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About This Book

The vCenter Operations Enterprise User’s Guide describes how to use VMware® vCenter Operations Enterprise to monitor the performance of your enterprise to diagnose and prevent problems.

Intended Audience

This book is intended for vCenter Operations Enterprise users and administrators.

VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation go to http://www.vmware.com/support/pubs.

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VMware vCenter Operations Enterprise Documentation

The documentation set for VMware vCenter Operations Enterprise consists of the following documents.

- Analytics Guide for VMware vCenter Operations Enterprise. Contains conceptual information that describes the principles of the vCenter Operations Enterprise analytics features.
- Integration Guide for vCenter Operations Enterprise and EMC Smarts. Contains conceptual and procedural information on integrating vCenter Operations Enterprise with EMC Smarts.
- VMware vCenter Operations Enterprise online help. Contains conceptual and procedural information to help you complete your tasks when administering using vCenter Operations Enterprise.
Technical Support and Education Resources

The following sections describe the technical support resources available to you. To access the current version of this book and other books, go to http://www.vmware.com/support/pubs.

Online and Telephone Support

To use online support to submit technical support requests, view your product and contract information, and register your products, go to http://www.vmware.com/support.

Customers with appropriate support contracts should use telephone support for the fastest response on priority 1 issues. Go to http://www.vmware.com/support/phone_support.

Support Offerings

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Introducing vCenter Operations Enterprise

This section introduces you to vCenter Operations Enterprise, its user interface, and some key terms and concepts. It discusses the following topics:

- “Product Overview” on page 9
- “The vCenter Operations Enterprise User Interface” on page 9
- “The Concepts of vCenter Operations Enterprise” on page 12

Product Overview

vCenter Operations Enterprise collects performance data from monitored software and hardware resources, stores it, analyzes it, and uses that analysis to provide you with real-time information about problems, or potential problems, anywhere in your enterprise. It leverages the power of your existing system management tools by aggregating data from different sources and processing them with its proprietary analytic algorithms.

vCenter Operations Enterprise presents its data and analysis to you in several ways: through Smart Alerts that warn of potential or occurring problems, in configurable dashboards that can show the exact combination of data you want to see, on predefined pages that show commonly needed information, or in a number of predefined reports.

The vCenter Operations Enterprise User Interface

The vCenter Operations Enterprise client is browser-based: you use it by pointing your Web browser to the vCenter Operations Enterprise URL for your installation, and all of its information is shown in the browser window. Within the browser window, vCenter Operations Enterprise includes menus for you to select its various features. Each menu option opens a vCenter Operations Enterprise page. Pages perform various functions, based on the menu where they are found: pages accessed through the Reports menu let you run vCenter Operations Enterprise reports; pages accessed through the Environment menu show how the vCenter Operations Enterprise environment is configured (and let users with sufficient permissions change the configuration), and so on.

The Home Page

The Home page deserves special mention, as it is different than other vCenter Operations Enterprise pages. The Home page contains all of the dashboards you have access to. You see it when you first log in to vCenter Operations Enterprise, and you can return to it at any time by clicking the Home menu or selecting a particular dashboard from the Dashboards menu.
Each dashboard contains one or more widgets; each widget shows a collection of related data. You can view any dashboard by clicking its tab. You can configure widgets and dashboards to show the data you want in the combinations you want.

Dashboards

When you start using vCenter Operations Enterprise, the dashboards on your Home page are determined by the groups your user name belongs to. For example, by default, the administrator user sees dashboards called vCenter Operations Enterprise Admin and Manager, while users in the Operators group see the Operations and Alerts by Type dashboards. You can view any of your dashboards by clicking its tab.

Each dashboard displays one or more widgets, each of which is shown in an individual pane. vCenter Operations Enterprise includes a number of predefined dashboards, but dashboards are configurable. If your user name has the right permissions, you can create new dashboards and modify existing ones. You can add, remove, resize, or move the widgets on each dashboard to display what is most important in your environment.

To add a dashboard, click the Add icon at the right side of the tabs. See “Creating a New Dashboard” on page 67 for more information.
Widgets
Widgets are panes, displayed on dashboards, that contain collections of related information about one or more resources. A resource is anything vCenter Operations Enterprise is configured to collect and track data for, from a single piece of software or hardware up to your entire environment. If you have the appropriate permissions, you can modify your dashboards to contain the widgets you prefer and configure widgets to display the information you want to see. The types of widgets available are described in Chapter 7.

The Menu Bar
The vCenter Operations Enterprise interface contains seven menus. The following sections briefly describe each one.

Home
The Home menu displays your Home page, with the default dashboard shown.

Dashboards
The Dashboards menu lets you go directly to any dashboard on your Home page. Select the option for the dashboard you want to view.

Reports
The options on the Reports menu let you generate a number of different reports with information on what is happening in your environment. These reports include:

- **Performance Correlation**: Lists pairs of resources which show significant correlation between their performance, their detected anomalies, or both.
- **Behavior Correlation**: For two resources which show correlation, lists the specific pairs of correlated metrics, including the percentage of correlated behavior.
- **Anomaly Correlation**: For two resources which show anomaly correlation, shows the specific pairs of metrics whose anomalies are correlated, the number of correlated anomalies, and the correlation percentage.

You can also change the image shown at the top of each report. For more information on reports, see Chapter 8.

Environment
The Environment menu contains options to view the resources, applications, and attributes defined for vCenter Operations Enterprise to track and analyze. These features are used mainly for configuring vCenter Operations Enterprise, and are described in the vCenter Operations Enterprise Installation and Administration Guide.

Alerts
The Alerts menu lets you view lists of and details about the alerts vCenter Operations Enterprise has generated. Alerts are discussed in Chapter 3.

Forensics
The Forensics menu features access some of the problem analysis and prediction features of vCenter Operations Enterprise. They are described in Chapter 5.

Admin
The features on the Admin menu are described in the vCenter Operations Enterprise Installation and Administration Guide.
Breadcrumbs

To help you navigate the interface and keep track of where you are, vCenter Operations Enterprise contains breadcrumbs. The breadcrumbs appear at the top-left corner of each page except the Home page.

You can click a page name in the breadcrumbs to return to that page.

The Concepts of vCenter Operations Enterprise

This section describes some of the terms used in vCenter Operations Enterprise and some concepts that will help you understand the vCenter Operations Enterprise displays and get the most out of the product.

Resources

A resource is any entity in your environment for which vCenter Operations Enterprise can collect data. For example, a typical environment might contain any of the following resources: routers, switches, firewalls, databases, application servers, TCP/IP-based applications—essentially, anything in your environment that can produce data. vCenter Operations Enterprise provides comprehensive data collection, predictive analysis, and alerting for your resources.

In addition to single entities—such as databases—resources can be containers to “hold” other resources. This lets you get combined metrics for logically grouped resources. For example, if you have several Web servers, you would define each one as a resource, then define another resource which contains all the individual Web servers and allows you to monitor their combined performance. Applications and tiers are types of container resources:

- An application is a collection of related resources, such as all resources related to your accounts payable application, organized in tiers. An application gives you the ability to combine, track, and analyze metrics for these related resources over a period of time. For a more complete discussion of this aspect of vCenter Operations Enterprise, see the Analytics Guide for vCenter Operations Enterprise.

- A tier is a group of resources that perform a specific task in your environment, such as database servers or Web servers. Tiers are collected together into applications. Multiple tiers can exist in a given application. Only applications can contain tiers.

Resource Tags

You can select resources from a list in many places in vCenter Operations Enterprise. For example, many widgets let you select the resources to see data for. Because an enterprise could easily have hundreds or thousands of resources defined, vCenter Operations Enterprise lets administrators assign tags to resources to make it easier to find the one you want.

A resource tag is a type of information, such as Application or GEO Location. These two tags always exist in vCenter Operations Enterprise. Each tag has tag values, which are values of that type of information. For example, the GEO Location tag could have values of New York, London, and Mumbai, if that’s where your offices are located, while the application tag could have values of accounts payable, human resources, and so on. When you select a resource using tags, you first select the tag, then a specific tag value, to list the resources for that value. You can then pick the resource(s) you want. This is generally much faster and easier than looking through the entire resource list.

How to create and assign tags and tag values is described in the vCenter Operations Enterprise Installation and Administration Guide.

NOTE vCenter Operations Enterprise has several predefined tags. It automatically creates values for most of these tags and assigns resources to them when the resource is added to vCenter Operations Enterprise. For example, whenever an administrator adds a resource, vCenter Operations Enterprise assigns it to the tag values for the collector it uses and the kind of resource it is, first creating those tag values if they do not already exist.
Attributes and Metrics

vCenter Operations Enterprise may collect several different kinds of data for a single resource. For example, for a database server, vCenter Operations Enterprise may receive data on free disk space, CPU utilization, average response time for a database request, and so on. Each different type of data that vCenter Operations Enterprise collects is called an attribute. The vCenter Operations Enterprise administrator defines attribute packages—different combinations of attributes—and assigns each resource the attribute package that contains the attributes you want to track for that resource. An instance of an attribute for a specific resource—for example, average response time for database server 3—is called a metric.

For each metric, vCenter Operations Enterprise collects and stores multiple readings over time. For example, a particular software program may provide information about its performance every 30 seconds or every minute. Each piece of data collected is called a metric value. If a program has the response time attribute assigned to it, vCenter Operations Enterprise collects metric values tracking the response time.

KPI

You can define attributes which are particularly critical to your enterprise as key performance indicators, or KPI. vCenter Operations Enterprise treats KPIs differently than other attributes: threshold violations by a KPI automatically generate alerts, while some violations by non-KPI attributes do not.

Super Metrics

It can be useful to track combinations of metrics, either from a single resource or, more commonly, from multiple resources. In vCenter Operations Enterprise, you can combine different metrics using mathematical operations to define a super metric, which vCenter Operations Enterprise then tracks like any other metric. For example, you can track the average free disk space for all database servers by defining a super metric combining and averaging the free disk space metrics for each server. See the vCenter Operations Enterprise Installation and Administration Guide for more information.

Alerts and Anomalies

For every attribute, vCenter Operations Enterprise maintains thresholds of normal behavior, either hard thresholds you define or dynamic thresholds that vCenter Operations Enterprise calculates and updates based on the attribute's usual values. When a metric violates its attribute's threshold—for example, CPU use goes higher than it should, or a transaction on a Web server takes longer than it should—vCenter Operations Enterprise generates an anomaly. An anomaly indicates an out-of-range value. vCenter Operations Enterprise continually tracks all anomalies; when its algorithms determine that a combination of anomalies may indicate a real problem, vCenter Operations Enterprise generates an alert.

An alert is a notification of an abnormality that might require your attention. Each alert includes details about the anomaly or anomalies that triggered it. An alert may indicate a problem with any type of resource, either a resource that represents a single entity or a container resource such as a tier or application.

For example, if multiple metrics of a resource—such as CPU use for all of the servers in a particular tier—go out of threshold and stay that way for a period of time, vCenter Operations Enterprise generates anomalies for each metric value that is out of threshold. However, it sends only one alert notifying you of the possible problem. When you look at the alert details, vCenter Operations Enterprise lists all the anomalies for each metric, so you have the complete details of what is happening.

vCenter Operations Enterprise can generate several kinds of alerts, and there are several ways you can list alerts. You can even be notified automatically when one occurs. See Chapter 3, for more information.
The Alerts Overview page lists alerts vCenter Operations Enterprise has generated. You can filter the alert list to show only certain types of alerts, or by other criteria.

For more information about alerts, see Chapter 3.

**Thresholds**

vCenter Operations Enterprise uses two types of metric thresholds, hard and dynamic:

- A hard threshold is a value an administrator defines for a metric. A hard threshold is static; it changes only if an administrator changes it.

- A dynamic threshold is defined by vCenter Operations Enterprise based on the incoming and historical metric data. vCenter Operations Enterprise adjusts dynamic thresholds as new data allow it to better define what is normal for a metric and what isn’t. Dynamic thresholds automate the massive manual effort that could be needed with hard thresholds, where you might need to configure thresholds for hundreds or thousands of metrics.

  Dynamic thresholds add context that helps vCenter Operations Enterprise discriminate between normal and abnormal behavior. They enable vCenter Operations Enterprise to evaluate the performance of IT components in context with historical conditions and determine if an anomaly is truly warranted. By determining what is normal in the environment, vCenter Operations Enterprise can filter out alerts that are associated with normal behavior—the alerts that would be triggered by hard thresholds—and instead generate alerts only for abnormal behaviors that are precursors to real problems in your environment.

**Root Causes**

The root cause of an alert is the condition, or symptom, that was the first step in the chain of events that led to the alert. For example, a slowdown in network traffic through a particular router could lead to an increased time-per-transaction for users of your Web site, which in turn leads to an alert being issued for the Web server resource.

For any alert, you can see a list of the conditions vCenter Operations Enterprise calculates as the most likely root causes of the symptom that caused the alert, ranked in order. You can list root causes either on a dashboard in the Root Cause Ranking widget, or from the Alerts Overview page.
Health

The health rating gives you a quick overview of the current state of any resource, from an individual operation up to your entire enterprise. vCenter Operations Enterprise calculates health by looking at the internally metrics for the resource and using its proprietary analytics formulas to determine an overall health score, from 0 to 100.

NOTE Internally generated metrics are metrics that vCenter Operations Enterprise generates and stores automatically for every resource: the total number of alerts and anomalies, the number of active alerts, and so on. They are generally used only for calculating the health score.

vCenter Operations Enterprise indicates health in two ways: the numeric score, or a colored indicator based on the range of the health score:

- Green: 76–100. Resource is behaving normally. No attention required.
- Yellow: 51–75. Resource is experiencing some level of problems. Check and take appropriate action.
- Orange: 26–50. Resource could have serious problems. Check and take appropriate action as soon as possible.
- Red: 0–25. Resource is either not functioning properly or is predicted to stop functioning shortly. Take action immediately. Health of 0 indicates the resource is down.
- Blue: No data is available for any metrics for this resource. This shows as a question mark on pages where the numeric score is shown, and as -1 on historic health graphs.

NOTE A blue health indicator means that vCenter Operations Enterprise does not know the health of the resource. It is not the same as a 0 health score. A 0 health score indicates that vCenter Operations Enterprise has received information from the adapter instance indicating that the resource is down. A blue (–1) score means that vCenter Operations Enterprise is not receiving data. This could indicate that metrics are not being collected for the resource or that the resource cache is being reloaded. The cache is reloaded whenever the vCenter Operations Enterprise services are restarted or if there are configuration changes to the resource or its parent.

When an adapter instance cannot connect to its data source, the adapter instance resources and all of its child resources will show blue.

The number ranges shown are the defaults; an administrator can change them so that, for example, green indicates a score above 80 instead of 75.

Anywhere the resource is listed in vCenter Operations Enterprise, you can see the health score, the indicator, or both. The Health widget below displays the health score for each tier of an application.
Forensics

The features on the Forensics menu let you look at a cross-silo analysis of resource anomalies, top-n analysis of the behavior of selected resources or metrics, or the fingerprint library of vCenter Operations Enterprise. You can get more information on these features in Chapter 5.

Cross-Silo Analysis

The Cross-Silo Analysis page displays one or more graphs showing the number of anomalies over time for particular resources. You can zoom the graph to focus on any desired period of time, such as just before a particular alert was issued. You can click at any point in the graph to see a ranking of the likely root causes for the anomalies at that point. For applications, the anomaly graph also includes a line showing the internally determined 90% threshold. If the number of anomalies exceeds this threshold, it generates an early warning Smart Alert, as there is a strong probability that there is a problem with the application.

Top-N Analysis

The Top-N Analysis page shows you the top resources, metrics, or alerts in one or more categories you select. For example, you can see the five most or least healthy resources in a tier. You can select the resource tag and time frame to analyze and the categories to show.

You can also show a top-n analysis on the Top-N Analysis widget, but it shows only one category at a time. See “Top-N Analysis Widget” on page 111

Fingerprints

When a KPI for an application or a tier belonging to an application violates a threshold, vCenter Operations Enterprise examines the events leading up to the violation. If it finds enough related information (such as other anomalies), it captures the set of events which preceded and led up to the violation. This captured series of events is called a fingerprint. vCenter Operations Enterprise can then monitor events in the future, and, if it finds a similar series of events, issue a predictive alert warning that the KPI violation is likely to occur.

Fingerprinting captures models of problems you can use for detailed forensics. This helps you identify problems and resolve them more quickly than in a traditional IT environment by:

- Helping you to isolate problems. vCenter Operations Enterprise narrows the number of possible silos/tiers in which the problem may have occurred, so you can find and resolve it more quickly.
- Capturing the precursors to problems for root-cause analysis.
- Notifying you of problems before they occur, enabling you to solve problems.

You view the fingerprint information by selecting Problem Fingerprint Library from the Forensics menu.

The Analytics Guide for vCenter Operations Enterprise contains more in-depth information about fingerprints.

Capacity Analysis

Some metrics, such as disk space usage or network traffic measurements, frequently show long-term trends—they tend to either rise or fall over time, though short term fluctuations can hide this or make it difficult to calculate. The capacity analysis looks at the overall value trend for a selected metric and tells you when it is predicted to reach a threshold you set and how confident vCenter Operations Enterprise is of the prediction. This can help with planning for infrastructure upgrades, such as adding additional storage capacity, network routers, and so on.
Getting Started with vCenter Operations Enterprise

This section shows you how to get vCenter Operations Enterprise up and running. It does not provide in-depth information; it walks you through setting up the minimum configuration required to discover resources, begin collecting data, and view initial results.

This section contains the following topics:

- “Getting Started Overview” on page 17
- “Getting Started Overview” on page 17
- “Viewing Dashboards” on page 19
- “Viewing Alerts” on page 19
- “Modifying Your Home Page” on page 20

Getting Started Overview

vCenter Operations Enterprise allows you to do a large number of maintenance and troubleshooting tasks, from responding to alerts to tracking anomalies to system tuning based on the predictive information it generates.

NOTE Before you can use any of the procedures described here to view vCenter Operations Enterprise data, the vCenter Operations Enterprise administrator must configure the resources vCenter Operations Enterprise will monitor and start data collection. See the vCenter Operations Enterprise Installation and Administration Guide for more information.

The best way to learn the full feature set of vCenter Operations Enterprise is to get some hands-on experience with the system. This chapter describes some of the basic ways you can view the data vCenter Operations Enterprise has collected and analyzed:

- Logging on
- Viewing dashboards
- Viewing alert information
- Designing dashboards to show the data you want

Your ability to use any vCenter Operations Enterprise feature depends on the access rights assigned to you by the vCenter Operations Enterprise administrator. If you cannot use a feature you think you should have access to, contact your administrator to see if your access rights need to be adjusted.

All of the features mentioned in this chapter are described more fully elsewhere in the User Guide.
Logging On

NOTE vCenter Operations Enterprise works best with either the Microsoft Internet Explorer (IE) 7 or 8 or Mozilla Firefox 3 browser.

Once vCenter Operations Enterprise is installed and the vCenter Operations Enterprise services are running, you can connect to the vCenter Operations Enterprise server using a supported Web browser. Do the following:

1 In your browser, go to the following URL:
   
   http://ip_address/

   ip_address is the IP address of the vCenter Operations Enterprise server. If you are using the HTTPS protocol for the server, enter HTTPS instead of HTTP.

   The vCenter Operations Enterprise Login Page appears.

2 Enter your user name and password. If you do not know your user name, contact your administrator.

3 Click Login.

4 vCenter Operations Enterprise displays your Home page. You can customize the default dashboards shown to suit your needs. See “Modifying Your Home Page” on page 20 for more information.

NOTE Your vCenter Operations Enterprise session will time-out after 30 minutes of inactivity, and you will have to log in again.
**Viewing Dashboards**

When you log in to vCenter Operations Enterprise, you see your Home page. The Home page consists of one or more dashboards, each of which contains one or more widgets. Each widget shows a particular type of information about one or more resources.

If there is more than one dashboard on your Home page, you can switch to a different one by clicking its tab. Dashboards and widgets are very flexible. You can change the size of any widget, and edit it to change the information it shows or the format it uses to display it. Often, widgets are connected so that selecting a resource or metric in one widget changes a second widget to show information about the selection.

For more information about configuring widgets and dashboards, see Chapter 6.

For descriptions of each available widget type, see Chapter 7.

**Viewing Alerts**

Alerts are designed to notifying you about possible problems in your environment. Because of the predictive capabilities of vCenter Operations Enterprise, many alerts tell you about problems that have not happened yet, but that vCenter Operations Enterprise predicts are likely to happen in the near future.

Depending on how the administrator has configured vCenter Operations Enterprise, you may receive a notification, such as an e-mail message, when there is an alert for an area you are responsible for. However, you can always see a list of current alerts by using the Alerts Overview page.
To view an alert list and information

1. From the Alerts menu, select **Alerts Overview** to open the Alerts Overview page.

By default, this page lists all active alerts in the vCenter Operations Enterprise system. Icons indicate the alert's criticality level and type. You can click the icons at the top of the list to see only a particular type of alert (such as KPI breaches), alerts that have been cancelled, and so on.

2. To see detailed information for a listed alert, double-click it. This opens the Alert Summary page for the alert.

The Alert Summary page shows the reason for the alert, the resource it is for, its impact on the resource, and its likely root causes. For even more information, you can click the **Troubleshoot** button at the top of the page.

For more information about alerts, please see **Chapter 3**.

**Modifying Your Home Page**

You may now want to modify your Home page. vCenter Operations Enterprise is extremely flexible: you can create your own dashboards containing the widgets best suited to your needs, with each widget configured to show the exact information you want. It also has preconfigured dashboards available. To get started, we recommend you choose a preconfigured dashboard.
To add a preconfigured dashboard to your Home page

1. On the Home page, click the Add (+) button. The Add a Tab: Pick a Template page appears.

2. This page contains two panes. The left pane shows the available dashboard templates. Drag the dashboard template you want (for example, the Alerts by Type template) from the left pane to the right.

3. Type a name for your dashboard in the text box at the top of the right pane (for example, Alerts by Type).

4. In the Set as default field at the top of the right pane, click Yes if you want this dashboard to be your default. If not, leave No selected.

5. Click Save to save your new dashboard and return to the Home page. You will see a tab for your new dashboard at the top of your Home page with the label you selected. If you selected this dashboard as your default, it appears on top.

On your new dashboard, you can drag widgets around to new locations and columns.

For more information, see Chapter 6.
This section covers the alerting functionality of vCenter Operations Enterprise. It contains the following topics:

- “Introduction to Alerts and Anomalies” on page 23
- “About Alerts” on page 24
- “Viewing Alert Lists” on page 26
- “Viewing Single Alerts” on page 32
- “Responding to Alerts” on page 38

### Introduction to Alerts and Anomalies

The alerting features of vCenter Operations Enterprise combine industry-standard threshold violation alerts with the advanced, unique dynamic threshold calculations and metric correlation abilities of vCenter Operations Enterprise. The dynamic thresholds in vCenter Operations Enterprise determine what the normal range of values is for any metric. It can then detect when any metric deviates from its normal range, and use its correlation analytics to determine if this deviation is symptomatic of a larger problem in the enterprise. This correlation of metrics from different resources allows vCenter Operations Enterprise to do a much better job of telling you when you need to pay special attention to a situation, and what you need to pay attention to.

To facilitate this intelligent alert notification, vCenter Operations Enterprise can generate two types of events in response to abnormalities in your metrics:

- **An anomaly** is generated whenever any metric violates either an internally calculated dynamic threshold or a user-defined hard threshold. You are notified of an anomaly only if it occurs on a designated Key Performance Indicator (KPI) or becomes part of a larger alert.

- **An alert** is generated only if a KPI violates a threshold or if vCenter Operations Enterprise correlates several anomalies and determines that they may indicate a larger problem. Different combinations of conditions cause different types of alerts, as described in “Types of Alerts” on page 25.

This means that not all anomalies trigger alerts. A single metric going above or below its threshold generates an alert message only if that metric is defined as a KPI. If it is not, vCenter Operations Enterprise continues to track it, and generates an alert only if a combination of correlated metrics signals a probable problem. This can greatly reduce the number of false “alerts” which can take up valuable time and resources.

**NOTE** For metrics with dynamic thresholds, the calculation to determine whether to generate an anomaly is actually somewhat more complicated than described here. Based on how often, historically, the metric has violated its thresholds and by how much, vCenter Operations Enterprise calculates and continually adjusts a degree of abnormality for the metric. If the metric value is within this degree of abnormality, no anomaly is generated even if the value is outside the dynamic threshold.
The screenshot below shows the Metric Graph widget for a metric. The shaded gray area shows the dynamic threshold for the metric—as long as the value stays in that area it is performing normally. The yellow areas indicate out-of-range values which generated anomalies.

Alerts are shown on the Alerts Overview page or dashboards using various widgets and can be updated automatically at an interval you set. Anomalies can only be seen in the details of an alert, which include all anomalies that have been rolled up into that alert.

For information on configuring conditions that should trigger alerts, see the vCenter Operations Enterprise Installation and Administration Guide.

**KPI and Alerts**

When vCenter Operations Enterprise administrators configure attribute packages, they can identify any attribute (or attributes) for any resource as a Key Performance Indicator (KPI). A KPI is a high-priority metric that could indicate a severe problem in your infrastructure if it goes out of its normal value range. For this reason, vCenter Operations Enterprise treats KPI differently than other metrics. If a KPI violates a threshold, it always generates an alert. The alert type depends on the type of threshold the KPI uses:

- If the KPI violates an internally calculated dynamic threshold, vCenter Operations Enterprise sends a Smart KPI Breach alert.
- If the KPI violates a user-defined hard threshold, vCenter Operations Enterprise sends a Classic KPI Breach alert.

See “Types of Alerts” on page 25 for more information about alert types.

**About Alerts**

Alerts are the mechanisms vCenter Operations Enterprise uses to notify you of abnormal behavior.

There are several types of alerts, each of which has its own triggers and contents. An alert may be generated by abnormal behavior of one or more metrics for any resource, including a tier or application, or when a fingerprint predicts an upcoming problem. vCenter Operations Enterprise determines the type of alert to send based on what triggers it.

A major benefit of alert processing in vCenter Operations Enterprise is that vCenter Operations Enterprise can significantly reduce the total volume of alerts because it sends an alert only when its analytic algorithms indicate there is truly an impending problem.

Alerts are shown on the Alerts Overview page and on dashboards using various widgets and can be updated automatically at an interval you choose. You can have vCenter Operations Enterprise send alerts to event management consoles and e-mail addresses, as described in the vCenter Operations Enterprise Installation and Administration Guide.
Types of Alerts

Alerts are separated into types and subtypes. As described in “Filtering the Alert List” on page 29, you can list all alerts or only the subtypes you are interested in on the Alerts Overview page. Each type and subtype indicates a different problem, or potential problem, in the enterprise. The alert types in vCenter Operations Enterprise are:

- **Smart Alert** – A smart alert is triggered when an internally calculated value, either a correlated prediction of future behavior or a dynamic threshold breach on a KPI, indicates that there is or soon will be a problem. Smart alerts do not depend on any user-defined values except which metrics have been designated KPI. Smart alerts have three subtypes:

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Description</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI DT Breach</td>
<td>A KPI has breached one of its internally calculated dynamic thresholds.</td>
<td>Determined automatically by analytics based on user-defined KPI.</td>
</tr>
<tr>
<td>KPI Prediction</td>
<td>vCenter Operations Enterprise predicts that a KPI will soon breach a threshold. The cause could be that the current combination of metrics matches a stored metric fingerprint which predicts the breach, or that a metric which is highly correlated with the KPI has breached its threshold, indicating the KPI will likely also do so. KPI Prediction alerts are always considered critical.</td>
<td>Determined automatically by analytics based on user-defined KPI.</td>
</tr>
<tr>
<td>Early Warning</td>
<td>The vCenter Operations Enterprise correlation algorithms calculate a greater than 90% chance (above the “noise threshold”) that there is a problem with an application. Early warning alerts are always considered critical.</td>
<td>Determined automatically by analytics based on application topology</td>
</tr>
</tbody>
</table>

- **Classic Alerts** – A classic alert is an alert that could be generated by classic monitoring software; it relies on user-entered hard thresholds, not vCenter Operations Enterprise dynamic thresholds or other advanced calculations. Classic alerts have three subtypes:

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Description</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI HT Breach</td>
<td>A defined KPI has breached a user-defined hard threshold.</td>
<td>A user-defined KPI has breached one of its user-defined hard thresholds.</td>
</tr>
<tr>
<td>Abnormality</td>
<td>A non-KPI metric has breached one of its internally calculated dynamic thresholds.</td>
<td>A single metric (non-KPI) has breached one of its dynamic thresholds.</td>
</tr>
<tr>
<td>Notification</td>
<td>A non-KPI metric has breached a user-defined hard threshold. This is a traditional alert such as those sent by typical system and network management applications.</td>
<td>A single metric (non-KPI) has breached one of its internally calculated dynamic thresholds.</td>
</tr>
</tbody>
</table>

- **Administrative Alerts** – An administrative alert indicates a problem with vCenter Operations Enterprise itself, the monitoring software it is collecting data from, or the enterprise network. Administrative alerts have two subtypes:

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>Some component of the vCenter Operations Enterprise application has failed.</td>
</tr>
<tr>
<td>Environment</td>
<td>vCenter Operations Enterprise has stopped receiving data from one or more resources. This could indicate a problem with the resource, the monitoring software, or the network infrastructure.</td>
</tr>
</tbody>
</table>
By default, vCenter Operations Enterprise generates all types of alerts except for classic abnormality alerts. Since they do not involve KPI, classic abnormalities are unlikely to require any action and would just be “noise” you needed to look through to find the more important alerts which could indicate a problem. If you think you may want to change the types of alerts vCenter Operations Enterprise generates, contact your local vCenter Operations Enterprise administrator or refer to the “Technical Support and Education Resources” section of the vCenter Operations Enterprise Installation and Administration Guide.

**Alert Criticality**

In addition to a type, every alert has a criticality level that indicates how serious a problem it is likely to indicate and how important it is to deal with it quickly. There are four criticality levels, as shown in the table below.

<table>
<thead>
<tr>
<th>Level</th>
<th>Color</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>Red</td>
<td>5</td>
</tr>
<tr>
<td>Immediate</td>
<td>Orange</td>
<td>4</td>
</tr>
<tr>
<td>Warning</td>
<td>Yellow</td>
<td>3</td>
</tr>
<tr>
<td>Info</td>
<td>Blue</td>
<td>2</td>
</tr>
</tbody>
</table>

vCenter Operations Enterprise predictive Smart Alerts, KPI prediction and early warning alerts, are always Critical alerts. Other alert types may be of any criticality, depending on the alert type and how the attribute that triggers them is configured.

Both the Alerts Overview page and the Alerts widget offer the option to color-code the displayed alerts by criticality.

**Viewing Alert Lists**

There are three ways to list alerts in vCenter Operations Enterprise: on the Alerts Overview page, in the Alerts widget on a dashboard, or through the alert watch list. The Alerts widget is described in “Alerts Widget” on page 82. The Alerts Overview page and the watch list are described in the following sections.

**The Alerts Overview Page**

To view the Alerts Overview page, select Alerts Overview from the Alerts menu. The display is very similar to the Alerts widget, but the Alerts Overview page includes list filtering options not available on the widget.

You can click the Refresh icon at the bottom of the page periodically to refresh the list. The display may be too wide to fit in your browser window. If so, use the scroll bar to see the additional columns.

To see more information for any alert, double-click it. This opens the Alert Summary page for the alert, which is described in “Viewing Single Alerts” on page 32.
You can modify the alert list by doing any of the following:

- You can filter the list so it shows only alerts for the resource tags you select and/or meeting the criteria you choose. See “Filtering the Alert List” on page 29.

- By default, alerts are sorted by the internally assigned alert ID. You can sort the list by any column. To do so:
  a. Move the mouse pointer to the heading of the column to sort by. A down arrow appears at the right side of the heading.
  b. Click the down arrow, then select either Sort Ascending or Sort Descending from the pop-up menu that appears.

- To color-code the list by alert criticality, click the Colorize Rows icon. When this option is on, the rows are colored as described in “Alert Criticality” on page 26. To turn the option off, click the icon again.

- To move a column to another place in the table, drag its header to the desired location.

- To change the columns shown:
  a. Move the mouse pointer to the heading of any column. A down arrow appears at the right side of the heading.
  b. Click the down arrow, then click Columns from the pop-up menu that appears.
  c. Check the box for each column to add to the display, and clear the box for any column to remove.
  d. When you're done, click anywhere outside the column list.

The columns available are listed in Table 3-1.

**Table 3-1. Alerts Overview Column Descriptions**

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Sequential alert ID number.</td>
</tr>
<tr>
<td>Type</td>
<td>Icon indicating the type of alert. See “Types of Alerts” on page 25 for a description of each type:</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Smart alert" /> Smart alert</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Administrative alert" /> Administrative alert</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Classic alert" /> Classic alert</td>
</tr>
<tr>
<td>Start Time</td>
<td>Date and time the alert was first generated.</td>
</tr>
<tr>
<td>Cancel Time</td>
<td>Date and time the alert was cancelled.</td>
</tr>
<tr>
<td>Duration</td>
<td>How long the alert lasted.</td>
</tr>
<tr>
<td>Status</td>
<td>Icon showing whether the alert is active or cancelled:</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Active" /> Active</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Cancelled" /> Cancelled</td>
</tr>
<tr>
<td>Control State</td>
<td>Icon indicating whether the alert is open, assigned, suspended, or suppressed.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Open" /> Open</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Assigned" /> Assigned</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Suspended" /> Suspended</td>
</tr>
</tbody>
</table>
### Table 3-1. Alerts Overview Column Descriptions (Continued)

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Name</td>
<td>If the alert has been assigned, the user it is assigned to.</td>
</tr>
</tbody>
</table>
| Critical Level          | Color-coded icon indicating the alert's criticality:  
  - Red = critical
  - Orange = immediate
  - Yellow = warning
  - Blue = Info |
| Resource Name           | Resource associated with the alert.                                                                                                         |
| Resource Kind           | Kind of resource the alert was generated for (for example, FileServer Mount).                                                                |
| Resource Identifiers    | List of identifiers (up to five) which uniquely identify the resource. This is sometimes, but not always, the same as the resource name. (Multiple resources can have the same name.) The exact identifiers shown depend on the adapter type. |
| Metric                  | The metric which violated a threshold and triggered the alert.                                                                                 |
| Collector               | Collector associated with the alert (for example, vCenter Operations Enterprise Server).                                                     |
| Sub-Type                | Icon indicating the alert's subtype. These vary based on the type of alert. See “Types of Alerts” on page 25 for descriptions of each type and subtype. For Smart Alerts, the subtypes are: |
|                         |  
  - KPI dynamic threshold breach  
  - KPI prediction  
  - Early warning  
|                         | For administrative alerts, the subtypes are:  
  - Alice component failure  
  - Resource disconnected  
|                         | For classic alerts, the subtypes are:  
  - KPI hard threshold breach  
  - Notification  
| Root Cause              | The symptom that most likely indicates the start of the chain of events that led to the alert.                                                |
| Worst Sub-Containers    | If the alert is for a resource which contains other container resources (such as an application, which contains tiers), these icons represent the subcontainers which contributed most to the alert. |
| Info                    | For external notification alerts, this column may show additional information sent with the alert message.                                  |
| Update Time             | Date and time the alert was most recently updated.                                                                                           |
**Filtering the Alert List**

You can filter the alert list in two ways: by selecting one or more resource tag values, or by selecting the appropriate icon(s) at the top left of the Alerts Overview page.

By default, the list shows alerts for all resources. When you select a resource tag value, the list shows only alerts for resources with that value. When you select multiple tag values, vCenter Operations Enterprise follows these rules:

- If you select more than one value for the same tag, the list includes resources that have either value.
- If you select values for two or more different tags, the list includes only resources that have all the selected values.

For example, if you select two values of the GEO Location tag, such as New York and London, the list includes alerts for resources with either value. If you also select the Tier value of the Resource Kind tag, only alerts for tiers which are in New York or London are listed. Alerts are not listed for tiers in other locations, or for resources in those cities which are not tiers.

You can also “negatively select” the resources to show alerts for. If you click the Invert Result icon, the list will include alerts for resources which do not match the tag values you’ve selected. For example, if you select New York and London, then click Invert Result, you will see alerts for all resources that are not in either of those cities.

The icons at the top of the list filter by characteristics of the alert rather than by resource. When filtering using the icons, you can select more than one to filter by more than one characteristic. For example, if you click the Active and Assigned icons, the list will show only active alerts that have been claimed by a user.

Table 3-2 shows the alert filtering icons.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Alert Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="All" /></td>
<td>All. Displays both cancelled and active alerts.</td>
</tr>
<tr>
<td><img src="image" alt="Active" /></td>
<td>Active. Displays only active alerts.</td>
</tr>
<tr>
<td><img src="image" alt="Cancelled" /></td>
<td>Cancelled. Displays only cancelled alerts.</td>
</tr>
<tr>
<td><img src="image" alt="Own" /></td>
<td>Own. Displays alerts owned by your user name.</td>
</tr>
<tr>
<td><img src="image" alt="Open" /></td>
<td>Open. Displays alerts not owned by any user.</td>
</tr>
<tr>
<td><img src="image" alt="Assigned" /></td>
<td>Assigned. Displays alerts owned by an vCenter Operations Enterprise user.</td>
</tr>
<tr>
<td><img src="image" alt="Suspended" /></td>
<td>Suspended. Displays alerts suspended by user for duration specified in minutes.</td>
</tr>
<tr>
<td><img src="image" alt="Suppressed" /></td>
<td>Suppressed. Displays alerts suppressed by user for duration specified in days.</td>
</tr>
<tr>
<td><img src="image" alt="Smart (Early Warning)" /></td>
<td>Smart (Early Warning). Displays only early warning smart alerts.</td>
</tr>
<tr>
<td><img src="image" alt="Smart (KPI Breach)" /></td>
<td>Smart (KPI Breach). Displays only KPI dynamic threshold breach smart alerts.</td>
</tr>
<tr>
<td><img src="image" alt="Smart (KPI Prediction)" /></td>
<td>Smart (KPI Prediction). Displays only KPI prediction smart alerts.</td>
</tr>
<tr>
<td><img src="image" alt="Classic (KPI HT Breach)" /></td>
<td>Classic (KPI HT Breach). Displays only classic hard threshold breach alerts.</td>
</tr>
</tbody>
</table>
The other buttons at the top of the Alerts Overview page let you cancel, suspend, suppress, take ownership of, or release ownership of an alert. They are described in the appropriate sections of this chapter.

**Canceling an Alert**

You can cancel any active alert from the Alert Overview list by doing the following:

1. Select the alert in the list.
2. Click the Cancel Alert icon.

**Alert Watch List**

All vCenter Operations Enterprise pages include the watch list at the upper right corner, to the right of the menu items. The watch list shows the current number of active alerts. It can show all alerts for the entire system, or you can select alerts by criticality level, type, application, and so on. This lets you see a snapshot of the entire current environment, or just the part of it you are concerned with.

The watch list displays the number of alerts for each criticality level and the trend (up, down, or no change). This trend compares the sum of all alerts of a particular type during the current time period with the average of the last three periods before that. You set the length of the time period in the Manage Alert Watch List window, as described below.

To list the alerts of a particular criticality, hover the mouse icon over the criticality icon. You can double-click an alert in the list to see the Alert Summary page for that alert. The Alert Summary page is described in “Viewing Single Alerts” on page 32.
Managing the Alert Watch List

Click **Edit** at the right of the watch list to open the Manage Alert Watch List window.

![Manage Alert Watch List window](image)

You can set the following options for the watch list. Your settings affect only your watch list, not any other user.

- **Refresh Time** – How often, in seconds, to refresh the watch list with recent alerts.
- **Baseline Time** – The length, in minutes, of each period. To calculate the trend, vCenter Operations Enterprise compares the total alerts in the last time period with the average of alerts in the three time periods before that.
- **Select which tags to filter** – To show alerts only for resources with certain tag values, select the tag values you want to monitor. If you select more than one value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.
- **Criticality Level Range** – Limits the alerts displayed in the watch list to only the criticality levels specified. Only the levels checked will appear in the watch list.
- **Filter By** – Limits the alerts displayed in the watch list to only the values you specify. You can filter by any or all of:
  - **Alert Type** – Select the alert type(s) and/or subtype(s) to include.
  - **User Alert Control State** – If you select more than one of **Open**, **Assigned**, **Suspressed**, and **Suppressed** (for example, both **Suspressed** and **Suppressed**), all alerts matching either selection are included. However, if you select **Own Alerts** and one or more of the other states, only alerts which you own and which match one of the other selections are included.
  - **Time Range** – Select or enter a starting and ending date and time, or select a time range from the drop-down list.
  - **Number of alerts to show in tooltip**

### Viewing Single Alerts

vCenter Operations Enterprise offers two levels of detailed information about any alert: the Alert Summary page and the Alert Detail page:

- The Alert Summary includes information about the event that triggered the alert, the alert’s effects, and its likely causes. The information on the Alert Summary page is usually all you need to determine who in the enterprise may need to take action in response to the alert. See “How to Respond to an Alert” on page 39 for our recommendations on how to use the Alert Summary to get the necessary information about an alert to the right person or people.
- The Alert Detail page is usually only accessed by the person responsible for fixing the condition that caused the alert. It contains more information about events leading up to the alert, other behavior correlated with the alert, and more.

### The Alert Summary Page

To view detailed information about a specific alert, double-click the row for that alert in any alert list. This displays the Alert Summary page, as shown below.

![Alert Summary Page](image)

The top of the Alert Summary page shows the alert type, when it started, its duration, and the resource it is for. You can click the resource name to navigate to the Resource Detail page where you can view detailed information for the selected resource (see “The Resource Detail Page” on page 48). There is also a **Troubleshoot** button, which is described in “Troubleshooting an Alert: the Alert Detail Page” on page 33.

The top-right of the page contains the alert ID and icons which enable you to go to the next or previous alert, or search for an alert by ID.
The rest of the page is divided into three areas:

- **Reason** Pane – Shows specific information about the alert: the type of trigger that caused it, the resource or metric the trigger was on, and details about the trigger.

- **Impact** Pane – Shows information “around” the alert: health information for the last six hours for the resource the alert is for and any subcontainers in it, or, if the alert is for a tier, a health graph for the application containing it and current health for all the tiers in the application. It also shows a metric graph for up to five metrics for the resource, in this order: breaching KPI, breaching super metrics, non-breaching KPI, non-breaching super metrics. If there are more anomalies, you can see them all by clicking the **Troubleshoot** button and looking at the **Metric Charts** pane.

- **Root Cause** Pane – The display is very similar to the Root Cause Ranking widget in symptom mode, which is described in “Root Cause Ranking Widget” on page 108. It shows the likely root cause container resources, ranked by the analytical algorithm on the container resource. You can double-click any resource to see the symptom groups, ranked by percentage of possible resources exhibiting symptoms in the group, and double-click any group to see the top five individual symptoms, ranked by percentage of possible resources exhibiting the symptom.

You can double-click any displayed root cause symptom to open a pop-up window listing the individual anomalies that comprise the it. You can then click the **Copy to Clipboard** button to copy the list to the clipboard. For example, you might want to do this if you are opening a problem ticket for the alert, or sending an e-mail message about it. You can also select a symptom in the popup window and click the **Dynamic Dashboard** icon to display the Dynamic Dashboard (see “The Dynamic Dashboard” on page 38).

The exact information shown in these three areas varies depending on the type of alert and the type of resource the alert is for. vCenter Operations Enterprise always shows what it considers the most relevant information of each type. For example, for an early warning smart alert for an application, the **Root Cause** pane shows the tiers in the application ranked by number of symptoms. On the other hand, for a KPI breach smart alert for a non-container resource, **Root Cause** shows the actual symptoms encountered in the resource’s metrics.

**NOTE** Many of the pieces of information on the Alert Summary page have a circled number or icon at the right end of the line. This indicates the adapter instance the information is being collected through. Place the mouse pointer over the number to see the adapter kind.

**Troubleshooting an Alert: the Alert Detail Page**

To see more information about this alert or take action for it, click the **Troubleshoot** button. This displays the Alert Detail page.
The top of the Alert Detail page is the same as the Alert Summary page, except that it includes icons for you to suspend the alert, suppress it, or take or release ownership of it. Using these icons is described in “Suspending and Suppressing Alerts” on page 40 and “Owning Alerts” on page 40.

The left side of the Alert Detail page is the same as the Alert Summary page. The right side includes seven additional tabs. You can use the information on the troubleshooting tabs to help you diagnose the actual cause of the behavior leading to the alert and see what steps you can take to prevent it from happening again in the future. The tabs are described below.

**NOTE** vCenter Operations Enterprise remembers the state of each tab as long as you are looking at information for the same alert. For example, if you change the graphs shown on the Mashup tab, then switch to the Timeline tab, then go back to Mashup, the graphs you selected will still be shown.

**Mashup Tab**

The Mashup tab is shown by default when you click Troubleshoot. It displays up to three types of charts showing behavior of the resource the alert is for.

By default, the charts cover the six hours before the alert was generated and one hour after. The charts are:

- A health chart for the resource. The chart can include (based on the Layers setting) each alert during the time shown. Click an alert to see more information, or double-click it to open the Alert Summary page for it. The Alert Summary page is described on page 32.

- An anomaly count graph for the resource. For an application, this also shows the count for any tiers which contain root cause metrics for the resource. This is very similar to the anomaly graph shown by the Cross-Silo Analysis feature (see “Cross-Silo Analysis” on page 51). The graph shows the number of anomalies for the resource at the indicated time. A red line marks the noise threshold for the resource—an anomaly count higher than this indicates a 90% probability of a problem and triggers an early warning alert.

- Metric graphs for any or all of the KPI for any resource listed as a root cause resource. For an application, this will be the application and any tiers which contain root causes. You can select the KPI to include by clicking Chart Controls, KPIs. Any shaded areas on a graph indicate the KPI was violating its threshold during that time.
To pick which charts to view, click **Chart Controls** at the top of the tab. You can select:

- **Show Charts** to select which types of graphs to include.

- **Layers** to select what types and subtypes of alerts to show on the metric graph. You can also choose to have the graph show change events. Change events are user-defined notifications sent to vCenter Operations Enterprise using the vCenter Operations Enterprise OpenAPI.

- **Show in Stacked Mode** changes the **Anomaly Count Graph** to be a single stacked graph showing anomalies for all selected root cause resources.

- **Root Cause Resources** lets you select the child resources to include in the **Anomaly Count Graph**.

- **KPIs** to select the KPI to include metric graphs for.

To change the time period shown, click the **Date Controls** icon. You can then either select a period in the top box or enter a start date and time and end date and time in the fields beneath it.

You can use the buttons at the top left of the tab to zoom or pan the graphs. All of the graphs change together, so you always see the same time period for all the data shown on the tab.

To see the value of a graphed KPI at any given point, click the **Point Values** icon, then move the mouse cursor over the desired KPI and time. You can also click the top left of any shaded alert area on the metric graph to see information about that alert.

### Timeline Tab

The **Timeline** tab shows all anomalies contributing to this alert, displayed as a dual-drag timeline starting with the beginning of the first anomaly. It ends with the current time or, if the alert was cancelled, the cancel time.

The top portion displays a zoomed-in version of the timeline and the bottom portion displays a summary view. To move through the timeline quickly, click and drag using the mouse in either portion of the timeline. You can also use these keys:

- **Home** - Brings the start of the first associated anomaly to the center of the timeline.

- **End** - Brings the end of the last associated anomaly to the center of the screen

- **Page Up** - Shows the previous page in the timeline.

- **Page Down** - Shows the next page in the timeline.
You can hover the mouse pointer over a metric to display the complete name. Click a time period to display a popup of symptom details. The anomalies are grouped by symptom. To display the Dynamic Dashboard (see “The Dynamic Dashboard” on page 38), select a symptom in the popup window and click the Dynamic Dashboard icon.

**Relationships Tab**

The **Relationships** tab displays a resource relationship chart for the resource the alert is for. The chart shows the structure of the topography around the resource—its parent and child resources. This is the same display as the Health Tree widget. See “Health Tree Widget” on page 92 for more information.

**Metric Charts Tab**

The **Metric Charts** tab allows you to view metric charts for any or all of the metrics contributing to the alert. Select a resource in the **Container** pane, then a symptom in the **Symptoms** pane, then double-click the anomaly in the **Anomalies** pane. The chart for the metric exhibiting that anomaly displays in the **Metric Graph** pane. The graph and options are the same as those described in “Metric Graph Widget” on page 100.
For smart KPI prediction alerts triggered by a fingerprint match, you have an additional option. If you click Visualize Fingerprint in the Anomalies pane, vCenter Operations Enterprise opens the Fingerprint Alert Details page. This is the same as the Display by Importance view on the Problem Fingerprint Library page, with one additional. It adds a circle to the graph for each symptom, showing the correlation between the data when the fingerprint was captured and when the alert was triggered. See below a sample page.

**Correlations Tab**

The Correlations tab lists metrics showing either behavior or anomaly correlations to the KPI metrics contributing to the alert. Select one of the KPI Metrics in the field at the top of the tab to see the resources which contain correlated metrics. Click a resource to expand the tree and see its correlated metrics. Each metric will shows a percentage correlation in the Behavior Correlation or Anomaly Correlation column, or both. The higher the number, the more closely correlated the metrics are.

**Notes Tab**

The Notes tab shows all notes related to the alert. This is a list of all prior alert functions (suspend, suppress, own, release), and can be viewed by other vCenter Operations Enterprise users (for example, team members working separate time shifts).

You can expand an individual entry by clicking the + button. You can add a note by double-clicking Notes, entering the text, and clicking Save.

**Resolutions Tab**

The Resolutions tab displays all resolution notes from related applications and tiers. You can add to or edit the notes by clicking the Manage Resolutions icon. You can also add and edit notes on the Application Detail or Tier Detail page.

As the resources can be part of multiple applications or tiers, you can filter the resolution notes by selecting the desired Application or Tier in those fields.
The Dynamic Dashboard

You can view the Dynamic Dashboard page from the pop-up window showing individual anomalies (You can display the anomaly pop-up from the Root Cause widget, the Root Cause pane of the Alert Summary or Cross-Silo Analysis page, or from the Timeline pane of the Alert Detail page.

The Dynamic Dashboard is divided into three panes:

- **Info** – Shows information about the anomaly you displayed the dashboard for: the resource the alert was for, the symptom itself (the metric name and what threshold was violated), the resource the symptom was on, and the time period for the anomaly.
- **Anomalies Detail** – Lists the individual anomalies which comprise the root cause symptom. Double-click a symptom (or select it and click Move to Graph) to graph it in the Metric Graph pane.
- **Metric Graph** – Shows metric graphs for the selected symptoms. It is the same as the Metric Graph widget. See “Metric Graph Widget” on page 100 for details about the widget display.

Responding to Alerts

How to respond to an vCenter Operations Enterprise alert depends on what type of alert it is and what kind of resource it is for. In general, predictive smart alerts — either early warnings or KPI predictions — call for faster action than other alert types. That is why these alerts are always rated as critical. Alerts for applications or tiers are generally more urgent than alerts for an individual resource, as their effects can be more widespread. “How to Respond to an Alert” on page 39 contains some suggested courses of action for various alert and resource types.

If your organization manages alert responses through vCenter Operations Enterprise, there are two advanced actions you may want to take with some alerts: claiming ownership, or suspending or suppressing. Taking ownership of an alert notifies other vCenter Operations Enterprise users that you are handling the situation, and they do not need to. Suspending or suppressing an alert signals that no action needs to be taken on it at the current time. Suspending or suppressing an alert also gives you ownership of it. See “Owning Alerts” on page 40 and “Suspending and Suppressing Alerts” on page 40.
How to Respond to an Alert

How to proceed after vCenter Operations Enterprise notifies you of an alert varies greatly depending on the alert's type, criticality level, and other characteristics, such as the type of resource it is for. The details of any process for resolving alerts will also depend on your organization's rules, procedures, and priorities. The flowchart on the next page gives some general procedures for dealing with alerts.

**NOTE** If you receive an administrative system alert, do not follow the steps below. Instead, see the procedures in the System Alerts appendix of the vCenter Operations Enterprise Installation and Administration Guide.

**Figure 3-1. Flow Chart Diagram for Resolving Alerts**

- Examine **REASON** section
- Is it about App/Tier/Container? Yes → Identify the owner of the App/Tier/Container on which the alert occurred
  - Is it about KPI? Yes → Identify the SLA associated with the KPI
    - Examine the **IMPACT** section
      - Are there KPI's breaching? Yes → Identify the SLA's associated with the KPI's
    - Examine the **ROOT CAUSE** section
      - Does it have multiple tiers? Yes → Examine the 1st Tier and identify its owner. Pick all Tier metrics with >=50% probability
        - Identify Resource owner. Pick all metrics with >=50% probability
          - **Problem resolution hand-off**
            - Notify the owner identified from the **ROOT CAUSE** section
            - Provide highest probability abnormal metrics from the **ROOT CAUSE** section
            - Provide URL of alert summary page
            - If predictive alert, provide due time and probability from **REASON** section
          - **Problem notification for interested parties**
            - Notify the owner identified from the **REASON** section
            - Provides SLA and KPI breach information
            - If requested provide URL of alert summary page
            - Provide name of who the problem resolution was handed to
Owning Alerts

You can take ownership of any listed alert. Owning an alert means you have acknowledged the alert is yours. This can reduce overlap when multiple operators manage alerts. When an alert is owned, it shows as **Assigned** in the **Control State** column of the alert list, and the owner’s user name is in the **User Name** column. Only the owner can suspend or suppress an owned alert.

**To take ownership of one or more alerts**

1. In the list on the Alerts Overview page or the Alerts widget, select the alert(s). To select multiple alerts, hold down the CTRL key while clicking, or hold down SHIFT to select a range.
2. Click the **Take Ownership** icon.
3. Click **Yes**.
4. In the alert list, the **Control State** for the alert(s) will show **Assigned**.

**To release ownership of one or more alerts**

1. In the list on the Alerts Overview page or the Alerts widget, select the alert(s). To select multiple alerts, hold down the CTRL key while clicking, or hold down SHIFT to select a range.
2. Click the **Release Ownership** icon.
3. Click **Yes**.
4. In the alert list, the **Control State** for the alert(s) will show **Open**.

To include only owned alerts in the list on the Alerts Overview page, click the **Assigned Alerts** icon.

To include only your own alerts in the list on the Alerts Overview page, click the **Own Alerts** icon.

To include only unowned alerts in the list on the Alerts Overview page, click the **Open Alerts** icon.

**NOTE** You can also take or release ownership of a single alert by clicking the appropriate icon on its Alert Details page.

Suspending and Suppressing Alerts

vCenter Operations Enterprise allows you to suspend or suppress an active alert for a period of time you define. If the problem condition remains after time has elapsed, vCenter Operations Enterprise reactivates the alert. You can suspend an alert for a specific number of minutes or suppress one for a specific number of days.

Suspending or suppressing an alert does not cancel its cancel cycle; the alert is still cancelled according to the cancel cycle value set when the resource or application was configured.

When you suspend or suppress an alert you take ownership of it, as described in the previous section. You cannot suspend or suppress an alert owned by another user.

**To suspend one or more alerts**

1. In the list on the Alerts Overview page or the Alerts widget, select the alert(s). To select multiple alerts, hold down the CTRL key while clicking, or hold down SHIFT to select a range.
2. Click the **Suspend** icon.
3. Enter the number of minutes to suspend the alert(s).
4. The **Control State** for the alert(s) will change to **Suspended**.

To view the alerts you suspended, click the **Suspended Alerts** icon.
**To suppress one or more alerts**

1. In the list on the Alerts Overview page or the Alerts widget, select the alert(s). To select multiple alerts, hold down the CTRL key while clicking, or hold down SHIFT to select a range.

2. Click **Troubleshoot** to open the Alert Detail page.

3. Click the **Suppress** icon.

4. Enter the number of days to suppress the alert(s).

5. The **Control State** for the alert(s) will change to **Suppressed**.

To view the alerts you suppressed, click the **Suppressed Alerts** icon.

---

**NOTE** You can also suspend or suppress a single alert by clicking the appropriate icon on its Alert Details page.

You can also return a suspended or suppressed alert to an open state. To do so:

1. In the list on the Alerts Overview page or the Alerts widget, select the alert(s). To select multiple alerts, hold down the CTRL key while clicking, or hold down SHIFT to select a range.

2. Click the **Release Ownership** icon.

3. Click **Yes**.

4. In the alert list, the **Control State** for the alert(s) will show **Open**.
This section describe how to view detailed information about any vCenter Operations Enterprise resource or application. It contains the following topics:

- “Introduction to Viewing Resources and Applications” on page 43
- “Viewing Resource Information” on page 43
- “Viewing Application Information” on page 47
- “The Resource Detail Page” on page 48

Introduction to Viewing Resources and Applications

As discussed in “Resources” on page 12, a resource is any entity in your environment for which vCenter Operations Enterprise can collect data and an application is a collection of related resources which gives you the ability to combine, track, and analyze metrics for these related resources over a period of time.

The various widgets, reports, and alerts, discussed elsewhere in this manual, show certain types of information about all or selected resources or applications. This chapter describes two specific vCenter Operations Enterprise pages, the Environment Overview page and the Application Overview page, which can list resources or applications and let you see details about them.

vCenter Operations Enterprise administrators use these two pages to create and maintain the resources and applications. Those aspects of these features are described in the vCenter Operations Enterprise Installation and Administration Guide.

Viewing Resource Information

In vCenter Operations Enterprise, you can easily view a list of all resources in your environment, and select any resource to see detailed information about it.
The Resource List

To see a list of vCenter Operations Enterprise resources, select Environment Overview from the Environment menu. The Environment Overview page appears.

The left pane displays all resource tags. As described in “Resource Tags” on page 12, tags make it easier to categorize and select resources. The number of resources associated with each tag value is shown beside it. vCenter Operations Enterprise administrators create and maintain resource tags.

The right pane displays the list of resources. If no tag value is selected, it shows all resources. You can limit the resources in the list by selecting one or more tag values. When you select tag values, vCenter Operations Enterprise follows these rules:

- If you select more than one value for the same tag, the list includes resources that have either value.
- If you select values for two or more different tags, the list includes only resources that have all the selected values.

For example, if you select two values of the GEO Location tag, such as New York and London, it shows resources with either value. If you also select the Tier value of the Resource Kind tag, only tiers which are in New York or London are listed. Tiers in other locations are not, and neither are resources in those cities which are not tiers.

You can also “negatively select” the resources to show. If you click the Invert Result icon, the list will include resources which do not match the tag values you’ve selected. For example, if you select New York and London, then click Invert Result, you will see all resources that are not in either of those cities.

For each resource, the list can show the name, description, current health score, resource kind, and much more. To improve performance, it shows the list a page at a time. You can select the number of resources to show per page (from 50 to 1000) in the Resources per Page field.

Administrators can add, edit and delete resources from this page, as described in the vCenter Operations Enterprise Installation and Administration Guide.

Columns in the Resource List Pane

By default, the Resource List Pane includes these columns:

Table 4-1. Resource List Pane Default Columns

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name of the resource.</td>
</tr>
<tr>
<td>Health</td>
<td>The current health score for the resource. Health is described on page 15.</td>
</tr>
<tr>
<td>Resource Kind</td>
<td>The type of resource it is.</td>
</tr>
</tbody>
</table>
Table 4-1. Resource List Pane Default Columns (Continued)

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
</table>
| Collection State | Whether vCenter Operations Enterprise is supposed to be collecting values for the resource. This may be:  
- Collecting – Resource is set to collect data.  
- Not Collecting – Resource is set not to collect data.  
- Starting – Collection is in the process of starting.  
- Stopping – Collection is in the process of stopping.  
- Updating – Resource is being updated (for example, monitoring interval is changing).  
- Failed – Problem with resource configuration (for example, adapter instance may have been deleted).  
- In Maintenance – Resource is in scheduled maintenance.  
- In Maintenance (Manual) – Resource is in manual maintenance.  
- Removing – Resource is in the process of being deleted. |
| Collection Status| Whether vCenter Operations Enterprise is actually receiving values for the resource. There will be a status only if the Collection State is Collecting. This status may be:  
- Data Receiving – Data is being received for resource.  
- Old Data Receiving – There is data for this resource, but it is not current. The most recent value is at least five monitoring cycles old.  
- No Data Receiving – The adapter instance is collecting data, but no data has been received for this resource.  
- None – vCenter Operations Enterprise was just started or collection was just started for the resource, and there has not yet been an attempt to collect data.  
- Error – There was an error when trying to collect data.  
- Unknown – Adapter instance cannot connect to the resource, so status us unknown.  
- Resource Down – Resource is down. Some adapter types can report that the resource is known to be down.  
- No parent resource monitoring – The adapter instance resource used for this resource is stopped.  
- Collector down – The vCenter Operations Enterprise collector or the adapter instance used for this resource is down.  
- Other – Some adapters may write a customized status and message in some circumstances. This is usually done to give more information if there is a problem receiving data. |
| Data Source      | The type(s) of adapters collecting information for this resource and its children. Hover the mouse pointer over an icon to see the adapter type.                                                                                                                                                                                                                                                                            |
| Identifier 1 through 3 | Additional unique identifiers, if any, for the resource. These entries vary depending on the adapter type used for the resource.                                                                                                                                                                                                                                                                                                                                 |
| Description      | The resource description.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Attribute Package| The attribute package (group of metrics) being collected for the resource. This is set by an administrator.                                                                                                                                                                                                                                                                                                                                                                           |
| Creation Time    | When the resource was added to vCenter Operations Enterprise,                                                                                                                                                                                                                                                                                                                                                                                                               |
| Maintenance Schedule | When the resource is down for scheduled maintenance.                                                                                                                                                                                                                                                                                                                                                                                                                           |
You can add these columns to the list by following the procedure in “Customizing the Resource List” on page 46:

<table>
<thead>
<tr>
<th>Table 4-2. Resource List Pane Optional Columns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Column</strong></td>
</tr>
<tr>
<td>ID</td>
</tr>
<tr>
<td>Identifiers 4 and 5</td>
</tr>
<tr>
<td>Resource Flag</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Customizing the Resource List**

You can modify the information shown for each resource in the **List** tab page of the Environment Overview page. You can change the columns shown, their width, their order, and what column the list is sorted by.

**NOTE** Any changes you make to the list affect all vCenter Operations Enterprise users.

**To change the columns shown**

1. Put the mouse pointer over the right side of any column heading. A down arrow appears when the pointer is in the right place.
2. Click the down arrow. The column menu opens.
3. Click **Columns**. This lists all possible columns, with the currently displayed columns checked.
4. Click each column to add to the display; to remove a column, click it so its box is no longer checked.
5. When you’ve made all your selections, click outside the column list.

To change the column order, drag the heading of the column you want to move to the location you want.

To change column width, put the mouse pointer over the right edge of the column header. When the mouse pointer changes to a vertical bar with two horizontal arrows, drag the column edge to the new width.

**To change the sort order of the list**

1. Put the mouse pointer over the right side of the column to sort by. A down arrow appears when the pointer is in the right place.
2. Click the down arrow. The column menu opens.
3. Select either **Sort Ascending** or **Sort Descending**.
Resource Details

To see detailed information for any resource

1. If desired, in the left pane, expand a tag and select a tag value assigned to the resource. This can greatly shorten the resource list and make it easier to find the resource you want.

2. Select the resource in the list on the right.

3. Click the Show Detail icon. This displays the Resource Detail page for the resource. See “The Resource Detail Page” on page 48.

Resource Health Overview

To see a quick graphical representation of the health of all the resources for a specific tag value

1. In the left pane, expand the tag and select the tag value you want to see information for.

2. In the right pane, select the Group tab. The Group tab shows a colored icon representing the current health of each resource for the selected tag value.

3. To see the health icons for any time in the past six hours (in five minute increments), move the slider at the bottom of the tab to the left.

4. To see what resource any icon is for, hover the mouse pointer over it.

5. To see detailed information for a resource, click its icon, then click the Show Detail icon. This displays the Resource Detail page for the resource. See “The Resource Detail Page” on page 48.

Health scores are discussed in “Health” on page 15.

Viewing Application Information

In vCenter Operations Enterprise, you can easily view a list of all defined applications, then select a single application to see detailed information about it and its component tiers and resources.

The Application List

To view a list of vCenter Operations Enterprise applications, select Applications Overview from the Environment menu. The Application Overview page appears.

The left pane displays all configured application tags. Application tags make it easier to categorize and manage applications. The number of applications associated with each tag value is shown beside it. vCenter Operations Enterprise administrators create and maintain application tags.

The right pane displays the list of applications. If no application tag is selected, it shows all applications; if you select an application tag, then a tag value, it shows only applications with that tag value. By default, for each application, vCenter Operations Enterprise shows a graph of application health over the last six hours, the current health score, icons indicating the health of each tier, and the number of active alerts, by type.
Administrators can add, edit and delete applications here, as described in the *vCenter Operations Enterprise Installation and Administration Guide*.

**Application Details**

To see details about an application, double-click it in the list to open the Resource Detail page for the application. See “The Resource Detail Page” on page 48.

**The Resource Detail Page**

You can view the Resource Detail page for a resource by clicking the Show Detail icon from the Environment Overview page, or for a tier or resource from the Application Detail page. The Resource Detail page shows you information about the current state of the resource, its metrics, and its place in the resource tree. Because issues on the resource may be related to or caused by behavior on related resources, you can also display details about its children or parent resources from this page, as described below.

The Resource Detail page is divided into five panes:

- **Health Status** – Shows the health graph and current health score for the resource. To see the exact health score from any time shown on the graph, hover the mouse pointer over that time. If the resource has children, it also shows the number of immediate child resources, and the total number of metrics for the resource and its children.

  Hover the mouse pointer over the **More** icon to see its collector, adapter kind and instance, collection interval, resource kind, attribute package, and creation time.

- **Root Cause Ranking**—Shows the root causes of any current health degradation for the resource, ordered by container resource and symptom group. Double-click a symptom group to list the specific resources showing that symptom. You can then double-click a specific symptom resource to open a pop-up window showing details about the specific threshold violations.
**Metric Selector**—Lists the metric groups for the resource currently selected in the **Health Tree** pane. (The resource currently being shown is given in the title bar of the pane.) Expand a metric group to see the individual metrics. To see the graph for a metric in the **Metric Graphs** pane, double-click it or select it and click the **Move to Graph** icon. You can graph as many metrics as desired.

To see only metrics for which data is being collected for the selected resource, click the **Show Metrics Collecting** icon. If you do not click this icon, the list shows all defined metrics that have ever been collected for the resource.

**Health Tree**—Shows the section of the health tree around the resource, both its parents and children. You have these choices in this pane:

- Select a resource to list its metrics in the **Metric Selector** pane.
- Double-click a resource to center the **Health Tree** pane around it and list its metrics in the **Metric Selector** pane.
- Select a resource and click the **Show Detail** icon to show its Resource Detail page.
- Select a resource and click the **Show Alerts** icon to list any current alerts for it.

**Metric Graph**—Shows graphs for the selected metrics. It is the same as the Metric Graph widget. See “**Metric Graph Widget**” on page 100 for details about the widget display.

---

**NOTE** If you leave the Resource Detail page and return to it for the same resource during the same vCenter Operations Enterprise session, it will show the graphs you had previously selected.
This section covers the features available through the Forensics menu of vCenter Operations Enterprise. It contains the following topics:

- “Introduction” on page 51
- “Cross-Silo Analysis” on page 51
- “Top-N Analysis” on page 54
- “Fingerprints” on page 56
- “Capacity Analysis” on page 60

Introduction

The three features available from the Forensics menu offer you different ways of looking at the data vCenter Operations Enterprise has collected:

- Cross-Silo Analysis lets you compare the number of anomalies for a selected time period on various resources from anywhere in the enterprise.
- Top-N Analysis shows you the top- or bottom-performing resources, metrics, or alerts in the category you select.
- Problem Fingerprint Library shows the captured problem fingerprints—patterns of metric values vCenter Operations Enterprise has determined may lead to future problems—and lets you drill-down to see details of any one.
- Capacity Analysis predicts when a selected metric is likely to reach a value you set.

Cross-Silo Analysis

The Cross-Silo Analysis page shows the number of anomalies over time for any resources you select. It includes all anomalies for all metrics defined for the resources. You can select more than one resource to compare multiple resources from anywhere in your enterprise.

You can zoom the graph to focus on any desired period of time, such as just before a particular alert was issued. You can see a ranking of the likely root causes for the abnormalities at any given time. For applications, the analysis also includes a line showing the internally determined 90% probability threshold. If the number of anomalies exceeds this threshold, vCenter Operations Enterprise generates an early warning Smart Alert, as there is a strong probability that there is a problem with the application.

You can see this analysis only on the Cross-Silo Analysis page and when creating a manual fingerprint; it does not appear on any widget, and so cannot be shown on a dashboard. Because cross-silo analysis is used to analyze past behavior rather than monitor current conditions, there is generally no need to have it available on a dashboard.
The page is divided into four interacting panes:

- At the top left is a list of resources tags, where you select the resource to display.
- The top-center pane shows a Health Tree widget centered on the resource you selected.
- The bottom pane shows anomaly count graphs for any resources you select in the Health Tree.
- The top right displays the root causes ranking for a selected graph and time.

**NOTE** The graph shown when creating a manual fingerprint does not have all the features of the Cross-Silo Analysis page. See “Manually Capturing a Problem Fingerprint” on page 59 for instructions on creating a manual fingerprint.

### Using Cross-Silo Analysis

**To display information on the Cross-Silo Analysis page**

1. From the Forensics menu, select **Cross-Silo Analysis**.

2. In the top-left pane, select the desired resource. To find the resource, you can:
   - Search for it by typing all or part of the name in the **Search** field and clicking the **Search** icon.
   - Sort the list by any column: Hover the pointer over the right side of the desired column header, click the arrow that appears, and select **Sort Ascending** or **Sort Descending**.

Once you have found the resource, click it to display its section of the Health Tree.

**NOTE** You can add or remove columns from the resource list by hovering the pointer over the right side of the a column header, clicking the arrow that appears, and selecting **Columns**. Check the boxes for any columns to add or clear the boxes for any columns to remove.

3. In the Health Tree (top-center pane), click any resource to display its anomaly graph in the bottom pane. You can click multiple resources; each graph is added to the pane. You can also double-click a resource to both display its graph and center the Health Tree on it.

You can also use the icons on the pane’s toolbar:

- **Zoom to fit** – Changes the size of the displayed resource icons for the best possible fit in the widget.
- **Pan** – Click this button, then click and drag the hierarchy to see different parts of it.
- **Image Map Tooltip** – If Pan or **Zoom the view** is selected, select this icon to leave that mode and return to showing a resource's name and current health when you hover the mouse pointer over it.
- **Zoom the view** – Click this icon, then drag to outline a part of the displayed hierarchy. The display zooms to show just the outlined section.
- **Zoom in** – Zooms in on the hierarchy display.
- **Zoom out** – Zooms out on the hierarchy display.
- **Reset to Initial Resource** – Returns the display to the resource you selected in the list and resets it to the initial display size.
- **Resource Detail** – To show the Resource Detail page for a resource, select it, then click this icon. See “The Resource Detail Page” on page 48 for a description of the Resource Detail page.
- **Show Alerts** – To see the alerts for a resource, select it in, then click this icon. This lists the alerts in a pop-up window. You can double-click an alert in the list to see its Alert Summary page, as described on page 32.
4 The bottom pane shows graphs of the number of anomalies for each resource selected in the Health Tree. A red line indicates the internally calculated “noise line”—the threshold which triggers an early warning Smart Alert when it is exceeded. (If early warning alerts are not enabled for a resource, the line is not shown.)

There are separate graphs for each selected resource. As you select new resources, their graphs are added at the bottom of the pane; you may need to scroll the list to see all the graphs.

Generally, you will be more interested in some times than in others—for example, in the time during or just before a particular alert. You can zoom the graph display, and more, using the icons in the toolbar at the top of the pane. They are:

- **Zoom by X** – When selected, zooming the graph affects the X axis. You can select both **Zoom by X** and **Zoom by Y** at the same time. **Zoom the View** must be selected for zooming to work.
- **Zoom by Y** – When selected, zooming the graph affects the Y axis. You can select both **Zoom by X** and **Zoom by Y** at the same time. **Zoom the View** must be selected for zooming to work.
- **Zoom to Fit** – Changes all graphs to show the entire time period and value range.
- **Zoom All** – When selected, zooming any one graph changes all displayed graphs.
- **Zoom the View** – When selected, dragging in a graph zooms the graph to show just the selected area. The exact behavior is determined by the **Zoom by X**, **Zoom by Y**, and **Zoom All** settings.
- **Pan** – When selected, dragging in the graph changes the time period shown; it does not zoom the graph.
- **Point Values** – Click this icon, then place the pointer over a graphed data point to see its time and exact value.
- **Auto-Refresh** – When selected, the graphs will refresh with new data every 15 seconds.
- **Date Controls** – Select the time period to show on the graphs. You can either select a period in the top box or enter a start date and time and end date and time in the fields beneath it.
- **Active Anomalies** – Click to show only active anomalies.
- **New Anomalies** – Click to show only new anomalies.
- **Normalize** – Click to normalize all graphs to a percentage scale.

You can also click the icons at the top right of any individual graph. They are:

- **Download** – Click to download the data making up the graph to a tab-separated data file.
- **Move** – Click the down arrow to move the graph down in the list or the up arrow to move it up.
- **Remove** – Click this icon to remove the graph from the list.
To show the root causes for the anomalies at any point on a graph, select **Point Values**, then click the point you want information for.

To show the root causes for a different point, click it. You can show root causes for only one point on one graph at a time.

The Root Cause pane is very similar to the Root Cause Ranking widget in symptom mode, which is described in “Root Cause Ranking Widget” on page 108. It shows the likely root cause container resources, ranked by the analytical algorithm on the container resource. You can:

- Double-click any resource to see the symptom groups, ranked by percentage of possible resources exhibiting symptoms in the group.
- Double-click any group to see the top five individual symptoms, ranked by percentage of possible resources exhibiting the symptom. A thin vertical bar in the horizontal bar for the symptom shows when that anomaly began. If the light bulb icon to the right appears lit, the symptom is still active.
- Double-click a symptom to open a pop-up window listing the individual anomalies that comprise it. You can then click the **Copy to Clipboard** button to copy the list to the clipboard.

For example, you might want to do this if you are opening a problem ticket for the alert, or sending an e-mail message about it. You can also display the Dynamic Dashboard for a resource by selecting an anomaly and clicking the Dynamic Dashboard icon. See “The Dynamic Dashboard” on page 38.

**Top-N Analysis**

The Top-N Analysis page shows you the top or bottom performers in one or more categories you select. It can show many types of information: the most or least healthy tiers in an application or resources in a tier, the most volatile KPIs, the top root cause metrics, and so on. It is very similar to the Top-N Analysis widget described on page 111, but offers more options.
To use the Top-N Analysis feature

1. From the Forensics menu, select Top-N Analysis. This opens the Top-N Analysis page.
2. Click the Configure icon. This opens the Configuration page.
3. On the Configuration page, select the time period to show data for: 30, 60, or 90 days.
4. Select the number of items to show in each list. Select 5, 10, or 15, or select User defined and type the number you want in the field to the right.
5. In the resource tree, select the resource to show data for.
6. Click Save.
7. The Resource Health pane at the top left shows the health of the selected resource for the time period. In the Tools area, check the box for each type of information you want to see. The information is shown in the right-hand pane.
To see details about any listed item, click it. What is displayed depends on the item type:

- For a resource, it shows the Resource Detail page. For details, see “The Resource Detail Page” on page 48.
- For a metric, it displays details about the resource the metric belongs to.
- For an alert, it displays details about the alert. See “Viewing Single Alerts” on page 32 for more information.

You can change the items to display or the configured resources or time period at any time.

### Fingerprints

vCenter Operations Enterprise can calculate and store fingerprints for applications. When a KPI for an application or a tier belonging to an application violates a threshold, vCenter Operations Enterprise examines the events leading up to the violation. If it finds enough related information (such as other anomalies), it captures the set of events which preceded and led up to the violation. This captured series of events is called a fingerprint. vCenter Operations Enterprise can then monitor events in the future, and, if it finds a similar series of events, issue a predictive alert warning that the KPI violation is likely to occur.

A fingerprint provides information for future detection and analysis of precursor events. More importantly, it equips event correlation to recognize when the problem is recurring in order to issue a KPI Prediction Smart Alert. The information obtained after the fingerprint was generated assists you in correcting the problem.

vCenter Operations Enterprise generates fingerprints only for applications. Whenever vCenter Operations Enterprise generates a fingerprint, it notes it in the system admin log.

**NOTE** The only type of attribute that can be assigned directly to a tier or application is a super metric. Therefore, vCenter Operations Enterprise will generate fingerprints only if you have super metrics assigned to a tier or application and marked as KPI. For information about creating super metrics and configuring them as KPI, see the *vCenter Operations Enterprise Installation and Administration Guide*.

### Viewing and Working With Fingerprints

You can manage all problem fingerprints, whether automatically generated by vCenter Operations Enterprise or created manually, via the Problem Fingerprint Library. To view the Problem Fingerprint Library, follow these steps:

1. In the Forensics menu select Problem Fingerprint Library. The Problem Fingerprint Library page appears.
2. Select an application from the drop-down list to display all active problem fingerprints for it. Each fingerprint is preceded by an icon indicating whether it is a KPI violation or a manually generated fingerprint and labeled with the tier and the metric and symptom causing the problem.
3. Expand the fingerprint to view the list of branches within the fingerprint. Each branch is a different set of precursors that led to the problem. The default name for the branch is “Precursor Set” and the fingerprint ID. This name is editable.
Select a fingerprint branch to display the precursor details. If there are multiple versions of the fingerprint, the most recent version is shown first.

Click the **Show Mature Fingerprints** icon to display only mature fingerprints. A fingerprint is mature when vCenter Operations Enterprise has learned enough about it that it can make predictions based on a similar pattern with over 50% probability.

Click the **Delete** icon to delete the selected fingerprint or branch.

Click the **Activate/Deactivate** icon to change the status of the selected fingerprint or branch. This button toggles between active and passive. Passive fingerprints will not generate fingerprint prediction alerts, and will not be updated. To activate a deactivated fingerprint, you must click **Activate/Deactivate**, then restart the Analytics service.

The right panel contains two tabs: **View/Manage** and **Create**. The **View/Manage** tab contains specific information about the fingerprint, including the following:

- **Reason** - An assumed condition that justifies the creation of a fingerprint. This is also the display name of the fingerprint branch. An example reason might be **App DT below Free Memory**.
- **Resolution** – Free-form text area where you can enter the solution to the problem.
- **History** – Shows all the versions of the precursor set, as vCenter Operations Enterprise learns over time. This always starts at the most recent version. Use the navigation buttons to view the next, previous, first, and last version. You can also type in its number to view a specific version.
- **Generated** – Date and time in which the specific version was generated.

The upper toolbar in the center of the window contains buttons for you to manage the fingerprint version.

- **Last Version** – Displays the last (most recent) fingerprint version.
- **Previous** – Displays the previous page (the next newest fingerprint version).
- **Version** – Displays the specific version out of the total number of versions.
- **Next** – Displays the next page (the next oldest fingerprint version).
- **First Version** – Displays the first (oldest) fingerprint version.
- **Refresh** – Refreshes the fingerprint symptoms.
- **Delete Version** – Deletes the current fingerprint version.
- **Activate/Deactivate Version** – Changes the status of the current fingerprint version. This button toggles between active and passive.

**NOTE** Because the more recent versions of a fingerprint are frequently more useful than older versions, the pages of the fingerprint display are numbered in reverse version order. (Page 1 is the most recent version; higher page numbers are older versions.) The Previous and Next buttons refer to pages, not versions, so their results may be different than you expect at first.

You can view fingerprint information in three formats. Each format shows information about the symptoms preceding the fingerprint which caused the fingerprint to be captured, shown on a time line leading up to the fingerprint capture time. Use the lower toolbar in the center of the window to switch between the different modes.

- **Display in Grid** – This mode provides a numerical view of each symptom in relation to the fingerprint. Each symptom includes the tier, the attribute, the reason for the symptom and the correlation weights as a numeric value.

![Grid View](image)

- **Display By Importance** – This is the default mode when viewing a fingerprint. It gives a graphical view of each symptom in relation to the fingerprint.

![Importance View](image)
Each row of the Display By Importance list shows one symptom. The columns show:

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>Describes the symptom: its tier, the violation type, and the KPI metric showing the violation. In the screenshot above, the first symptom listed is App DT abnormal Reports/Branch Transactions. This indicates that the symptom is in the App tier, the violation is an abnormal behavior, and the metric is Reports/Branch Transactions. The tier component indicates that the symptom is occurring somewhere in this tier—it may be occurring on one resource in the tier or across multiple resources. In the example, all of the web servers in the tier are violating this threshold.</td>
</tr>
<tr>
<td>Weight</td>
<td>How closely this symptom is correlated to the end failure. This value is calculated by comparing the number of resources showing the symptom to the total number of resources in the tier. Possible values are from .001 to .999, indicating the approximate percentage probability that the symptom is related to the problem. In this example, the Reports/Branch Transactions symptom weight is .08, meaning there is a 8% probability that it is correlated with the end problem/failure.</td>
</tr>
<tr>
<td>% Corr</td>
<td>Percent correlation. This value denotes how closely correlated this symptom is to the end failure.</td>
</tr>
<tr>
<td>15-minute intervals</td>
<td>15-minute time intervals in which the symptom occurred. A gray bubble in an interval column indicates that the symptom was occurring during that interval. The size of the bubble reflects how closely the symptom correlates to the end failure/problem during that interval. If there is no gray dot in that interval, the symptom was not occurring at that time. An orange circle identifies the time interval in which the metric value is the closest match to the historical fingerprint in the fingerprint library.</td>
</tr>
</tbody>
</table>

**Display By Tier** – This mode displays a number of circles, color coded by application tier. The circles are placed above or below the horizontal line depending on whether the tier is above or below the threshold. The size of the circle determines the correlation weight of the tier. Mouse over the circle to view the symptom and the number of resources experiencing this symptom.

![Diagram showing Display By Tier](image)

**Manually Capturing a Problem Fingerprint**

Manually generated problem fingerprints let you define the conditions for a fingerprint to be generated the moment a violation occurs. vCenter Operations Enterprise generates a fingerprint when it finds a KPI violation and a required number of precursors in an application.

**To manually capture a problem fingerprint**

1. In the Forensics menu select **Problem Fingerprint Library**. The Problem Fingerprint Library page appears.
2. Select the application to create the fingerprint for.
3. In the right panel, click the **Create** tab. An anomaly chart showing the number of anomalies in the application appears.
4 In the drop-down field, select the time period of the chart. The default value is Last 24 Hours.

5 In the Select Tier field, choose the tier of the application to capture.

6 Click the chart to choose the date and time of the manual fingerprint capture. You can also select a specific date and time using the date and time fields.

7 A time cut is the number of intervals to go back to capture alert patterns for fingerprints. Set the time cut by choosing the Select Intervals Count and Select Interval Duration (in minutes).

Enter the reason for the manual fingerprint generation attempt under the Enter Reason field. Click Generate Manual Fingerprint to display the results of the fingerprint capture attempt. This includes the outcome of the attempt, as well as further details of the number of symptoms found during that time period.

Capacity Analysis

The capacity analysis uses the performance history of a metric you select to predict its future growth, and when it is likely to reach a limit you set. You can use this to help plan when to perform infrastructure upgrades, such as adding disk storage to a server or increasing your network capacity. Capacity analysis works best and is most useful with metrics that tend to show long-term trends in one direction, such as disk space usage or network traffic.

To perform a capacity analysis, you select the metric to use (for example, PctUsedDiskSpace) and the limiting value you are interested in knowing about (such as 95% full). vCenter Operations Enterprise looks at the past and current performance of the metric. Its analytics algorithms determine the various cycles in the metric’s values (daily, weekly, monthly, or other) and use them to extrapolate the metric’s likely future performance. vCenter Operations Enterprise displays when the metric is likely to exceed the value you set, how predictable the metric is (higher predictability indicates a higher signal-to-noise ratio), and other information about its behavior.

To display a capacity analysis for a metric

1 From the Forensics menu select Capacity Analysis. The Capacity Analysis page appears.

2 If you have previously saved one or more analysis configuration, you can either:
   - Display the analysis for a saved configuration by selecting it in the Configurations field and clicking Forecast This! Skip to Step 9.
   - Click the thin bar at the top of the page to display the Resources-Tags and Metrics panes so you can make new selections.

3 Select the resource containing the metric in the List pane at the top-center of the page. You can filter the resource list by selecting one or more tag values in the list on the left. If you select more than one tag value, vCenter Operations Enterprise follows these rules:
   - If you select more than one value for the same tag, the list includes resources that have either value.
   - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the Invert Result icon, the list will include resources which do not match the selected tag values.

4 The attribute groups for the selected resource appear in the Metric pane at the top right. To select the metric to show:
   a If you want to list only KPI metrics, click the KPI Metrics icon.
   b To find a particular metric group, metric instance, or metric, you can type all or part of its name in the Search field, select the type of value you are searching for, and click the Search icon.
c Expand the group containing the desired metric.

d Double-click the metric. The performance information for the metric appears in the center pane.

5 Set the value limit (either high or low) you want vCenter Operations Enterprise to predict for:

a The graph’s range depends on the past performance of the metric. You can change the range shown by typing the minimum and maximum values to show in Y-max and Y-min, then clicking the arrow to the right of the field.

b Click the icon indicating whether you will be entering an upper or lower threshold.

c Type the limit value in the Threshold field or use the mouse to drag the slider at the left of the graph to the desired limit value.

6 In Probability, enter the percentage of metric values that must be out of threshold within a 24-hour period before it is considered a breach.

7 In Show Forecast, select the time period to see the forecast for.
Click **Forecast This!** The capacity analysis predictions appear in the **Analysis Results** pane.

The **Analysis Results** include:

- The amount of time until the metric is predicted to breach the limit you’ve set and the date and time it is predicted to occur.

- The predictability of the metric’s behavior, expressed as a decimal between 0 and 1. Higher values indicate more predictable behavior, and therefore more certainty in the predicted breach time.

- If the analytics mechanisms have detected a correlation between the behavior of the selected metric and another metric, the degree of the correlation. Click the value to open a pop-up window showing the correlated metrics, including the resource, the metric name, and the percentage of correlation. You can also display a column showing the type of correlation, either **Anomaly** (the metrics’ anomalies are correlated) or **Behavior** (the metrics’ behavior is correlated).

- The predicted minimum and maximum values within the forecast period, and when they are expected to occur.

  **NOTE** You can hide any of the fields at the top of the **Analysis Results** pane. Move the mouse pointer over the right side of a column header and click the arrow that appears. Select **Columns**, then clear the boxes for the fields you don’t want to see, or check the box for any field to add to the display.

- A metric graph showing recent behavior and the predicted behavior for the forecast period. The graph includes a line showing the most likely predicted value, with a shaded area around it showing the confidence bound of the prediction.

- A graph showing the calculated cycles in the metric’s behavior. Captions beneath the graph give the period and relative strength of each cycle. Click **All Cycles** to display a pop-up window with information on the cycles.

  **NOTE** Depending on your screen resolution, you may need to collapse the **Resources-Tags** and **Metrics** panes (click the thin bar at the top of the page) to display the cycle graph.
You now have these choices:

- To change any criteria, such as the forecast period or the limit value, make your change and click **Forecast This!** again.

- To save the current configuration so you can return to this set of criteria later to see if the prediction has changed, click **Capture new**, then type a name for the configuration and click **OK**. Only you can use configurations you have saved.

- To update an existing configuration with the current settings, select it in the **Configurations** list, then click **Update selected configuration**.

- To delete an existing configuration, select it in the **Configurations** list, click **Delete selected**, then click **Yes**.

- To save the forecast data in one of three formats, click one of the icons at the top right of the metric graph: **Save a snapshot**, **Save a full-screen snapshot**, or **Download tab separated data**. You will be able to select the file name and folder to save to.
This section discusses the various ways you can select the information vCenter Operations Enterprise shows you and how it is presented. It contains the following topics:

- “Introduction to Widgets and Dashboards” on page 65
- “Working with Dashboards” on page 66
- “Working with Widgets” on page 72
- “Modifying User Preferences” on page 78

Introduction to Widgets and Dashboards

You can see the information vCenter Operations Enterprise tracks and compiles for you by displaying one or more widgets. Each vCenter Operations Enterprise widget contains a collection of related information about configured attributes, resources, applications, or the overall processes of your environment. You can customize each widget to show the information you are interested in, selecting the resources to display, the time period it covers, and so on.

You choose the widgets to see by adding them to dashboards. Each dashboard contains one or more widgets. At the dashboard level, you select whether the widgets are arranged in one, two, or three columns, the column widths, and whether any of the widgets on it interact with one another—for example, selecting a resource in one widget may change the information shown in another.

Each dashboard has a name, which appears on its tab. The tabs for all the dashboards you can view appear near the top of the vCenter Operations Enterprise window, just beneath the menus. You select the dashboard to view by clicking its tab. You can view only one dashboard at a time.
The screenshot below illustrates the vCenter Operations Enterprise window, with its widgets, dashboards, and tabs.

When you first log on to vCenter Operations Enterprise, the dashboards you can see are determined by the user group you belong to. For example, users in the Administrators group see only the vCenter Operations Enterprise Admin dashboard by default. Other groups will see other dashboards, as defined for your installation.

If you have the necessary permissions, you can create new dashboards. While you can put any widget on any dashboard, in general, each dashboard will contain widgets showing related information—different views of the performance of a particular group of resources, similar alerts for separate applications, and so on. Each new dashboard has a new tab with its name and is added to the list on the Dashboards menu.

The following sections describe how you can create and modify dashboards and how to work with widgets.

**Working with Dashboards**

**NOTE** You can only create or edit dashboards if you have permission to do so. If you cannot use any of the features discussed here, contact your administrator.

A dashboard contains one or more widgets, with each widget showing a different view of the information vCenter Operations Enterprise has collected and analyzed. To create a dashboard, you either select a dashboard template to use or define the widgets it contains and how they are arranged. You can display the dashboard you create either by clicking its tab or through the Dashboards menu.

Dashboards have one, two, or three columns. You can change the column width to fit the widgets on the dashboard. When you place a widget on a dashboard, it automatically aligns itself within the column where you put it.
You can set the tab order for the dashboards on your Home page. You can also set any dashboard to switch to another after a set amount of time. For example, if vCenter Operations Enterprise is displayed on a console in the Network Operations Center, this would allow someone there to keep an eye on different aspects of the enterprise.

You can share any of your dashboards with other user groups.

The following sections describe how to create, edit, re-order, share, and delete dashboards, enable automatic dashboard switching, and create and delete templates.

Creating a New Dashboard

1. Click the Home menu. Your Home page appears.

2. To the right of the last listed tab, click the plus symbol. The Dashboard Editing: Create a Tab page appears.

   ![Dashboard Editing: Create a Tab](image)

   The left side of the page shows the existing dashboard templates. (For information on adding, modifying, and deleting templates, see “Dashboard Templates” on page 71). The default templates you see depend on the user group you belong to.

3. To base the dashboard on a template:
   - Drag the template to use to the right side of the window.
   - If desired, change the dashboard name in the Tab Name field.

4. To start with a blank dashboard:
   - Click the Create Dashboard Using Widgets icon at the top left of the window.
   - Type the name for the dashboard in the Tab Name field.
   - In Column Count, select the number of columns to use.
   - Drag each widget you want on the new dashboard from the left pane to the right pane. Place them in the order you want them to appear. The right pane does not necessarily show the widgets as they will appear in the dashboard.
   - To change the size of the columns, drag the divider bar(s) under Drag to Change Layout.
5 To make the new dashboard your default, select Yes in the Mark as Default field.

6 Click OK to create the new dashboard or Cancel to cancel your changes. If you choose OK, the Home page is refreshed to include your changes.

If you used a template to create the new dashboard, and you want to change the layout or the widgets it includes, see “Editing a Dashboard” on page 68.

Cloning a Dashboard

To make a copy of an existing dashboard

1 Click the Home menu. The Home page appears.

2 Click the tab of the dashboard to copy.

3 In the Dashboard Tools bar, click Clone. The Clone Tab dialog box appears.

4 Enter the name to give the copied dashboard.

5 Click OK. The newly-cloned tab appears on the Home page.

6 Click the tab for the newly cloned dashboard. All widgets that appear in the original dashboard also appear in the cloned dashboard. You can now edit the new dashboard as desired.

Editing a Dashboard

You can make two kinds of changes to a dashboard directly on the dashboard display:

- You can remove a widget from the dashboard, as described in “Removing a Widget” on page 74.
- You can move a widget by dragging its title bar to the desired location.

For any other changes, you must edit the dashboard. To edit an existing dashboard, follow these steps:

1 Click the Home menu. The Home page appears.

2 Click the tab of the dashboard to edit.

3 In the Dashboard Tools bar, click Edit. The Dashboard Editing: Edit a Tab page appears.

4 The left pane displays all available widgets (for a complete list of available widgets, see “Available Widgets” on page 80). Drag and drop each widget you want on this dashboard to the right-hand pane of the page.
5 If desired, at the top of the right-hand pane, change the Tab Name.
6 If you want this dashboard to be your default, click Yes.
7 To change the number of columns, select 1, 2, or 3 in Column Count.
8 To change the size of the columns, drag the divider bar(s) under Drag to Change Layout.
9 To remove a widget from the dashboard, click the Delete Widget icon in its upper right corner.
10 When you have finished your modifications, click OK. Your Home page appears with your updated dashboard.

Changing Dashboard Order

When you create a new dashboard, its tab is added to the right of the other dashboard tabs on your Home page. You can move the new tab, or change the order of any existing dashboard tabs, by following these steps:

1 From the Dashboards menu, select Reorder Tabs. This opens the Reorder Tabs window.
2 Your dashboard tabs are listed on the left. To change the order, drag each tab to the location you want.
3 Click OK.

Setting Up Automatic Dashboard Switching

If you have different dashboards defined to display various aspects of your enterprise's performance, you may want to look at each of them in turn. You can have vCenter Operations Enterprise switch from one dashboard display to another automatically. For each dashboard, you can select if you want it to switch to another, how long it should wait before doing so, and what dashboard it should switch to. To do so:

1 From the Dashboards menu, select Reorder Tabs. This opens the Reorder Tabs window.
2 For each dashboard you want to have switch to another:
   a Select Switch Tab On.
   b In the field to the right, type the number of seconds this dashboard should stay displayed before switching to the next.
   c In the list at the far right, select the dashboard it should switch to.
3 Repeat step 2 for each dashboard that should switch to another automatically.
4 When you’re finished, click OK.
For example, the Reorder Tabs window shown below has the vCenter Operations Admin dashboard switch to the Manager dashboard after 30 seconds, the Manager dashboard switch to the Mashup dashboard after 60 seconds, and the Mashup dashboard switch back to the vCenter Operations Admin dashboard after 60 seconds. If you select any of these three dashboards, your Home page will cycle through all three on the set schedule. If you select the Metric Graph dashboard, it will stay displayed, as automatic switching is not defined for that tab.

Sharing Dashboards

When you share a dashboard, you add it to the Home page for all users in each group you share it with. They see the dashboard exactly as you define it. If you change the dashboard, by adding or deleting widgets or editing the widgets on it, it changes the shared dashboard for all users.

Users in the group you share a dashboard with cannot change the dashboard. They cannot add widgets to it or remove widgets from it, and the widgets on it do not have Edit buttons so they cannot modify their settings. They can only view the dashboard as you’ve defined it.

Dashboards you have shared with others and dashboards others have shared with you have special icons in their tabs:

- This icon indicates a dashboard you have shared with other user groups.
- This icon indicates a dashboard another user has shared with your group. You cannot edit a dashboard marked with this icon.

To share a dashboard

1. Display the dashboard you want to share.
2. In the Dashboard Tools bar, click Share to open the Share Dashboard window.
3 Click the dashboard in the **Shared Dashboards** list and drag it to the **Account Group** to share it with. The number under the **Dashboards Assigned** column for that group increases by one.

4 Repeat step 3 for each group you want to share the dashboard with.

**To stop sharing a dashboard**

1 Display the dashboard you no longer want to share.

2 In the **Dashboard Tools** bar, click **Share** to open the Share Dashboard window.

3 Click the dashboard in the **Shared Dashboards** list.

4 Click the **Stop Sharing Dashboard** icon.

This stops sharing the dashboard with all groups it is shared with. If you want to keep sharing the dashboard with some groups, you must stop sharing it, then reshare it with the desired groups.

### Deleting a Dashboard

**To delete a dashboard**

1 Click the Home menu. The Home page appears.

2 Click the tab of the dashboard to delete.

3 In the **Dashboard Tools** bar, click **Delete**. A dialog box asks you to confirm that you want to delete the tab.

4 Click **Yes**. The dashboard and its tab are deleted, and the change is reflected on your Home page.

### Dashboard Templates

Dashboard templates are designs you can base new dashboards on. vCenter Operations Enterprise contains several default templates; which ones are available to you depends on your user group. You can create new templates for your use and, if desired, assign them to other vCenter Operations Enterprise groups so other users can use them.

A dashboard template contains all of the information in the dashboard definition: the number and size of the columns, what widgets are displayed, where they appear, and the options chosen for each widget.

When you create a template, it is available to all users who can create dashboards.

**Adding a Dashboard Template**

**To add a new dashboard template**

1 Create the dashboard configuration to use as a template. You can do this by creating a new dashboard or modifying an existing one.

2 In the **Dashboard Tools** bar at the top of the dashboard, click **Create Template** to open the Create Template window. Enter the name of the new dashboard template.

3 You, and other users, can now use the new template to create new dashboards, as described in “Creating a New Dashboard” on page 67.

**Deleting a Dashboard Template**

**To delete an existing dashboard template**

1 To the right of the last listed tab on the Home page, click the plus symbol (+); the Add a Tab: Pick a Template page appears.

2 Click the **Manage Templates** link. The Manage Dashboard Templates window appears.
3 Select the dashboard template to remove and click the **Remove Selected Dashboard Template** icon.

4 A dialog box appears asking if you are sure you want to remove the dashboard. Click **Yes** to remove it.

**Working with Widgets**

Widgets are boxes which contain information about configured attributes, resources, applications, or the overall processes of the environment. The various types of widgets can provide a holistic, end-to-end view of the health of all applications in the enterprise.

You can customize widgets according to your needs. You can have as many widgets as necessary and can align them in one, two, or three columns on a dashboard. (The more widgets you add, the further you must scroll down in the browser window.) You can also rearrange the display of widgets by dragging them across the browser window to your preferred position.

Widgets can work in concert with one another. Choosing an item in one widget changes the way information is displayed in others if their functionalities are related.

You can set most widgets to update their data automatically at an interval you select. (The Metric Selector and Tag Selector widgets cannot be set to update automatically, and the Metric Weather Map always does.) You can also update the displayed information at any time by clicking the refresh icon at its bottom. If a widget has more than one page of information, you can advance to the next page by clicking the **Next** button, or go to the last page by clicking the **End** button. You can collapse a widget by clicking the icon located to the left of its name.

You can assign a unique name to each widget. Click **Edit** on the widget toolbar. On the edit screen, type your chosen widget name in the **Widget Title** text box and click **Save**.

**Changing a Widget’s Appearance**

The toolbar at the top right of each widget offers several ways for you to modify the widget’s appearance and behavior. You can:

- Edit the widget. You will probably do when first defining the widget for a particular dashboard, but only rarely afterward.
- Change the widget height
- Expand or collapse the widget
- Remove the widget from the dashboard

**NOTE** To change a widget’s appearance, you need the proper permissions. You may be able to perform some of these actions but not others. You may want to check with your administrator to see what actions your user name is allowed to perform.
**Editing a Widget**

**To edit a widget’s configuration**

1. On the widget’s toolbar, click the **Edit** icon. The Edit Widget window for that widget appears.

   ![Edit Widget Window](image)

   The Edit Widget window is different for each type of widget (Health Status, Alerts, and so on).

2. Make all desired changes. For details about the fields in each widget’s Edit window, see the section describing that widget type.

3. Click **OK**, or click **Close** to leave the settings as they were.

**Resizing a Widget**

All widgets contain controls to let you set the height of the widget. You cannot change the width of a widget; it depends on the width of the dashboard column it is in.

**To change a widget’s height**

- To make the widget larger, click the **Expand Widget** icon.
- To make the widget smaller, click the **Shrink Widget** icon.

Continue clicking either icon until the widget is the height you want.

**Expanding or Collapsing a Widget**

Collapsing a widget hides its data so just its title bar shows. Expanding a widget reverses this so you can see its full display.

To collapse a widget, click the **Expand/Collapse Widget** icon.

To expand a collapsed widget, click the **Expand/Collapse Widget** icon.

The icon arrow changes direction depending on the state of the widget.
Removing a Widget

To completely remove a widget from the dashboard, click the Close Widget icon. This does not just temporarily close the widget; it removes it from the dashboard definition. To add it back to this dashboard, you must edit the dashboard. See “Editing a Dashboard” on page 68.

Widget Interaction

Many widgets provide information only on selected resources or metrics. For example, the Metric Graph widget charts the values only for the metrics you choose. You can select the resources or metrics to show in these widgets in two ways:

- You can make the widget a self-provider and select the resources, resource tags, or metrics on the Edit page for it. How to do this is described in the individual widget type sections in Chapter 7.

- You can set up a widget interaction, so the widget shows information for the resources or metrics you select in one or more other widgets on the dashboard. This section describes this method.

When you set up a widget interaction, you specify the widget that will provide information to a receiving widget. For example, you can define the Metric Selector as the provider for the Metric Graph widget, which is then the receiving widget. These interactions apply only to the dashboard where you define them—on one dashboard, the Root Cause Ranking widget could receive its resources form the Health Widget widget; on another, it may be get them from the Tag Selector widget or be a self-provider.

For some widgets, you can define two providing widgets. To continue the example above, you could define the Root Cause Ranking widget as receiving data from both the Tag Selector and Health Status widgets. It would then show root cause data for any resource you select in the Health Status widget or the resources with the tag value you select in the Tag Selector.

To create or modify widget interactions

1. Click the Home menu. The Home page appears.
2. Click the tab of the dashboard containing the widgets you want to define interactions for.

The Receiving Widget column lists the widgets in the dashboard which can receive information from another widget in the dashboard. The Providing Widget column has either one or two list boxes for each Receiving Widget. If there are two list boxes, you can select one providing widget from each one. The possible providing widgets for each receiving widget are shown in Table 6-1, “Widget Interaction,” on page 75.
For each possible **Providing Widget** for each **Receiving Widget**, select either the desired widget name or **None**.

**NOTE**  If you select **None** for all possible providers for a receiving widget, that widget will not show any data unless it is set as a self-provider. You may want to edit the widget and make sure **Self Provider** is selected.

1. Click **OK**.

**Widget Interaction Chart**

The table below shows which widgets can provide data to each widget that can receive it. The widgets listed in Providing Widgets 1 can provide a resource ID to the receiving widget; the widgets listed in Providing Widgets 2 can provide a metric ID. If there are entries in both providing widget columns, you can select one providing widget from each column.

**Table 6-1. Widget Interaction**

<table>
<thead>
<tr>
<th>Receiving Widget</th>
<th>Providing Widgets 1</th>
<th>Providing Widgets 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Health Tree</td>
<td>Alerts</td>
<td>Application Overview</td>
</tr>
<tr>
<td></td>
<td>Generic Scoreboard</td>
<td>Tag Selector</td>
</tr>
<tr>
<td></td>
<td>Health Status</td>
<td></td>
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<td>Providing Widgets 2</td>
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<td>Mashup Charts</td>
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<td>Root Cause Ranking</td>
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<td>Metric Graph (Rolling View)</td>
<td>Advanced Health Tree</td>
<td>Alerts</td>
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<td>Generic Scoreboard</td>
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<td>Resources</td>
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<td></td>
<td>Root Cause Ranking</td>
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Table 6-1. Widget Interaction (Continued)

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<tr>
<th>Receiving Widget</th>
<th>Providing Widgets 1</th>
<th>Providing Widgets 2</th>
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<td>Metric Selector</td>
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<td>Alerts</td>
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<td>Resources</td>
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<td>Resources</td>
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<td>Root Cause Ranking</td>
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<tr>
<td>Metric Weather Map</td>
<td>None</td>
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<tr>
<td>Resources</td>
<td>Advanced Health Tree</td>
<td>Application Overview</td>
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<td>Tag Selector</td>
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<td>Alerts (see the note below)</td>
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<tr>
<td>Tag Selector</td>
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<tr>
<td>Top-N Analysis</td>
<td>Application Overview</td>
<td>Tag Selector</td>
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</table>

**NOTE**  For the Resources widget, the Alerts widget is in a separate provider category. If it is a provider, selecting one or more alerts displays the resources for those alerts. You can select it in addition to any providing widget selected from the other two categories.
Modifying User Preferences

Any user can manage two user preferences through the vCenter Operations Enterprise interface: the color scheme vCenter Operations Enterprise uses and whether to display times using the time zone where the user is located or where the vCenter Operations Enterprise server is located.

Changing User Preferences

To change preferences

1. Click the User Preferences link at the top of any vCenter Operations Enterprise page. The Manage User Account Settings window appears.

![Manage User Account Settings](image)

2. In the Scheme field, select the light or dark display scheme.

3. In the Time Preference field, select Browser to use the time settings of your computer or Host to sync your vCenter Operations Enterprise session with the time on the vCenter Operations Enterprise server.

4. Click OK.
This section describes the various types of widgets you can view on your vCenter Operations Enterprise dashboards. It contains the following topics:

- “Widget Overview” on page 80
- “Advanced Health Tree Widget” on page 81
- “Alerts Widget” on page 82
- “Application Detail Widget” on page 84
- “Application Overview Widget” on page 85
- “Configuration Overview Widget” on page 86
- “Data Distribution Analysis Widget” on page 87
- “Generic Scoreboard Widget” on page 88
- “GEO Widget” on page 90
- “Health Status Widget” on page 91
- “Health Tree Widget” on page 92
- “Health-Workload Scoreboard Widget” on page 93
- “Heat Map Widget” on page 94
- “Mashup Charts Widget” on page 98
- “Metric Graph Widget” on page 100
- “Metric Graph (Rolling View) Widget” on page 102
- “Metric Selector Widget” on page 104
- “Metric Sparklines Widget” on page 105
- “Metric Weather Map Widget” on page 106
- “Resources Widget” on page 107
- “Root Cause Ranking Widget” on page 108
- “Tag Selector Widget” on page 110
- “Top-N Analysis Widget” on page 111
Widget Overview

Widgets are panes, displayed on dashboards, that contain collections of related information about one or more resources. How to select the widgets to view on each dashboard and general procedures for modifying widgets, such as changing a widget's height, are described in “Designing Your Workspace” on page 65. This chapter describes each widget type, including the information it shows, the options you have when customizing it for your use, and your options for interacting with it.

The table below gives a very brief description of each type of widget. Each one is described in detail later in this chapter.

Table 7-1. Available Widgets

<table>
<thead>
<tr>
<th>Widget name</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Advanced Health Tree</td>
<td>Similar to Health Tree, but includes the health of the grandchildren of the selected resource.</td>
</tr>
<tr>
<td>Alerts</td>
<td>Lists all alerts for all resources being monitored</td>
</tr>
<tr>
<td>Application Detail</td>
<td>Shows the health and alert counts for each tier in a single selected application,</td>
</tr>
<tr>
<td>Application Overview</td>
<td>Shows the overall health and health of each tier for one or more applications.</td>
</tr>
<tr>
<td>Configuration Overview</td>
<td>Displays statistics for the overall environment being monitored by vCenter Operations Enterprise.</td>
</tr>
<tr>
<td>Data Distribution Analysis</td>
<td>Within a given time period, shows how often a metric had a particular value, as a percentage of all values. Can compare percentages for two time periods.</td>
</tr>
<tr>
<td>Geo</td>
<td>Shows the location of resources that you have given Geo Location tag values to.</td>
</tr>
<tr>
<td>Health Status</td>
<td>Displays health information for selected resources or all resources with a selected tag.</td>
</tr>
<tr>
<td>Health Tree</td>
<td>Shows the health indicator for a selected resource, its parent resource and its child resources.</td>
</tr>
<tr>
<td>Heat Map</td>
<td>Displays performance information of a selected application as a heat map</td>
</tr>
<tr>
<td>Mashup Charts</td>
<td>Brings together disparate pieces of information for a resource, showing a health chart, anomaly count graph, and metric graphs for KPI. This is most often used for an application.</td>
</tr>
<tr>
<td>Metric Graph</td>
<td>Graphically displays the recent performance of selected metrics</td>
</tr>
<tr>
<td>Metric Graph (Rolling View)</td>
<td>Cycles through selected metrics at an interval you define, showing one metric graph at a time. Miniature graphs for all selected metrics are shown at the bottom of the widget; you can click any one to expand it.</td>
</tr>
<tr>
<td>Metric Selector</td>
<td>Displays all metrics for the resource selected in the Resources widget</td>
</tr>
<tr>
<td>Metric Sparklines</td>
<td>Graphically shows the values collected for one or more selected metrics, over a time period you set.</td>
</tr>
<tr>
<td>Metric Weather Map</td>
<td>Uses changing colors to shows the behavior of a selected metric over time for multiple resources.</td>
</tr>
<tr>
<td>Resources</td>
<td>Lists all configured resources.</td>
</tr>
<tr>
<td>Root Cause Ranking</td>
<td>Shows the likely root causes for symptoms for a selected resource.</td>
</tr>
<tr>
<td>Generic Scoreboard</td>
<td>Displays values for selected metrics (usually key performance indicators), with color-coding for defined value ranges.</td>
</tr>
<tr>
<td>Health-Workload Scoreboard</td>
<td>Shows color-coded health or workload scores for selected resources.</td>
</tr>
<tr>
<td>Tag Selector</td>
<td>Lists all defined resource tags.</td>
</tr>
<tr>
<td>Top-N Analysis</td>
<td>Shows the top or bottom five metrics or resources in various categories, such as the five applications with the best or worst health score.</td>
</tr>
</tbody>
</table>
Widget Interaction

Many widgets can accept input from one or more other widgets. For example, you can configure the Metric Sparklines widget so it shows a graph for the metric you choose in the Metric Selector widget. The description for each widget includes what other widgets it can accept selections from in this manner. To use this feature, both widgets must appear on the same dashboard, and you must define the interactions between the widgets. How to do this is described in “Widget Interaction” on page 74.

Advanced Health Tree Widget

The Advanced Health Tree widget shows the section of your resource hierarchy around any resource you select. It is similar to the Health Tree widget, but also includes information about the resource's grandchildren and indicates the health of each resource it shows. You can select the resource to show by editing the widget or have it provided by the Alerts, Application Overview, Health Status, Heat Map, Health Tree, Resources, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget.

The widget shows the selected resource and its parent and child resources. The color of the icon for each resource indicates its current health. It also shows the number of children for each child, broken down by current health color. For example, it may show that one child resource has five children with good health (green) and three with abnormal health (yellow).

You can click any resource shown to make it the center of the displayed relationships. You will then see its parents, children, and grandchild count.

The toolbar at the top left of the widget contains these icons:

- **Zoom to fit** – Changes the size of the displayed resource icons for the best possible fit in the widget.
- **Pan** – Click this button, then click and drag the hierarchy to see different parts of it.
- **Image Map Tooltip** – When this icon is selected, hovering the mouse pointer over a resource shows its name and current health.
- **Zoom the view** – Click this icon, then drag to outline a part of the displayed hierarchy. The display zooms to show just the outlined section.
- **Zoom in** – Zooms in on the hierarchy display.
- **Zoom out** – Zooms out on the hierarchy display.
- **Reset to Initial Resource** – If you have changed the central resource of the hierarchy, returns the display to it. Also resets to the initial display size.
- **Resource Detail** – To show the Resource Detail page for a resource, select it in the hierarchy, then click this button. See “The Resource Detail Page” on page 48 for a description of the Resource Detail page.
You can click the **Edit** button on the widget toolbar to open the Edit Advanced Health Tree Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select **On** to select the resource on the Edit window, or **Off** to select it in the providing widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is **On**.
- **Resources-Tags** – In the **List** pane, select the resources to show in the widget. By default, the list includes all resources. You can filter the list by selecting one or more tag values on the left. If you select more than one value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the **Invert Result** icon, the list will include resources which do not match the tag values you’ve selected.

**Alerts Widget**

The Alerts widget provides a more convenient way of viewing and managing alerts that can also be viewed on the Alerts Overview window. It lists alerts for selected resources. You can define the resources to show by editing the widget or they can be provided by the Application Overview, Health Status, Heat Map, Health Tree, Advanced Health Tree, Resources, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget. When you double-click a listed alert, the Alert Summary window appears, displaying more detailed information about the alert, as described in “Viewing Single Alerts” on page 32.

**NOTE** If the widget is accepting resources from a providing widget, it shows alerts for the provided resource and its immediate children, unless the resource is an application. For applications, it shows alerts for the application, its tiers, and the resources in the tiers.

<table>
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<th>Resource Name</th>
<th>Resource Kind</th>
<th>Start Time</th>
<th>Duration</th>
<th>Metric</th>
<th>Update Time</th>
<th>Critical</th>
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<td>3/1/10 8:36 PM</td>
<td>34m-3s</td>
<td></td>
<td>3/1/10 8:36 PM</td>
<td>▶️</td>
</tr>
<tr>
<td>UserExperience</td>
<td>IEM</td>
<td></td>
<td>3/1/10 9:26 PM</td>
<td>34m-45s</td>
<td>Measurements/EndUserResp</td>
<td>3/1/10 9:26 PM</td>
<td>▶️</td>
</tr>
<tr>
<td>UserExperience</td>
<td>IEM</td>
<td></td>
<td>3/1/10 2:46 PM</td>
<td>34m-45s</td>
<td>Measurements/EndUserResp</td>
<td>3/1/10 2:46 PM</td>
<td>▶️</td>
</tr>
<tr>
<td>UserExperience</td>
<td>IEM</td>
<td></td>
<td>3/1/10 2:12 AM</td>
<td>34m-03s</td>
<td>Measurements/EndUserResp</td>
<td>3/1/10 2:12 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>DServers</td>
<td>DServers</td>
<td></td>
<td>3/11/10 5:02 AM</td>
<td>34m-3s</td>
<td></td>
<td>3/11/10 5:02 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>DServers</td>
<td>DServers</td>
<td></td>
<td>3/1/10 3:53 AM</td>
<td>34m-3s</td>
<td></td>
<td>3/1/10 3:53 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>DServers</td>
<td>DServers</td>
<td></td>
<td>3/1/10 3:54 AM</td>
<td>34m-3s</td>
<td></td>
<td>3/1/10 3:54 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>Report/Engine</td>
<td>Reports</td>
<td></td>
<td>6:12 AM</td>
<td>34m</td>
<td>Reports/Branch Transactions</td>
<td>5:12 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>Report/Engine</td>
<td>Reports</td>
<td></td>
<td>6:02 AM</td>
<td>34m</td>
<td>Reports/Branch Transactions</td>
<td>5:02 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>Report/Engine</td>
<td>Reports</td>
<td></td>
<td>7:40 AM</td>
<td>34m</td>
<td>Reports/Branch Transactions</td>
<td>7:40 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>Report/Engine</td>
<td>Reports</td>
<td></td>
<td>8:32 AM</td>
<td>34m</td>
<td>Reports/Branch Transactions</td>
<td>8:32 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>Report/Engine</td>
<td>Reports</td>
<td></td>
<td>12:42 AM</td>
<td>34m</td>
<td>Reports/Branch Transactions</td>
<td>12:42 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>Report/Engine</td>
<td>Reports</td>
<td></td>
<td>14:51 AM</td>
<td>34m</td>
<td>Reports/Branch Transactions</td>
<td>14:51 AM</td>
<td>▶️</td>
</tr>
<tr>
<td>UserExperience</td>
<td>IEM</td>
<td></td>
<td>2:4H AM</td>
<td>14H-02s</td>
<td>Measurements/EndUserResp</td>
<td>2:4H AM</td>
<td>▶️</td>
</tr>
</tbody>
</table>
The toolbar at the top of the widget has these buttons:

- **RSS Feed** – Lets you receive RSS feeds of issued alerts in your Web browser. Only alerts which would appear in the widget as it is configured will be included. For example, if the widget is set to show alerts only for a particular application, only alerts for that application will be included in the RSS feed. The detail message of an individual alert will appear as the feed’s headline, and, depending on the RSS client you use, details pertaining to all anomalies related to that alert will be shown in the feed’s body.

- **Reset Grid Sort** – Returns the grid to the default sort order (set on the Edit Alerts Widget page) if you have changed it while using the widget.

- **Reset Interaction** – Returns the widget to its initial configured state, undoing any selections or filters you have changed while viewing it.

- **Filters** – Appears only if you have selected at least one filter on the Edit Alerts Widget window. Click this button to show the filters currently selected for the widget.

- **Colorize** – Sets the background color for each alert’s row based on its criticality: red for critical, orange for immediate, yellow for warning, or blue for information.

- **Cancel Alert** – Cancels the selected alert. You can cancel only one alert at a time. You can do this only if your user name has administrative access rights.

- **Suspend** – Suspends the selected alert(s). You can enter the number of minutes the alert(s) should be suspended.

- **Suppress** – Suppresses the selected alert(s). You can enter the number of days the alert(s) should be suppressed.

- **Take Ownership** – Takes ownership of the selected alert(s).

- **Release Ownership** – Releases ownership of the selected alert(s).

You can click the **Edit** button on the widget toolbar to open the Edit Alerts Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.

- **Pagination Number** – Sets the number of alerts shown on each page of the widget.

- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.

- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is On.

- **Select which tags to filter** – To show alerts only for resources with certain tag values, select the tag values you want to monitor. If you select more than one value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the **Invert Result** icon, the list will include resources which do not match the tag values you’ve selected.

Unlike most vCenter Operations Enterprise widgets, these tag values are used even if the resources to include alerts for are being provided by another widget. If you select a resource in the providing widget which does not match your tag value selection, its alerts will not be listed.

- **Filter By** – Limits the alerts displayed in the widget according to the filters you specify. You can filter by any of the categories listed. Click the category, then select the values to include. If you filter by **Time Range**, you can pick a range in the drop-down list or select specific dates and times in **From Date and To Date**. If you specify multiple filters, an alert must meet them all to be listed.

- **Sort Data By** – Sets the default sort order for the alerts displayed in the widget. You can sort by up to four column values, and by any of the standard columns except **Resource Identifier**.
For further information on alerts and anomalies, see Chapter 3.

Application Detail Widget

The Application Detail widget shows information for a selected application. You can define the application to show by editing the widget or it can be provided by the Application Overview or Tag Selector widget.

The top of the widget displays the number of tiers, resources, and metrics contained in the application and the number of smart alerts and classic alerts on the application itself (not child resources). For each tier in the application, the widget shows:

- Icons for the health of each resource in the tier
- The tier name
- The metric sparkline for the last 24 hours
- The tier’s current health score
- The number of active smart alerts and classic alerts for the tier itself

You can click the Edit button on the widget toolbar to open the Edit Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Mode** – Either Compact or Large. The same information is shown in both modes, but the column arrangement is different.
- **Self Provider** – Select On to show information for the application selected on the Edit window, or Off to show it for one chosen in the Application Overview or Tag Selector widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is On.
- **Select which tags to filter**– If Self Provider is On, select the application tag value you want to monitor.
Application Overview Widget

The Application Overview widget lists either all applications in the enterprise or those you select when editing the widget.

For each application, the Application Overview widget shows:

- The application name
- A graph showing health for the last 24 hours
- The current health score
- Icons indicating the current health of each tier.
- The number of smart alerts and classic alerts for the application itself (not including alerts for child resources)

You can search for a particular application by entering all or part of its name in the Search field and clicking the Search icon. The list changes to show just applications matching your entry.

Double-click an application to open the Application Detail page for it. See “Application Details” on page 48 for more information.

If you are using this widget as a provider for another widget on the dashboard, the Perform Multi-Select Interaction icon lets you select multiple applications for display in the other widget. To use it, first select the applications you want (hold the CTRL key while clicking applications after the first, or hold SHIFT and click to select a range). When you have highlighted all the desired applications, click Perform Multi-Select Interaction. The other widget will reflect your choices—for example, the Alerts widget would show alerts for all selected applications.

You can click the Edit button on the widget toolbar to open the Edit Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in Widget Refresh Interval.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is On.
- **Tag Filter** – Use this tree box to define the applications to show in the widget by selecting one or more application tag values. It is similar to the application tag pane in the Applications Overview page. The toolbar buttons let you do the following:
  - **Collapse All** – Collapses all application tag branches.
  - **Expand All** – Expands all application tag branches.
  - **Deselect All** – Unselects all application tags in the list.
Configuration Overview Widget

This widget displays the current uptime functional status of configured resources and applications and collected metrics for the environment. You can select the resources to show by editing the widget or have them provided by the Alerts, Application Overview, Health Status, Health Tree, Heat Map, Resources, Advanced Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget.

You can click the **Edit** button on the widget toolbar to open the Edit Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select **On** to show information for the resource tags selected on the Edit window, or **Off** to show it for one chosen in a providing widgets.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is **On**.
- **Viewable Data** – Check the boxes for the data you want the widget to include. If you select a category (Resources, Metrics, Applications, Alerts, Analytics, or Users), it selects all boxes in that category. If you do not make any selections, all data will appear in the widget.
- **Select which tags to filter** – If **Self Provider** is **On**, select the tag value to show information for.
Data Distribution Analysis Widget

The Data Distribution Analysis widget displays a graph for each selected metric, showing its data distribution: how often it had a particular value. You can compare values of the metric over two time periods: by default, the widget compares the last seven days to the last 30 days. You can define the metrics to show by editing the widget or they can be provided by the Alerts, Heat Map, Metric Selector, Root Cause Ranking, Generic Scoreboard, or Health-Workload Scoreboard widget.

The x-axis of the graph shows the range of received values for the metric over the selected time period, from lowest to highest. The y-axis is the percentage of the received metrics that had that value. The graph has two possible modes:

- In density mode, the graph shows how often the metric had each particular value.
- In distribution mode, the graph shows the percentage probability that the metric was at or below the x-axis value. In this mode, the y-axis always goes from 0 to 1 and the right edge of the graph always reaches a value of 1, showing that all received readings were at or below the maximum value indicated on the x-axis. At any point in the middle of the graph, the y-axis value is the percentage of collected values that were at or below the x-axis value (or the probability that any one collected value was at or below that value).

Click the Density Mode or Distribution Mode icon on the widget toolbar to switch between modes. Only one of these icons is shown at a time.

In either mode, when graphing only one time period, the graph can include vertical lines at the 75, 90, and/or 95% levels. Edit the widget to add or remove the percentage lines.

To change either or both time periods shown on the graph, click the Date Controls icon. In the two drop-down fields that appear, select the time periods you want the graphs to cover. To show only one time period, select Not Selected in the second field. Click the Date Controls icon again to hide the date fields.

You can click the Edit button on the widget toolbar to open the Edit Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select On to show information for the metrics selected on the Edit window, or Off to show it for one chosen in the Metric Selector widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in Widget Refresh Interval.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is On.
- **75th percentile** – Whether to include a line on the graph at the metric value that 75% of the values are below.
- **90th percentile** – Whether to include a line on the graph at the metric value that 90% of the values are below.
- **95th percentile** – Whether to include a line on the graph at the metric value that 95% of the values are below.
- **Resources - Tags** – To select the metrics to show in the widget if Self Provider is set to On, select the resource containing the metric in the List pane. This displays the metrics for that resource in the Metric Selector pane. You can filter the resource list by selecting one or more tag values in the list on the left. If you select more than one tag value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the Invert Result icon, the list will include resources which do not match the tag values you’ve selected.
- **Metric Selector** – After selecting a resource, double-click the metrics to appear in the widget.
- **Selected Metrics** – Shows the metrics you have selected to appear in the widget.

**Generic Scoreboard Widget**

The Generic Scoreboard widget displays the current value for each metric you select. Each metric displays in a separate box; the color of the box is determined by the value of the metric; you define the values for each color when you edit the widget. It cannot accept metric selections from another widget; you must define the metrics by editing the widget.

If you hover the cursor over a box, it will show the source resource and metric for the data.

You can click the Edit button on the widget toolbar to open the Edit Generic Scoreboard Widget window. This window contains these options:
- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – This field is not used. The widget is always a self-provider.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in Widget Refresh Interval.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is On.
- **Box Height** – If Layout mode is set to Fixed Size, the height, in pixels of each metric box.
- **Layout Mode** – Select Fixed Size to define the height for each metric box in Box Height, or Fixed View to have vCenter Operations Enterprise size the boxes so all metrics fit in the displayed widget.
Box Columns – Number of boxes to include in each row, from 2 - 10. If Layout Mode is set to Fixed View, vCenter Operations Enterprise will change the box width as needed to fit this many columns in the widget width.

Label Size – Point size to use for the label of each metric box. vCenter Operations Enterprise will decrease this if needed to fit the label in the box width.

Value Size – Point size to use for the value in each metric box. vCenter Operations Enterprise will decrease this if needed to fit the value in the box width.

Resources - Tags – To select the metrics to show in the widget, select the resource containing the metric in the List pane. This displays the metrics for that resource in the Metric Selector pane. You can filter the resource list by selecting one or more tag values in the list on the left. If you select more than one tag value, vCenter Operations Enterprise follows these rules:

- If you select more than one value for the same tag, the list includes resources that have either value.
- If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the Invert Result icon, the list will include resources which do not match the tag values you’ve selected.

Metric Selector – After selecting a resource, double-click the metrics to appear in the widget.

NOTE This widget does not work with string metrics.

Selected Metrics – Shows the metrics you have selected to appear in the widget, in the order they will appear. You can drag and drop metrics in this list to change the display order. For each metric, you should set:

- Box Label – The text label to include in the box for this metric.
- Measurement Unit – This text will appear after the metric value in the box.
- Value ranges – Defines the value ranges for each box color for this metric. You must define either an ascending or descending set of ranges from green through red.

For an ascending range, enter the highest value that should be green in Green Range. In Yellow Range, enter the Green Range value, a dash, and the highest Yellow Range color. In Orange Range, enter the highest Yellow Range value, a dash, and the highest Orange Range value. In Red Range, repeat the highest Orange Range value. All values higher than this will be red. For example, you could enter this set of values:

<table>
<thead>
<tr>
<th>Green</th>
<th>Yellow</th>
<th>Orange</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>50–75</td>
<td>75–100</td>
<td>100</td>
</tr>
</tbody>
</table>

For a descending range, reverse this. For example:

<table>
<thead>
<tr>
<th>Green</th>
<th>Yellow</th>
<th>Orange</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>500–1000</td>
<td>250–500</td>
<td>250</td>
</tr>
</tbody>
</table>
GEO Widget

If your installation assigns values to the GEO Location resource tag, the GEO widget shows where your resources are located on a world map. It is very similar to the GEO tab page of the Environment Overview page. You can define the resources to show by editing the widget or they can be provided by the Tag Selector or Application Overview widget.

You can move the map and zoom in or out using the controls that appear on the map. The icons at each location show the health of each resource with that GEO Location tag value.

You can click the Edit button on the widget toolbar to open the Edit Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select **On** to show information for the resource tag values selected on the Edit window, or **Off** to show it for tag values chosen in the defined providing widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is **On**.
- **Select which tag to show** – To show only resources with certain tag values (in addition to their GEO Location value), select the tag values you want to include. If you select more than one value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the **Invert Result** icon, the list will include resources which do not match the tag values you’ve selected.
Health Status Widget

The Health Status widget shows the health score—a 0-100 ranking determined by vCenter Operations Enterprise for each resource based on predetermined metrics—for selected resources. You can select the resource to show by editing the widget or have it provided by the Alerts, Application Overview, Health Tree, Heat Map, Resources, Advanced Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget.

For each resource, the widget includes the current health score and a graph showing how the health has changed over time. To see detailed information for a resource, double-click its graph. This opens the Resource Detail page, which is described in “The Resource Detail Page” on page 48.

If vCenter Operations Enterprise was not receiving metrics for a resource at a particular time, it cannot calculate a health score for that time. This shows on the graph as a score of -1. This could mean that collection was turned off for the resource, or that there was a problem gathering data.

You can click the Edit button on the widget toolbar to open the Edit Health Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select On to show health for the resources selected on the Edit window, or Off to show only those chosen in the Resources or Tag Selector widget.
- **Mode** – Sets whether the widget shows health for the selected resources, their children, or their parents. When Children or Parents is selected, health for the selected resources themselves is not shown.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in Widget Refresh Interval.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is On.
- **Order by** – Sets whether the list is ordered by health score or resource name, and whether the order is ascending or descending.
- **Pagination Number** – Sets the number of resources shown on each page of the widget.
- **Period Length** – Sets the amount of time shown on the health graph for each resource.
- **Select which tag to filter** – To define the resources to show in the widget, select the tag values you want to monitor. If you select more than one value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the widget includes resources that have either value.
  - If you select values for two or more different tags, the widget includes only resources that have all the selected values.
Health Tree Widget

The Health Tree widget shows the section of your resource hierarchy around any resource you select. As described in “Resources” on page 12, an administrator can create container resources which group other resources together for combined tracking. This widget shows all the containers which hold the resource you select (its parent resources), and, if it is a container, all the resources it contains (its child resources). You can select the resource to show by editing the widget or have it provided by the Alerts, Application Overview, Health Status, Heat Map, Resources, Advanced Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget.

Unless you are in Pan or Zoom the view mode, hovering the pointer over a resource shows its name and current health. To shift the display to show the parents and children of any resource shown in the widget, double-click it.

If there is a section in the Tag Filter pane of the Edit dialog box for the widget (see below), when the widget first appears only parent and child resources matching the selected tag values are shown. If you double-click a resource to show its parents and children, it ignores the tag filter and shows all of its parents and children. You can double-click the original resource to turn off the filter and show all its parents and children.

NOTE The icons which represent each resource kind are chosen by an vCenter Operations Enterprise administrator. See the vCenter Operations Enterprise Installation and Administration Guide for more information.

The toolbar at the top left of the widget contains these icons:

- **Zoom to fit** – Changes the size of the displayed resource icons for the best possible fit in the widget.
- **Pan** – Click this button, then click and drag the hierarchy to see different parts of it.
- **Image Map Tooltip** – If Pan or Zoom the view is selected, select this icon to leave that mode and return to showing a resource’s name and current health when you hover the mouse pointer over it.
- **Zoom the view** – Click this icon, then drag to outline a part of the displayed hierarchy. The display zooms to show just the outlined section.
- **Zoom in** – Zooms in on the hierarchy display.
- **Zoom out** – Zooms out on the hierarchy display.
- **Reset to Initial Resource** – If you have changed the central resource of the hierarchy, returns the display to it. Also resets to the initial display size.
- **Resource Detail** – To show the Resource Detail page for a resource, select it in the hierarchy, then click this icon. See “The Resource Detail Page” on page 48 for a description of the Resource Detail page.
- **Show Alerts** – To see the alerts for a resource, select it in the hierarchy, then click this icon. This lists the alerts in a pop-up window. You can double-click an alert in the list to see its Alert Summary page, as described on page 32.

- **Filtering** – To see the settings currently being used for the widget, including the metric being shown, click this icon.

You can click the **Edit** button on the widget toolbar to open the Edit Health Tree Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select **On** to select the resource on the Edit window, or **Off** to select it in the providing widget. If **Self Provider** is **On**, the name of the currently selected resource displays next to the field.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is **On**.
- **Resource Selection** – Select the resource to show in the widget if **Self Provider** is **On**. To make it easier to find the resource you want, you can type all or part of its name in the **Search** field, then click the icon next to it. Only resources matching your entry will be listed.
- **Tag Filter** – This pane lets you filter the parent and child resources that appear in the widget. Only parents and children matching your selection here will be shown by default. To show all parents and children of the selected resource, do not select any tag value.

If you select more than one tag value, vCenter Operations Enterprise follows these rules:

- If you select more than one value for the same tag, resources that have either value will be shown.
- If you select values for two or more different tags, only resources that have all the selected values will be shown.

You can also “negatively select” the resources to show. If you click the **Invert Result** icon, the widget will include parents and children which do not match the tag values you’ve selected.

As mentioned above, the tag filter affects only the original display in the widget. If you double-click a resource, it turns off the filter and shows all parent and child resources.

**Health-Workload Scoreboard Widget**

The Health-Workload Scoreboard widget shows the health or workload score of selected resources. The icons for each resource are color-coded, from green for best performance (100 for health or 0 for workload) to red for worst (0 for health or 100 for workload). The resources to include in the widget can be provided by the Alerts, Health Status, Health Tree, Advanced Health Tree, Heat Map, Resources, Generic Scoreboard, or Root Cause Ranking widget, or you can define them using the Edit Health-Workload Scoreboard Widget window.

The workload score applies only to specific resources monitored through the VMWare adapter. If you configure the widget to show workload for resources which do not have the workload metric, those resources will have blue icons.
You can click the Edit button on the widget toolbar to open the Edit Health-Workload Scoreboard Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select On to select the resources on the Edit window, or Off to select them in the providing widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is On.
- **Image Type** – Select the image to show for each resource.
- **Metric** – Sets the metric to show for the selected resources. Select Health or Workload. If you select Workload, select the attribute to use for the workload score. If the attribute you select is not collected for any of the listed resources, that resource will always show blue (unknown). You can filter the attribute list by typing part of the attribute name and pressing ENTER to list only matching attributes.
- **Resources-Tags** – In the List pane, select the resources to show in the widget. By default, the list includes all resources. You can filter the list by selecting one or more tag values on the left. If you select more than one value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the Invert Result icon, the list will include resources which do not match the tag values you’ve selected.

### Heat Map Widget

The Heat Map widget displays graphical indicators of the current value of two selected attributes for the resources belonging to the tag values you select. You must select the resources to show by editing the widget; it does not accept selections from another widget. Because you can configure the widget in so many ways to show different combinations of data, you can save multiple settings for it, as described below. You can then select the configuration to show using the Configuration field at the top of the widget. The widget will not show any data until you have configured it.
In most cases, you can select only from internally generated attributes which describe the general operation of the resource, such as health or the active anomaly count. However, selecting a single resource kind allows you to select any metric for that resource kind.

The widget is highly configurable. It has two basic modes:

- In general mode, it displays a colored rectangle for each selected resource. The size of the rectangle indicates the value of one selected attribute. The color of the rectangle indicates the value of another selected attribute.
- In instance mode, each rectangle represents a single instance of the selected metric for a resource (a resource may have multiple instances of the same metric). The rectangles are all the same size; the color varies based on the instance value. You can use instance mode only when you select a single resource kind.

In either mode, the rectangles can be grouped according to any tag type you select, and you can select the color range to use. By default, green indicates a low value while red indicates the high end of the value range. You can change the high and low values to any desired colors, and set the color to use for the midpoint of the range. You can also choose to set the values to use for either end of the color range, or you can let vCenter Operations Enterprise define them based on the range of values for the attribute being represented.

Because there are so many options when configuring this widget, an example may help. Suppose you have a number of physical servers in multiple data centers, each running many virtual servers to support a number of functions. Each virtual server is a resource in vCenter Operations Enterprise with several attributes being collected. You could configure the Heat Map widget as follows:

- Show all resources with a resource kind tag value of virtual machine.
- Group the resources by physical server, then by data center.
- For each resource, set the size of its rectangle based on the number of current anomalies for that resource, and the color based on the number of KPI breaches.

You would then have a widget display to show, at a glance, which virtual machines are exhibiting anomalies, whether those anomalies are for KPI, and which physical servers those virtual machines reside on.

You may need to experiment and adjust the widget settings several times before you get the display that is most useful to you.

When you place the pointer over the rectangle for a resource, it displays the resource name, its group-by values (for example, if you are grouping by tier and application, the tier and application it belongs to), and the current values of the two attributes being tracked. Click Show Sparkline on the popup window to see a small sparkline of the metric being tracked by the heat map color.

Select a resource and click the Resource Detail icon to show the Resource Detail page for the resource. See “The Resource Detail Page” on page 48 for more information.

If the Heat Map widget is set as a provider to another widget, such as the Metric Graph widget, double-click a rectangle to select that resource for the other widget. If the widget is in metric mode, double-clicking a rectangle selects the resource that metric is for and provides that resource to the receiving widget. See “Widget Interaction” on page 74 for more about providing and receiving widgets.
To configure the widget, click the **Edit** button on the widget toolbar to open the Edit Heat Maps Widget window, as shown below. You can create and save multiple configurations for the widget using the Edit window.

The Edit window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is On.
- **Group by** – Select the tag to use for first-level grouping of the resources. If any of the selected resources does not have a value for this tag, it will appear in a group called **Other**.
- **Relational Grouping** – Check this box to have the widget grouping follow the hierarchy defined in vCenter Operations Enterprise or in the adapter. When this is checked, a resource will appear in a group box only if it is a child resource of the group by resource according to the resource hierarchy.
- **Then by** – Select the tag to use to separate the resources into subgroups. If any of the selected resources does not have a value for this tag, it will appear in a subgroup called **Other**.
- **Mode** – Select **General** to pick an individual instance of a metric for each resource and track only it. Select **Instance** to track all instances of a metric for a resource, with a separate rectangle for each one. If you choose **Instance**, you must select a **Resource Kind**, and the **Size By** and **Color By** lists are replaced by a single **Attribute Kinds** list. Those fields are described below.
- **Resource Kind** – To track metrics only for resources of a particular kind, select the resource kind here. If you select **Instance** mode, you must select a resource kind.

<table>
<thead>
<tr>
<th>Group by</th>
<th>Then by</th>
<th>Mode</th>
<th>Resource Kind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Selected</td>
<td>Not Selected</td>
<td>Instance</td>
<td>All Resource Kinds</td>
</tr>
</tbody>
</table>

Select **Instance** to track all instances of a metric for a resource, with a separate rectangle for each one. If you choose **Instance**, you must select a **Resource Kind**, and the **Size By** and **Color By** lists are replaced by a single **Attribute Kinds** list. Those fields are described below.
- **Configuration** – These fields let you save, update, and delete configurations for the widget. You must save a configuration before you can use it.
  - To save a configuration, make your selections in all the other fields, then click the Capture new configuration icon. Type a name for the configuration and click OK.
  - To update a configuration, select it in the list under Configuration. Make your changes, then click Update selected configuration.
  - To delete a configuration, select it in the list under Configuration, then click Delete selected configuration.

- **Colors** – Determines the colors displayed in the heat map. Click each of the three small blocks under the color bar to set the color for low, middle, and high values, respectively. The bar will show the color range used for intermediate values.
  
  If desired, you can also set the values to match the high and low end of the color range. If you leave the Min Value and Max Value fields blank, vCenter Operations Enterprise will map the highest and lowest values for the Color By metric to the end colors. If you set a minimum or maximum value, any metric at or beyond that value will be shown in the end color.

- **Size By** – This list appears only in General mode. Select the attribute to use to set the size of the rectangle for each resource. Resources with higher values for this attribute will have larger areas of the widget display. You can also select fixed-size rectangles.

- **Color By** – This list appears only in General mode. Select the attribute to use to determine the color of the rectangle for each resource. The color will vary between the colors you have set based on the value of this attribute.

  **NOTE** In most cases, the attribute list in Size By and Color By includes only metrics that are generated by vCenter Operations Enterprise, because all resources have these metrics. If you select a resource kind, the list shows all attributes defined for the resource kind, with the internally generated metric list collapsed. In this case, to select an internally generated metric, click the plus sign next to vCenter Operations Enterprise Generated to expand the list.

- **Attribute Kinds** – This list appears only in Instance mode. Select the attribute to use to determine the color of the rectangle for each resource. The color will vary between the colors you have set based on the value of this attribute.

- **Select which tags to filter** – To define the resources to show in the widget, select the tag values you want to monitor. If you select more than one value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the widget includes resources that have either value.
  - If you select values for two or more different tags, the widget includes only resources that have all the selected values.

  As discussed above, if you select both a Resource Kind and one or more tag values, only resources of that kind and meeting the tag filter are shown.

  **NOTE** If you make changes, then click OK to close the Edit Heat Map Widget window without saving the new configuration, vCenter Operations Enterprise asks you to confirm that you do not want to save your changes.
Mashup Charts Widget

The Mashup Charts widget shows the same information as the **Mashup** tab of the Alert Details page. It displays up to three types of chart showing different aspects of the behavior of the selected resource. You can select the resource to show by editing the widget, or have it provided by the Alerts, Application Overview, Health Status, Heat Map, Resources, Advanced Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget. By default, the charts cover the past six hours.

![Mashup Charts Widget Example](image)

The Mashup Charts widget contains the following charts:

- A health chart for the resource. The chart can include (based on the **Layers** setting) each alert during the time shown. Click an alert to see more information, or double-click it to open the Alert Summary page for it. The Alert Summary page is described on page 32.

- An anomaly count graph for the resource. This is very similar to the anomaly graph shown by the Cross-Silo Analysis feature (see “Cross-Silo Analysis” on page 51). The graph shows the number of anomalies for the resource and its children at the indicated time. For an application, it also shows the count for each tier in a stacked chart. A red line marks the noise threshold for the resource—an anomaly count higher than this indicates a 90% probability of a problem and triggers an early warning alert.

- Metric graphs for any or all of the KPI for any resource listed as a root cause resource. For an application, this will be the application and any tiers which contain root causes. You can select the KPI to include by clicking **Chart Controls, KPIs**. Any shaded areas on a graph indicate the KPI was violating its threshold during that time. Click the top left of the shaded area to see details about the anomaly.

The anomaly count and metric graphs reflect up to five levels of resources (the selected resource and four child levels).

To pick which charts to view, click **Chart Controls** at the top of the widget. You can select:

- **Show Charts** to select which types of graphs to include.

- **Layers** to select what types and subtypes of alerts to show on the metric graph. You can also choose to have the graph show change events. Change events are user-defined notifications sent to vCenter Operations Enterprise using the vCenter Operations Enterprise OpenAPI.

- **Show in Stacked Mode** changes the **Anomaly Count Graph** to be a single stacked graph showing anomalies for all selected resources.

- **Resources** lets you select the resources to include in the **Anomaly Count Graph**.

- **KPIs** to select the KPI to include metric graphs for.
Chapter 7 Widgets

The maximum and minimum points on the line chart are indicated in the key of the graph. The toolbar at the top of this widget contains these buttons to let you determine exactly what each graph shows:

- **Zoom by X** – When selected, zooming the graph affects the X axis. You can select both **Zoom by X** and **Zoom by Y** at the same time. **Zoom the View** must be selected for zooming to work.

- **Zoom by Y** – When selected, zooming the graph affects the Y axis. You can select both **Zoom by X** and **Zoom by Y** at the same time. **Zoom the View** must be selected for zooming to work.

- **Zoom to Fit** – Changes all graphs to show the entire time period and value range.

- **Zoom the View** – When selected, dragging in a graph zooms the graph to show just the selected area. The exact behavior is determined by the **Zoom by X**, **Zoom by Y**, and **Zoom All Graphs** settings.

- **Pan** – When selected, dragging in the graph changes the time period shown; it does not zoom the graph.

- **Point Values** – Click this icon, then place the pointer over a graphed KPI data point to see its time and exact value. You can show values only if the selected time period is 24 hours or less.

- **Date Controls** – Select the time period to show on the graphs. You can either select a period in the top box or enter a start date and time and end date and time in the fields beneath it.

You can click the **Edit** button on the widget toolbar to open the Edit Mashup Charts Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.

- **Self Provider** – Select **On** to show graphs for the resource selected on the Edit window, or **Off** to show one chosen in the providing widget.

- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.

- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is **On**.

- **Resources-Tag** – In the **List** pane, select the resources to show in the widget if **Self Provider** is set to **On**. By default, the list includes all resources. You can filter the list by selecting one or more tag values on the left. If you select more than one value, vCenter Operations Enterprise follows these rules:

  - If you select more than one value for the same tag, the list includes resources that have either value.

  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the **Invert Result** icon, the list will include resources which do not match the tag values you’ve selected.
Metric Graph Widget

This widget displays a graph of the recent performance (and predicted future performance) of a metric. You can select the metrics to show by editing the widget, have them provided by the Metric Selector widget, or select a resource in the Alerts, Health Status, Heat Map, Health Tree, Advanced Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Resources widget to see its top metrics. The number of metrics shown is determined by the important metrics count set by an vCenter Operations Enterprise administrator.

The maximum and minimum points on the line chart are indicated in the key of the graph. The toolbar at the top of this widget contains these buttons to let you determine exactly what each graph shows:

- **Split Graphs** – When two or three time periods are selected, shows the values for each period on a different graph.
- **Y Axis** – Displays or hides the Y-axis scale.
- **Metric Graph** – Hides or shows the line connecting the data points on the graph.
- **Trend Line** – Shows or hides the trend line. The trend line filters out metric “noise” along the timeline by plotting each data point relative to the average of its adjoining data points.
- **Dynamic Thresholds** – Shows or hides the dynamic threshold for each metric for the last 24 hours.
- **Show Entire Period Dynamic Thresholds** – Shows or hides dynamic thresholds for the entire time period of the graph.
- **Anomalies** – Hides or shows anomalies on the graph. When shown, time periods when the metric is violating a threshold are shaded; the color indicates the criticality of the violation. You can click the top-left corner of the shaded area to display details about that anomaly.
- **Show Data Point Tips** – Retrieves the metric readings for the graphed data points. You can then use **Show Data Values** to see the values, if desired. This is not done automatically as retrieving the values if you do not want to see them is a needless use of resources.
- **Zoom by X** – When selected, zooming the graph affects the X axis. You can select both **Zoom by X** and **Zoom by Y** at the same time. **Zoom the View** must be selected for zooming to work.
- **Zoom by Y** – When selected, zooming the graph affects the Y axis. You can select both **Zoom by X** and **Zoom by Y** at the same time. **Zoom the View** must be selected for zooming to work.
- **Zoom to Fit** – Changes all graphs to show the entire time period and value range.
- **Zoom to Dynamic Thresholds** – Changes the Y axis of the graphs to match the dynamic threshold of the metric.
- **Compress Graphs** – Shortens the Y axis of all graphs so they take up less vertical space while showing the same data.
- **Zoom All Graphs** – When selected, zooming one graph changes all graphs to match. **Zoom the View** must be selected for zooming to work.
Zoom the View – When selected, dragging in a graph zooms the graph to show just the selected area. The exact behavior is determined by the Zoom by X, Zoom by Y, and Zoom All Graphs settings.

Pan – When selected, dragging in the graph changes the time period shown; it does not zoom the graph.

Show Data Values – After clicking Show Data Point Tips to retrieve the data, click this icon, then place the pointer over a graphed data point to see its time and exact value. You can show values only if the selected time period is 24 hours or less.

Auto Refresh – Turns auto-refresh on or off.

Date Controls – Select up to three time periods to show on the graph. For the first period, select a value in the top box or enter a start date and time and end date and time in the fields beneath it. To graph multiple periods, select the first period, then select which previous period to compare it to in the second (and third, if desired) set of fields. All periods must be the same length. If you set a start date and time for the second or third period, vCenter Operations Enterprise fills in the end time automatically.

NOTE For most time periods, vCenter Operations Enterprise will include predicted values for the near future. For example, if you select the last hour, vCenter Operations Enterprise will also show 15 minutes into the future; if you select the last day, vCenter Operations Enterprise will predict four hours into the future, and so on. Periods longer than 30 days do not show any future time. If a user-defined time period includes time in the future, vCenter Operations Enterprise will show predicted values for the defined future period.

Generate Dashboard – Creates a new dashboard containing just the Metric Graph widget, in self-provider mode, showing the same metrics as currently displayed. You are prompted to enter the name to give the new dashboard.

Remove All – Removes all graphs from the widget.

Each of the buttons affects all metric graphs shown. Each graph has a toolbar at the top right, affecting only that graph. It includes these buttons:

Data Source – Place the mouse pointer over this icon to see the name of the data source (adapter instance) for this metric. For super metrics, this will say vCenter Operations Enterprise.

Show Correlated Metrics – Appears only if vCenter Operations Enterprise has determined that the behavior or anomalies of other metrics are correlated to this one. Opens a pop-up window showing the correlated metrics, including the resource, the metric name, and the percentage of correlation. You can also display a column showing the type of correlation, either Anomaly (the metrics’ anomalies are correlated) or Behavior (the metrics’ behavior is correlated). If the widget is not in self-provider mode, you can select a correlated metric to add it to the widget display.

Save a Chart Snapshot – Downloads the current graph image as a PNG (Portable Network Graphics) file, which you can display or save.

Save a Fullscreen Snapshot – Downloads the current graph image as a full-page PNG (Portable Network Graphics) file, which you can display or save.

NOTE For both snapshots, the default file name contains the resource, attribute group, and metric name.

Download tab-separated data – Downloads the data points currently shown on the graph to a tab-separated .csv file. Each file includes the resource name and metric name and, for each value, date and time of the collected metric, the value, and the lower and upper bounds of dynamic thresholds. You are given the choice to open or save the file.

Move Down – Moves the graph down one position in the widget.

Move Up – Moves the graph up one position in the widget.

Close – Removes the graph from the widget.
You can click the **Edit** button on the widget toolbar to open the Edit Metric Graph Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Self Provider** – Select **On** to show graphs for the metrics selected on the Edit window, or **Off** to show only those chosen in the providing widget.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is **On**.
- **Resources - Tags** – To select the metrics to show in the widget if **Self Provider** is set to **On**, select the resource containing the metric in the **List** pane. This displays the metrics for that resource in the **Metric Selector** pane. You can filter the resource list by selecting one or more tag values in the list on the left. If you select more than one tag value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the **Invert Result** icon, the list will include resources which do not match the tag values you’ve selected.

- **Metric Selector** – After selecting a resource, double-click the metrics to appear in the widget.
- **Selected Metrics** – Shows the metrics you have selected to appear in the widget.

For further information on attributes, see the *vCenter Operations Enterprise Installation and Administration Guide*

**Metric Graph (Rolling View) Widget**

The Metric Graph (Rolling View) widget is very similar to the Metric Graph widget, except that it shows a full chart for only one of the selected metrics at a time. The bottom of the widget shows miniature graphs of the other selected metrics. You can click any miniature graph to see the full graph for that metric, or set the widget to rotate through all selected metrics at an interval you define. You can select the metrics to show by editing the widget, have them provided by the Metric Selector widget, or select a resource in the Alerts, Health Status, Heat Map, Health Tree, Advanced Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Resources widget to see its top ten metrics.

The maximum and minimum points on the line chart are indicated in the key of the graph. The toolbar at the top of this widget contains these buttons to let you determine exactly what the graph shows:

- **Y Axis** – Displays or hides the Y-axis scale.
- **Metric Graph** – Hides or shows the line connecting the data points on the graph.
- **Trend Line** – Shows or hides trend line. The trend line filters out metric “noise” along the timeline by plotting each data point relative to the average of its adjoining data points.
- **Dynamic Thresholds** – Shows or hides the dynamic threshold for the last 24 hours.
- **Show Entire Period Dynamic Thresholds** – Shows or hides dynamic thresholds for the entire time period of the graph.
- **Anomalies** – Hides or shows anomalies on the graph. When shown, time periods when the metric is violating a threshold are shaded; the color indicates the criticality of the violation.
- **Show Data Point Tips** – Retrieves the metric readings for the graphed data points. You can then use Show Data Values to see the values, if desired. This is not done automatically as retrieving the values if you do not want to see them is a needless use of resources.
- **Zoom by X** – When selected, zooming the graph affects the X axis. You can select both Zoom by X and Zoom by Y at the same time. Zoom the View must be selected for zooming to work.
- **Zoom by Y** – When selected, zooming the graph affects the Y axis. You can select both Zoom by X and Zoom by Y at the same time. Zoom the View must be selected for zooming to work.
- **Zoom to Fit** – Changes the graph to show the entire time period and value range.
- **Zoom to Dynamic Thresholds** – Changes the Y axis of the graph to match the dynamic threshold of the metric.
- **Zoom the View** – When selected, dragging in the graph zooms the graph to show just the selected area. The exact behavior is determined by the Zoom by X, Zoom by Y, and Zoom All Graphs settings.
- **Pan** – When selected, dragging in the graph changes the time period shown; it does not zoom the graph.
- **Show Data Values** – After clicking Show Data Point Tips to retrieve the data, click this icon, then place the pointer over a graphed data point to see its time and exact value. You can show values only if the selected time period is 24 hours or less.
- **Date Controls** – Select the time period to show on the graph. You can either select a period in the top box or enter a start date and time and end date and time in the fields beneath it.

**NOTE** For most time periods, vCenter Operations Enterprise will include predicted values for the near future. For example, if you select the last hour, vCenter Operations Enterprise will also show 15 minutes into the future; if you select the last day, vCenter Operations Enterprise will predict four hours into the future, and so on. Periods longer than 30 days do not show any future time. If a user-defined time period includes time in the future, vCenter Operations Enterprise will show predicted values for the defined future period.

You can click the **Edit** button on the widget toolbar to open the Edit Metric Graph Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select **On** to show graphs for the metrics selected on the Edit window, or **Off** to show only those chosen in the providing widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is **On**.
- **Auto Transition Interval** – Enter a value here to have the main chart cycle through all selected metrics. The graph will switch after the number of seconds you enter here.
- **Show Chart Toolbar** – Select whether to include the toolbar on the widget display.
- **Resources - Tags** – To select the metrics to show in the widget if **Self Provider** is set to **On**, select the resource containing the metric in the **List** pane. This displays the metrics for that resource in the **Metric Selector** pane. You can filter the resource list by selecting one or more tag values in the list on the left. If you select more than one tag value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the **Invert Result** icon, the list will include resources which do not match the tag values you’ve selected.

- **Metric Selector** – After selecting a resource, double-click the metrics to appear in the widget.

- **Selected Metrics** – Shows the metrics you have selected to appear in the widget.

For further information on attributes, see the *vCenter Operations Enterprise Installation and Administration Guide*.

### Metric Selector Widget

The Metric Selector widget displays attribute packages for one or more resources you’ve selected in the Alerts, Health Status, Heat Map, Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Resources widget. Expand each attribute group to view its metrics. If the widget is showing metrics for only one resource, metrics which are currently exhibiting anomalies are colored yellow.

If you have multiple resources selected in the providing widget, and want the list to show only metrics which all of the resource have, click the **Show Common Metrics** icon. Click it again to list all metrics for the resources. This icon appears only when there are multiple resources selected.

Select one or more metrics and click the **Move to Graph** icon to display them in the Metric Graph widget. Double clicking any attribute also displays it in the Metric Graph widget.

By default, the list shows all defined metrics that have ever been collected for the listed resources. To show only metrics which are currently being collected for the resources (and not those which were collected in the past but are not now), click the **Show Metrics Collecting** icon. Click it again to show all metrics.

To find a particular metric group, metric instance, or metric, type all or part of its name in the **Search** field, select the type of value you are searching for, and click the **Search** icon.

You can click the **Edit** button on the widget toolbar to open the Edit Widget window. The only option on this window is **Widget title**. This lets you change the display name of the widget, as shown in the title bar.
Metric Sparklines Widget

The Metric Sparklines widget shows simple graphs showing the value of the selected metric(s) over time. You can use it to get a quick view of the trends in KPI. You can select the metrics to show by editing the widget, have them provided by the Alerts, Metric Selector, or Health-Workload Scoreboard widget, or select a resource in the Alerts, Health Status, Heat Map, Health Tree, Advanced Health Tree, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Resources widget to see its top ten metrics. If all metrics shown are for one resource provided by one of these widgets, the resource name appears at the top right of the widget.

![Metric Sparklines Widget](image)

You can click the Edit button on the widget toolbar to open the Edit Metric Sparklines Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in Widget Refresh Interval.
- **Self Provider** – Select On to show sparklines for the metrics selected on the Edit window, or Off to show only those chosen in the Metric Selector widget.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is On.
- **Resources - Tags** – To select the metrics to show in the widget if Self Provider is set to On, select the resource containing the metric in the List pane. This displays the metrics for that resource in the Metric Selector pane. You can filter the resource list by selecting one or more tag values in the list on the left. If you select more than one tag value, vCenter Operations Enterprise follows these rules:
  - If you select more than one value for the same tag, the list includes resources that have either value.
  - If you select values for two or more different tags, the list includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the Invert Result icon, the list will include resources which do not match the tag values you’ve selected.

- **Metric Selector** – After selecting a resource, double-click the metrics to appear in the widget.
- **Selected Metrics** – Shows the metrics you have selected to appear in the widget.
Metric Weather Map Widget

The Metric Weather Map widget gives a graphical display of the changing values of a single metric for multiple resources over time. It uses colored icons to represent each value of the metric. Each icon location represents the metric value for particular resource. The color of the icon changes to show changes in the value of the metric. Watching how this map changes can give you a picture of how the performance of the metric varies over time for different resources.

The display does not show the real-time performance of the metrics. You choose the time period for it to cover, how fast the map refreshes, and the interval between the readings it shows. For example, you could have the widget play the metric values over the last day, refreshing every half-second, with each change representing five minutes worth of metric values.

To see what resource any icon represents, click it to display a hyperlink of the resource name. Click the X next to the link to remove it. Click the hyperlink to display the Resource Detail page for the resource. See “The Resource Detail Page” on page 48 for more information.

To stop or start the display, click the pause/play icon at the top left of the widget. This setting is saved, so if you leave the widget display and return, it will be in the same state.

To see the settings currently being used for the widget, including the metric being shown, click the Filtering icon at the top left of the widget.

You can click the Edit button on the widget toolbar to open the Edit Metric Weather Map Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Image Redraw Rate** – How often the widget gets new metric data and updates the display with it. This is the same as the Widget Refresh Interval for other widgets.
- **Metric History** – Select the time period (from the previous hour to the last 30 days) for the weather map to cover.
- **Metric Sample Increment** – The interval between the metric readings the widget uses. For example, if you set this to one minute and the Metric History to one hour, the widget would have a total of 60 readings for each metric.
- **Group by** – If you want the widget to group the resources by tag value, select the tag to group them by.
- **Sort by** – Choose to sort the metrics shown on the widget by Resource name or Metric value.
- **Frame Transition Interval** – How fast the icons change to show each new value. You can enter either between frames or the number of frames per second (fps).
- **Start over delay** – The number of seconds for the display to remain static when it reaches the end of the Metric History period (the most current readings), before it starts over again from the beginning.
■ **Colors** – Determines the colors displayed in the weather map. Click each of the three small blocks under the color bar to set the color for minimum, middle, and maximum values, respectively. The bar will show the color range used for intermediate values.

If desired, you can also set the values to match the high and low end of the color range. If you leave the **Min Value** and **Max Value** fields blank, vCenter Operations Enterprise will map the actual minimum and maximum values of the metric over the time period to the end colors. If you set a minimum or maximum value, any metric at or beyond that value will be shown in the end color.

■ **Resources-Tags** – Use this pane to select the metric to show in the widget. Select a resource tag in the list on the left to display its resources in the center list. Select a resource in the center list to show its metrics in the **Metric Selector** on the right. Select the metric to show in the widget.

### Resources Widget

The Resources widget lists configured resources. You can select the resources to show by editing the widget, or have them provided by the Alerts, Application Overview, Health Status, Health Tree, Advanced Health Tree, Heat Map, Root Cause Ranking, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget. You can configure the Resources widget as a source for many other widgets, so clicking a resource will change the information displayed in those widgets.

![Resources Widget](image)

You can search for resources by entering all or part of the resource name or kind in the **Search** field and clicking the **Search** icon.

The toolbar at the top left of this widget contains five buttons:

■ **Reset Grid Sort** – Returns all column sorting to the default settings.

■ **Reset Interaction** – Returns the widget to its initial configured state, undoing any selections or filters you have changed while viewing it.

■ **Resource Detail** – Displays the Resource Detail page for the selected resource. For more information, see “The Resource Detail Page” on page 48.

■ **Perform Multi-Select Interaction** – To select multiple resources, click the first one, then hold the CTRL key while clicking the others (or hold SHIFT and click to select a range). When you have highlighted all the desired resources, click this button.

■ **Show Filter** – If you are filtering the resource list by resource tag, health status, or collection status, click this icon to see the filter settings.

You can click the **Edit** button on the widget toolbar to open the Edit Resources Widget window. This window contains these options:

■ **Widget title** – The display name of the widget, as shown in the title bar.

■ **Pagination number** – The number of resources displayed on each page.
Mode – Sets whether the widget shows selected resources, their children, or their parents. When Children or Parents is selected, the selected resources themselves are not shown. This is true whether you select the resources by editing this widget or have them provided by another widget.

Refresh Widget Content – Sets the widget to refresh after the time period set in Widget Refresh Interval.

Widget Refresh Interval – How often to refresh the widget content if Refresh Widget Content is On.

Select which tags to filter – To define the resources to show in the widget, select the tag values you want to monitor. If you select more than one value, vCenter Operations Enterprise follows these rules:

- If you select more than one value for the same tag, the widget includes resources that have either value.
- If you select values for two or more different tags, the widget includes only resources that have all the selected values.

You can also “negatively select” the resources to show. If you click the Invert Result icon, the list will include resources which do not match the tag values you’ve selected.

Filter By – Limits the resources displayed to the filters you specify. You can filter by health status (good, abnormal, degraded, bad, or unknown) and collection status (not collecting, starting, collecting, stopping, updating, failed, collector down, configuration invalid, accepting data, not receiving data, in maintenance, in manual maintenance).

NOTE Your selections in Select which tags to filter and Filter By are taken into account even when another widget is providing resources to the resources widget. If the resource provided by the source widget does not meet the filter criteria you’ve selected, it is not shown.

Sort Data By – Sorts the resources displayed in the widget. You can sort by any of the columns you can display in the widget.

Root Cause Ranking Widget

The Root Cause Ranking widget gives an instant view of the probable causes of health degradation for the selected resource. It shows information about metrics on related resources which vCenter Operations Enterprise has determined contributed to alerts on the resource, including the percentage likelihood that each is a cause, based on number of symptoms and when they occurred relative to the alert.
You can view the root causes in two modes:

- **Symptom** – Shows the likely root cause container resources, ranked by the analytical algorithm on the container resource. You can double-click any resource to see the symptom groups, ranked by percentage of possible resources exhibiting symptoms in the group, and double-click any group to see the top five individual symptoms, ranked by percentage of possible resources exhibiting the symptom. Double-click a symptom (or select it and click **Show Bar Details**) to open a pop-up window showing detailed information about it. This is the default.

When viewing individual symptoms, a thin vertical bar in the horizontal bar for the symptom shows when that anomaly began. If the light bulb icon to the right of the symptom bar appears lit, the symptom is still active.

- **Resource** – Lists the individual root cause resources, ranked by number of anomalies. Double-click a resource (or select it and click **Show Bar Details**) to list the individual anomalies.

**NOTE** A change event symptom may include different types of events, with different messages. If all the change events for a symptom are of the same type, the message is shown to the right of the symptom bar (if it does not fit, hover over it to see the full message). If the symptom includes different messages, the text shown is **Multiple Change Events**.

The resources to include in the widget can be provided by the Alerts, Application Overview, Health Status, Health Tree, Advanced Health Tree, Heat Map, Resources, Generic Scoreboard, Health-Workload Scoreboard, or Tag Selector widget, or you can define them using the Edit Root Cause Ranking Widget window.

**NOTE** If the resources are being provided by the Health Status widget, and you click at a point in the past on the health score graph, for a resource, Root Cause Ranking will show root causes as of the time you clicked.

The toolbar at the top of this widget contains these buttons:

- **Auto Refresh** – Refreshes the widget data.
- **Anomalies Activity Period** – Select **All Anomalies** to show all currently active anomalies, or select a time period to show anomalies which were active at some point during the preceding 2, 4, or 6 hours. Then, click the **Go** icon.
- **Show Bar Details** – Opens a new window showing detailed information about the threshold violations that contributed to the selected root cause. This is the same as double-clicking the symptom.
- **Perform Interaction** – Shows the first five alarming metrics for the resource of the selected symptom in either the Metric Graph or Metric Sparklines widget. One of those widgets must be included in the dashboard and be set to receive data from the Root Cause widget for this feature to work. See “**Widget Interaction**” on page 74 for information about setting one widget to receive data from another.
- **Change Mode** – Switches between Resource mode and Symptom mode.

You can double-click any displayed root cause symptom to open a pop-up window listing the individual threshold violations that comprise the symptom. You can then click the **Copy to Clipboard** button to copy the list to the clipboard. For example, you might want to do this if you are opening a problem ticket for the alert, or sending an e-mail message about it.

To see the Dynamic Dashboard for a root cause resource, select it in the pop-up window, then click the **Dynamic Dashboard** button. See “**The Dynamic Dashboard**” on page 38 for a description of the Dynamic Dashboard page.

You can click the **Edit** button on the widget toolbar to open the Edit Root Cause Ranking Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select **On** to show health for resources selected on the Edit window, or **Off** to show only those chosen in the Health, Resources, or Tag Selector widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if **Refresh Widget Content** is **On**.
- **Bars Count** – The number of root cause bars to show on the widget at once.
- **Bars Show** – Whether to show bars for **Symptoms** or **Resources**. If you select resources, you can choose how many resources (bars) to display.
- **Tag Filter** – This box is similar to the tag pane in the Applications Overview screen. Buttons let you filter by application tags, including the following:
  - **Collapse All** – Collapses all application tag branches.
  - **Expand All** – Expands all application tag branches.
  - **Deselect All** – Unselects all application tags from the list.

**Tag Selector Widget**

The Tag Selector widget lists all defined resource tags and tag values. You can select one or more tag values in this widget to change the information shown in the Alerts, Configuration Overview, Health Status, Root Cause Ranking, or Health Tree widget.

If you select more than one value, vCenter Operations Enterprise follows these rules:

- If you select more than one value for the same tag, it includes resources that have either value.
- If you select values for two or more different tags, it includes only resources that have all the selected values.

You can also “negatively select” the tag values. If you click the **Invert Result** icon, only resources which do not match the tag values you’ve selected are included.

The toolbar at the top left contains four buttons:

- **Collapse All**– Collapses all expanded tag branches.
- **Expand All**– Expands all tag branches.
- **Deselect All**– Clears any selected tag values.
- **Perform Multi-Select Interaction** – to select multiple tag values, click the first one, then hold the CTRL key while clicking the others (or hold SHIFT and click to select a range). When you have highlighted all the desired values, click this button.

If you click the **Edit** button, the only option on the Edit Tag Selector Widget window lets you change the display name of the widget.
Top-N Analysis Widget

The Top-N Analysis widget lists the top five (or another number you select) items of a type you select, such as the five metrics showing the highest volatility or the five most (or least) healthy tiers in an application. Seeing the extreme performers in any category can be helpful in assessing the overall performance of your environment. The widget is very similar to the Top-n Analysis feature on the Forensics menu, which is described in “Top-N Analysis” on page 54.

You can select the resources or metrics for the widget to consider by editing the widget, or have resources provided by the Application Overview or Tag Selector widget. To select what type of information to have shown, edit the widget, as described below.

The toolbar at the top left of this widget contains three buttons:

- **Auto Refresh** – refreshes the widget data.
- **Resource Detail** – Displays the Resource Detail page for the selected resource. For more information, see “The Resource Detail Page” on page 48. It does not work in Metric mode.
- **Show Filter** – Click this icon to see the settings currently being used by the widget.

You can click the **Edit** button on the widget toolbar to open the Edit Top-N Analysis Widget window. This window contains these options:

- **Widget title** – The display name of the widget, as shown in the title bar.
- **Self Provider** – Select **On** to select tags or metrics on the Edit window, or **Off** to select them in the providing widget.
- **Refresh Widget Content** – Sets the widget to refresh after the time period set in **Widget Refresh Interval**.
- **Widget Refresh Interval** – How often to refresh the widget content if Refresh Widget Content is On.
- **Period Length** – How far back into the past the widget will look at data.
- **Bar Count** – By default, the widget shows the top five items in the category you select. You can change that to 10 or 15, or select **User Defined** and type any desired number in the field to the right.
- **Widget Mode** – To display items related to resources, select **Tag**. To display items related to specific metrics, select **Metric**. This changes the categories you can select from and whether you select a resource tag or a specific metric for the widget to examine.

**NOTE** Since Metric mode requires you to select a specific metric, it will not give any results if the widget is accepting resources from the Application Overview or Tag Selector widget.
- **Category Selection** – This area lists the various categories you can have the widget show information for. The lists are different for Tag mode and Metric mode. You can select only one category at a time.

- **Tag Selection** – Use this pane to select the resource tag (in Tag mode) or the specific metric (in Metric mode) for the widget to consider when building its list. In Tag mode, just select the tag value to use. In Metric mode, select a resource tag to display its **Resource Kinds** in the center list. Select a resource kind to show its metrics in the **Metrics** list, then select the metric to use. To show only metrics shared by all resources of that kind, click the **Show Common Metrics** icon at the top of the list.

**NOTE**  Some of the automatically assigned vCenter Operations Enterprise tags are not shown in the tag list, as there would be no reason to base a top-N analysis on those tags.
In this section, we discuss how to generate reports in vCenter Operations Enterprise. This section contains the following topics:

- “Preparing to Run a Report” on page 113
- “Uploading a Report Image” on page 113
- “Performance Correlation Report” on page 113
- “Behavior Correlation Report” on page 115
- “Anomaly Correlation Report” on page 115

Preparing to Run a Report

The Reports menu and its submenus allow you to run a variety of reports, including:

- Performance Correlation
- Behavior Correlation
- Anomaly Correlation

You can configure the parameters for each report, including the time period it covers.

You can also change the image shown at the top of each report you run by uploading your own desired image.

NOTE vCenter Operations Enterprise audit reports, available through the Admin menu, are described in the vCenter Operations Enterprise Installation and Administration Guide.

Uploading a Report Image

At any time, you can set a logo to use for a header on each report you run. To do so, follow these steps:

1. From the Reports menu, select Advanced, Upload Default Report Image. The Upload Default Report Image page appears.
2. Click the Browse button. This opens the Find Upload dialog box.
3. Select the image file to use. You can use a .gif, .jpeg, or .bmp file. Click Open.
4. Click Upload. The image you selected will be shown at the top of each report you generate.

Performance Correlation Report

The Performance Correlation report lists resources whose behavior correlates to the behavior of other selected resources. You select two (or more) resource tags and vCenter Operations Enterprise compares the resources belonging to those tags, looking for resources whose metrics and anomalies indicate correlations.
To run a Performance Correlation report


2. In Scope 1 and Scope 2, select the resource tags to compare metrics for. You can select more than one tag value in each field. If you select more than one value, vCenter Operations Enterprise follows these rules:
   - If you select more than one value for the same tag, the selection includes resources that have either value.
   - If you select values for two or more different tags, the selection includes only resources that have all the selected values.
   All tags selected in Scope 1 will be compared to all tags selected in Scope 2.

3. Enter a Correlation cutoff percentage, from 50 to 100. The default is set to generate reports for all metrics with a correlation of 70% or more.

4. In Custom Heading, you can type an identifying header for the report. It will appear on the report directly beneath the title.

5. In the Select Report Type field, choose whether to display the report in HTML format in a new browser window or as a .pdf file.

6. Click Submit. A new window appears, displaying all correlated anomalies.
Behavior Correlation Report

The Behavior Correlation report shows the details of correlated metrics between two chosen resources and their associated symptoms.

To run a Behavior Correlation report


2. In Resource 1 and Resource 2, select the two resources to compare metrics for.

3. Enter a Correlation cutoff percentage, from 50 to 100. The default is set to generate reports for all metrics with a correlation of 70% or more.

4. To generate a report only for correlations between defined KPI and other vCenter Operations Enterprise metrics, check the Only Key Indicators box. This is the default. Clear the check box to include correlations that do not include KPI.

5. In Custom Heading, you can type an identifying header for the report. It will appear on the report directly beneath the title.

6. In the Select Report Type field, choose whether to display the report in HTML format in a new browser window or as a .pdf file.

7. Click Submit. A new window appears, displaying all correlated metrics.

Anomaly Correlation Report

The Anomaly Correlation report shows the details of correlated anomalies between two chosen resources.

To run an Anomaly Correlation report


2. In Resource 1 and Resource 2, select the two resources to compare anomalies for.

3. Enter a Correlation cutoff percentage, from 50 to 100. The default is to include all anomalies with a correlation of 70% or more.
4 To include only correlated anomalies between defined KPI and other vCenter Operations Enterprise metrics, Check the **Only Key Indicators** box. This is the default. Clear the check box to include anomalies that do not include KPI.

5 In **Additional Custom Heading**, you can type an identifying header for the report. It will appear on the report directly beneath the title.

6 In the **Report Type** field, choose whether to display the report in HTML format in a new browser window or as a .pdf file.

7 Click **Submit**. A new window appears, displaying correlated anomalies for the two resources.
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