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## Contents

VMware vCenter Infrastructure Navigator User's Guide  5

1 vCenter Infrastructure Navigator Overview  7
   vCenter Infrastructure Navigator Functionality  7
   vCenter Infrastructure Navigator Target Users and Benefits  8
   Essential Concepts of vCenter Infrastructure Navigator  8
   vCenter Infrastructure Navigator Architecture  9
   Components of vCenter Infrastructure Navigator  9

2 Mapping Overview  11
   Mapping Services  11
   Active Discovery  12
   Remapping Services  12
   Services Supported by vCenter Infrastructure Navigator  12

3 Getting Started with vCenter Infrastructure Navigator  15
   Log in to the vCenter Infrastructure Navigator Portal  15
   Enable or Disable vCenter Infrastructure Navigator Plug-In  16
   vCenter Infrastructure Navigator Notification Messages  17

4 Application Visibility at the Virtual Machine Level  19
   Understanding the Navigator Portlet  19
   Viewing Application Dependencies of a Virtual Machine  20
   Dependency Map and Table Messages  20
   Viewing the Dependency Map  21
   Viewing the Dependency Table  23
   Viewing Details of a Virtual Machine  24
   Defining an Unknown Service  25
   Discovery of External Entities  26
   Aging Process of Dependencies  27
   Understanding the Manual Application Feature  27
   Understanding Application Definition  29

5 Application Visibility at the vCenter Entity Level  33
   Understanding the Navigator Portlet  33
   Viewing Application Dependencies of a vCenter Entity  34
   Viewing the Inventory Table  34
   Filter Text in the Inventory Table  35
   Export Inventory Table  36
   Viewing Details of a vCenter Entity  36
The VMware vCenter Infrastructure Navigator User’s Guide describes the tasks that users can perform using VMware® vCenter™ Infrastructure Navigator™.

Intended Audience

This information is intended for virtual infrastructure administrators who are familiar with virtual machine technology and datacenter operations.
vCenter Infrastructure Navigator Overview

vCenter Infrastructure Navigator is an application awareness plug-in to the vCenter Server that provides continuous dependency mapping of applications.

vCenter Infrastructure Navigator offers application context to the virtual infrastructure administrators to monitor and manage the virtual infrastructure inventory objects and actions. Administrators can use vCenter Infrastructure Navigator to understand the impact of the change on the virtual environment in their application infrastructure.

**NOTE** Plug-ins (also referred to as Extensions) expand the capabilities of vCenter Server by adding features and functionality to the base product.

This chapter includes the following topics:

- “vCenter Infrastructure Navigator Functionality,” on page 7
- “vCenter Infrastructure Navigator Target Users and Benefits,” on page 8
- “Essential Concepts of vCenter Infrastructure Navigator,” on page 8
- “vCenter Infrastructure Navigator Architecture,” on page 9
- “Components of vCenter Infrastructure Navigator,” on page 9

vCenter Infrastructure Navigator Functionality

vCenter Infrastructure Navigator provides a centralized view of your application environment.

vCenter Infrastructure Navigator performs the following high-level functions:

- Maps virtual infrastructure resources such as virtual machines, Web servers, mail servers, database servers, application servers, cache servers, messaging servers, application management servers, and virtualization management servers.
- Displays relationships between virtual machines and external machines through services.
- Allows you to detect inconsistencies from the norm.
- Allows you to take advantage of integration with other VMware products such as vCenter Server, VMware vCenter Site Recovery Manager (SRM), and vCenter Operations Manager.
- Allows you to define multi-tier application pattern and then discovers all of this pattern instances in the vCenter Server. You can then view these application instance maps.
- Allows you to create or define manual applications that in turn allow you to track a group of virtual machines.
- Allows you to create or define roles that you can use to find instances of the applications in your environment.
vCenter Infrastructure Navigator Target Users and Benefits

vCenter Infrastructure Navigator creates a detailed model of the application environment and offers application context to its users.

vCenter Infrastructure Navigator helps virtual infrastructure administrators to accurately answer the following questions:

- Which application services are running on my virtual machines?
- What are the dependencies among application services running on different virtual machines?
- Where are the hidden optimization opportunities and how can I capitalize on them?
- How do certain application changes impact my environment?
- What are the risks involved in making changes in the virtual environment?
- How do certain virtual machine's issues impact application operation and how can I prevent or solve these issues?
- How the integration with SRM and vCenter Operations Manager benefits the users?

Essential Concepts of vCenter Infrastructure Navigator

Before working with vCenter Infrastructure Navigator, you must understand certain concepts related to vCenter Infrastructure Navigator.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mapping</td>
<td>Mapping is a continuous process that creates and maintains a detailed model of your application environment.</td>
</tr>
<tr>
<td>Services</td>
<td>vCenter Infrastructure Navigator maps services that are installed and running in your virtual environment. Services include Web servers, mail servers, database servers, application servers, cache servers, messaging servers, application management servers, and virtualization management servers. To view the list of services supported by vCenter Infrastructure Navigator, see “Services Supported,” on page 12</td>
</tr>
<tr>
<td>vCenter Entity</td>
<td>A vCenter entity is any entity that is part of the Hosts and Clusters inventory pane except a virtual machine. For example, a vCenter Server, an ESX host, a cluster, a datastore are all vCenter entities.</td>
</tr>
<tr>
<td>Change</td>
<td>A change is any modification in the virtual environment. For example, installing a new service is a change.</td>
</tr>
<tr>
<td>Incoming Dependency</td>
<td>When a virtual machine or a service running on it requires information from a service running on the selected virtual machine, a dependency exists between the two virtual machines. This dependency is known as an incoming dependency. For example, if the selected virtual machine serves another virtual machine it is an incoming dependency.</td>
</tr>
<tr>
<td>Outgoing Dependency</td>
<td>When the selected virtual machine or a service running on it requires information from a service running on another virtual machine, a dependency exists between the two virtual machines. This dependency is known as an outgoing dependency. For example, if the selected virtual machine is served by another virtual machine it is an outgoing dependency.</td>
</tr>
</tbody>
</table>
**Manual Application**

Allows you to mark a collection of virtual machines with an application name. For example, vCenter Operations Manager can show the health of an application group rather than that of individual virtual machines.

**Application Definition**

An application definition is a rule or pattern by which a collection of connected virtual machines are identified as a deployed application instance. Application instance is a set of connected virtual machines that matches an application definition.

**vCenter Infrastructure Navigator Architecture**

vCenter Infrastructure Navigator is a virtual appliance that you can deploy on the vCenter Server. A virtual appliance is a virtual machine image that contains software designed to run in a virtual machine.

With the components of vCenter Infrastructure Navigator, you can map services running in your virtual environment, examine the application discovery status, view and analyze the dependency map, and have a centralized view of the entire application environment.

The architecture illustrates various components of vCenter Infrastructure Navigator and their dependencies.

**Figure 1-1. vCenter Infrastructure Navigator Architecture Diagram**

![vCenter Infrastructure Navigator Architecture Diagram](image)

**Components of vCenter Infrastructure Navigator**

A component is a software or software design with a well-defined interface. A component represents specific behavior of the system.

The following table lists and describes principal components of vCenter Infrastructure Navigator.
**Table 1-1. vCenter Infrastructure Navigator Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server in vCenter Infrastructure Navigator</td>
<td>The Server component reconciles the data from Active Discovery and transfers the data to the Database component.</td>
</tr>
<tr>
<td>virtual machine</td>
<td></td>
</tr>
<tr>
<td>Database in vCenter Infrastructure Navigator</td>
<td>The Database component stores the data received from the Server component. The Database component also stores vCenter Infrastructure Navigator configurations. Note: vCenter Infrastructure Navigator does not support storing of data in an external database.</td>
</tr>
<tr>
<td>virtual machine</td>
<td></td>
</tr>
<tr>
<td>vCenter Infrastructure Navigator Plug-In</td>
<td>The vCenter Infrastructure Navigator Plug-In in the vSphere Web Client provides a graphical user interface that you use to view and analyze dependencies.</td>
</tr>
<tr>
<td>in the vSphere Web Client</td>
<td></td>
</tr>
<tr>
<td>Inventory Service</td>
<td>Inventory service is a vSphere component to which vCenter Infrastructure Navigator exports its data.</td>
</tr>
</tbody>
</table>
Mapping Overview

Mapping is a continuous process that creates and maintains a detailed model of your application environment. The mapping process populates the vCenter Infrastructure Navigator Database with the mapped items and identifies the relationships between them.

This chapter includes the following topics:

- “Mapping Services,” on page 11
- “Active Discovery,” on page 12
- “Remapping Services,” on page 12
- “Services Supported by vCenter Infrastructure Navigator,” on page 12

Mapping Services

vCenter Infrastructure Navigator maps services that are installed and running in your virtual environment. Services include Web servers, mail servers, database servers, application servers, cache servers, messaging servers, application management servers, and virtualization management servers. With the mapped data, you can visualize dependencies between services and virtual machines through application dependency mapping.

vCenter Infrastructure Navigator maps services running on virtual machines only if all the following conditions are satisfied:

- The virtual machine is powered on.
- The virtual machine can be reached on the network.
- The vCenter Server credentials are of administrator level. For more information on credentials, see “Log in to the vCenter Infrastructure Navigator Portal,” on page 15.
- The virtual machine is running on a supported ESX version. For the supported ESX/ESXi versions list, see vCenter Infrastructure Navigator Installation and Configuration Guide.
- VMware Tools is installed and running on the virtual machine.
- The VMware Tools version is supported by vCenter Infrastructure Navigator.
- The virtual machine has a supported guest operating system on it.

Note: Microsoft Windows NT, Microsoft Windows 2000, Apple Macintosh, FreeBSD, SCO UnixWare 7, Sun Solaris 9, and Sun Solaris 10 (64-bit) are not supported by vCenter Infrastructure Navigator. Also, vCenter Infrastructure Navigator does not support virtual machines with guest operating system defined during creation as Other (64-bit) and Other (32-bit).

If any one of these condition fails, an Access failed error message is displayed in the Discovery Status field.
Active Discovery

In vCenter Infrastructure Navigator, active discovery is the method used to access the virtual machines. Active discovery is a multithreaded process that uses VMware Tools to access virtual machines.

vCenter Infrastructure Navigator starts the mapping process shortly after installation and if you provide valid administrator-level vCenter Server credentials. vCenter Infrastructure Navigator also supports some minimally privileged users who can start the discovery process. For more information on administrator-level credentials and minimally privileged user, see vCenter Infrastructure Navigator Installation and Configuration Guide. Mapping is continuous, unless you stop or disable vCenter Infrastructure Navigator.

 Depending on the size of your environment, vCenter Infrastructure Navigator begins to populate the inventory table within an hour after you install the virtual appliance and start the discovery process. To view the complete information in the inventory table, dependency map, and dependency table, wait until you have collected at least one hour of data.

*NOTE* If the initial mapping process is incomplete, a *This VM is pending application mapping* message is displayed in place of the dependency map.

Remapping Services

After initial deployment, vCenter Infrastructure Navigator remaps services at a predefined time interval. Remapping ensures that the vCenter Infrastructure Navigator database is up to date and is synchronized with the changes in the virtual environment. The default frequency for remapping is one hour, and is displayed in the Successful Discovery field.

A change is any change in the virtual environment. For example, installing a service is a change. A change in the virtual environment takes effect only after remapping.

When the specified time interval has elapsed, vCenter Infrastructure Navigator rediscovers the change. For example, if you install a service on a powered-on virtual machine, vCenter Infrastructure Navigator discovers this service within one hour, the default frequency for remapping.

Also, the vCenter vCenter Infrastructure Navigator server is refreshed with the vCenter Server changes by synchronizing with the vCenter Server every five minutes and the Discovery Status field is updated with the relevant information. For example, consider a virtual machine with services installed and running on it is powered off. Within five minutes after the virtual machine is powered off, vCenter Infrastructure Navigator discovers the change as the vCenter Server is refreshed and updates this in the Discovery Status field. The services that have been discovered on the virtual machine before the virtual machine was powered off remain on the virtual machine. The Successful Discovery field displays the time elapsed since vCenter Infrastructure Navigator last discovered the virtual machine when it was up and running.

Services Supported by vCenter Infrastructure Navigator

vCenter Infrastructure Navigator maps services that are installed and running in your virtual environment.

Services Supported

The following table lists and describes the services supported by vCenter Infrastructure Navigator along with the supported versions and service name as displayed in the UI.
<table>
<thead>
<tr>
<th>Category</th>
<th>Service Name</th>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Server</td>
<td>Apache HTTP</td>
<td>2.0.X, 2.2.X</td>
<td>The Apache HTTP Server, also known as Apache, is an open-source Web server that provides HTTP services in sync with the current HTTP standards.</td>
</tr>
<tr>
<td></td>
<td>IIS</td>
<td>6.0.X</td>
<td>The Internet Information Services (IIS) is a flexible, secure, and easy-to-manage Web server developed by Microsoft for use with Microsoft Windows.</td>
</tr>
<tr>
<td></td>
<td>Nginx</td>
<td>0.7, 0.8</td>
<td>The nginx is a lightweight, HTTP, and reverse proxy server, as well as a mail proxy server that runs on UNIX, Linux, BSD variants, Mac OS X, Solaris, and Microsoft Windows.</td>
</tr>
<tr>
<td></td>
<td>SharePoint</td>
<td>2007, 2010</td>
<td>Microsoft SharePoint is a centralized web application platform and a replacement for multiple web applications. In the user interface, the single server installation of SharePoint appears as SharePoint Server, Web-server Front End appears as SharePoint Web Server, and Application appears as SharePoint Application Server.</td>
</tr>
<tr>
<td>Cache Server</td>
<td>GemFire</td>
<td>6.0, 6.5</td>
<td>VMware vFabric GemFire is a distributed data management platform that provides dynamic scalability, high performance, and data management capabilities of a database.</td>
</tr>
<tr>
<td>Mail Server</td>
<td>Exchange</td>
<td>2003, 2007, 2010</td>
<td>Microsoft Exchange Server is the server side of the messaging application used by enterprises.</td>
</tr>
<tr>
<td>Database Server</td>
<td>Oracle DB</td>
<td>11g</td>
<td>The Oracle Database is an Object-Relational Database Management System (ORDBMS).</td>
</tr>
<tr>
<td></td>
<td>MS-SQL DB</td>
<td>9.0, 10.0, 10.5</td>
<td>Microsoft SQL Server is a relational model database server.</td>
</tr>
<tr>
<td></td>
<td>DB2</td>
<td>9.5, 9.7</td>
<td>IBM DB2 Enterprise Server Edition is a relational model database server that runs on Unix, Linux, IBM i, z/OS and Windows servers.</td>
</tr>
<tr>
<td></td>
<td>MySQL DB</td>
<td>5.1, 5.5</td>
<td>MySQL is an open source Relational Database Management System (RDBMS) that runs as a server, providing multi-user access to a number of databases.</td>
</tr>
<tr>
<td></td>
<td>Sybase DB</td>
<td>15.0, 15.5</td>
<td>Adaptive Server Enterprise (ASE) is a Relational Database Management System (RDBMS) developed by Sybase Corporation.</td>
</tr>
<tr>
<td>Application Server</td>
<td>Apache Tomcat</td>
<td>6.0.X, 7.0</td>
<td>Apache Tomcat is an open-source software implementation of the Java Servlet and JavaServer Pages (JSP) technologies that provides an environment for Java code to run.</td>
</tr>
<tr>
<td></td>
<td>tc Server</td>
<td>2.0, 2.1.1</td>
<td>tc Server is a lightweight application server that provides an enterprise version of the Apache Tomcat application server optimized for cloud and virtual environments.</td>
</tr>
<tr>
<td></td>
<td>WebSphere</td>
<td>6.1, 7.0</td>
<td>WebSphere Application Server (WAS) is a software application server developed by IBM that builds, deploys, and manages SOA business applications and services.</td>
</tr>
<tr>
<td></td>
<td>WebLogic</td>
<td>10.3</td>
<td>Oracle WebLogic Server is an application server for building and deploying enterprise Java EE applications.</td>
</tr>
<tr>
<td></td>
<td>JBoss</td>
<td>5.1, 6.0</td>
<td>JBoss Application Server is an open-source Java EE-based application server that provides Java EE 5 features along with extended enterprise services including clustering, caching, and persistence.</td>
</tr>
<tr>
<td>Virtualization Management</td>
<td>VMware vCenter</td>
<td>4.1, 5.0</td>
<td>VMware vCenter Server centrally manages VMware vSphere environments and improves IT administrators control over the virtual environment.</td>
</tr>
<tr>
<td>Category</td>
<td>Service Name</td>
<td>Version</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>VMware vCloud Director</td>
<td>1.1, 1.5</td>
<td></td>
<td>VMware vCloud Director delivers cloud infrastructure on-demand so that the end users can consume virtual resources with maximum agility. Consolidate datacenters and deploy workloads on shared infrastructure with built-in security and role-based access control. Migrate workloads between different clouds and integrate existing management systems using customer extensions, APIs, and open cross-cloud standards.</td>
</tr>
<tr>
<td>VMware vShield Manager</td>
<td>4.1, 5.0</td>
<td></td>
<td>VMware vShield Manager provides a central point of control for managing, deploying, reporting, logging and integrating vShield as well as third-party security services. Working in conjunction with vCenter Server, vShield Manager enables role based access control and separation of duties as part of a unified framework for managing virtualization security.</td>
</tr>
<tr>
<td>VMware vCenter Operations Standard</td>
<td>1.0.0, 1.0.1</td>
<td></td>
<td>vCenter Operations Standard is a tool for monitoring and managing the performance of your virtual environment. vCenter Operations Standard collects performance data from each object at every level of your virtual infrastructure, from individual virtual machines and disk drives to entire clusters and data centers. It stores and analyzes the data, and uses that analysis to provide real-time information about problems, or potential problems, anywhere in your enterprise.</td>
</tr>
<tr>
<td>Application Management</td>
<td>VMware View Server</td>
<td>4.6, 5.0</td>
<td>VMware View simplifies desktop and application management while increasing security and control. Delivers a personalized high fidelity experience for end-users across sessions and devices.</td>
</tr>
<tr>
<td>Messaging Server</td>
<td>RabbitMQ</td>
<td>1.8.1, 2.3.1</td>
<td>RabbitMQ is an open-source, enterprise messaging system that uses Advanced Message Queuing Protocol (AMQP). RabbitMQ provides robust messaging for applications.</td>
</tr>
<tr>
<td>Disaster Recovery Server</td>
<td>Site Recovery Manager</td>
<td>4.1, 5.0</td>
<td>Site Recovery Manager is used for disaster protection and site migration for all virtualized applications migration.</td>
</tr>
<tr>
<td>Replication Management Server</td>
<td>1.0</td>
<td></td>
<td>Replication Server is a part of the host based replication solution for SRM.</td>
</tr>
</tbody>
</table>
Getting Started with vCenter Infrastructure Navigator

You can use the vCenter Infrastructure Navigator portal to view and analyze the information collected during discovery.

This chapter includes the following topics:

- “Log in to the vCenter Infrastructure Navigator Portal,” on page 15
- “Enable or Disable vCenter Infrastructure Navigator Plug-In,” on page 16
- “vCenter Infrastructure Navigator Notification Messages,” on page 17

Log in to the vCenter Infrastructure Navigator Portal

You can access the vCenter Infrastructure Navigator portal through the vSphere Web Client. vCenter Infrastructure Navigator is compatible only with the vSphere Web Client and does not support the .NET client.

Prerequisites

- Install and deploy the vCenter Infrastructure Navigator plug-in on a vCenter Server from which you want to administer vCenter Infrastructure Navigator. For more information, see vCenter Infrastructure Navigator Installation and Configuration Guide.

- You must have administrator privileges to use the services offered by vCenter Infrastructure Navigator. An administrator is a user that is assigned the administrator role on the vCenter Server or a user in a group that is assigned the administrators role on the vCenter Server. A user or group must be assigned with the administrator role on the root folder and all the child folders that are propagating from root folder. For more information on assigning privileges, see vCenter Infrastructure Navigator Installation and Configuration Guide.

Procedure

   By default the port is 9443, but this can be changed during vSphere Web Client installation.

2. Enter administrator credentials in the Username and Password fields.

3. Click Login to connect to the vCenter Server.

4. If vCenter Infrastructure Navigator plug-in is deployed correctly, you can see the Application Services tab under Manage tab at the vCenter entity level and Application Dependencies tab under Manage tab at the virtual machine level.
If you have all the required privileges, services running in your virtual environment are displayed. Otherwise, the message *Infrastructure Navigator can only be used by vCenter Server administrators* is displayed.

**Note**  
$vCenter$ Infrastructure Navigator displays the services running in your virtual environment within approximately an hour of you installing the virtual appliance. To view the complete information, wait until you have collected at least one hour of data. You can manually start or stop the discovery process, start or stop SRM integration, and uninstall $vCenter$ Infrastructure Navigator virtual appliance. For more information, see  
$vCenter$ Infrastructure Navigator Installation and Configuration Guide.

## Enable or Disable vCenter Infrastructure Navigator Plug-In

You can enable or disable $vCenter$ Infrastructure Navigator plug-in through the Plug-in Manager. After you install the $vCenter$ Infrastructure Navigator plug-in, it is enabled by default.

### Prerequisites

Install and deploy the $vCenter$ Infrastructure Navigator plug-in on a $vCenter$ Server from which you want to administer $vCenter$ Infrastructure Navigator. For more information, see  
vCenter Infrastructure Navigator Installation and Configuration Guide.

### Procedure

1. Log in to $vSphere$ Web Client.
2. From the inventory menu, click **Administration**.  
   The Administration screen appears.
3. Click **Plug-in Management**.  
   The Plug-in Management screen appears.
4. Right-click **vCenter Infrastructure Navigator**.  
   The Disable Plug-in dialog box appears.
5. Click **Yes** to disable the $vCenter$ Infrastructure Navigator plug-in.
   **Note**  
   Disabling the plug-in does not remove it from the client. You must uninstall the plug-in to remove it.
6. To enable the disabled plug-in, right-click **vCenter Infrastructure Navigator**.  
   The Enable Plug-in dialog box appears.
7. Click **Yes** to enable the $vCenter$ Infrastructure Navigator plug-in.

When you disable the plug-in, the Application Services tab and the Navigator portlet in the Summary tab is not visible in the $vSphere$ Web Client, but $vCenter$ Infrastructure Navigator continues the mapping process in the background.
vCenter Infrastructure Navigator Notification Messages

vCenter Infrastructure Navigator displays notification messages when any general system error or any credentials error. The notification messages appear in the Application Dependencies tab at the virtual machine level and at the Application Services tab at the vCenter Entity level. The notification messages related to SRM appears only when SRM server is configured to work with vCenter Infrastructure Navigator.

In case of more than one notification message, vCenter Infrastructure Navigator displays the most important notification according to the priorities mentioned below.

Table 3-1. Notification Messages

<table>
<thead>
<tr>
<th>Priority</th>
<th>Icon</th>
<th>Icon Description</th>
<th>Error Summary</th>
<th>Error Description</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Critical</td>
<td>Navigator server is not responding.</td>
<td>Unable to retrieve data from the Navigator server as it is not responding.</td>
<td>Refresh or restart the Navigator server.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Info</td>
<td>Discovery is off.</td>
<td>Data might not be accurate because Navigator discovery is off.</td>
<td>Click the Turn on discovery link to start the discovery process.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Critical</td>
<td>Invalid or insufficient vCenter credentials.</td>
<td>Data might not be accurate as the vCenter credentials are invalid.</td>
<td>Click Set the vCenter credentials link to enter the vCenter Server credentials.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Warning</td>
<td>SRM integration is stopped.</td>
<td>SRM integration is stopped due to invalid credentials.</td>
<td>Click Set the SRM credentials to enter the SRM credentials.</td>
</tr>
</tbody>
</table>

Also, if there is any error in retrieving data from SRM server, the Error in retrieving data from the SRM server popup message is displayed. If there is any error in retrieving data from the vCenter Infrastructure Navigator server, the Error in retrieving data from the Infrastructure Navigator server popup message is displayed. At the vCenter Entity level, if there is any error in retrieving data from the vCenter Infrastructure Navigator server there is no popup message, but Error in retrieving data from the Infrastructure Navigator server message is displayed in the Application Services tab and the portlet is empty.
You can view the application dependency of a virtual machine to manage your vSphere inventory. The inventory appears in the left pane and displays all the virtual machines managed by the vCenter Server.

You can view the services offered by vCenter Infrastructure Navigator on a virtual machine by selecting a virtual machine from the inventory. The selected virtual machine name is highlighted in the inventory and its details appear in the Navigator portlet in the Summary tab.

This chapter includes the following topics:

- “Understanding the Navigator Portlet,” on page 19
- “Viewing Application Dependencies of a Virtual Machine,” on page 20
- “Dependency Map and Table Messages,” on page 20
- “Viewing the Dependency Map,” on page 21
- “Viewing the Dependency Table,” on page 23
- “Viewing Details of a Virtual Machine,” on page 24
- “Defining an Unknown Service,” on page 25
- “Discovery of External Entities,” on page 26
- “Aging Process of Dependencies,” on page 27
- “Understanding the Manual Application Feature,” on page 27
- “Understanding Application Definition,” on page 29

**Understanding the Navigator Portlet**

The Navigator portlet in the Summary tab gives a summarized result of the mapping process carried out on the selected virtual machine.

The following table lists and describes the fields in the Navigator portlet.
Table 4-1. Navigator Portlet

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery Status</td>
<td>Displays the discovery status of the virtual machine.</td>
</tr>
<tr>
<td></td>
<td>■ Normal: Indicates absence of any error. For more information, see “Mapping Services,” on page 11.</td>
</tr>
<tr>
<td></td>
<td>■ Access failed: Indicates that the mapping process failed on the selected virtual machine and displays an error message stating the reason for failure.</td>
</tr>
<tr>
<td></td>
<td>The field also displays a green icon for a Normal status and a gray icon for a Access failed status.</td>
</tr>
<tr>
<td>Successful Discovery</td>
<td>Displays the time elapsed since the last successful discovery of the virtual machine.</td>
</tr>
<tr>
<td>Application services</td>
<td>Displays a comma-separated list of services installed and running on the selected virtual machine. In case of multiple services with the same version or multiple services without any version, the service name is displayed once with number of instances in parenthesis.</td>
</tr>
<tr>
<td>Dependencies</td>
<td>Displays the total number of dependencies including incoming and outgoing dependencies. Click Dependencies to view the number of incoming and outgoing dependencies.</td>
</tr>
<tr>
<td>Incoming</td>
<td>When a virtual machine or a service running on it requires information from a service running on the selected virtual machine, a dependency exists between the two virtual machines. This dependency is known as an incoming dependency. For example, if the selected virtual machine serves another virtual machine it is an incoming dependency.</td>
</tr>
<tr>
<td>Outgoing</td>
<td>When the selected virtual machine or a service running on it requires information from a service running on another virtual machine, a dependency exists between the two virtual machines. This dependency is known as an outgoing dependency. For example, if the selected virtual machine is served by another virtual machine it is an outgoing dependency.</td>
</tr>
</tbody>
</table>

To view the dependency map of the selected virtual machine, click Show dependencies at the bottom of the Navigator portlet or click the Application Dependencies tab under Manage tab from the toolbar.

Viewing Application Dependencies of a Virtual Machine

By default the Application Dependencies tab displays the first level application dependencies in a map and tabular form of the selected virtual machine. The information panel displays additional information about the selected virtual machine, which is present at the bottom of the screen. You can select the way that you want to see the application dependencies in a map or tabular form by using the Application Dependencies drop-down menu.

The Application Dependencies tab also shows second-level application dependencies in a map form of all the virtual machines except the selected virtual machine. For more information about viewing second-level application dependencies, see “Viewing Second-Level Application Dependencies,” on page 22.

Dependency Map and Table Messages

vCenter Infrastructure Navigator displays messages in the dependency map and dependency table depending on the discovery status of a virtual machine and the information-retrieval action that is being performed on the virtual machine.

You might encounter the following messages while using Infrastructure Navigator.

Table 4-2. Dependency Map and Table Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loading</td>
<td>The dependency map or table is being loaded with relevant data.</td>
</tr>
<tr>
<td>Access failed. VMware Tools is not installed</td>
<td>Discovery failed as VMware tools is not installed on the selected virtual machine.</td>
</tr>
</tbody>
</table>
Table 4-2. Dependency Map and Table Messages (Continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access failed. VM is powered off or suspended</td>
<td>The selected virtual machine is powered off or suspended.</td>
</tr>
<tr>
<td>Retrieving data from SRM</td>
<td>Infrastructure Navigator is retrieving data from the SRM.</td>
</tr>
<tr>
<td>SRM integration is stopped</td>
<td>The integration of the SRM is stopped.</td>
</tr>
<tr>
<td>This VM is pending application mapping</td>
<td>The initial mapping process is incomplete.</td>
</tr>
<tr>
<td>Access failed. The disk is full</td>
<td>Infrastructure Navigator is unable to perform discovery on the targeted virtual machine because the disk of targeted virtual disk is full.</td>
</tr>
</tbody>
</table>

Viewing the Dependency Map

The dependency map is a map of relationships that displays the services installed and running on a virtual machine. The dependency map displays all virtual machines connected to the selected virtual machine by incoming or outgoing dependencies. The name of the selected virtual machine appears at the top of the dependency map. The dependency map also displays the total number of unknown services running on that particular virtual machine that have connections. If you have integrated SRM with vCenter Infrastructure Navigator, the SRM Protection Groups and SRM Recovery Plans of the selected virtual machine are also displayed in the dependency map. If a virtual machine is part of a vApp, then the vApp name is also displayed in the dependency map.

The following table lists and describes the icons that is being used in the vCenter Infrastructure Navigator dependency map.

Table 4-3. Dependency Map Icons

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Icon]</td>
<td>Represents a virtual machine. The name of the virtual machine appears next to the icon. If you select a virtual machine it is highlighted in dark blue.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Represents services running on the selected virtual machine. The names of the services appear below the virtual machine that you have selected.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Represents that the particular virtual machine is being protected by SRM. The information related to SRM also appears. Appears only when SRM integration is on and the virtual machine is being protected by SRM.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Represents a vApp. If a virtual machine is part of a vApp, then the vApp name also appears.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Represents a critical alarm on a virtual machine. This icon appears next to the virtual machine name. At the tool tip, the total number of warning alarms is listed. If you click the icon, it links to the Issues tab under Monitor tab of that particular virtual machine.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Represents a warning alarm on a virtual machine. This icon appears next to the virtual machine name. At the tool tip, the total number of warning alarms is listed. If you click the icon, it links to the Issues tab under Monitor tab of that particular virtual machine.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Represents a button that you can click to view the second level incoming and outgoing dependencies. This button is present in all the virtual machines except the selected virtual machine and external entities. The total number of incoming or outgoing dependencies is displayed on the button. For example, if there are 4 incoming dependencies for any particular virtual machine except the selected virtual machine, the number 4 is displayed on the button. For more information, see “Viewing Second-Level Application Dependencies,” on page 22.</td>
</tr>
</tbody>
</table>
In case of an outgoing connection from the selected virtual machine (VM1) to another virtual machine
(VM2) that is part of the virtual environment monitored by vCenter Infrastructure Navigator, VM2 appears
in the dependency map as an outgoing dependency. In case of an incoming connection from a virtual
machine (VM1) to the selected virtual machine (VM2) that is part of the virtual environment monitored by
vCenter Infrastructure Navigator, VM1 appears in the dependency map as an incoming dependency.

The arrows in a dependency map determine whether a dependency is outgoing or incoming. An outgoing
arrow from the selected virtual machine denotes an outgoing dependency and an incoming arrow to the
selected virtual machine denotes incoming dependency.

In the dependency map, you can double-click another virtual machine (VM3) to navigate to that virtual
machine and view its dependency map. The navigation is successful when the following changes occur:

- The other virtual machine (VM3) is highlighted in dark blue.
- The other virtual machine (VM3) is highlighted in the left inventory pane.
- The information panel displays details of the other virtual machine (VM3).

**Note** If you try to open a dependency map with more than 70 direct connections, the dependency map is
not loaded and the Too many connections. Redirecting to table view message is displayed. After three
seconds, you will be redirected to table view. Also, vCenter Infrastructure Navigator discovers and displays
machines, services, and dependencies that are external to the current vCenter Server. For more information,
see “Discovery of External Entities,” on page 26.

### Viewing Second-Level Application Dependencies

You can now view the next level of application dependencies that is dependent or serves the virtual
machine.

To view second-level application dependencies, two buttons, represented by 🔄, are present at the bottom
of each virtual machine except the selected virtual machine. The button on the left is for incoming
application dependency, and the total number of incoming dependency is displayed on the button. The
button on the right is for outgoing application dependency, and the total number of outgoing dependency is
displayed on the button. If there are no dependencies to display, the button is disabled and the tool tip
shows a No more dependencies to display message. If you click any one of these buttons, it displays the
next level of application dependencies that is dependent or serves the virtual machine and the button is
grayed out. The first level application dependency is shown in dark blue color and the second-level
application dependencies are shown in dark green color. You can remove the newly discovered virtual
machines and its connections that have been discovered by this functionality by clicking the 🔄 icon on the
upper right corner of the virtual machine. If you remove a second-level dependent virtual machine, the
count on the button of the original virtual machine is increased by one. You can retrieve all the second-level
dependent virtual machines by again clicking on the button of the original virtual machine.

**Note** If a virtual machine has more than 70 incoming or outgoing dependencies, then the 🔄 is disabled
and at the tool tip

Too many connections. Double-click the virtual machine to see its first level dependencies in
table view

message is displayed.

### Understanding the Dependency Map Toolbar

You can use the control buttons on the Dependency Map toolbar to manage the dependency map.

The Dependency Map toolbar appears above the dependency map.
Table 4-4. Dependency Map Control Buttons

<table>
<thead>
<tr>
<th>Control Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Button Icon]</td>
<td>Represents a button that you can click to create manual application. For more information, see “Create Manual Application,” on page 27.</td>
</tr>
<tr>
<td>![Button Icon]</td>
<td>Represents a button that you can click to rename an application. For more information, see “Rename Manual Application,” on page 28.</td>
</tr>
<tr>
<td>![Button Icon]</td>
<td>Represents a button that you can click to add application members, see “Add Application Members,” on page 28.</td>
</tr>
<tr>
<td>![Button Icon]</td>
<td>Represents a button that you can click to remove the virtual machines from the selected application. For more information, see “Remove Virtual Machines from the Dependency Map of an Application,” on page 28.</td>
</tr>
<tr>
<td>![Magnifier Icon]</td>
<td>The Magnifier icon opens a magnifying glass that magnifies the dependency map if you move the glass over the dependency map. Click the icon again to close the magnifier glass.</td>
</tr>
<tr>
<td>![Overview Icon]</td>
<td>The Overview icon opens an overview image to the left of the dependency map. You can click the overview image to navigate within the dependency map. Click the icon again to close the overview image.</td>
</tr>
<tr>
<td>![Fit Content Icon]</td>
<td>The Fit content icon adjusts the magnification of the dependency map so that the dependency map exactly fits in the rectangular map pane.</td>
</tr>
<tr>
<td>![Zoom In Icon]</td>
<td>The Zoom in icon magnifies the dependency map by preset levels. You can use your mouse wheel to change the size of the dependency map. Place the cursor on the dependency map and roll the mouse wheel forward to zoom in on the map.</td>
</tr>
<tr>
<td>![Zoom Out Icon]</td>
<td>The Zoom out icon shrinks the dependency map by preset levels. You can use your mouse wheel to change the size of the dependency map. Place the cursor on the dependency map and roll the mouse wheel backward to zoom out.</td>
</tr>
<tr>
<td>![Export Icon]</td>
<td>Represents a button that you can click to export the displayed Dependency Map as an image.</td>
</tr>
</tbody>
</table>

You can also move the dependency map in any direction. To move the dependency map, left-click the dependency map and drag the mouse in the desired direction without releasing the mouse button.

Apart from these buttons, the toolbar has two drop-down menus. You can view the application dependencies in either Map View or Table View by using the Application Dependencies drop-down menu. The Display map of drop-down menu by default displays the first level application dependencies dependency map.

Viewing the Dependency Table

The dependency table is the dependency map in a tabular form. In addition to the virtual machine name and services installed, it displays the virtual machine state, virtual machine status, discovery status, and the time elapsed since last successful discovery of the selected virtual machine. The name of the selected virtual machine appears at the top of the dependency table.

In the Application Dependencies tab, select Table View from the Application Dependencies drop-down menu to view the first level application dependency table of the selected virtual machine along with the incoming dependency table and outgoing dependency table.

The three tables displayed are the sub tables of the inventory table.

- The Incoming dependencies table displays the details of all virtual machines that depend on the selected virtual machine.
- The Virtual Machine name table displays the details of the selected virtual machine.
- The Outgoing dependencies table displays the details of all virtual machines that the selected virtual machine depends on.
If the virtual machine has no incoming dependencies, a No incoming dependencies message is displayed in place of the Incoming dependencies table. If the virtual machine has no outgoing dependencies, a No outgoing dependencies message is displayed in place of the Outgoing dependencies table.

Table 4-5. Dependency Table

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Displays the virtual machine name as displayed in the vCenter inventory panel.</td>
</tr>
<tr>
<td>Services</td>
<td>Displays a comma-separated list of mapped services along with their versions that are running on the selected virtual machine. In case of multiple services with the same version or multiple services without any version, the service name is displayed once with the number of instances in parenthesis.</td>
</tr>
<tr>
<td>Discovery Status</td>
<td>Displays the discovery status of the virtual machine.</td>
</tr>
<tr>
<td></td>
<td>◦ Normal. Indicates absence of any error. For more information, see &quot;Mapping Services,&quot; on page 11.</td>
</tr>
<tr>
<td></td>
<td>◦ Access failed. Indicates that the mapping process failed on the selected virtual machine, and displays an error message stating the reason for failure.</td>
</tr>
<tr>
<td></td>
<td>The field also displays a green icon for a Normal status and a gray icon for Access failed status.</td>
</tr>
<tr>
<td>Successful Discovery</td>
<td>Displays the time elapsed since the last successful discovery of the virtual machine.</td>
</tr>
<tr>
<td>Protection Group</td>
<td>Displays the SRM protection group of the virtual machine. A blank field indicates that the virtual machine does not belong to any SRM protection group.</td>
</tr>
<tr>
<td>Recovery Plans</td>
<td>Displays a comma-separated list of SRM recovery plans for the virtual machine. A blank field indicates that the virtual machine does not belong to any SRM recovery plan.</td>
</tr>
</tbody>
</table>

The Protection Group and Recovery Plans column appears only if you decide to integrate vCenter Infrastructure Navigator with SRM. For information about SRM integration, see vCenter Infrastructure Navigator Installation and Configuration Guide.

Viewing Details of a Virtual Machine

The information panel displays the details of the selected virtual machine and appears at the bottom of the dependency table and dependency map. The information displayed in the information panel is not displayed in the dependency map or the dependency table. The information panel appears very small, although you can drag the link above the information panel to view the complete information.

The following table lists and describes the fields in the General tab of the information panel.

Table 4-6. General Tab

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest OS</td>
<td>The name of the guest operating system installed on the selected virtual machine.</td>
</tr>
<tr>
<td>DNS name</td>
<td>The Domain Name System (DNS) name of the selected virtual machine.</td>
</tr>
<tr>
<td>IP Addresses</td>
<td>A comma-separated list of IP addresses of the selected virtual machine.</td>
</tr>
<tr>
<td>Host</td>
<td>The name of the ESX host on which the selected virtual machine resides.</td>
</tr>
<tr>
<td>Cluster</td>
<td>The name of the cluster assigned to the selected virtual machine.</td>
</tr>
<tr>
<td>Storage</td>
<td>The name of the storage assigned to the selected virtual machine.</td>
</tr>
<tr>
<td>Networks</td>
<td>The name of the network assigned to the selected virtual machine.</td>
</tr>
<tr>
<td>VMware Tools</td>
<td>Displays the status of the VMware Tools installed on the selected virtual machine.</td>
</tr>
<tr>
<td>vApp Name</td>
<td>The name of the vApp to which the selected virtual machine belongs.</td>
</tr>
</tbody>
</table>
By default, Services tab shows all the known services and unknown services that has at least one incoming dependency. If you want to see the unknown services with no incoming dependency, select the checkbox that is present above the table.

**Table 4-7. Services Tab**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Displays the icons of supported service and unsupported service.</td>
</tr>
<tr>
<td>Action</td>
<td>A  icon allows you to create user-defined services out of unknown services.</td>
</tr>
<tr>
<td></td>
<td>For more information, see “Create User-Defined Service,” on page 25. A  icon</td>
</tr>
<tr>
<td></td>
<td>allows you edit the details of an user-defined service. For more information,</td>
</tr>
<tr>
<td></td>
<td>see “Edit User-Defined Service,” on page 26. A  icon removes the user-defined</td>
</tr>
<tr>
<td></td>
<td>service. For more information, see “Delete User-Defined Service,” on page 26.</td>
</tr>
<tr>
<td>Name</td>
<td>Displays the name of the service if it is a supported service. If the service</td>
</tr>
<tr>
<td></td>
<td>is an unknown service then the name displayed is Unknown Service.</td>
</tr>
<tr>
<td>Listening Ports</td>
<td>Comma-separated list of listening port numbers of the selected virtual machine.</td>
</tr>
<tr>
<td>Category</td>
<td>Displays the name of the category the supported service belongs to. If the service</td>
</tr>
<tr>
<td></td>
<td>is an unknown service, then the category name displayed is Unknown.</td>
</tr>
<tr>
<td>Process Using Port</td>
<td>Displays the name of the process that runs on the listening port of the selected virtual machine.</td>
</tr>
<tr>
<td># Incoming Dependencies</td>
<td>Displays the number of incoming dependencies to the selected virtual machine.</td>
</tr>
</tbody>
</table>

**Defining an Unknown Service**

Services that are not part of the vCenter Infrastructure Navigator knowledge base are categorized as unknown services. You can define an unknown service as a user-defined service and enlarge the knowledge base.

**Create User-Defined Service**

You can create user-defined services out of unknown services. If you create a user-defined service, all the virtual machines that run the service on the defined port number and process name display the service.

**Procedure**

1. In the Services tab of the information panel, click the Add a service definition icon.
   The Create User Defined Service Definition window appears. If multiple ports or multiple processes are related to the unknown service, you can select them from the drop-down menu.
2. Select either Port or Process, or both check boxes.
   If you select both port and process name name to define a service, it takes precedence over the service that you have defined by using only port or process name.
3. Type a name for the unknown service.
4. Select the category from the Category drop-down menu.
5. Click OK.

The user-defined service replaces the unknown service in the information panel and also in the Summary tab at the vCenter Entity level.

**Note** On external entities, the definition of unknown services includes port number, name, and category. If you create a user-defined service for internal virtual machines and include process name, this definition does not apply to the external virtual machines.
**Edit User-Defined Service**

You can edit user defined services that you have already created. The edit definition results in changes to all services that match this definition.

**Procedure**

1. In the **Services** tab of the information panel, click the **Edit the service definition** icon 📊.
   
The Edit User Defined Service Definition window appears.

2. Select the definition that you want to edit from the drop-down menu.
   
The **Port** and **Process** information related to the selected definition is populated by default and the current definition name is displayed.

3. Type a new name for the definition.

4. (Optional) If you want to change the category, select the new category from the drop-down menu.

5. Click **OK**.
   
The new definition name is applied to the user-defined service.

**Note** Only one definition can be edited for each instance of Edit User Defined Service Definition window. If you want to edit another user-defined service, perform the same procedure again.

**Delete User-Defined Service**

You can delete a user-defined service definition that you have created. Deleting the definition affects all services that match the definition.

**Procedure**

1. In the **Services** tab of the information panel, click the **Delete the service definition** icon 🗑.
   
The Delete User Defined Service Definition window appears.

2. From the drop-down menu, select the definition that you want to delete.
   
The **Port**, **Process**, **Name**, and **Category** fields are populated by default for the selected definition.

3. Click **OK**.
   
The definition is removed from the vCenter Infrastructure Navigator database.

**Discovery of External Entities**

vCenter Infrastructure Navigator discovers and displays machines, services, and dependencies that are external to the current vCenter Server. An external machine with more than one IP address is discovered as separate external machines. Also, different external machines with the same IP address are discovered as a single external machine.

An external virtual machine is shown in a gray color in the dependency map and is represented by its DNS name. If a DNS name does not exist, the dependency map displays the IP address of the external virtual machine. If you select a machine that is external to your current vCenter Server environment, the information panel displays the details of the selected external machine at the bottom of the dependency table and dependency map.
The Service tab displays the services running on the external virtual machine. The General tab displays the message

This is an external IP address. It can be either a physical machine or a virtual machine, which is not managed by the vCenter Server that Navigator is deployed on.

**Aging Process of Dependencies**

To keep database, portlets, and the map accurate and updated with relevant connections, vCenter Infrastructure Navigator removes non-frequently used dependencies.

To provide only the relevant dependencies among the virtual machines and among services, vCenter Infrastructure Navigator removes non-frequently used dependencies for a selected period of inactivity. The inactivity period is non-configurable and is set to three days.

For example, a dependency between a source and a target where the source is a virtual machine and the target is a service, a virtual machine, or an external entity disappears if the dependency has not been discovered in the past inactivity period. vCenter Infrastructure Navigator keeps track of the last time the dependency was discovered. If discovery is turned off and later turned back on, vCenter Infrastructure Navigator resets the countdown of the inactivity period.

**Understanding the Manual Application Feature**

The manual application feature allows you to mark a collection of virtual machines with an application name. For example, vCenter Operations Manager can show the health of an application group rather than that of individual virtual machines.

The manual application feature's requirements are as follows.

- A manual application must be unique, that is, two manual applications cannot have the same name.
- The name of the manual application is limited to 128 characters.

The manual application feature's functionalities are as follows.

- You can use the Dependency Map for creating a manual application.
- You can create manual applications with virtual machines that are not connected.
- Manual applications are listed in the **Display map of** drop-down menu.
- If the spotlighted virtual machine does not belong to any application, the **Display map of** drop-down menu only shows the first level dependencies of that virtual machine.
- If you create a manual application by using only external entities, you cannot view the created manual application.

**Create Manual Application**

You can create a manual application to mark the collection of virtual machines with an application name. You can then filter and show the virtual machines that belong to a certain application.

**Procedure**

1. At the virtual machine level, expand the Dependency Map to view all the available dependencies.
2. Select the virtual machines that you want to create a manual application on.
   - You can use Ctrl+click to add multiple virtual machines.
3. Click the Create application icon 📊.
4 Type a name for the manual application.
The name must be unique to the vCenter Server you are currently working on.

5 Click **OK**.
The manual application is created. You can view the created manual application by selecting one of its virtual machines and opening its dependency map. The manual application is listed in the **Display map of** drop-down menu.

**Rename Manual Application**
You can rename a manual application that you have created. The functionality of the manual application does not change if you rename a manual application.

**Procedure**
1 At the virtual machine level, from the **Display map of** drop-down menu, select the manual application that you want to rename.

2 Click the **Rename application** icon.

3 Type a new name in the **Name** text box.
The name must be unique to the vCenter Server that you are currently working on.

4 Click **OK**.
The new name is applied to the manual application.

**Add Application Members**
You can add application members to the manual application that you have created.

**Procedure**
1 Open the application map to which you want to add the application members.

2 Expand all the incoming or outgoing dependencies of the application map.

3 Select the virtual machines that you want to add.
   You can use Ctrl+click to select multiple virtual machines.

4 Click the **Add selected application members** icon.
The new application map is displayed. In case of a failure, this message is displayed.

**Selected application members were not added to the application because of error.**
If the action is successful, no warning, no confirmation, and no notification message is displayed.

**Remove Virtual Machines from the Dependency Map of an Application**
You can remove the virtual machines from the Dependency Map of the selected application. The removal of the virtual machines from an application changes the displayed application map.

**Procedure**
1 Open the application map from which you want to remove the virtual machine.

2 Select the virtual machines that you want to remove.
   You can use Ctrl+click to select multiple virtual machines.
3 Click the icon.

Depending on the virtual machines that you select for removal, three different types of messages are displayed.

- If you try to remove a virtual machine other than the spotlighted virtual machine, then this message is displayed.

  Removing the virtual machine from the application will change the displayed application map. Do you want to continue?

- If you try to remove the spotlighted virtual machine or if spotlighted virtual machine is present among the virtual machines that you select for removal, then this message is displayed.

  By removing the spotlighted virtual machine from the application, you will lose the focus on this application. The first-level dependencies will be displayed. Do you want to continue?

- If you try to remove all the virtual machines from the application, then this message is displayed.

  Removing all the virtual machines from manual application will make this application undiscoverable by the Infrastructure Navigator. The first-level dependencies map will be displayed. Do you want to continue?

Understanding Application Definition

An application definition is a rule or pattern by which a collection of connected virtual machines are identified as a deployed application instance. An application instance is a set of connected virtual machines that matches an application definition.

During the discovery process, the virtual machines, the services running on the virtual machines, and the components deployed on the virtual machines are compared to application definitions. Each set of connected virtual machines that matches an application definition is considered an application instance.

If you have Microsoft Exchange installed, each Exchange role is a service for which you can create application definitions. When you are creating a rule and you select Mail Server as the server category, each of the Exchange roles are listed under Service Name.

The Manage tab of the vCenter Infrastructure Navigator virtual appliance displays the application definitions management table. The application definitions management table shows all the application definitions that exist under a vCenter Server, and all the Exchange roles.

On the Services tab in the information panel at the bottom of the screen, you can view the Microsoft Exchange name and version number of a role, and a list of the ports on which listening occurs. You can also view this information in the vCenter Infrastructure Navigator portlet on the Summary tab.

Create Application Definitions

You can create application definitions by which a collection of connected virtual machines are identified as a deployed application instance. The application definitions management table shows all the application definitions that exist under a vCenter Server.

Procedure

1 Log in to the vSphere Web Client.

2 From the inventory menu, select Infrastructure Navigator.

   The vCenter Infrastructure Navigator home page appears.

3 Click the Manage tab.

4 From the vCenter Server drop-down menu, select the vCenter Server where you want to create the application definition.
5 Click the **Create Automatic Application Definition** icon.

6 Type a name and description for the application definition, and click **Next**.

   The name must be unique to the vCenter Server that you are currently working on. The length of the name is limited to 128 alphanumeric characters including spaces. The description is not mandatory, but is helpful as it can increase the efficiency in future tasks. The length of the description must be less than or equal to 2048 alphanumeric characters including spaces.

7 To set the rule, select the service category from the **Service Category** drop-down menu and service name from the **Service Name** drop-down menu.

   You must select a service category, a service name, or both before proceeding. You can set more than one rule by clicking the **Add** icon. The **Clustered** check box, which groups all the occurrences of this service into a single application instance is selected by default.

8 Click **Next**.

   The Ready to complete screen displays a summary of your settings.

9 Click **Finish**.

   The created application definition is listed in the application definitions management table. Any valid application definition generates application instances.

**Edit Application Definition**

You can edit an existing application definition that you have created. An existing and valid application definition might become invalid if one of the user-defined services used originally in the application definition does not exist anymore or has been renamed.

**Procedure**

1 Log in to the vSphere Web Client.

2 From the inventory menu, select **Infrastructure Navigator**.

   The vCenter Infrastructure Navigator home page appears.

3 Click the **Manage** tab.

4 From the **vCenter Server** drop-down menu, select the vCenter Server from which you want to edit an application definition.

5 Select the application definition that you want to edit and click the **Edit Automatic Application Definition** icon.

6 To edit the name and description, type a new name and description in the **Name** and **Description** text box and click **Next**.

   The name must be unique to the vCenter Server that you are currently working on. The length of the name is limited to 128 alphanumeric characters including spaces. The description is not mandatory, but is helpful as it can increase the efficiency in future tasks. The length of the description must be less than or equal to 2048 alphanumeric characters including spaces.

7 To add, delete, or change the rules, edit or select the new service category or service name from the **Service Category** or **Service Name** drop-down menu.

8 Click **Next**.

   The Ready to complete screen displays a summary of your new settings.

9 Click **Finish**.
The new definition is applied to the application definition.

**Delete Application Definition**

You can delete an application definition. If you delete an application definition you lose all the discovered application instances.

**Procedure**

1. Log in to the vSphere Web Client.
2. From the inventory menu, select **Infrastructure Navigator**. The vCenter Infrastructure Navigator home page appears.
3. Click the **Manage** tab.
4. From the **vCenter Server** drop-down menu, select the vCenter Server from which you want to delete an application definition.
5. Select the application definition that you want to delete and click the **Delete Automatic Application Definition** icon.
6. Click **Yes**.

The application definition is deleted from the application definitions management table.

**Note** Deleting multiple application definitions together is not supported.

**Export Application Definition List**

You can export the application definitions that are listed in the application definitions management table as a CSV file. You can select the rows and columns that you want to export or can export the entire table.

**Prerequisites**

You must define at least one application definition before you export an application definition list.

**Procedure**

1. Log in to the vSphere Web Client.
2. From the inventory menu, select **Infrastructure Navigator**. The vCenter Infrastructure Navigator home page appears.
3. Click the **Manage** tab.
4. From the **vCenter Server** drop-down menu, select the vCenter Server for which you want to generate the CSV file.
5. Click the **Export** icon at the bottom right-hand corner of the screen. If no application definition is defined, this icon is disabled.
6. (Optional) In the Rows pane, select the rows that you want to export.
   - Select the **All rows** check box if you want to export all the rows.
   - Select the **Selected rows only** check box if you want to export the selected rows. You can use Ctrl +click to select multiple rows.
7. (Optional) Select the columns that you want to export from the Columns pane.
8. Click **Generate CSV Report**.
Click **Save** and select the location where you want to save the CSV file.
Application Visibility at the vCenter Entity Level

You can view the services installed and running on a vCenter entity to manage your vSphere inventory. The inventory appears in the left pane and displays all the vCenter entities managed by the vCenter Server.

You can view the services installed and running on a vCenter entity, by selecting a vCenter entity from the inventory. The selected vCenter entity name is highlighted in the inventory and its details appear in the Navigator portlet in the Summary tab.

This chapter includes the following topics:

- “Understanding the Navigator Portlet,” on page 33
- “Viewing Application Dependencies of a vCenter Entity,” on page 34
- “Viewing the Inventory Table,” on page 34
- “Filter Text in the Inventory Table,” on page 35
- “Export Inventory Table,” on page 36
- “Viewing Details of a vCenter Entity,” on page 36

Understanding the Navigator Portlet

The Navigator portlet in the Summary tab gives a summarized result of the mapping process carried out on the selected vCenter entity.

The following table lists and describes the fields in the Navigator portlet.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Known Application Services</td>
<td>Displays the total number of services installed and running on the selected vCenter entity. Services include Web servers, mail servers, database servers, application servers, cache servers, messaging servers, application management servers, and virtualization management servers. You can click <strong>Known Application Services</strong> to view the number of Web servers, mail servers, database servers, application servers, cache servers, messaging servers, application management servers, and virtualization management servers discovered by vCenter Infrastructure Navigator.</td>
</tr>
<tr>
<td>Application Server</td>
<td>Displays the number of application servers installed and running on the selected vCenter entity. Supported application servers include Apache Tomcat, tc Server, WebSphere, WebLogic, and JBoss.</td>
</tr>
<tr>
<td>Web Server</td>
<td>Displays the number of Web servers installed and running on the selected vCenter entity. Supported Web servers include Apache HTTP, IIS, SharePoint, and Nginx.</td>
</tr>
<tr>
<td>Messaging Server</td>
<td>Displays the number of messaging servers installed and running on the selected vCenter entity. RabbitMQ is the only supported messaging server.</td>
</tr>
<tr>
<td>Mail Server</td>
<td>Displays the number of mail servers installed and running on the selected vCenter entity. Microsoft Exchange is the only supported mail server.</td>
</tr>
</tbody>
</table>
Table 5-1. Navigator Portlet (Continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Server</td>
<td>Displays the number of database servers installed and running on the selected vCenter entity. Supported database servers include Oracle DB, MS-SQL DB, DB2, MySQL DB, and Sybase DB.</td>
</tr>
<tr>
<td>Cache Server</td>
<td>Displays the number of cache servers installed and running on the selected vCenter entity. GemFire is the only supported cache server.</td>
</tr>
<tr>
<td>Application Management</td>
<td>Displays the number of application management servers installed and running on the selected vCenter entity. VMware View Server is the only supported application management server.</td>
</tr>
<tr>
<td>Virtualization</td>
<td>Displays the number of virtualization management servers installed and running on the selected vCenter entity. Supported virtualization management servers include VMware vCenter, VMware vCloud Director, and VMware vShield Manager.</td>
</tr>
<tr>
<td>Disaster Recovery Server</td>
<td>Displays the number of disaster recovery servers installed and running on the selected vCenter entity. Supported disaster recovery servers include Site Recovery Manager, Replication Server, and Replication Management Server.</td>
</tr>
<tr>
<td>Authentication Server</td>
<td>Active Directory provides a central location for network administration and security. Server computers that run Active Directory are called domain controllers. An Active Directory domain controller authenticates and authorizes all users and computers in a Windows domain type network. For example, when a user logs into a computer that is part of a Windows domain, Active Directory checks the submitted password and determines whether the user is an administrator or a normal user.</td>
</tr>
</tbody>
</table>

To view the inventory table of the selected vCenter entity, click Show all in inventory at the bottom of the Navigator portlet.

Viewing Application Dependencies of a vCenter Entity

The Application Services tab under Manage tab displays the inventory table of the selected vCenter entity. The Application Services tab also displays additional information about the selected vCenter entity in the information panel at the bottom of the screen.

Viewing the Inventory Table

Each row in the inventory table displays information about virtual machines that belong to the selected vCenter entity.

For example, if you select an ESX host, then all the virtual machines on that ESX host are listed in the inventory table. The virtual machine data displayed in each row of the inventory table is identical to the dependency table of that virtual machine.

Table 5-2. Inventory Table

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Displays the virtual machine name as displayed in the VC inventory panel.</td>
</tr>
<tr>
<td>VM State</td>
<td>Displays the current state of the virtual machine.</td>
</tr>
<tr>
<td></td>
<td>Powered Off</td>
</tr>
<tr>
<td></td>
<td>Powered On</td>
</tr>
<tr>
<td>VM Status</td>
<td>Displays the current status of the virtual machine.</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Alert</td>
</tr>
<tr>
<td></td>
<td>The field also displays a green icon for a Normal status and a red icon for an Alert status.</td>
</tr>
<tr>
<td>Services</td>
<td>Displays a comma-separated list of mapped services along with their versions that are running on the selected virtual machine. In case of multiple services with the same version or multiple services without any version, the service name is displayed once with number of instances in parenthesis.</td>
</tr>
</tbody>
</table>
Table 5-2. Inventory Table (Continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>Displays a comma separated list of the manual applications and the automatic application instances that the selected virtual machine takes part in. Automatic instances are named after the respective application definition name followed by instance number in the brackets. All applications are displayed in an ascending order.</td>
</tr>
<tr>
<td>Discovery Status</td>
<td>Displays the discovery status of the virtual machine.</td>
</tr>
<tr>
<td></td>
<td>- Normal. Indicates absence of any error. For more information, see “Mapping Services,” on page 11.</td>
</tr>
<tr>
<td></td>
<td>- Access failed. Indicates that the mapping process failed on the selected virtual machine and displays an error message stating the reason for failure.</td>
</tr>
<tr>
<td></td>
<td>The field also displays a green icon for a Normal status and a gray icon for Access failed status.</td>
</tr>
<tr>
<td>Successful</td>
<td>Displays the time elapsed since the last successful discovery of the virtual machine.</td>
</tr>
<tr>
<td>Discovery</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>Displays the SRM protection group of the virtual machine.</td>
</tr>
<tr>
<td>Group</td>
<td>A blank field indicates that the virtual machine does not belong to any SRM protection group.</td>
</tr>
<tr>
<td>Recovery</td>
<td>Displays a comma-separated list of SRM recovery plans for the virtual machine.</td>
</tr>
<tr>
<td>Plans</td>
<td>A blank field indicates that the virtual machine does not belong to any SRM recovery plan.</td>
</tr>
</tbody>
</table>

The Protection Group and Recovery Plans column appears only if you decide to integrate vCenter Infrastructure Navigator with SRM. For information about SRM integration, see vCenter Infrastructure Navigator Installation and Configuration Guide.

Customize Inventory Table

You can customize the inventory table by adding or removing columns. By default, vCenter Infrastructure Navigator does not display information about the state and the status of virtual machines in the inventory table.

Procedure

1. Select a vCenter entity from the inventory pane.
2. To view the inventory table for the selected vCenter entity, click the Application Services tab under Manage tab.
3. Right-click any column heading.
4. In the pop-up menu, click Show/Hide Columns.
   All columns of the inventory table appear in a list.
5. To add a column, select an item from the list and click OK.
6. To hide a column, deselect an item from the list and click OK.

Filter Text in the Inventory Table

vCenter Infrastructure Navigator enables you to search through the inventory table by filtering the information about a specific object.

You can search while typing and also filter the text alternatively. You can specify the search criteria to search for a specific object. For example, you can enter partial host name as the search criteria.

Procedure

1. Select a vCenter entity from the inventory.
2. Click the Application Services tab under Manage tab.
   The Filter text box appears above the inventory table.
3 In the **Filter** text box, type the search criteria for the object that you want to find in the inventory table. Only the rows matching the search criteria are retained in the table.

4 (Optional) Click **Clear**, to redisplay all the data that was initially displayed in the inventory table. The filter can be cleared in order to redisplay all the data.

### Export Inventory Table

You can export the inventory table related to a selected vCenter Server entity as a CSV file. All the information present in the inventory table is exported to the CSV file.

**Procedure**

1 Select the vCenter entity from the inventory pane.

2 Click the **Export** icon.

3 Select the folder where you want to save the CSV file.

4 Click **Save**.

All the data in the inventory table is exported to the CSV file.

### Viewing Details of a vCenter Entity

By default, the information panel displays the details of the virtual machine that appears in the first row of the inventory table of the selected vCenter entity. As you select different rows in the inventory table, the information displayed in the information panel changes accordingly.

The information panel that appears below the inventory table is identical to the information panel that appears below the dependency map and the dependency table of the selected virtual machine.

To view the list and description of the fields in the information panel, see Table 4-6.
You can install vFabric Hyperic agents on virtual machines that are managed by vCenter Server, using vCenter Infrastructure Navigator.

In the Manage > Hyperic Agents tab, you can see all the virtual machines for which you have vCenter Infrastructure Navigator access privileges. Depending on the level of access you have been assigned, you can install a vFabric Hyperic agent on those virtual machines, refresh the status of the agents, or cancel pending agent installations.

**Preparing to Install a vFabric Hyperic Agent on a Virtual Machine**

Before you can install a vFabric Hyperic agent on a virtual machine, you must have sufficient privileges to perform the action. Privileges are assigned at the level of vCenter Server or one of its objects, and propagated.

You must configure certain agent management parameters for the vFabric Hyperic agent. During installation, the target virtual machine retrieves the agent installation files from the vCenter Infrastructure Navigator appliance, so you must verify that the virtual machine can retrieve the files from the vCenter Infrastructure Navigator appliance.

If you are using an external repository for the vFabric Hyperic agent installation files, you must ensure that the virtual machines can access that repository.

**Procedures for Preparing to Install and Installing a vFabric Hyperic Agent on a Virtual Machine**

There are a number of procedures to set up the environment and install a vFabric Hyperic agent on a virtual machine using vCenter Infrastructure Navigator.

This chapter includes the following topics:

- “Configure vCenter Server Action Settings,” on page 38
- “Install a vFabric Hyperic Agent on a Virtual Machine,” on page 38
- “Refresh the Agent Status Summary,” on page 39
- “Cancel Pending Tasks,” on page 40
Configure vCenter Server Action Settings

You can configure vCenter Infrastructure Navigator to install vFabric Hyperic agents on virtual machines that are managed by a selected vCenter Server.

The installation package URL supports HTTP and HTTPS protocols, including self-signed and public certificate authority certificates. The certificates are not validated. The SHA-256 hash is used to verify authenticity and minimize the possibility of "man in the middle" attacks.

By default, the installation files for the vFabric Hyperic agent are located in the vCenter Infrastructure Navigator appliance. You can modify the location of the installation package on your system. In that case, you must change the Install Package URL value to the relevant location. The location must only contain ASCII characters.

Prerequisites

- The vCenter Infrastructure Navigator appliance must be located on the same vCenter Server on which you the virtual machines on which you are installing vFabric Hyperic agents reside.
- Verify that the target virtual machine can access the URL of the vCenter Infrastructure Navigator appliance to retrieve the installation package.

Procedure

1. In the vSphere Web Client navigator, select **Administration > Agent Management**.
2. Select the vCenter Server that manages the virtual machine on which the vFabric Hyperic agent is being installed.
3. Enter the IP address of the vFabric Hyperic server to which the vFabric Hyperic agent will connect. Default values appear for the Action Parameters.
4. Change the parameter values as necessary, noting the following information.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Install Package URL</strong></td>
<td>SVIN-IP is the IP address of the vCenter Infrastructure Navigator appliance. If you locate the installation package in a different location, the parameter value must contain only ASCII characters.</td>
</tr>
<tr>
<td><strong>Linux installation directory</strong></td>
<td>The parameter value must contain only ASCII characters.</td>
</tr>
<tr>
<td><strong>Windows installation directory</strong></td>
<td>The parameter value must contain only ASCII characters.</td>
</tr>
<tr>
<td><strong>Agent files SHA–256</strong></td>
<td>The default values are the SHA-256 hash checksums for the installation files. The key is downloaded as part of the installation package and includes comma-separated checksums for Windows 32-bit and 64-bit installations and Linux 32-bit and 64-bit installations. The value of this parameter must contain all four checksums, or be empty.</td>
</tr>
</tbody>
</table>

Parameters with an asterisk beside their names are mandatory. A red frame around a value field indicates that a mandatory value is missing.

5. Click **Save**.

Install a vFabric Hyperic Agent on a Virtual Machine

You can install vFabric Hyperic agents on one or more virtual machines.

If you do not have the required administration privileges, but you have View and Perform Action privileges for the affected virtual machines, you can still view the list of machines and the status of the agents running on them.
You can select virtual machines for which you do not have administration privileges, but a vFabric Hyperic agent will only be installed on the machines for which you do have the required privileges. Should it be necessary, you can cancel pending agent installations. See “Cancel Pending Tasks,” on page 40.

**Prerequisites**

- You must have configured the vFabric Hyperic action settings for the agent that you are installing on the virtual machines. You can click the Hyperic Action Settings link to access the necessary Web page if necessary. See “Configure vCenter Server Action Settings,” on page 38.
- To install vFabric Hyperic agents on a virtual machines, you must have a user role with vFabric Hyperic Agent Management.Hyperic.Administrator privileges for the target machines.

**Procedure**

1. Select the aggregated item in the vSphere Web Client navigator that includes the virtual machines on which to install a vFabric Hyperic agent.

2. On the Manage > Hyperic Agents tab, select one or more virtual machines on which to install a vFabric Hyperic agent.
   
   You can only install one vFabric Hyperic agent on a virtual machine.

3. Click the Install Hyperic Agent icon at the top of the table.

A vFabric Hyperic agent is installed on the virtual machines. An error message appears in the Issues column of the table if installation of the agent fails on any of the virtual machines.

**What to do next**

Refresh the page to update the status information of the agents. See “Refresh the Agent Status Summary,” on page 39.

**Refresh the Agent Status Summary**

If the status of an agent changes during the period between automated refresh cycles, you do not immediately see the change. You can initiate a refresh to immediately display the current status of the agents and to view any installation-related error messages.

**Procedure**

1. Select the aggregated item in the vSphere Web Client navigator that contains the virtual machines whose status you want to refresh, and click the Manage > Hyperic Agents tab.

2. Click the Refresh Hyperic Agent’s status icon to update the agent status for the virtual machines.
   
   The Issues status is also updated.

The current agent status of the virtual machines appears.
Cancel Pending Tasks

Installing vFabric Hyperic agents on many virtual machines in a single process can take some time. Until it is the turn of a virtual machine to have an agent installed, the installation task is in pending mode. You can cancel all pending tasks that you initiated.

When you cancel vFabric Hyperic agent installation pending tasks, all tasks that were initiated under your user name that have not been begun or completed are cancelled, regardless of whether the virtual machines are listed in the currently displayed table. Agents that have already been installed on virtual machines are not affected.

Procedure

− Click the Cancel Pending Tasks icon above the table and, at the prompt, click OK.

All pending tasks that were initiated with your user name are cancelled.
Index

A
Active Discovery 9, 12
Adaptive Server Enterprise 12
add application members 28
agents
cancel installation 40
install 38
managing 37
refresh status 39
aging 27
aging dependencies 27
Apache 12
application definition 29
application instance 29
application definition creation 29
application definition deletion 31
application definitions management table 29
application dependencies tab 15, 19, 20
application group 27
application instances 29, 31
application management 12, 33
application map 28
application name 27
application server 12, 33
application services 8, 19, 33
application visibility 19
architecture 9
audience 5

B
benefits 8

C
cache server 12, 33
change 8
cluster 24
compatible 15
configurations 9
create user define service 25
CSV file 36
CSV file\ 31
customize inventory table 35

D
Database component 9
database server 12, 33
DB2 12
delete user-defined service 26
dependencies 19
dependency table 23
dependency map 20, 21
dependency map toolbar 22
disable plug-in 16
discovery 29
discovery status 19, 23, 34
DNS name 24

e
edit application definition 30
edit user-defined service 26
enable plug-in 16
Exchange 12
export application definition 31
export inventory table 36
external entities 26

F
feedback 5
filter text 35
fit content 22
frequency 12
functionality 7

G
GemFire 12
graphical user interface 9
guest operating system 11, 24

H
host 24
Hyperic action settings, specify 38

I
IIS 12
incoming dependency 19, 21
information panel 20, 24, 34, 36
integration 7
invalid user-defined service 30
inventory 19, 33
inventory table 33–36
IP address 15, 24

J
JBoss 12

K
knowledge base 25

L
login 15

M
magnifier 22
mail server 12, 33
manual application 27
manual application creation 27
manual application members addition 28
manual application renaming 28
map and table messages 20
mapping 8, 11, 12
messaging server 12, 33
MS-SQL DB 12
multiple ports 25
multiple process 25
MySQL DB 12

N
navigate 21
Navigator tab 33, 35
network 24
NGINX 12
notification messages 17

O
Oracle DB 12
outgoing dependency 19, 21
overview, vCenter Infrastructure Navigator 7

P
password 15
plug-in 9
port based service 25
portal 15
portlet 19, 33
protection group 23, 34

R
RabbitMQ 12
recovery plan 23, 34
remapping 12
rename manual application 28
rows and columns selection 31

S
search 35
second-level application dependencies 22
Server component 9
service category 29–31
service name 29–31
services 8, 12, 23, 34
SharePoint 12
SRM 7, 23, 34
storage 24
successful discovery 19
support 5
Sybase DB 12
synchronize 12

T
tc Server 12
Tomcat 12

U
user name 15

V
vApp 24
vCenter entity 8, 33, 34, 36
vCenter Server 7, 9, 15, 16, 19, 33
vFabric Hyperic
install agents 38
manage agents 37, 40
refresh agent status 39
virtual appliance 9, 12
virtual environment 8
virtual infrastructure 7, 8
virtual machine access 27
virtual machines removal 28
virtualization management 12, 33
VM Name 23, 34
VM State 23, 34
VM Status 23, 34
VMware Tools 11, 24
vSphere Web Client 9, 15, 16

W
Web server 12, 33
WebLogic 12
WebSphere 12
Z
zoom in 22
zoom out 22