory utilization is more than 2.8 standard deviations from the mean memory utilization.	Critical	None

Views Displaying Alarms Based on this Rule

- Action panel on page 252
- Alarms List view on page 75
- Alarms Overview on page 75
- Quick-View on page 205
- Related Objects views on page 117
- Virtual Environment Overview on page 224
- Virtual Infrastructure view on page 151

- VMware Explorer Primary view on page 153

VMW VirtualCenter Network IO

Purpose

This rule monitors for spikes and dramatic drops in network IO for a VirtualCenter.

Scope

VMWVirtualCenter

Table 235. Rule Definition

Conditions	State	Action
The network usage is no more than 2.2 standard deviations (NumSTDevs) from the mean network usage.	Normal	None
The network usage is more than 2.2 but no more than 2.8 standard deviations from the mean network usage.	Warning	None
The network usage is more than 2.8 standard deviations from the mean network usage.	Critical	None

Views Displaying Alarms Based on this Rule

- Action panel on page 252
- Alarms List view on page 75
- Alarms Overview on page 75
- Quick-View on page 205
- Related Objects views on page 117
- Virtual Environment Overview on page 224
- Virtual Infrastructure view on page 151
- VMware Explorer Primary view on page 153

VMW VirtualCenter Percent Ready

Purpose

This rule fires an alarm to report that when a virtual machine within the VirtualCenter is requesting CPU cycles from the ESX Server on which it is running, it is not receiving them some percentage of the time. This will impact performance on the virtual machine.

Scope

VMWVirtualCenter

Rule Definition

Conditions	State	Action
When the virtual machine requests CPU cycles, it is only not receiving them 2 percent or less of the time.	Normal	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 2 percent but no greater than 8 percent of the time.	Warning	None

Rule Definition

When the virtual machine requests CPU cycles, it is not receiving them greater than 8 percent but no greater than 12 percent of the time.	Critical	Send email to VMware administrator
When the virtual machine requests CPU cycles, it is not receiving them greater than 12 percent of the time.	Fatal	Send email to VMware administrator

Views Displaying Alarms Based on this Rule

- Action panel on page 252
- Alarms List view on page 75
- Alarms Overview on page 75
- Quick-View on page 205
- Related Objects views on page 117
- Virtual Environment Overview on page 224
- Virtual Infrastructure view on page 151
- VMware Explorer Primary view on page 153

Virtual Machine Rules

This section lists and describes the virtual machine rules.

Rules in this section:

- VMW Virtual Machine Active Vs. Granted Memory on page 278
- VMW Virtual Machine Balloon Memory Deflation on page 278
- VMW Virtual Machine Balloon Memory Target on page 278
- VMW Virtual Machine Consumed Vs. Granted Memory on page 279
- VMW Virtual Machine CPU Utilization on page 279
- VMW Virtual Machine Disk Command Aborts on page 280
- VMW Virtual Machine Disk IO on page 280
- VMW Virtual Machine Logical Drive Estimated Fill Time on page 280
- VMW Virtual Machine Logical Drive Availability on page 281
- VMW Virtual Machine Memory Allocation Versus Limit on page 281
- VMW Virtual Machine Memory Swapping on page 282
- VMW Virtual Machine Memory Utilization on page 282
- VMW Virtual Machine Network IO on page 282
- VMW Virtual Machine Percent Ready on page 283
- VMW Virtual Machine Power State Change on page 283
- VMW Virtual Machine VMware Tools on page 284
- VMW Virtual Machine Zero Page Memory Detection on page 284

VMW Virtual Machine Active Vs. Granted Memory

Purpose

This rule compares the amount of physical memory that is actively being used by the virtual machine to the amount of memory granted to the virtual machine by the vmkernal.

If active memory approaches the granted memory value in the virtual machine's configuration, you should consider increasing the granted memory value.

Scope

VMWVirtualMachineMemory

Table 236. Rule Definition

Conditions	State	Action
The virtual machine is actively using only 75 percent or less of the memory it has been granted by the vmkernal.	Normal	None
The virtual machine is actively using more than 75 percent but no more than 85 percent of the memory it has been granted by the vmkernal.	Warning	None
The virtual machine is actively using more than 85 percent but no more than 90 percent of the memory it has been granted by the vmkernal.	Critical	Send email to VMware administrator
The virtual machine is actively using more than 90 percent of the memory it has been granted by the vmkernal.	Fatal	Send email to VMware administrator

VMW Virtual Machine Balloon Memory Deflation

Purpose

This rule monitors for virtual machines working excessively to reclaim memory.

To better balance memory utilization across hosts in a cluster, you can add more physical resources to a host or you can use VMotion to move a virtual machine from one host to another.

Scope

VMWVirtualMachineMemory

Rule Definition

Conditions	State	Action
The balloon has not been growing excessively and is deflating normally.	Normal	None
The balloon has reached 20 percent of the host's memory over the course of the last 90 minutes and has failed to deflate to less than 5 percent over the last 15 minutes.	Warning	None
The balloon has reached 20 percent of the host's memory over the course of the last 90 minutes and has failed to deflate to less than 12 percent over the last 15 minutes.	Critical	None

VMW Virtual Machine Balloon Memory Target

Purpose

This rule monitors the ability of the virtual machine to swap memory locally in order to free it up for reclamation. If the virtual machine is having no trouble swapping memory normally, the balloon (and therefore the balloon target) is not excessively large. If the virtual machine is having trouble swapping memory, the balloon is excessively large.

Scope

VMWVirtualMachineMemory

Table 237. Rule Definition

Conditions	State	Action
The balloon target is 33 percent or less of the virtual machine's configured memory.	Normal	None
The balloon target is greater than 33 percent but not greater than 50 percent of the virtual machine's configured memory.	Warning	None
The balloon target is greater than 50 percent of the virtual machine's configured memory.	Critical	Send email to VMware administrator

VMW Virtual Machine Consumed Vs. Granted Memory

Purpose

This rule compares the amount of memory that is being requested by virtual machines (the application workload) to the amount of memory granted to the virtual machines by the ESX Server.

If the application workload of the ESX Server is requesting an excessive amount of the available memory resources, you must either add memory to the ESX Server or use VMotion to better balance the virtual machines across the servers within the cluster.

Scope

VMWVirtualMachineMemory

Table 238. Rule Definition

Conditions	State	Action
The virtual machine is consuming 75 percent or less of the memory it has been granted by the ESX Server.	Normal	None
The virtual machine is consuming more than 75 percent but no more than 83 percent of the memory it has been granted by the ESX Server.	Warning	None
The virtual machine is consuming more than 83 percent but no more than 90 percent of the memory it has been granted by the ESX Server.	Critical	Send email to VMware administrator
The virtual machine is consuming more than 90 percent of the memory it has been granted by the ESX Server.	Fatal	Send email to VMware administrator

VMW Virtual Machine CPU Utilization

Purpose

This rule monitors for spikes, dramatic drops, and sustained high levels in CPU utilization for a virtual machine.

Scope

VMWVirtualMachineHostCPUs

Table 239. Rule Definition

Conditions	State	Action
The CPU utilization is no more than 2.2 standard deviations (NumSTDevs) from the mean CPU utilization and the CPU utilization is at 75 percent or less.	Normal	None

Table 239. Rule Definition

The CPU utilization is more than 2.2 but no more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 75 percent but not greater than 83 percent.	Warning	None
The CPU utilization is more than 2.8 standard deviations from the mean CPU utilization, or the CPU utilization is greater than 83 percent.	Critical	Send email to VMware administrator

VMW Virtual Machine Disk Command Aborts

Purpose

This rule monitors for situations in which a disk command has been aborted because these may be an indication of hardware problems.

Scope

VMWVirtualMachineHostStorage

Table 240. Rule Definition

Conditions	State	Action
There are no disk command aborts to report.	Normal	None
A disk command abort has occurred.	Critical	Send email to VMware administrator

VMW Virtual Machine Disk IO

Purpose

This rule monitors for spikes and dramatic drops in disk IO for a virtual machine.

Scope

VMWVirtualMachineHostStorage

Table 241. Rule Definition

Conditions	State	Action
The disk usage is no more than 2.2 standard deviations (NumSTDevs) from the mean disk usage.	Normal	None
The disk usage is more than 2.2 but no more than 2.8 standard deviations from the mean disk usage.	Warning	None
The disk usage is more than 2.8 standard deviations from the mean disk usage.	Critical	None

VMW Virtual Machine Logical Drive Estimated Fill Time

Purpose

This rule determines when the virtual machine logical drive is likely to reach its capacity, based on its present growth rate.

Scope

VMWVirtualMachineLogicalDisk

Table 242. Rule Definition

Conditions	State	Action
At the present growth rate, the logical drive will not reach its capacity within 90 days.	Normal	None
At the present growth rate, the logical drive will reach its capacity in 90 days or less.	Warning	None
At the present growth rate, the logical drive will reach its capacity in 30 days or less.	Critical	Send email to VMware administrator
At the present growth rate, the logical drive will reach its capacity in 7 days or less.	Fatal	Send email to VMware administrator

VMW Virtual Machine Logical Drive Availability

Purpose

This rule monitors disk utilization and fires when the disk utilization reaches 90 percent or greater.

Scope

VMWVirtualMachineLogicalDisk

Table 243. Rule Definition

Conditions	State	Action
The disk utilization is less than 90 percent.	Normal	None
The disk utilization is 90 percent or greater, but less than 95 percent.	Warning	None
The disk utilization is 95 percent or greater, but less than 99 percent.	Critical	Send email to VMware administrator
The disk utilization is 99 percent or greater.	Fatal	Send email to VMware administrator

VMW Virtual Machine Memory Allocation Versus Limit

Purpose

This rule monitors for virtual machines that have a memory limit that is lower than their memory allocation, which could result in poor performance on the virtual machine.

Scope

VMWVirtualMachineMemory

Table 244. Rule Definition

Conditions	State	Action
The virtual machine has a memory limit that is higher than its memory allocation.	Normal	None
The virtual machine has a memory limit that is lower than its memory allocation.	Critical	None

VMW Virtual Machine Memory Swapping

Purpose

This rule monitors for the swapping in and out of virtual machine memory.

Scope

VMWVirtualMachineMemory

Table 245. Rule Definition

Conditions	State	Action
The virtual machine has not moved any of its memory from its physical pages to the VMware swap file within the ESX Server.	Normal	None
The virtual machine has moved some of its memory from its physical pages to the VMware swap file within the ESX Server. This may adversely affect the virtual machine's performance.	Critical	None
The virtual machine is actively using memory that it has moved to the VMware swap file. This will adversely affect the virtual machine's performance.	Fatal	None

VMW Virtual Machine Memory Utilization

Purpose

This rule monitors for high memory utilization for a virtual machine.

Scope

VMWVirtualMachineMemory

Table 246. Rule Definition

Conditions	State	Action
The memory utilization is less than 85 percent.	Normal	None
The memory utilization is equal to or greater than 85 percent and less than 90 percent.	Warning	None
The memory utilization is equal to or greater than 90 percent and less than 93 percent.	Critical	Send email to VMware administrator
The memory utilization is equal to or greater than 93 percent.	Fatal	Send email to VMware administrator

VMW Virtual Machine Network IO

Purpose

This rule monitors for spikes and dramatic drops in network IO for a virtual machine.

Scope

VMWVirtualMachineHostNetwork

Table 247. Rule Definition

Conditions	State	Action
The network usage is no more than 2.2 standard deviations (NumSTDevs) from the mean network usage.	Normal	None
The network usage is more than 2.2 but no more than 2.8 standard deviations from the mean network usage.	Warning	None
The network usage is more than 2.8 standard deviations from the mean network usage.	Critical	None

VMW Virtual Machine Percent Ready

Purpose

This rule fires an alarm to report that when a virtual machine is requesting CPU cycles from the ESX Server on which it is running, it is not receiving them some percentage of the time. This will impact performance on the virtual machine.

Scope

VMWVirtualMachineHostCPUs

Table 248. Rule Definition

Conditions	State	Action
When the virtual machine requests CPU cycles, it is only not receiving them 2 percent or less of the time.	Normal	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 2 percent but no greater than 8 percent of the time.	Warning	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 8 percent but no greater than 12 percent of the time.	Critical	None
When the virtual machine requests CPU cycles, it is not receiving them greater than 12 percent of the time.	Fatal	None

VMW Virtual Machine Power State Change

Purpose

This rule fires an alarm if a virtual machine has been suspended or powered off recently.

Scope

VMWVirtualMachine

Table 249. Rule Definition

Conditions	State	Action
The virtual machine has not been suspended or powered off recently.	Normal	None
The virtual machine has been suspended recently.	Warning	None
The virtual machine has been powered off recently.	Critical	Send email to VMware administrator

VMW Virtual Machine VMware Tools

Purpose

This rule fires an alarm if the VMware tools on a virtual machine are out of date or not running properly.

You should always keep the VMware tools on each virtual machine up-to-date to enable the collection of all relevant data.

Scope

VMWVirtualMachine

Table 250. Rule Definition

Conditions	State	Action
The VMware tools on the virtual machine are up-to-date and running properly.	Normal	None
The VMware tools on the virtual machine are either out of date or not running properly.	Warning	None

VMW Virtual Machine Zero Page Memory Detection

Purpose

This rule monitors for any virtual machines that have a large amount of memory that is only zero memory.

Scope

VMWVirtualMachineMemory

Table 251. Rule Definition

Conditions	State	Action
The virtual machine does not have overcommitted memory resources.	Normal	None
The virtual machine may have overcommitted memory resources; more than 33 percent of its memory is filled with zeros. It is likely that the memory allocated to this virtual machine can be reduced without any impact on performance.	Warning	None

VMW Stale Data Management Rule

Purpose

This rule identifies any data that collected before a pre-defined number of days, as configured by the `VMW:ageInDays` registry variable. The global default value of this variable is 30.

Virtual Switch Rules

This section lists and describes the virtual switch rules.

Rules in this section:

- VMW Distributed Virtual Switch Available Ports on page 285
- VMW Distributed Virtual Switch Network Utilization on page 285
- VMW Distributed Virtual Switch Packet Loss on page 286

- VMW Standard Virtual Switch Available Ports on page 286
- VMW Standard Virtual Switch Network Packet Loss on page 287
- VMW Standard Virtual Switch Network Utilization on page 287
- VMW Virtual Switch Credentials Invalid on page 288

VMW Distributed Virtual Switch Available Ports

Purpose

This rule checks for available ports on VMware distributed virtual switches.

Scope

VMWDistributedVirtualSwitch

Table 252. Rule Definition

Conditions	State	Action
The number of available ports on a distributed virtual switch is greater than the value set by the `VMW:DistributedVirtualSwitchAvailablePorts.warning` registry variable. The global default value of this variable is 20, meaning that in a default installation each of the monitored distributed virtual switches has more than 20 available ports.	Normal	None
The number of available ports on a distributed virtual switch reached the value set by the `VMW:DistributedVirtualSwitchAvailablePorts.warning` registry variable. The global default value of this variable is 20, meaning that in a default installation a Warning alarm is generated if a distributed virtual switch has 20 or fewer available ports.	Warning	None
The number of available ports on a distributed virtual switch reached the value set by the `VMW:DistributedVirtualSwitchAvailablePorts.critical` registry variable. The global default value of this variable is 10, meaning that in a default installation a Critical alarm is generated if a distributed virtual switch has 10 or fewer available ports.	Critical	None
The number of available ports on a distributed virtual switch reached the value set by the `VMW:DistributedVirtualSwitchAvailablePorts.fatal` registry variable. The global default value of this variable is 5, meaning that in a default installation a Fatal alarm is generated if a distributed virtual switch has 5 or fewer available ports.	Fatal	None

VMW Distributed Virtual Switch Network Utilization

Purpose

This rule checks the levels of network utilization on VMware distributed virtual switches.

Scope

VMWDistributedVirtualSwitch

Table 253. Rule Definition

Conditions	State	Action
The levels of network utilization on all monitored distributed virtual switches is below the percentage set by the `VMW:DistributedVirtualSwitchNetwork.warning` variable. The global default value of this variable is 75, meaning that in a default installation the network utilization of each of the monitored distributed virtual switches is lower than 75%.	Normal	None

Table 253. Rule Definition

The level of network utilization of a distributed virtual switch reached the percentage set by the `VMW:DistributedVirtualSwitchNetwork.warning` variable. The global default value of this variable is 75, meaning that in a default installation a Warning alarm is generated if the network utilization of a distributed virtual switch is 75% or higher.	Warning	None
The level of network utilization of a distributed virtual switch reached the percentage set by the `VMW:DistributedVirtualSwitchNetwork.critical` variable. The global default value of this variable is 85, meaning that in a default installation a Critical alarm is generated if the network utilization of a distributed virtual switch is 85% or higher.	Critical	None
The level of network utilization of a distributed virtual switch reached the percentage set by the `VMW:DistributedVirtualSwitchNetwork.fatal` variable. The global default value of this variable is 95, meaning that in a default installation a Fatal alarm is generated if the network utilization of a distributed virtual switch is 95% or higher.	Fatal	None

VMW Distributed Virtual Switch Packet Loss

Purpose

This rule checks the levels of packet loss on VMware distributed virtual switches.

Scope

VMWDistributedVirtualSwitch

Table 254. Rule Definition

Conditions	State	Action
The levels of packet loss on all monitored distributed virtual switches matches the percentage set by the `VMW:DistributedVirtualSwitchPacketLoss.warning` variable. The global default value of this variable is 0, meaning that in a default installation the packet loss on each of the monitored distributed virtual switches is 0%.	Normal	None
The level of packet loss of a distributed virtual switch is higher than the percentage set by the `VMW:DistributedVirtualSwitchPacketLoss.warning` variable. The global default value of this variable is 0 meaning that in a default installation a Warning alarm is generated if the packet loss on a distributed virtual switch is higher than 0%	Warning	None
The level of packet loss of a distributed virtual switch reached the percentage set by the `VMW:DistributedVirtualSwitchPacketLoss.critical` variable. The global default value of this variable is 85, meaning that in a default installation a Critical alarm is generated if the packet loss of a distributed virtual switch is higher than 10%.	Critical	None
The level of packet loss of a distributed virtual switch reached the percentage set by the `VMW:DistributedVirtualSwitchPacketLoss.fatal` variable. The global default value of this variable is 95, meaning that in a default installation a Fatal alarm is generated if the packet loss of a distributed virtual switch is higher than 20%.	Fatal	None

VMW Standard Virtual Switch Available Ports

Purpose

This rule checks for available ports on VMware standard virtual switches.

Scope

VMWHostVirtualSwitch

Table 255. Rule Definition

Conditions	State	Action
The number of available ports on a standard virtual switch is greater than the value set by the `VMW:StandardVirtualSwitchAvailablePorts.warning` registry variable. The global default value of this variable is 20, meaning that in a default installation each of the monitored standard virtual switches has more than 20 available ports.	Normal	None
The number of available ports on a standard virtual switch reached the value set by the `VMW:StandardVirtualSwitchAvailablePorts.warning` registry variable. The global default value of this variable is 20, meaning that in a default installation a Warning alarm is generated if a standard virtual switch has 20 or fewer available ports.	Warning	None
The number of available ports on a standard virtual switch reached the value set by the `VMW:DistributedVirtualSwitchAvailablePorts.critical` registry variable. The global default value of this variable is 10, meaning that in a default installation a Critical alarm is generated if a standard virtual switch has 10 or fewer available ports.	Critical	None
The number of available ports on a standard virtual switch reached the value set by the `VMW:StandardVirtualSwitchAvailablePorts.fatal` registry variable. The global default value of this variable is 5, meaning that in a default installation a Fatal alarm is generated if a standard virtual switch has 5 or fewer available ports.	Fatal	None

VMW Standard Virtual Switch Network Packet Loss

Purpose

This rule checks the levels of packet loss on VMware standard virtual switches.

Scope

VMWHostVirtualSwitch

Table 256. Rule Definition

Conditions	State	Action
The levels of packet loss on all monitored distributed virtual switches matches the percentage set by the `VVMW:StandardVirtualSwitchPacketLoss.warning` variable. The global default value of this variable is 0, meaning that in a default installation the packet loss on each of the monitored distributed virtual switches is 0%.	Normal	None
The level of packet loss of a distributed virtual switch is higher than the percentage set by the `VMW:StandardVirtualSwitchPacketLoss.warning` variable. The global default value of this variable is 0 meaning that in a default installation a Warning alarm is generated if the packet loss on a distributed virtual switch is higher than 0%	Warning	None
The level of packet loss of a distributed virtual switch reached the percentage set by the `VMW:StandardVirtualSwitchPacketLoss.critical` variable. The global default value of this variable is 85, meaning that in a default installation a Critical alarm is generated if the packet loss of a distributed virtual switch is higher than 10%.	Critical	None
The level of packet loss of a distributed virtual switch reached the percentage set by the `VMW:StandardVirtualSwitchPacketLoss.fatal` variable. The global default value of this variable is 95, meaning that in a default installation a Fatal alarm is generated if the packet loss of a distributed virtual switch is higher than 20%.	Fatal	None

VMW Standard Virtual Switch Network Utilization

Purpose

This rule checks the levels of network utilization on VMware standard virtual switches.

Scope

VMWHostVirtualSwitch

Table 257. Rule Definition

Conditions	State	Action
The levels of network utilization on all monitored standard virtual switches is below the percentage set by the `VMW:StandardVirtualSwitchNetwork.warning` variable. The global default value of this variable is 75, meaning that in a default installation the network utilization of each of the monitored standard virtual switches is 75% or lower.	Normal	None
The level of network utilization of a standard virtual switch reached the percentage set by the `VMW:StandardVirtualSwitchNetwork.warning` variable. The global default value of this variable is 75, meaning that in a default installation a Warning alarm is generated if the network utilization of a standard virtual switch is higher than 75%.	Warning	None
The level of network utilization of a standard virtual switch reached the percentage set by the `VMW:StandardVirtualSwitchNetwork.critical` variable. The global default value of this variable is 85, meaning that in a default installation a Critical alarm is generated if the network utilization of a standard virtual switch is higher than 85%.	Critical	None
The level of network utilization of a standard virtual switch reached the percentage set by the `VMW:StandardVirtualSwitchNetwork.fatal` variable. The global default value of this variable is 95, meaning that in a default installation a Fatal alarm is generated if the network utilization of a standard virtual switch is higher than 95%.	Fatal	None

VMW Virtual Switch Credentials Invalid

Purpose

This rule monitors the accuracy of virtual switch credentials.

Scope

VMWVirtualSwitch.alerts

Table 258. Rule Definition

Conditions	State	Action
All monitored virtual switches have valid credentials.	Normal	None
The credentials for a virtual switch are invalid which prevents data collections for the configurations associated with that switch.	Fatal	None

A

Appendix: Alarm Messages

This appendix describes the alarm messages generated by the VMware Performance Agent, and suggests possible solutions.

An error has occurred while attempting to connect to the vCenter. Please review the credentials used by the agent for accessing the vCenter.

Possible solutions:

- Ensure the VMware Performance Agent properties contain a valid user name and password.

The user account configured for the agent does not have sufficient permissions to perform its collections. Please review the agent configuration and ensure the correct account is being used and that this account has the necessary permissions in the VMware environment.

Possible solutions:

- Ensure the VMware Performance Agent credentials are configured to grant sufficient user permissions.
- Ensure the user has sufficient permissions on the Virtual Center.

The agent was unable to connect to the vCenter. Please review the Host Name and Host Port in the agent configuration. If these are correct there may be issues in your network preventing the connection to the vCenter.

Possible solutions:

- Incorrect host name
  - Ensure the VMware Performance Agent properties contain a valid host name.
- Incorrect port number
  - Ensure the VMware Performance Agent properties contain a valid port number.
- The specified host name does not resolve in DNS
  - Correct any DNS issues.
- The specified IP address not reachable
  - Correct any network issues.

The agent was unable to connect to the vCenter. Please review the Host Name and Host Port in the agent configuration. If these are correct there may be an issue with the vCenter causing it to refuse connections. Please contact the administrator of the VMware environment to ensure the vCenter is operating normally.

Possible solutions:

- Incorrect host name
  - Ensure the VMware Performance Agent properties contain a valid host name.
- Incorrect port number
  - Ensure the VMware Performance Agent properties contain a valid port number.

An invalid Host Port value has been used in one or more attempts to connect to the vCenter. Please review your agent configuration to ensure proper connection information has been entered.

Possible solutions:

- Incorrect port number
  - Ensure the VMware Performance Agent properties contain a valid port number.

The vCenter defined in the agent configuration is running a version that is not supported by this product. Please review the Host Name and Host Port in the agent configuration to ensure the connection settings point to the intended system. You may also need to contact your VMware administrator to ensure it is on one of the supported versions.

Possible solutions:

- Update the vCenter to a supported version.

The agent is unable to find a route through the network to communicate with the vCenter. Please contact your network administrator to ensure that the Foglight, Agent (if separate), and vCenter systems are able to communicate or

to resolve other network issues that may be resulting in this issue.

Possible solutions:

- Incorrect host name
  - Ensure the VMware Performance Agent properties contain a valid host name.
- Incorrect port number
  - Ensure the VMware Performance Agent properties contain a valid port number.
- The specified host name does not resolve in DNS
  - Correct any DNS issues.
- The specified IP address not reachable
  - Correct any network issues.

A problem occurred connecting to the vCenter. Please review your agent configuration to ensure proper connection information has been entered.

Possible solutions:

- Incorrect host name
  - Ensure the VMware Performance Agent properties contain a valid host name.
- The specified host name does not resolve in DNS
  - Correct any DNS issues.
- The specified IP address is not reachable
  - Correct any network issues.

The agent was unable to construct a valid URL from the connection information provided. Please review your agent configuration to ensure proper connection information has been entered.

Possible solutions:

- Incorrect host name
  - Ensure the VMware Performance Agent properties contain a valid host name.

An unexpected error occurred while connecting to the vCenter. Please review your agent configuration to ensure proper connection information has been entered.

Possible solutions:

- Incorrect host name
  - Ensure the VMware Performance Agent properties contain a valid host name.
- Incorrect credentials

    - Ensure the VMware Performance Agent properties contain a correct user name and password.
- Incorrect port number
    - Ensure the VMware Performance Agent properties contain a valid port number.
- The specified host name does not resolve in DNS
    - Correct any DNS issues.
- The specified IP address not reachable.
    - Correct any network issues.

The agent has entered an invalid state and is unable to proceed with normal operation. This situation may be self-correcting. However, if you continue to see this message, please deactivate the agent and then reactivate it one or two minutes after deactivation completed. If the situation continues please contact Quest Support.

Possible solutions:

- If alarm reoccurs, contact Quest Support

The agent was unable to establish a secure SSL connection to the vCenter. Please review your agent configuration to ensure proper connection information has been entered.

Possible solutions:

- Incorrect connection settings
    - Ensure the VMware Performance Agent properties contain a valid host name and port number.
- vCenter not accepting SSL connections
    - Enable SSL Connections in your Virtual Center.

An unexpected error occurred while connecting to the vCenter. Please review your agent configuration to ensure proper connection information has been entered.

Possible solutions:

- Incorrect host name
    - Ensure the VMware Performance Agent properties contain a valid host name.
- Incorrect credentials
    - Ensure the VMware Performance Agent properties contain a correct user name and password
- Incorrect port number
    - Ensure the VMware Performance Agent properties contain a valid port number.
- The specified host name does not resolve in DNS.
    - Correct any DNS issues.

- The specified IP address not reachable.
    - Correct any network issues.

Collecting performance data for one or more specific entities has caused the performance data request to the vCenter to fail. No further performance data will be collected for these entities. Please review the status of these entities in the VMware Environment and address any serious issues that may have occurred. Once the entities are operating normally, they can be removed from the Agent-Managed Blacklisted Entities list and performance data collections will resume for the entities. Consult the Foglight for VMware documentation for the procedure for removing an entity from the Agent-Managed Blacklisted Entities list.

Possible solutions:

- Resolve any errors with these entities in the virtual environment.

Collecting performance data for 25 or more specific entities has caused the performance data request to the vCenter to fail. Due to the size of this number it is likely that an issue with the virtual environment is the root cause and these entities are not specifically at fault. Please resolve any known environment issues. If the situation continues, please contact Quest Support.

Possible solutions:

- Resolve any known environment issues.

An unexpected issue occurred during data collection from the vCenter. Please review your environment to ensure that data collection has resumed in a normal fashion. If there is a persistent problem or this message recurs regularly please contact Quest Support.

Possible solutions:

- Confirm that the VMware data collection resumed after the issue was encountered by the agent. If the Foglight installation is not receiving VMware monitoring data or this message occurs regularly, contact Quest Support.

B

Appendix: Metrics

This appendix lists what metrics are collected by the VMware Performance Agent, and explains the collected metrics.

Virtual machine metrics

Table 259. Virtual machine metrics

Topology	Metric name	Description
host.cpus.processor	usedHz	CPU usage, as measured in hertz, during the interval
host.cpus.processor	percentSystemTime	Amount of time spent on system processes on each virtual CPU in the virtual machine
host.cpus.processor	Utilization	CPU usage as a percentage during the interval
host.cpus	usedHz	CPU usage, as measured in hertz, during the interval
host.cpus	percentSystemTime	The percent of time spent on system processes on each virtual CPU in the virtual machine
host.cpus	Utilization	CPU usage as a percentage during the interval
cpus.processor	percentReadyTime	The percent of time that the virtual machine was ready, but could not get scheduled to run on the physical CPU during last measurement interval
cpus.processor	swapWaitPercent	The percent of CPU time spent waiting for memory swap-in
cpus.processor	maxlimited	The percent of time the virtual machine is ready to run, but is not running because it has reached its maximum CPU limit setting
cpus.processor	coStopPercent	The percent of time the virtual machine is ready to run, but is unable to run due to co-scheduling constraints
cpus	percentReadyTime	The percent of time that the virtual machine was ready, but could not get scheduled to run on the physical CPU during last measurement interval
cpus	summedPercentReady	Sum of all vCPU's percentReadyTime
cpus	swapWait	CPU time spent waiting for memory swap-in
cpus	swapWaitPercent	The percent of CPU time spent waiting for memory swap-in
cpus	maxlimited	The percent of time the virtual machine is ready to run, but is not running because it has reached its maximum CPU limit setting
cpus	coStop	Time the virtual machine is ready to run, but is unable to run due to co-scheduling constraints
cpus	coStopPercent	The percent of time the virtual machine is ready to run, but is unable to run due to co-scheduling constraints
cpus	demand	The amount of CPU resources a virtual machine would use if there were no CPU contention or CPU limit

Table 259. Virtual machine metrics

cpus	latency	Percent of time the virtual machine is unable to run because it is contending for access to the physical CPU(s)
cpus	shares	The priority of CPU resource allocation
cpus	reservation	Amount of CPU resource reserved for virtual machine
cpus	limit	Max of CPU resource can be allocated to VM due to limit setting
host.memory	consumed	Amount of host physical memory consumed by host
host.memory	utilization	Memory usage as percentage of total configured or available memory
host.memory	capacity	Amount of configured memory
memory	active	Amount of memory that is actively used, as estimated by VMkernel based on recently touched memory pages
memory	allocated	Amount of configured memory
memory	balloon	Amount of memory allocated by the virtual machine memory control driver
memory	balloonTarget	Target value set by VMkernal for the virtual machine's memory balloon size
memory	capacity	Amount of configured memory
memory	granted	Amount of host physical memory or physical memory that is mapped for a virtual machine
memory	limit	Max of physical memory can be allocated to virtual machine due to limit setting
memory	overhead	Host physical memory consumed by the virtualization infrastructure for running the virtual machine
memory	reservation	Amount of memory resource reserved for virtual machine
memory	shared	Amount of guest physical memory that is shared with other virtual machines
memory	shares	The priority of memory resource allocation
memory	swapIn	Amount swapped-in to memory from disk
memory	swapOut	Amount of memory swapped-out to disk
memory	swapped	Current amount of guest physical memory swapped out to the virtual machine swap file by the Vmkernel
memory	swapTarget	Target size for the virtual machine swap file
memory	vmSwapInRate	Rate at which memory is swapped from disk into active memory during the interval
memory	vmSwapOutRate	Rate at which memory is being swapped from active memory to disk during the current interval
host.network.interface	inboundPacketsDropped	Number of received packets dropped during the collection interval
host.network.interface	outboundPacketsDropped	Number of transmitted packets dropped during the collection interval
host.network.interface	packetsReceived	Packets received per second during the interval
host.network.interface	packetsSent	Packets transmitted per second during the interval
host.network.interface	receiveRate	Average amount of data received per second during the interval
host.network.interface	sendRate	Average amount of data transmitted per second during the interval
host.network	packetsReceived	Sum of packetsReceived of all NICs

Table 259. Virtual machine metrics

host.network	packetsSent	Sum of packetsSent of all NICs
host.network	receiveRate	Sum of receiveRate of all NICs
host.network	sendRate	Sum of sendRate of all NICs
host.network	transferRate	Sum of transferRate of all NICs
network.interface	networkPacketLoss	percent of dropped packets
network.interface	utilization	deprecated metric
network	networkPacketLoss	average percent of dropped packets of all NICs
network	utilization	deprecated metric
host.storage.physicalDisk	bytesRead	Average bytes read from the disk each second during the collection interval.
host.storage.physicalDisk	bytesWritten	Average bytes written to disk each second during the collection interval
host.storage.physicalDisk	reads	Average number of read commands issued per second from the disk during the collection interval.
host.storage.physicalDisk	writes	Average number of write commands issued per second to the disk during the collection interval.
host.storage.logicalDisk	capacityAvailable	Percent of available capacity of the logical disk
host.storage.logicalDisk	capacityUsed	Percent of used capacity of the logical disk
host.storage.logicalDisk	spaceAvailable	Available space of the logical disk
host.storage.logicalDisk	spaceUsed	Used space of the logical disk
host.storage.logicalDisk	totalSpace	Total space of the logical disk
host.storage	diskBytesRead	Sum of bytesRead of all physical disks
host.storage	diskBytesWritten	Sum of bytesWritten of all physical disks
host.storage	diskTransferRate	Sum of transferRate of all physical disks (diskBytesRead + diskBytesWritten)
host.storage	diskReads	Sum of reads of all physical disks
host.storage	diskWrites	Sum of writes of all physical disks
host.storage	diskUtilization	Percent of used capacity of all logical disks
host.storage	spaceAvailable	Sum of spaceAvailable of all logical disks
host.storage	spaceUsed	Sum of spaceUsed of all logical disks
storage.physicalDisk	commandAbortsRate	Number of SCSI commands aborted per second during the collection interval.
storage.physicalDisk	commandsIssuedRate	Number of SCSI commands issued per second during the collection interval.
storage.physicalDisk	bytesTotal	Average bytes transfer of disk each second during the collection interval. (bytesRead + bytesWritten)
storage.datastore(VMWDatastoreUsage)	read	Average bytes read from the datastore each second during the collection interval.
storage.datastore(VMWDatastoreUsage)	write	Average bytes written to datastore each second during the collection interval
storage.datastore(VMWDatastoreUsage)	transferRate	Average transferRate of the datastore each second during the collection interval. (read + write)

Table 259. Virtual machine metrics

storage.datastore(VMWDatastoreUsage)	readCommands	Average number of read commands issued per second from the datastore during the collection interval.
storage.datastore(VMWDatastoreUsage)	writeCommands	Average number of write commands issued per second to the datastore during the collection interval.
storage.datastore(VMWDatastoreUsage)	iops	Average number of commands issued per second to the datastore during the collection interval. (readCommands + writeCommands)
storage.datastore(VMWDatastoreUsage)	readLatency	Average amount of time for a read operation from the datastore
storage.datastore(VMWDatastoreUsage)	writeLatency	Average amount of time for a write operation to the datastore
storage.datastore(VMWDatastoreUsage)	averageLatency	Average amount of time for a I/O operation to the datastore
storage.virtualDisk	busResets	Number of SCSI-bus reset commands issued during the collection interval.
storage.virtualDisk	commandsAborted	Number of SCSI commands aborted during the collection interval.
storage.virtualDisk	iops	Average number of commands issued per second to the virtual disk during the collection interval
storage.virtualDisk	numberReadAveraged	Average number of read commands issued per second to the virtual disk during the collection interval
storage.virtualDisk	numberWriteAveraged	Average number of write commands issued per second to the virtual disk during the collection interval
storage.virtualDisk	read	Rate of reading data from the virtual disk
storage.virtualDisk	write	Rate of writing data to the virtual disk
storage.virtualDisk	throughput	Rate of data throughput of the virtual disk. (read + write)
storage.virtualDisk	totalReadLatency	Average amount of time for a read operation from the virtual disk
storage.virtualDisk	totalWriteLatency	Average amount of time for a write operation to the virtual disk
storage.virtualDisk	totalCommandLatency	Average amount of time for a I/O operation to the virtual disk
storage.virtualDisk	readLoadMetric	Storage DRS virtual disk metric for the read workload model
storage.virtualDisk	writeLoadMetric	Storage DRS virtual disk metric for the write workload model
storage.virtualDisk	readOIO	Average number of outstanding read requests to the virtual disk during the collection interval
storage.virtualDisk	writeOIO	Average number of outstanding write requests to the virtual disk during the collection interval.
storage	datastoreRead	Sum of read of all datastores
storage	datastoreWrite	Sum of write of all datastores
storage	datastoreTransferRate	Sum of transferRate of all datastores
storage	datastoreReadCommands	Sum of readCommands of all datastores
storage	datastoreWriteCommands	Sum of writeCommands of all datastores
storage	datastoreIops	Sum of iops of all datastore
storage	diskCommandAbortsRate	Sum of commandAbortsRate of all physical disks
storage	diskCommandsIssuedRate	Sum of commandsIssuedRate of all physical disks

Table 259. Virtual machine metrics

storage	diskReadRequestsRate	Sum of reads of all physical disks
storage	diskWriteRequestsRate	Sum of writes of all physical disks
VMWVsanObject	read	Rate of reading data from the vSAN object (A virtual disk is a vSAN object)
VMWVsanObject	write	Rate of writing data from the vSAN object
VMWVsanObject	transferRate	Rate of data transferRate of the vSAN object (read + write)
VMWVsanObject	readCommands	Average number of read commands issued per second to the vSAN object during the collection interval
VMWVsanObject	writeCommands	Average number of write commands issued per second to the vSAN object during the collection interval
VMWVsanObject	iops	Average number of commands issued per second to the vSAN object during the collection interval
VMWVsanObjectContent	read	Rate of reading data from the vSAN Content(A vSAN object may store on several contents(phisical disk), depends on vSAN policy)
VMWVsanObjectContent	write	Rate of writing data from the vSAN Content
VMWVsanObjectContent	transferRate	Rate of data transferRate of the vSAN Content (read + write)
VMWVsanObjectContent	readCommands	Average number of read commands issued per second to the vSAN Content during the collection interval
VMWVsanObjectContent	writeCommands	Average number of write commands issued per second to the vSAN Content during the collection interval
VMWVsanObjectContent	iops	Average number of commands issued per second to the vSAN Content during the collection interval

ESXi host metrics

Table 260. ESXi host metrics

Topology	Metric name	Description
host.cpus.processor	usedHz	CPU usage, as measured in hertz, during the interval
host.cpus.processor	Utilization	CPU usage as a percentage during the interval
host.cpus	usedHz	CPU usage, as measured in hertz, during the interval
host.cpus	Utilization	CPU usage as a percentage during the interval
host.cpus	totalHz	Total amount of CPU resources is equal to the frequency of the processors multiplied by the number of cores.
cpus	percentReadyTime	average of averages from child VM percentReadyTime
cpus	demand	The amount of CPU resources a virtual machine would use if there were no CPU contention or CPU limit
host.memory	consumed	Amount of host physical memory consumed by host
host.memory	utilization	Memory usage as percentage of total configured or available memory
host.memory	capacity	Amount of configured memory
memory	active	Amount of memory that is actively used, as estimated by VMkernel based on recently touched memory pages

Table 260. ESXi host metrics

memory	balloon	Amount of memory allocated by the virtual machine memory control driver
memory	capacity	Amount of configured memory
memory	consumed	Amount of host physical memory consumed by a virtual machine
memory	granted	Amount of host physical memory or physical memory that is mapped for a virtual machine
memory	heap	VMkernel virtual address space dedicated to VMkernel main heap and related data
memory	heapFree	Free address space in the VMkernel main heap.Varies based on number of physical devices and configuration options
memory	overhead	Host physical memory consumed by the virtualization infrastructure for running the virtual machine
memory	reservedCapacity	Total amount of memory reservation used by powered-on virtual machines and vSphere services on the host
memory	serverSwapInRate	Rate at which memory is swapped from disk into active memory during the interval
memory	serverSwapOutRate	Rate at which memory is being swapped from active memory to disk during the current interval
memory	sharedCommon	Amount of machine memory that is shared by all powered-on virtual machines and vSphere services on the host
memory	shared	Sum of all shared metrics for all powered-on virtual machines, plus amount for vSphere services on the host
memory	swapIn	Sum of swapin values for all powered-on virtual machines on the host.
memory	swapOut	Sum of swapout metrics from all powered-on virtual machines on the host.
memory	swapUsed	Current amount of guest physical memory swapped out to the virtual machine swap file by the Vmkernel
memory	unreserved	Amount of memory that is unreserved
memory	vmKernel	Amount of memory used by vmKernel
memory	zero	Memory that contains 0s only.Included in shared amount, Host: Sum of zero metrics for all powered-on virtual machines, plus vSphere services on the host.
host.network.interface	packetsReceived	Packets received per second during the interval.
host.network.interface	packetsSent	Packets transmitted per second during the interval.
host.network.interface	receiveRate	Average amount of data received per second during the interval.
host.network.interface	sendRate	Average amount of data transmitted per second during the interval.
host.network.interface	bandwidth	bandwidth of the NIC
host.network.interface	inboundPacketsDropped	Number of received packets dropped during the collection interval.
host.network.interface	outboundPacketsDropped	Number of transmitted packets dropped during the collection interval.
host.network	packetsReceived	Sum of packetsReceived of all NICs
host.network	packetsSent	Sum of packetsSent of all NICs
host.network	receiveRate	Sum of receiveRate of all NICs
host.network	sendRate	Sum of endRate of all NICs

Table 260. ESXi host metrics

host.network	transferRate	Sum of transferRate of all NICs
network.interface	ftusage	Average pNic I/O rate for FT
network.interface	hbrusage	Average pNic I/O rate for HBR
network.interface	iscsiusage	Average pNic I/O rate for iSCSI
network.interface	nfsusage	Average pNic I/O rate for NFS
network.interface	usage	The current network usage for the NIC
network.interface	utilization	The current network percent usage for the NIC
network.interface	vmotionusage	Average pNic I/O rate for vMotion
network.interface	vmusage	Average pNic I/O rate for VMs
network.switch	ftTrafficUtilization	FT traffic utlization for the vSwitch
network.switch	hbrTrafficUtilization	HBR traffic utlization for the vSwitch
network.switch	iscsiTrafficUtilization	iSCSI traffic utlization for the vSwitch
network.switch	networkPacketLoss	Percent of packet loss for the vSwitch
network.switch	networkThroughput	Throughput for the vSwitch
network.switch	networkUtilization	bandwidth Utilization for the vSwitch
network.switch	nfsTrafficUtilization	NFS traffic utlization for the vSwitch
network.switch	sumThroughput	ftusage + hbrusage + iscsiusage + nfsusage + vmotionusage + vmusage of All attached NICs
network.switch	vmotionTrafficUtilization	vMotion traffic utlization for the vSwitch
network.switch	vmTrafficUtilization	VMs traffic utlization for the vSwitch
network	bandwidth	bandwidth of all available pNICs on the host
host.storage.physicalDisk	bytesRead	Average number of bytes read from the disk each second during the collection interval.
host.storage.physicalDisk	bytesWritten	Average number of bytes written to disk each second during the collection interval
host.storage.physicalDisk	reads	Average number of read commands issued per second from the disk during the collection interval.
host.storage.physicalDisk	writes	Average number of write commands issued per second to the disk during the collection interval.
host.storage	diskBytesRead	Sum of bytesRead of all physical disks
host.storage	diskBytesWritten	Sum of bytesWritten of all physical disks
host.storage	diskTransferRate	Sum of transferRate of all physical disks (diskBytesRead + diskBytesWritten)
host.storage	diskReads	Sum of reads of all physical disks
host.storage	diskWrites	Sum of writes of all physical disks
storage.physicalDisk	commandAbortsRate	Number of SCSI commands aborted per second during the collection interval.
storage.physicalDisk	commandsIssuedRate	Number of SCSI commands issued per second during the collection interval.
storage.physicalDisk	deviceReadLatency	Average amount of time, in milliseconds, to read from the physical device
storage.physicalDisk	kernelReadLatency	Average amount of time, in milliseconds, spent by VMkernel to process each SCSI read command
storage.physicalDisk	totalReadLatency	Average amount of time taken during the collection interval to process a SCSI read command issued from the guest OS to the virtual machine

Table 260. ESXi host metrics

storage.physicalDisk	queueReadLatency	Average amount of time spent in the VMkernel queue, per SCSI read command, during the collection interval
storage.physicalDisk	deviceWriteLatency	Average amount of time, in milliseconds, to write to the physical device
storage.physicalDisk	kernelWriteLatency	Average amount of time, in milliseconds, spent by VMkernel to process each SCSI write command
storage.physicalDisk	totalWriteLatency	Average amount of time taken during the collection interval to process a SCSI write command issued by the guest OS to the virtual machine
storage.physicalDisk	queueWriteLatency	Average amount of time spent in the VMkernel queue, per SCSI write command, during the collection interval
storage.physicalDisk	deviceCommandLatency	Average amount of time taken during the collection interval to process a SCSI write command issued by the guest OS to the virtual machine
storage.physicalDisk	kernelCommandLatency	Average amount of time, in milliseconds, spent by VMkernel to process each SCSI command
storage.physicalDisk	totalCommandLatency	Average amount of time taken during the collection interval to process a SCSI command issued by the guest OS to the virtual machine
storage.physicalDisk	queueCommandLatency	Average amount of time spent in the VMkernel queue, per SCSI command, during the collection interval.
storage.physicalDisk	bytesTotal	Average bytes transfer of disk each second during the collection interval. (bytesRead + bytesWritten)
storage.storageAdapter(VMWESXStorageAdapter)	read	Rate of reading data by the storage adapter
storage.storageAdapter(VMWESXStorageAdapter)	write	Rate of writing data by the storage adapter
storage.storageAdapter(VMWESXStorageAdapter)	readCommands	Average number of read commands issued per second by the storage adapter during the collection interval
storage.storageAdapter(VMWESXStorageAdapter)	writeCommands	Average number of write commands issued per second by the storage adapter during the collection interval
storage.storageAdapter(VMWESXStorageAdapter)	totalCommands	Average number of commands issued per second by the storage adapter during the collection interval
storage.storageAdapter(VMWESXStorageAdapter)	readLatency	Average amount of time for a read operation by the storage adapter.
storage.storageAdapter(VMWESXStorageAdapter)	writeLatency	Average amount of time for a write operation by the storage adapter.
storage.datastore(VMWDatastoreUsage)	read	Average bytes read from the datastore each second during the collection interval.
storage.datastore(VMWDatastoreUsage)	write	Average bytes written to datastore each second during the collection interval
storage.datastore(VMWDatastoreUsage)	transferRate	Average bytes transferRate of datastore each second during the collection interval (read + write)
storage.datastore(VMWDatastoreUsage)	readCommands	Average number of read commands issued per second from the datastore during the collection interval.

Table 260. ESXi host metrics

storage.datastore(VMWDatastoreUsage)	writeCommands	Average number of write commands issued per second to the datastore during the collection interval.
storage.datastore(VMWDatastoreUsage)	datastoreIops	Average number of commands issued per second to the datastore during the collection interval.
storage.datastore(VMWDatastoreUsage)	readLatency	Average amount of time for a read operation from the datastore
storage.datastore(VMWDatastoreUsage)	writeLatency	Average amount of time for a write operation to the datastore
storage.datastore(VMWDatastoreUsage)	averageLatency	Average amount of time for a I/O operation to the datastore
storage.datastore(VMWDatastoreUsage)	iops	Average number of write commands issued per second to the datastore during the collection interval.
storage.datastore(VMWDatastoreUsage)	datastoreMaxQueueDepth	The maximum number of I/Os that can be outstanding at a given time
storage	datastoreIops	Sum of iops of all datastores
storage	datastoreRead	Sum of read of all datastores
storage	datastoreReadCommands	Sum of readCommands of all datastores
storage	datastoreTransferRate	Sum of transferRate of all datastores
storage	datastoreWrite	Sum of write of all datastores
storage	datastoreWriteCommands	Sum of writeCommands of all datastore
storage	diskCommandAbortsRate	Sum of commandAbortsRate of all physical disks
storage	diskCommandsIssuedRate	Sum of commandsIssuedRate of all physical disks
storage	diskReadRequestsRate	Sum of reads of all physical disks
storage	diskWriteRequestsRate	Sum of writes of all physical disks
VMWVsanDisk	spaceReserved	Reserved space of the vSAN disk
VMWVsanDisk	spaceUsed	Used space of the vSAN disk
VMWVsanDisk	totalSpace	Total space of the vSAN disk

Datastore metrics

Table 261. Datastore metrics

Topology	Metric name	Description
VMWDatastore	read	Average number of bytes read from the datastore each second during the collection interval (sum from attached ESX Host VMWDatastoreUsage objects)
VMWDatastore	write	Average number of bytes written to datastore each second during the collection interval (sum from attached ESX Host VMWDatastoreUsage objects)
VMWDatastore	readwriteTotal	read + write
VMWDatastore	readLatency	Average amount of time for a read operation from the datastore

Table 261. Datastore metrics

VMWDatastore	writeLatency	Average amount of time for a write operation to the datastore
VMWDatastore	averageLatency	Average amount of time for a I/O operation to the datastore
VMWDatastore	capacityAvailable	Percent of available capacity for the datastore
VMWDatastore	capacityUsed	Percent of used capacity for the datastore
VMWDatastore	totalSpace	Total space of the datastore
VMWDatastore	uncommitted	Uncommitted space of the datastore
VMWDatastore	spaceAvailable	Available space of the datastore
VMWDatastore	spaceUsed	Used space of the datastore
VMWVirtualStorage	capacityAvailable	Percent of available capacity for the datastore
VMWVirtualStorage	capacityUsed	Percent of used capacity for the datastore
VMWVirtualStorage	totalSpace	Total space of the datastore
VMWVirtualStorage	uncommitted	Uncommitted space of the datastore
VMWVirtualStorage	spaceAvailable	Available space of the datastore
VMWVirtualStorage	spaceUsed	Used space of the datastore

Datastore cluster metrics

Table 262. Datastore cluster metric

Topology	Metric name	Description
VMWDatastoreCluster	read	Average number of bytes read from the datastore cluster each second during the collection interval (sum of child datastores)
VMWDatastoreCluster	write	Average number of bytes written to datastore cluster each second during the collection interval (sum of child datastores)
VMWDatastoreCluster	readwriteTotal	read + write
VMWDatastoreCluster	readLatency	Average amount of time for a read operation from the datastore cluster
VMWDatastoreCluster	writeLatency	Average amount of time for a write operation to the datastore cluster
VMWDatastoreCluster	averageLatency	Average amount of time for a I/O operation to the datastore cluster
VMWDatastoreCluster	capacityAvailable	Percent of available capacity for the datastore cluster (sum of child datastores)
VMWDatastoreCluster	capacityUsed	Percent of used capacity for the datastore cluster (sum of child datastores)
VMWDatastoreCluster	totalSpace	Total space of the datastore cluster (sum of child datastores)
VMWDatastoreCluster	uncommitted	Uncommitted space of the datastore cluster (sum of child datastores)
VMWDatastoreCluster	spaceAvailable	Available space of the datastore cluster (sum of child datastores)
VMWDatastoreCluster	spaceUsed	Used space of the datastore cluster (sum of child datastores)

Resource pool metrics

Table 263. Resource pool metric

Topology	Metric name	Description
VMWResourcePool	avgDiskReadRequestsRate	Average disk read request rate of VMs under the resource pool
VMWResourcePool	avgDiskWriteRequestsRate	Average disk write request rate of VMs under the resource pool
VMWResourcePool	avgNetworkPacketsReceivedRate	Average network packet received rate of VMs under the resource pool
VMWResourcePool	avgNetworkPacketsTransmittedRate	Average network packet transmitted rate of VMs under the resource pool
VMWResourcePool	avgNetworkReceiveRatebps	Average network received rate of VMs under the resource pool
VMWResourcePool	avgNetworkTransmitRatebps	Average network transmitted rate of VMs under the resource pool
VMWResourcePool	cpuLimit	Max of CPU resource can be allocated to VMs under the resource pool
VMWResourcePool	cpuPercentReady	Average CPU PercentReady of VMs under the resource pool
VMWResourcePool	cpuReservation	Amount of CPU resource reserved for the resource pool
VMWResourcePool	cpuShares	The priority value of CPU resource allocation
VMWResourcePool	cpuUsedHz	Sum of usedHz from all VMs under the resource pool
VMWResourcePool	cpuUtilization	Average CPU utilization of VMs under the resource pool
VMWResourcePool	diskReadRate	Sum of disk bytesRead from all VMs under the resource pool
VMWResourcePool	diskReadRequestsRate	Sum of diskReadRequestsRate from all VMs under the resource pool
VMWResourcePool	diskUsage	sum of disk.usage.average from all VMs under the resource pool
VMWResourcePool	diskWriteRate	Sum of disk bytesWrite from all VMs under the resource pool
VMWResourcePool	diskWriteRequestsRate	Sum of diskWriteRequestsRate from all VMs under the resource pool
VMWResourcePool	memoryActive	Sum of active memory from all VMs under the resource pool
VMWResourcePool	memoryBalloon	Sum of balloon memory from all VMs under the resource pool
VMWResourcePool	memoryConsumed	Sum of consumed memory from all VMs under the resource pool
VMWResourcePool	memoryGranted	Sum of granted memory from all VMs under the resource pool
VMWResourcePool	memoryLimit	Max of physical memory resource can be allocated to VMs under the resource pool
VMWResourcePool	memoryOverhead	Sum of overhead memory from all VMs under the resource pool

Table 263. Resource pool metric

VMWResourcePool	memoryReservation	Amount of physical memory resource reserved for the resource pool
VMWResourcePool	memoryShared	Sum of shared memory from all VMs under the resource pool
VMWResourcePool	memoryShares	The priority value of cpu resource allocation
VMWResourcePool	memorySwapIn	Sum of active memory from all VMs under the resource pool
VMWResourcePool	memorySwapOut	Sum of active memory from all VMs under the resource pool
VMWResourcePool	memoryUtilization	Sum of active memory from all VMs under the resource pool
VMWResourcePool	memoryZero	Sum of active memory from all VMs under the resource pool
VMWResourcePool	networkPacketsReceivedRate	Sum of network packetsReceived from all VMs under the resource pool
VMWResourcePool	networkPacketsSentRate	Sum of network packetsSent from all VMs under the resource pool
VMWResourcePool	networkReceiveRate	Sum of network receiveRate from all VMs under the resource pool
VMWResourcePool	networkSendRate	Sum of network sendRate from all VMs under the resource pool
VMWResourcePool	networkUsagebps	sum of net.usage.average from all VMs under the resource pool

vApp metrics

Table 264. vApp metrics

Topology	Metric name	Description
VMWvApp	avgDiskReadRequestsRate	Average disk read request rate of VMs under the vApp
VMWvApp	avgDiskWriteRequestsRate	Average disk write request rate of VMs under the vApp
VMWvApp	avgNetworkPacketsReceivedRate	Average network packet received rate of VMs under the vApp
VMWvApp	avgNetworkPacketsTransmittedRate	Average network packet transmitted rate of VMs under the vApp
VMWvApp	avgNetworkReceiveRatebps	Average network received rate of VMs under the vApp
VMWvApp	avgNetworkTransmitRatebps	Average network transmitted rate of VMs under the vApp
VMWvApp	cpuLimit	Max of CPU resource can be allocated to VMs under the resource pool
VMWvApp	cpuPercentReady	Average cpuPercentReady of VMs under the vApp
VMWvApp	cpuReservation	Amount of CPU resource reserved for the resource pool
VMWvApp	cpuShares	The priority value of CPU resource allocation

Table 264. vApp metrics

VMWvApp	cpuUsedHz	Sum of usedHz from all VMs under the vApp
VMWvApp	cpuUtilization	Average cpu utilization of VMs under the vApp
VMWvApp	diskReadRate	Sum of disk bytesRead from all VMs under the vApp
VMWvApp	diskReadRequestsRate	Sum of diskReadRequestsRate from all VMs under the vApp
VMWvApp	diskUsage	sum of disk.usage.average from all VMs under the vApp
VMWvApp	diskWriteRate	Sum of disk bytesWrite from all VMs under the vApp
VMWvApp	diskWriteRequestsRate	Sum of diskWriteRequestsRate from all VMs under the vApp
VMWvApp	memoryActive	Sum of active memory from all VMs under the vApp
VMWvApp	memoryBalloon	Sum of balloon memory from all VMs under the vApp
VMWvApp	memoryConsumed	Sum of consumed memory from all VMs under the vApp
VMWvApp	memoryGranted	Sum of granted memory from all VMs under the vApp
VMWvApp	memoryLimit	Max of physical memory resource can be allocated to VMs under the resource pool
VMWvApp	memoryOverhead	Sum of overhead memory from all VMs under the vApp
VMWvApp	memoryReservation	Amount of physical memory resource reserved for the resource pool
VMWvApp	memoryShared	Sum of shared memory from all VMs under the vApp
VMWvApp	memoryShares	The priority value of cpu resource allocation
VMWvApp	memorySwapIn	Sum of active memory from all VMs under the vApp
VMWvApp	memorySwapOut	Sum of active memory from all VMs under the vApp
VMWvApp	memoryUtilization	Average memory utilization of VMs under the vApp
VMWvApp	memoryZero	Sum of active memory from all VMs under the vApp
VMWvApp	networkPacketsReceivedRate	Sum of network packetsReceived from all VMs under the vApp
VMWvApp	networkPacketsSentRate	Sum of network packetsSent from all VMs under the vApp
VMWvApp	networkReceiveRate	Sum of network receiveRate from all VMs under the vApp
VMWvApp	networkSendRate	Sum of networ sendRate from all VMs under the vApp
VMWvApp	networkUsagebps	sum of net.usage.average from all VMs under the vApp

Cluster metrics

Table 265. Cluster metrics

Topology	Metric name	Description
VMWCluster	avgDiskReadRate	Average disk read rate of ESX Hosts under the cluster
VMWCluster	avgDiskReadRequestsRate	Average disk read request rate of ESX Hosts under the cluster
VMWCluster	avgDiskWriteRate	Average disk write rate of ESX Hosts under the cluster
VMWCluster	avgDiskWriteRequestsRate	Average disk write request rate of ESX Hosts under the cluster
VMWCluster	avgNetworkPacketsReceivedRate	Average network packet received rate of ESX Hosts under the cluster
VMWCluster	avgNetworkPacketsTransmittedRate	Average network packet transmitted rate of ESX Hosts under the cluster
VMWCluster	avgNetworkReceiveRatebps	Average network received rate of ESX Hosts under the cluster
VMWCluster	avgNetworkTransmitRatebps	Average network transmitted rate of ESX Hosts under the cluster
VMWCluster	cpuDemand	Sum of CPU demand from all ESX Hosts under the cluster
VMWCluster	cpuUsedHz	Sum of CPU usedHz from all ESX Hosts under the cluster
VMWCluster	cpuUtilization	Average CPU Utilization of ESX Hosts under the cluster
VMWCluster	cpuPercentReady	Average CPU percentReady of ESX Hosts under the cluster
VMWCluster	totalHz	Sum of CPU totalHz from all ESX Hosts under the cluster
VMWCluster	diskReadRate	Sum of disk bytesRead from all ESX Hosts under the cluster
VMWCluster	diskWriteRate	Sum of disk bytesWritten from all ESX Hosts under the cluster
VMWCluster	diskReadRequestsRate	Sum of disk diskReadRequestsRate from all ESX Hosts under the cluster
VMWCluster	diskWriteRequestsRate	Sum of disk diskWriteRequestsRate from all ESX Hosts under the cluster
VMWCluster	diskUsage	Sum of disk.usage.average from all ESX Hosts under the cluster
VMWCluster	memoryActive	Sum of active memory from all ESX Hosts under the cluster
VMWCluster	memoryBalloon	Sum of balloon memory from all ESX Hosts under the cluster
VMWCluster	memoryConsumed	Sum of consumed memory from all ESX Hosts under the cluster
VMWCluster	memoryGranted	Sum of granted memory from all ESX Hosts under the cluster

Table 265. Cluster metrics

VMWCluster	memoryHeap	Sum of heap memory from all ESX Hosts under the cluster
VMWCluster	memoryHeapFree	Sum of heapFree memory from all ESX Hosts under the cluster
VMWCluster	memoryOverhead	Sum of Overhead memory from all ESX Hosts under the cluster
VMWCluster	memoryReservedCapacity	Sum of ReservedCapacity memory from all ESX Hosts under the cluster
VMWCluster	memoryShared	Sum of shared memory from all ESX Hosts under the cluster
VMWCluster	memorySharedCommon	Sum of sharedCommon memory from all ESX Hosts under the cluster
VMWCluster	memoryState	Sum of state memory from all ESX Hosts under the cluster
VMWCluster	memorySwapIn	Sum of swapIn memory from all ESX Hosts under the cluster
VMWCluster	memorySwapOut	Sum of swapOut memory from all ESX Hosts under the cluster
VMWCluster	memorySwapUsed	Sum of swapUsed memory from all ESX Hosts under the cluster
VMWCluster	memoryUnreserved	Sum of unreserved memory from all ESX Hosts under the cluster
VMWCluster	memoryUtilization	Average memory utlization of the Cluster
VMWCluster	memoryZero	Sum of zero memory from all ESX Hosts under the cluster
VMWCluster	vmKernelMemory	Sum of vmKernel memory from all ESX Hosts under the cluster
VMWCluster	totalMemory	Sum of total memory from all ESX Hosts under the cluster
VMWCluster	networkPacketsSentRate	Sum of network packetsSent from all ESX Hosts under the cluster
VMWCluster	networkPacketsReceivedRate	Sum of network packetsReceived from all ESX Hosts under the cluster
VMWCluster	networkSendRate	Sum of network sendRate from all ESX Hosts under the cluster
VMWCluster	networkReceiveRate	Sum of network receiveRate from all ESX Hosts under the cluster
VMWCluster	networkUsagebps	Sum of network net.usage.average from all ESX Hosts under the cluster

Datacenter metrics

Table 266. Datacenter metrics

Topology	Metric name	Description
VMWDatacenter	avgDiskReadRate	Average disk read rate of ESX Hosts under the datacenter
VMWDatacenter	avgDiskReadRequestsRate	Average disk read request rate of ESX Hosts under the datacenter
VMWDatacenter	avgDiskWriteRate	Average disk write rate of ESX Hosts under the datacenter
VMWDatacenter	avgDiskWriteRequestsRate	Average disk write request rate of ESX Hosts under the datacenter
VMWDatacenter	avgNetworkPacketsReceivedRate	Average network packet received rate of ESX Hosts under the datacenter
VMWDatacenter	avgNetworkPacketsTransmittedRate	Average network packet transmitted rate of ESX Hosts under the datacenter
VMWDatacenter	avgNetworkReceiveRatebps	Average network received rate of ESX Hosts under the datacenter
VMWDatacenter	avgNetworkTransmitRatebps	Average network transmitted rate of ESX Hosts under the datacenter
VMWDatacenter	cpuUsedHz	Sum of CPU usedHz from all ESX Hosts under the datacenter
VMWDatacenter	cpuUtilization	Average CPU Utilization of ESX Hosts under the datacenter
VMWDatacenter	cpuPercentReady	Average CPU percentReady of ESX Hosts under the datacenter
VMWDatacenter	totalHz	Sum of CPU totalHz from all ESX Hosts under the datacenter
VMWDatacenter	diskReadRate	Sum of disk bytesRead from all ESX Hosts under the datacenter
VMWDatacenter	diskWriteRate	Sum of disk bytesWritten from all ESX Hosts under the datacenter
VMWDatacenter	diskReadRequestsRate	Sum of disk diskReadRequestsRate from all ESX Hosts under the datacenter
VMWDatacenter	diskWriteRequestsRate	Sum of disk diskWriteRequestsRate from all ESX Hosts under the datacenter
VMWDatacenter	diskUsage	Sum of disk.usage.average from all ESX Hosts under the datacenter
VMWDatacenter	memoryActive	Sum of active memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryBalloon	Sum of balloon memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryConsumed	Sum of consumed memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryGranted	Sum of granted memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryHeap	Sum of heap memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryHeapFree	Sum of heapFree memory from all ESX Hosts under the datacenter

Table 266. Datacenter metrics

VMWDatacenter	memoryOverhead	Sum of Overhead memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryReservedCapacity	Sum of ReservedCapacity memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryShared	Sum of shared memory from all ESX Hosts under the datacenter
VMWDatacenter	memorySharedCommon	Sum of sharedCommon memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryState	Sum of state memory from all ESX Hosts under the datacenter
VMWDatacenter	memorySwapIn	Sum of swapIn memory from all ESX Hosts under the datacenter
VMWDatacenter	memorySwapOut	Sum of swapOut memory from all ESX Hosts under the datacenter
VMWDatacenter	memorySwapUsed	Sum of swapUsed memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryUnreserved	Sum of unreserved memory from all ESX Hosts under the datacenter
VMWDatacenter	memoryUtilization	Average memory utlization of the Cluster
VMWDatacenter	memoryZero	Sum of zero memory from all ESX Hosts under the datacenter
VMWDatacenter	vmKernelMemory	Sum of vmKernel memory from all ESX Hosts under the datacenter
VMWDatacenter	totalMemory	Sum of total memory from all ESX Hosts under the datacenter
VMWDatacenter	networkPacketsSentRate	Sum of network packetsSent from all ESX Hosts under the datacenter
VMWDatacenter	networkPacketsReceivedRate	Sum of network packetsReceived from all ESX Hosts under the datacenter
VMWDatacenter	networkSendRate	Sum of network sendRate from all ESX Hosts under the datacenter
VMWDatacenter	networkReceiveRate	Sum of network receiveRate from all ESX Hosts under the datacenter
VMWDatacenter	networkUsagebps	Sum of network net.usage.average from all ESX Hosts under the datacenter

vCenter metrics

Table 267. vCenter metric

Topology	Metric name	Description
VMWVirtualCenter	avgDiskReadRate	Average disk read rate of ESX Hosts under the vCenter
VMWVirtualCenter	avgDiskReadRequestsRate	Average disk read request rate of ESX Hosts under the vCenter
VMWVirtualCenter	avgDiskWriteRate	Average disk write rate of ESX Hosts under the vCenter

Table 267. vCenter metric

VMWVirtualCenter	avgDiskWriteRequestsRate	Average disk write request rate of ESX Hosts under the vCenter
VMWVirtualCenter	avgNetworkPacketsReceivedRate	Average network packet received rate of ESX Hosts under the vCenter
VMWVirtualCenter	avgNetworkPacketsTransmittedRate	Average network packet transmitted rate of ESX Hosts under the vCenter
VMWVirtualCenter	avgNetworkReceiveRatebps	Average network received rate of ESX Hosts under the vCenter
VMWVirtualCenter	avgNetworkTransmitRatebps	Average network transmitted rate of ESX Hosts under the vCenter
VMWVirtualCenter	cpuUsedHz	Sum of CPU usedHz from all ESX Hosts under the vCenter
VMWVirtualCenter	cpuUtilization	Average CPU Utilization of ESX Hosts under the vCenter
VMWVirtualCenter	cpuPercentReady	Average CPU percentReady of ESX Hosts under the vCenter
VMWVirtualCenter	totalHz	Sum of CPU totalHz from all ESX Hosts under the vCenter
VMWVirtualCenter	diskReadRate	Sum of disk bytesRead from all ESX Hosts under the vCenter
VMWVirtualCenter	diskWriteRate	Sum of disk bytesWritten from all ESX Hosts under the vCenter
VMWVirtualCenter	diskReadRequestsRate	Sum of disk diskReadRequestsRate from all ESX Hosts under the vCenter
VMWVirtualCenter	diskWriteRequestsRate	Sum of disk diskWriteRequestsRate from all ESX Hosts under the vCenter
VMWVirtualCenter	diskUsage	Sum of disk.usage.average from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryActive	Sum of active memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryBalloon	Sum of balloon memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryConsumed	Sum of consumed memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryGranted	Sum of granted memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryHeap	Sum of heap memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryHeapFree	Sum of heapFree memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryOverhead	Sum of Overhead memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryReservedCapacity	Sum of ReservedCapacity memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryShared	Sum of shared memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memorySharedCommon	Sum of sharedCommon memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryState	Sum of state memory from all ESX Hosts under the vCenter

Table 267. vCenter metric

VMWVirtualCenter	memorySwapIn	Sum of swapIn memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memorySwapOut	Sum of swapOut memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memorySwapUsed	Sum of swapUsed memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryUnreserved	Sum of unreserved memory from all ESX Hosts under the vCenter
VMWVirtualCenter	memoryUtilization	Average memory utlization of the Cluster
VMWVirtualCenter	memoryZero	Sum of zero memory from all ESX Hosts under the vCenter
VMWVirtualCenter	vmKernelMemory	Sum of vmKernel memory from all ESX Hosts under the vCenter
VMWVirtualCenter	totalMemory	Sum of total memory from all ESX Hosts under the vCenter
VMWVirtualCenter	networkPacketsSentRate	Sum of network packetsSent from all ESX Hosts under the vCenter
VMWVirtualCenter	networkPacketsReceivedRate	Sum of network packetsReceived from all ESX Hosts under the vCenter
VMWVirtualCenter	networkSendRate	Sum of network sendRate from all ESX Hosts under the vCenter
VMWVirtualCenter	networkReceiveRate	Sum of network receiveRate from all ESX Hosts under the vCenter
VMWVirtualCenter	networkUsagebps	Sum of network net.usage.average from all ESX Hosts under the vCenter

DvSwitch metrics

Table 268. DvSwitch metrics

Topology	Metric name	Description
VMWDistributedVirtualSwitch	ftTrafficUtilization	FT traffic utlization for the vSwitch
VMWDistributedVirtualSwitch	hbrTrafficUtilization	HBR traffic utlization for the vSwitch
VMWDistributedVirtualSwitch	iscsiTrafficUtilization	iSCSI traffic utlization for the vSwitch
VMWDistributedVirtualSwitch	networkPacketLoss	Percent of packet loss for the vSwitch
VMWDistributedVirtualSwitch	networkThroughput	Throughput for the vSwitch
VMWDistributedVirtualSwitch	networkUtilization	bandwidth Utilization for the vSwitch
VMWDistributedVirtualSwitch	nfsTrafficUtilization	NFS traffic utlization for the vSwitch
VMWDistributedVirtualSwitch	sumThroughput	ftusage + hbrusage + iscsiusage + nfsusage + vmotionusage + vmusage of All attached NICs
VMWDistributedVirtualSwitch	vmotionTrafficUtilization	vMotion traffic utlization for the vSwitch
VMWDistributedVirtualSwitch	vmTrafficUtilization	VMs traffic utlization for the vSwitch

About Us

Quest creates software solutions that make the benefits of new technology real in an increasingly complex IT landscape. From database and systems management, to Active Directory and Office 365 management, and cyber security resilience, Quest helps customers solve their next IT challenge now. Around the globe, more than 130,000 companies and 95% of the Fortune 500 count on Quest to deliver proactive management and monitoring for the next enterprise initiative, find the next solution for complex Microsoft challenges and stay ahead of the next threat. Quest Software. Where next meets now. For more information, visit https://www.quest.com/.

Technical support resources

Technical support is available to Quest customers with a valid maintenance contract and customers who have trial versions. You can access the Quest Support Portal at https://support.quest.com.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. The Support Portal enables you to:

- Submit and manage a Service Request.
- View Knowledge Base articles.
- Sign up for product notifications.
- Download software and technical documentation.
- View how-to-videos.
- Engage in community discussions.
- Chat with support engineers online.
- View services to assist you with your product.