Quest™

Hyper-V Monitoring in Foglight® Evolve Cloud 6.0.0

User and Reference Guide

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Legend

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

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

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

Hyper-V Monitoring in Foglight Evolve Cloud User and Reference Guide
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1

About Hyper-V Monitoring in Foglight Evolve Cloud

Hyper-V Monitoring in Foglight® Evolve Cloud monitors a Microsoft® Hyper-V® virtual infrastructure. Better management of services can be achieved when you are alerted of infrastructure problems before end users are affected. This ensures consistent application performance at established service levels. Hyper-V Monitoring in Foglight Evolve Cloud monitors the health of your virtual system by tracking resource consumption such as CPU, network, and memory consumption for individual clusters, servers and virtual machines in your integrated environment.

- About your monitored environment
- Prerequisites: Hyper-V Monitoring in Foglight Evolve Cloud roles
- Prerequisites: Hyper-V Monitoring in Foglight Evolve Cloud configuration
- Hyper-V Monitoring in Foglight Evolve Cloud WinRM GPO script

About your monitored environment

Microsoft® Hyper-V® provides an innovative mechanism for organizing a virtual infrastructure using a unique combination of physical and logical components. Hyper-V Monitoring in Foglight® Evolve Cloud accommodates environments of all sizes that leverage the Hyper-V virtualization platform by examining and enhancing the Hyper-V eminently knowledgeable view of the virtual world.

Microsoft Hyper-V allows for the configuration of a hierarchical organizational structure that resides primarily within the virtual domain. This enables organizations to easily configure physical Hyper-V servers and virtual machines to reside in logical groups that dictate various aspects of the virtual infrastructure, like physical object location, resource allocations and limitations for virtual machines, and high availability settings for physical and virtual components.

A Hyper-V infrastructure contains a collection of physical and virtual objects. The physical objects within the virtual infrastructure are those with which you can physically interact. The virtual components or objects that make up the virtual environment cannot exist without the presence of underlying physical components, such as Hyper-V servers. In addition, virtual objects, such as clusters and virtual machines, allow for the advanced configuration of resource management and of high availability settings. Each Hyper-V infrastructure contains a collection of the following object types:

- *Clusters*. A cluster object is a group of Hyper-V servers that share common storage resources and network configurations.
- *Servers*. A Hyper-V server is a physical component required to begin building a virtual infrastructure. Hyper-V servers provide hypervisor-based architecture for controlling and managing resources for the virtual machines that run on it. Virtual machines running on a Hyper-V server share the server's resources.
- *SCVMM Servers*. A System Center Virtual Machine Manager (SCVMM) allows you to manage host, networking, and storage resources when creating and deploying virtual machines to virtual clouds.
- *Virtual Machines*. A virtual machine resides on a Hyper-V server. Virtual machines share many of the characteristics of physical systems (like storage and network interaction), but they do not have direct access to the hardware that is used to process. Each virtual machine runs on a guest operating system, for

example, Microsoft Windows XP, and is allocated access to a specific set of the server's resources, that includes the number of processors and the amount of memory it can leverage.

- *Storage*. A Microsoft Windows Cluster Shared Volume (CSV) is a shared disk available for read and write operations by all nodes within a Windows Server Failover Cluster. A Windows Server Failover Cluster is a group of computers that provides continued service when system components fail.
- *Virtual Switches*. A Hyper-V virtual switch is a software-based layer-2 Ethernet network switch. The switch connects virtual machines to virtual and physical networks.
- SOFS Servers. A Scale-Out File Server (SOFS) allows the same folder or file to be shared from multiple cluster nodes.

Prerequisites: Hyper-V Monitoring in Foglight Evolve Cloud roles

Foglight Evolve Cloud™ Management Server relies on roles to control user access. Each user can have one or more roles. The roles granted to a user determine the set of actions that the user can perform. The Management Server includes a set of built-in roles that control access to dashboards and reports included with the Management Server. The following roles are included with Hyper-V Monitoring in Foglight Evolve Cloud to control access to the Hyper-V dashboards and reports. Your Hyper-V Monitoring in Foglight Evolve Cloud users must have the appropriate roles granted to them in order to access related browser interface components:

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

  IMPORTANT: Executing Hyper-V administration tasks, such as rebooting a Hyper-V server, require specific Hyper-V permissions.

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

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

Prerequisites: Hyper-V Monitoring in Foglight Evolve Cloud configuration

User privileges required for monitoring agents

Hyper-V Monitoring in Foglight Evolve Cloud requires the following configuration prerequisites:

- Privileges of Monitor Account for Hyper-V® Agent:
  - The user is a member of a local group administrators.
- Privileges of Monitor Account for SCVMM Agent (Hyper-V® environments):
  - The user is SCVMM (Not Windows) administrator.
  - The user is a member of a local group administrators.

  NOTE: SCVMM 2012 and SCVMM 2012R2 are currently supported.

  NOTE: Follow the Microsoft documentation to add a user to the SCVMM administrator role https://technet.microsoft.com/en-us/library/hh341475(v=sc.12).aspx

  NOTE: Follow the Microsoft documentation to add a member to a local group https://technet.microsoft.com/en-us/library/cc772524(v=ws.11).aspx
- Privileges of Hyper-V Optimizer (Hyper-V® environments):
  - Hyper-V Optimizer is using the Hyper-V agent credentials (which is the local administrator).
- Privileges of Monitor Account for Scale-Out File Server (SOFS) Agent:
  - The user is a member of a local group administrators.

Configurations required for collecting data from VMs resided on SMB server

To collect the complete data of virtual machines that are resided on the SMB server, make sure to do the following:

1. Open *krb5.config* under the *FGLAM_HOM\state\default\config* directory, set *"forwardable=true"* in *libdefaults*.
2. Enable SMB delegation on Active Directory using either of the following approaches:
   - Run the following command on Active Directory. Visit Enable-SmbDelegation for details.

     ```
     Enable-SmbDelegation [-SmbClient] <Hyper-V server name> [-SmbServer] <SMB server name>
     ```

     NOTE: The Active Directory forest must be at the Windows Server 2012 functional level. This cmdlet relies on Active Directory Windows PowerShell cmdlets to perform its actions. To install the Active Directory cmdlets, run the following command: `Install-WindowsFeature RSAT-AD-PowerShell`
   - Enable the SMB delegation through the Active Directory Users and Computers console.
     a. Browse to select the default container named *Computers*.
     b. Select the computer on which you want to configure constrained delegation (your Hyper-V host server), right click on it and select *Properties*.
     c. Click *Delegation*, and then select the *Trust this computer for delegation to specified services only* option and ensure you select the *Use Kerberos Only* option.
     d. In the *Service* box, click *Add* and select the Hyper-V target host computer, and then select ***cifs*** from the list of services that show up.

Hyper-V Monitoring in Foglight Evolve Cloud WinRM GPO script

The GPO script is provided to allow for a streamlined deployment, including how to configure Windows Remote Management (WinRM). Users must run the script as the Administrator on the AD controller which is enabled on Windows Server 2008 R2, Windows Server 2012 or Windows Server 2012 R2. They must enable WinRM for all the Hyper-V® servers through one time setup at Domain Controller, login to just one Domain Controller, and change the group policy by running an automation script.

The script creates a group policy object and links it to the specific OU (specified by running the script). The policy has the following settings:

- Create a firewall rule “Allow WinRM for FglAM Requests” which allows port 5985 on all network.
- Allow WinRM basic authentication.
- Allow WinRM unencrypted traffic.
- Set WinRM IPv4 and IPv6 filter to “*”.
- At the end of the script, users can chose to force the policy update. It runs an “Invoke-GPUpdate” method on all members in the specific OU.

These settings can be observed in the Group Policy Management console by selecting the policy object.

To undo the changes made by the script:

- Delete the group policy object.

  OR

- Remove the linked OU from the GPO scope.

2

Agent administration

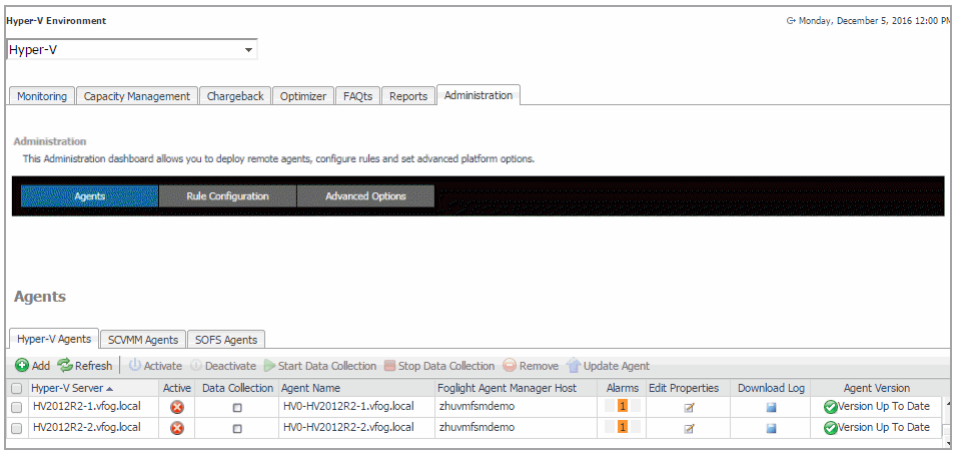
The **Administration** tab of the Hyper-V Environment dashboard contains links to agent administration tasks that you can use to manage Hyper-V agent instances, set the alarm sensitivity, and review and remove Hyper-V objects.

- Accessing the Administration tab
- Configuring monitoring agents
- Reviewing object instances and deleting expired data

Accessing the Administration tab

This tab consists of the Administration area and the Agents view commands.

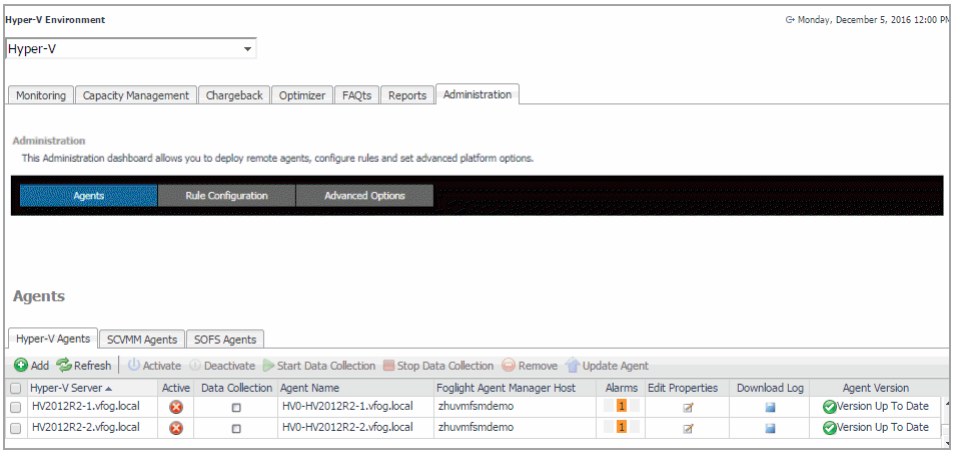
Figure 1. Administration tab



To access the Administration tab:

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

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



Administration area

The **Administration** area contains links to administrative tasks that you can initiate from this tab:

- **Rule Configurations:** Sets the level of alarms that the system generates, stores, and displays. For more information, see Setting the alarm sensitivity level on page 176.
- **Agents:** Review existing Hyper-V/SOFS/SCVMM object instances. For more information, see Agents view commands on page 11.
- **Advanced Options:** Review and delete Hyper-V object instances that are no longer needed. For more information, see Reviewing object instances and deleting expired data on page 32.

Agents view commands

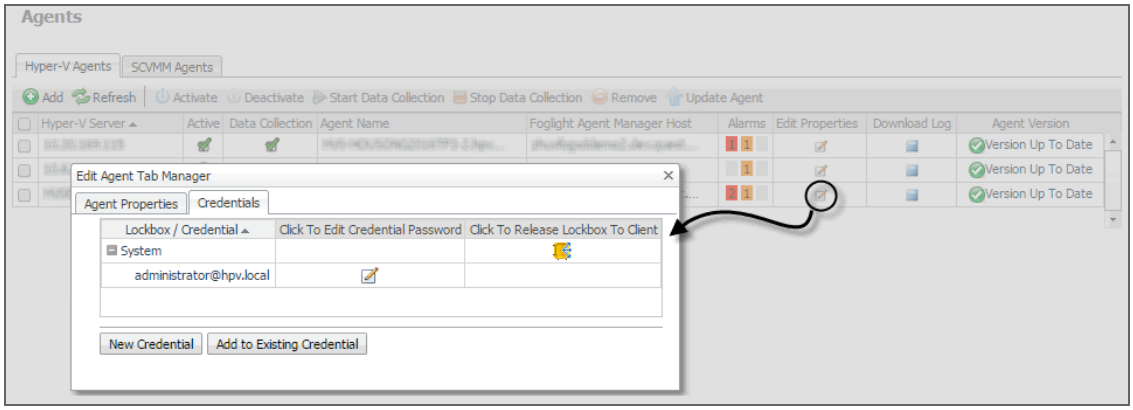
The **Agents** view shows a list of existing agent instances and a set of agent management commands at the top of the list. Use it to verify that your agents are collecting data from the monitored environment.

The following commands are available:

- **Add:** Starts a workflow for creating new agent instances. For more information, see Configuring monitoring agents on page 13.
- **Refresh:** Refreshes the list of agent instances and their states.
- **Activate:** Activates one or more selected agent instances. Activating an agent instance starts the agent process on the machine on which the agent is installed.
- **Deactivate:** Deactivates one or more selected agent instances. Deactivating an agent stops the agent process on the machine on which the agent is installed.
- **Start Data Collection:** Starts the data collection for one or more selected agent instances. Starting an agent's data collection causes the agent to begin monitoring the Hyper-V server and to send the collected metrics back to the Management Server.
- **Stop Data Collection:** Stops the data collection for one or more selected agent instances. Stopping an agent's data collection causes the agent to stop monitoring the Hyper-V server.
- **Edit Properties:** Starts a workflow for editing the properties of one or more selected agent instances. Each agent comes with a set of properties that it uses to configure its correct running state. For more information, see Configuring agent properties on page 23.
- **Remove:** Deletes the selected agent instance.
- **Update Agent:** Updates the agent package to the latest version. For more information, see the *Installing and Configuring Foglight for Storage Management* Guide.

IMPORTANT: Updating the agent package using this command generates the previously existing credentials. However, if you update the agent package by re-deploying its .gar file through the Agent Status page, the credentials need to be re-created. To do that, select an agent instance, click **Edit Properties**, and configure the required credentials on the **Credentials** tab of the **Edit Tab Manager** dialog box.

Figure 2. Edit Tab Manager dialog box



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

Agent tabs

The Agents area contains three tabs: **Hyper-V Agents**, **SCVMM Agents**, and **SOFS Agents**. Each tab displays a list of the existing Hyper-V, SCVMM, or SOFS Agent instances and shows their status. Use it to verify if your agents are collecting data from the monitored environment.

Figure 3. Agents view

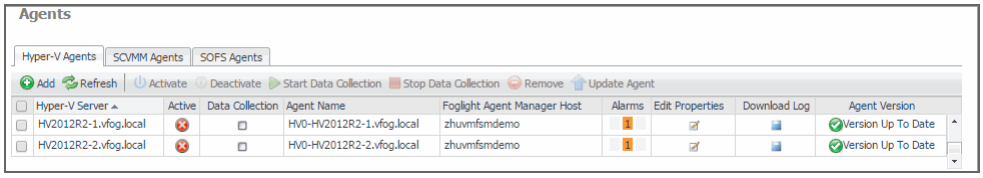


Table 1. Description of the View

Data displayed	• **Active**. Indicates if the Hyper-V Agent process is running. • **Agent Name**. The name of the Hyper-V Agent instance. • **Agent Version**. Indicates if the agent is running the latest version of the agent package (Version Up To Date), or it needs to be updated (Update Agent). • **Alarms**. The total numbers of Warning, Critical, and Fatal alarms. • **Data Collection**. Indicates if the Hyper-V Agent is collecting data from the monitored environment. • **Download Log**. Allows you to download the agent log file. • **Edit Properties**. Allows you to edit the agent's properties. • **Foglight Agent Manager Host**. The name of the machine on which the Foglight Evolve Cloud™ Agent Manager and the Hyper-V Agent process are running.

Table 1. Description of the View

- **Hyper-V Server** (**Hyper-V Agents** tab only). The name of the monitored Hyper-V® server.
- **SCVMM Server** (**SCVMM Agents** tab only). The name of the monitored Hyper-V Virtual Machine Manager.
- **SOFS Server** (**SOFS Agents** tab only). The name of the monitored SOFS server.

Configuring monitoring agents

Hyper-V Monitoring in Foglight® Evolve Cloud uses the Hyper-V, SCVMM, and SOFS agents to collect information about your virtual environment:

- *Hyper-V Agents* collect information from monitored Hyper-V servers. A Hyper-V server is a physical component required to begin building a virtual infrastructure. Hyper-V servers provide hypervisor-based architecture for controlling and managing resources for the virtual machines that run on it.
- *SCVMM Agents* collect information from Virtual Machine Managers (VMM). A VMM allows you to manage host, networking, and storage resources when creating and deploying virtual machines to virtual clouds.
- *SOFS Agents* collect information from monitored SOFS servers. A SOFS server is a Windows Server cluster with some form of shared storage. SOFS servers provide highly available file-based storage for applications and general use.

When Hyper-V, SCVMM, and SOFS agent packages are successfully deployed, you can create agent instances, activate them, and start their data collection. To perform these steps in a single operation for one or more monitored hosts, use the **Agents** area on the **Administration** tab .

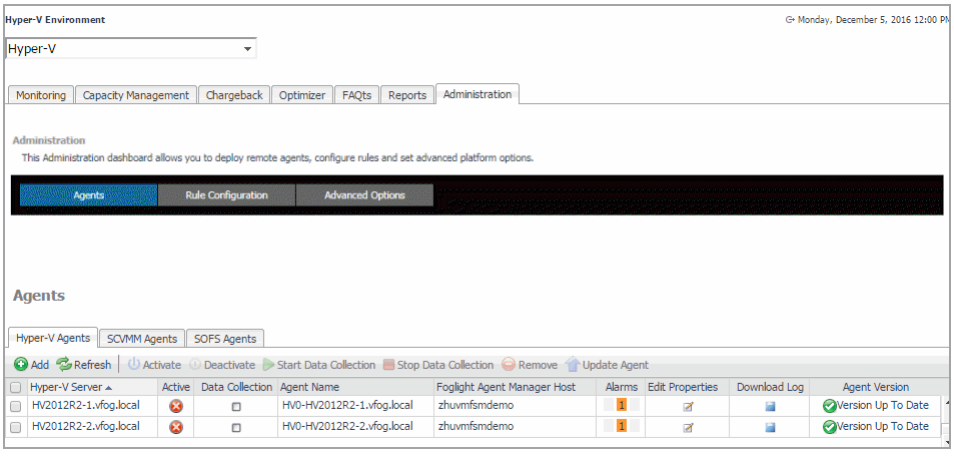
When you add an agent instance, the agent process is created on the Agent Manager host. Activating the agent instance starts that agent process. When you start an agent's data collection, the agent process starts collecting data from the monitored host and to sends it to Hyper-V Monitoring in Foglight Evolve Cloud.

To create, activate agent instances, and start their data collection:

1 Log in to the Foglight Evolve Cloud browser interface.

2 On the navigation panel, under **Dashboards**, choose **Hyper-V > Hyper-V Environment**.

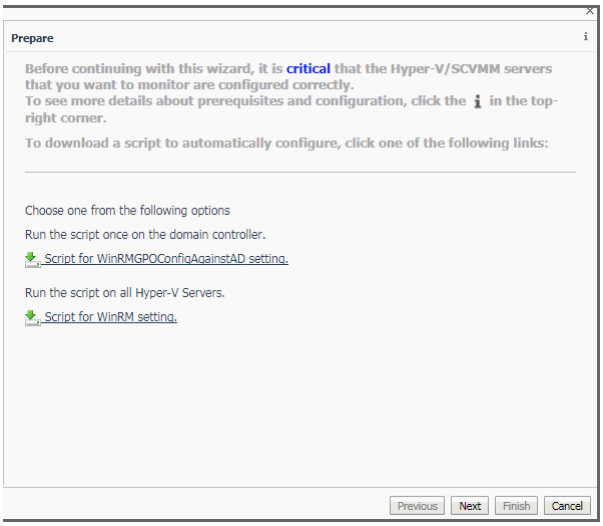
3 On the Hyper-V Environment dashboard that appears in the display area, click the **Administration** tab.



4 On the **Administration** tab, under **Agents**, open the **Hyper-V Agents**, the **SCVMM Agents** tab, or the **SOFS Agents** tab, as required.

5 Click **Add** to launch the **Agent Setup** wizard.

The **Agent Setup** wizard appears, showing the **Prepare** page.

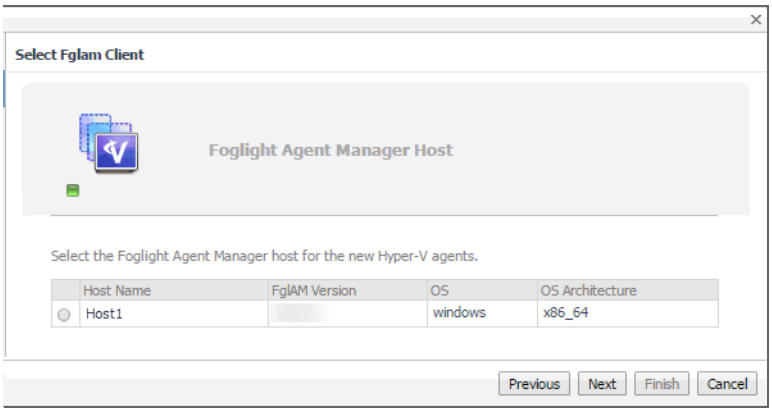


6 Review the information on this page.

- If you want to configure WinRM settings automatically, download the appropriate script, and follow the instructions provided with the scripts.
- To configure these settings manually, see the *Agent Manager Guide*.

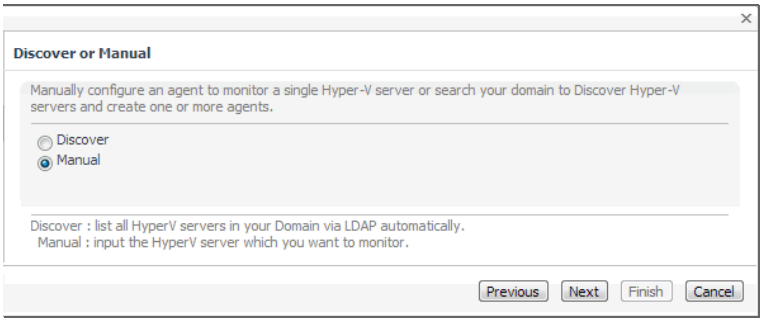
When done, click **Next**.

The **Agent Setup** wizard refreshes, showing the **Select FglAM Client** page. The page shows a list of all hosts that already have the Agent Manager installed and running, and to which you can deploy the Hyper-V Agent package.



7 Select the Agent Manager on which you want to create the Hyper-V Agent instance, and click **Next**.

8 **Hyper-V Agents only**. On the **Discover or Manual** page that appears, you can indicate if you want to manually specify the Hyper-V Server that you want to monitor, or to choose between the servers running in a given domain.

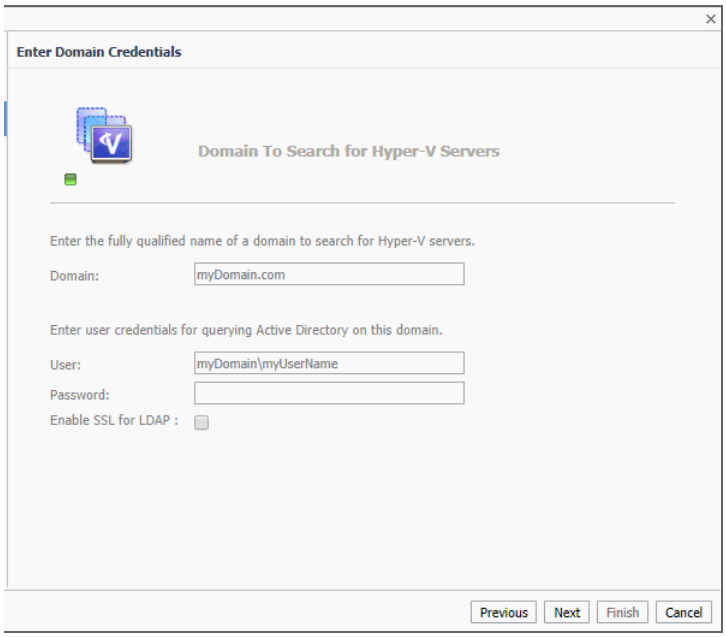


Select one of the following options:

Discover. Select this option if you want to choose from the available Hyper-V Servers running in the desired domain. Click **Next** and proceed to Step a.

Manual. Select this option if you want to manually specify the name of the Hyper-V Server. Click **Next** and proceed to Step b.

a **Discovering Hyper-V Servers only**. On the **Enter Domain Credentials** page that appears, specify the information needed to search for the running Hyper-V Servers.

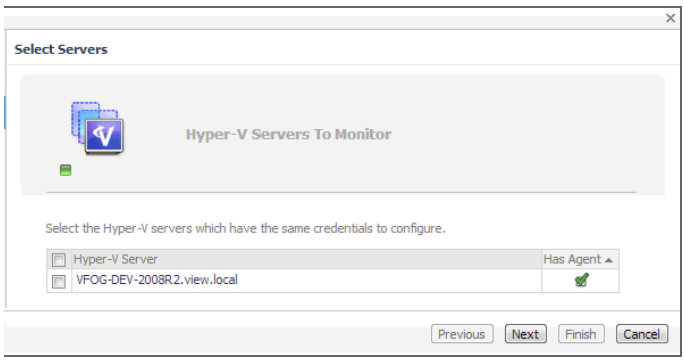


a Provide the following information, and then click **Next**.

- **Domain**: Type the fully qualified name of a domain to search for the Hyper-V Server. For example, `myDomain.com`.
- **User**: Type the user name to be used by the agent to be used to query Active Directory on the selected domain using the syntax *Domain**UserName*. For example, `myDomain\jsmith`.
- **Password**: Type the password associated with the above user name.
- **Enable SSL for LDAP**. Select this option to enable SSL for LDAP connection.

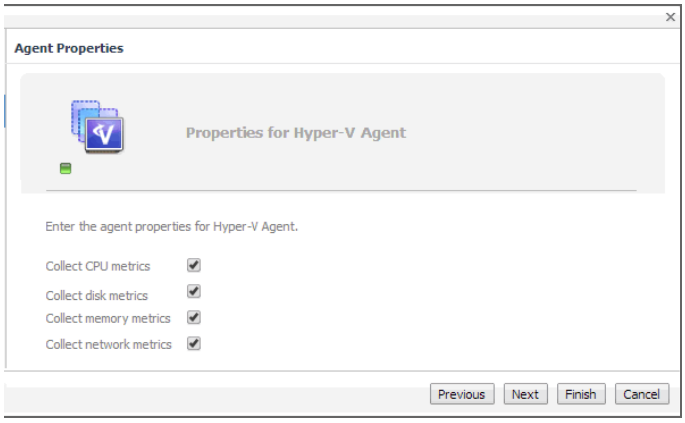
NOTE: In FIPS-compliant mode, you need to import the CA certificate or the self-signed certificate to the KeyStore of FMS to use this option. For more information, see Managing certificates for FMS on page 29.

The **Agent Setup** wizard refreshes, showing the **Select Servers** page. The page shows a list of all Hyper-V servers that you have access to, based on the domain name and user credentials you provided in this step.



b Select one or more Hyper-V Servers that you want to monitor and click **Next**.

The **Agent Setup** wizard refreshes, showing the **Agent Properties** page.



c By default, the options for collecting CPU, disk, memory, and network metrics are selected. Review these settings, and make any changes, if required. When done, click **Next**.

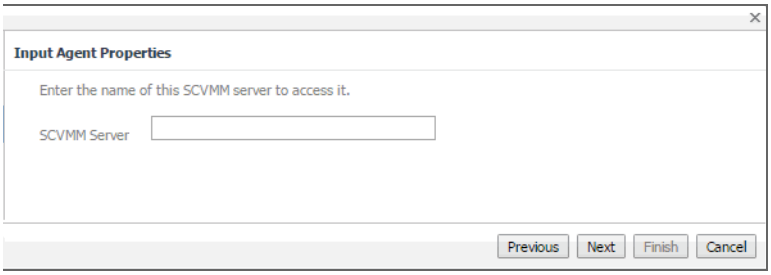
d Proceed to Step c.

b **Manually specifying a Hyper-V Server only**. On the **Manual Agent Properties** page that appears, specify the information needed to search for the running Hyper-V servers.

Click **Next**.

c On the **Credential Verification** page that appears, review the existing set of credentials. If the wizard determines that the selected Agent Manager has any credentials configured for the host on which the Hyper-V Server is running, they appear listed on this page.

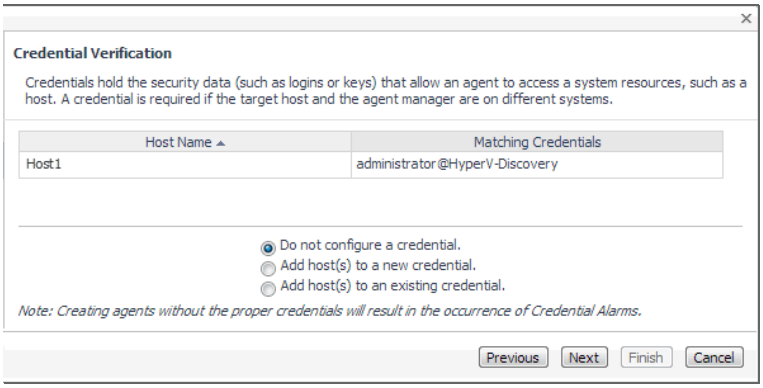
9 **SCVMM Agents only**. On the Input Agent Properties page that appears, type the name of the SCVMM server, and click **Next**.



10 On the **Credentials Verification** page that appears, select one of the following options:

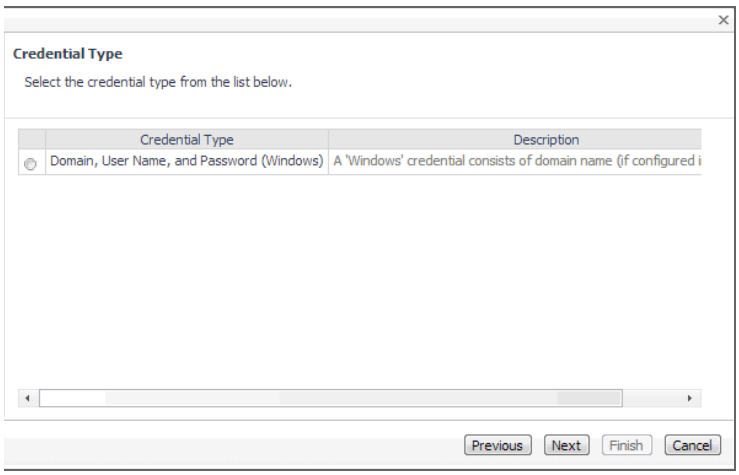
- **Do not configure a credential**: Select this option if you want to configure the credential for this resource at a later time. Click **Next** and continue with Step 13.
- **Add host(s) to a new credential**: Select this option if you want to add the host to a new credential. This option is suitable if none of the existing credentials have the connection details needed to access the new host. Click **Next** and continue with Step 11.
- **Add host(s) to an existing credential**: Select this option if you want to add the host to an existing credential. This option is suitable if an existing credential has the security data needed to access the new host, but you need to edit its resource mappings to include this host. Click **Next** and continue with Step 12.

IMPORTANT: Credentials are security data that provide the Infrastructure agent with the permission to monitor system resources, such as a host or a range of hosts.



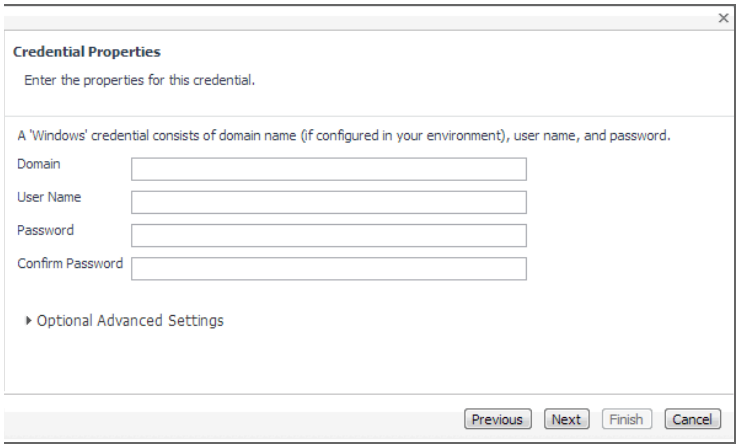
11 Create a new credential.

a On the **Credential Type** page that appears, select the credential type from the available options.



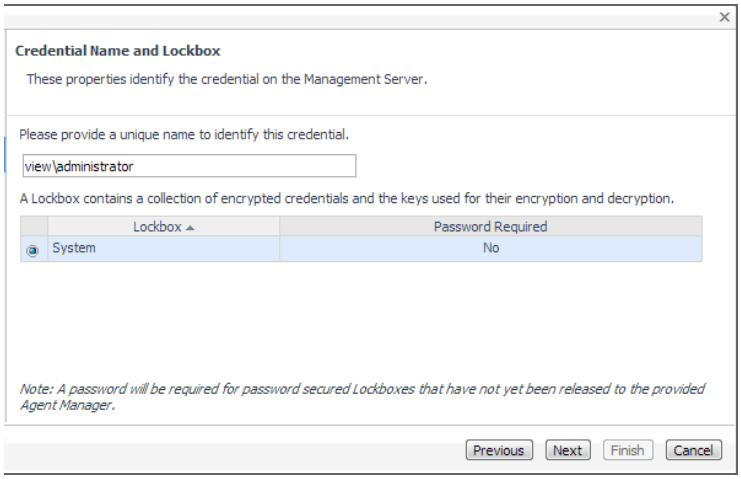
b Click **Next**.

The **Credential Properties** page appears.



c On the **Credential Properties** page, type the required properties, and click **Next**.

The **Credential Name and Lockbox** page appears.

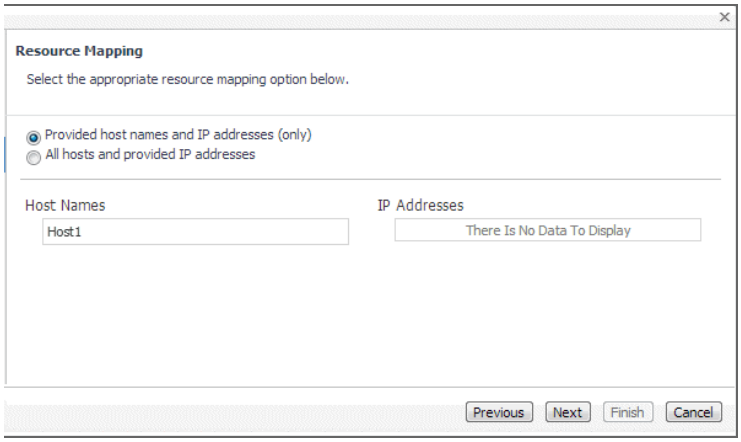


d On the **Credential Name and Lockbox** page, provide a name to uniquely identify the credential, and select a lockbox in which you want to keep the credential. A lockbox can be used to group credentials for access and/or security. In smaller Foglight Evolve Cloud installations, using the default **System** lockbox should be sufficient.

> **NOTE:** If a lockbox is password protected and is not released to the target Foglight Agent Manager, you can provide the lockbox password on the last page of the wizard.

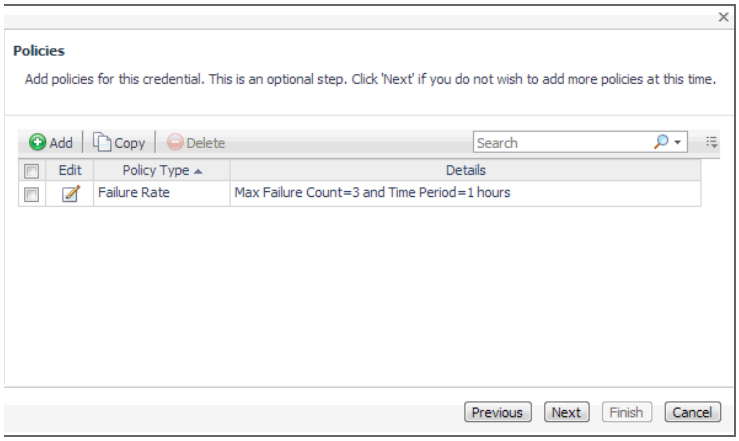
Click **Next**.

The **Resource Mapping** page appears.



e On the **Resource Mapping** page, indicate which hosts you want to associate with this credential. Click **Next**.

The **Policies** page appears.

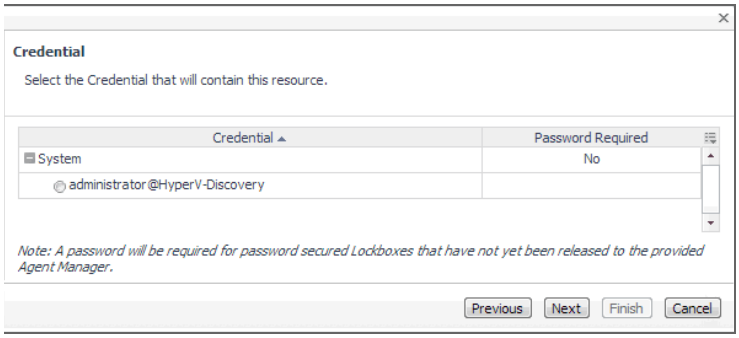


f Optional—On the **Policies** page, define one or more policies for this credential. A policy defines the number of times a credential can be used, the number of allowed authentication failures, the time range during which the credential is valid, or the length of time the credential data can be cached on the client. For example, you can specify the number of times the credential can be used, or the time period during which it can be used. For complete information about the available credential policies, see the *Administration and Configuration Help*.

g Click **Next** and proceed to Step 13.

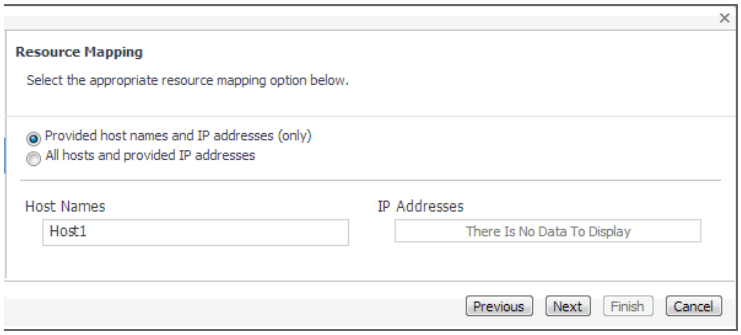
12 Use an existing credential.

a On the **Credential** page that appears, select an existing credential to contain this host.



b Click **Next**.

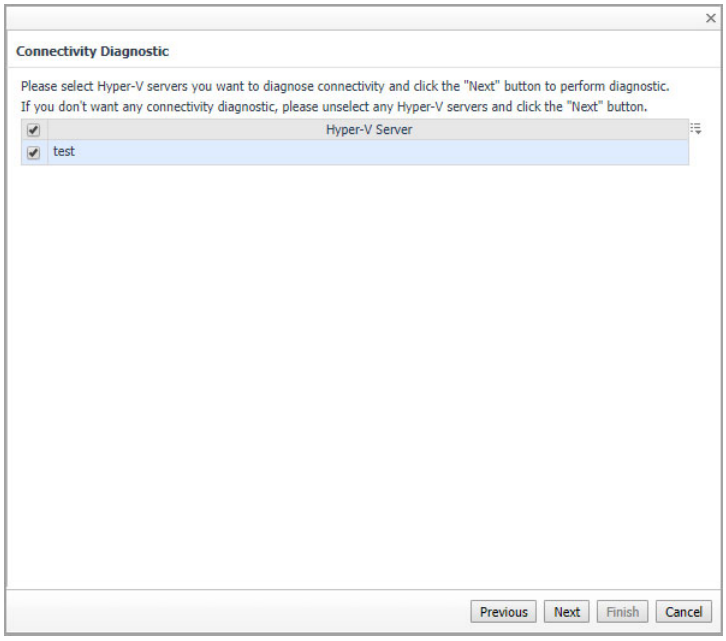
The **Resource Mapping** page appears.



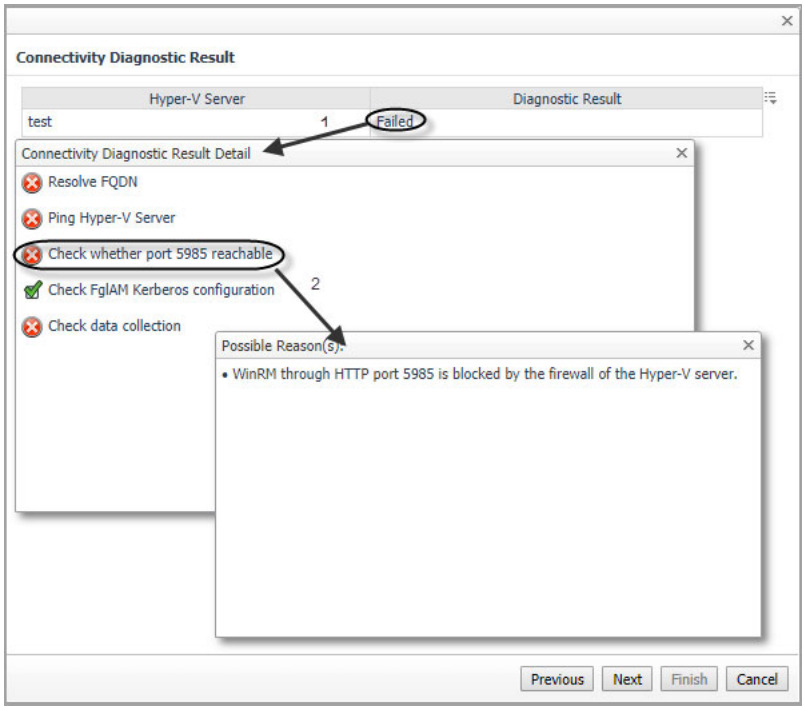
c On the **Resource Mapping** page, indicate which hosts you want to associate with this credential. You can either select the host that you are about to start monitoring, all monitored hosts, or hosts whose name contains a specific text string.

d Click **Next** and proceed to Step 13.

13 On the **Connectivity Diagnostic** page that appears, select the Hyper-V servers you want to diagnose connectivity and click **Next** to perform diagnostic. If no connectivity diagnostic is required, unselect any Hyper-V servers and click **Next**.

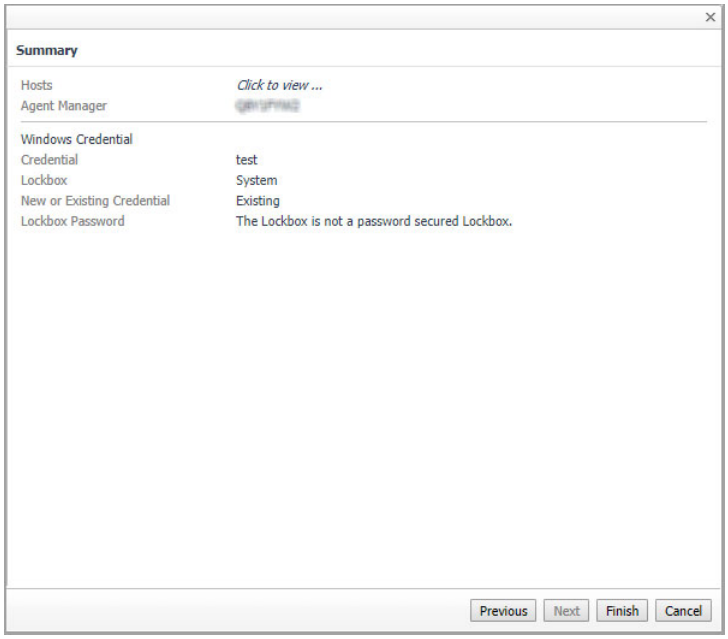


Wait for a few seconds until the **Connectivity Diagnostic Result** page appears. Click the Diagnostic Result and the **Connectivity Diagnostic Result Detail** page appears. Click on the failed items to see the possible reasons.



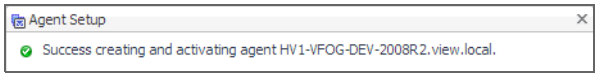
Click **Next** after connectivity diagnostic completes.

14 On the **Summary** page that appears, review the information provided about the host and the monitoring agent.



15 Click **Finish**.

The new host is added to the Hosts dashboard after a short delay. The monitoring agent is created. If the operation is successful, the **Agent Setup** message box appears. Review the information and close the message box.



The agent instances created to monitor the new host appear on the **Administration** tab, in the **Agents** area.

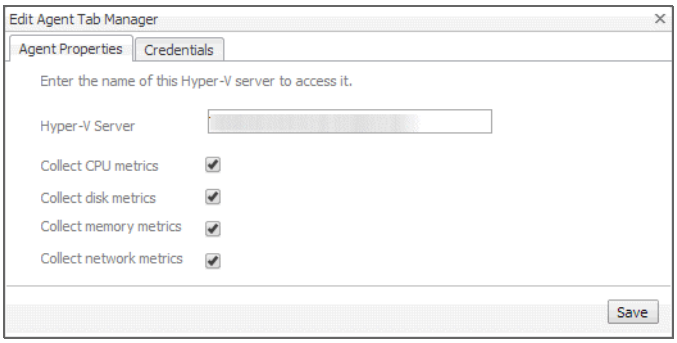
Close the dialog box. The **Administration** tab dashboard refreshes, showing the newly created Hyper-V Agent in the list.

16 If required, reconfigure the agent properties or credentials. For example, you can specify the name of the monitored Hyper-V server or the authentication schema.

When an agent connects to the Management Server, it is provided with sets of properties that it uses to configure its correct running state. Hyper-V Monitoring in Foglight Evolve Cloud stores agent properties on the Management Server.

a Select an agent and click **Edit Properties**.

The **Edit Agent Tab Manager** dialog box appears, showing the Hyper-V Agent properties on the **Agent Properties** tab.

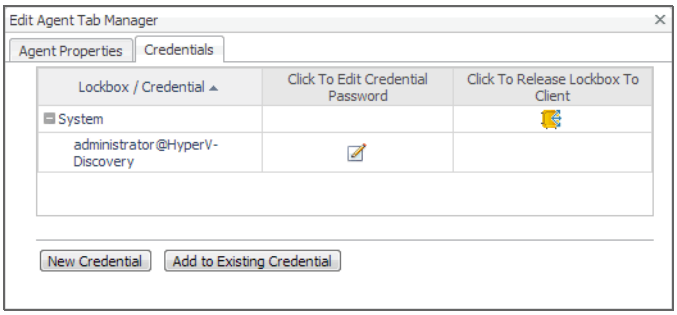


NOTE: When multiple agents are selected, you can only edit the properties that are common to all selected agents.

b Review and edit the agent properties, as required.

For additional information about these properties, see Setting the Hyper-V Agent Configuration properties on page 24.

c Open the **Credentials** tab, and review the available credentials.



d If required, you can create a new credential for this agent, or associate it with an existing credential.

- **New credentials**. Click **New Credential** and use the **Create Credential Wizard** that appears to provide the required information. For more details, see Step 11.
- **Existing credentials**. Click **Add to Existing Credential** and use the **Create Credential Wizard** that appears to provide the required information. For more details, see Step 12.

17 Activate one or more agents.

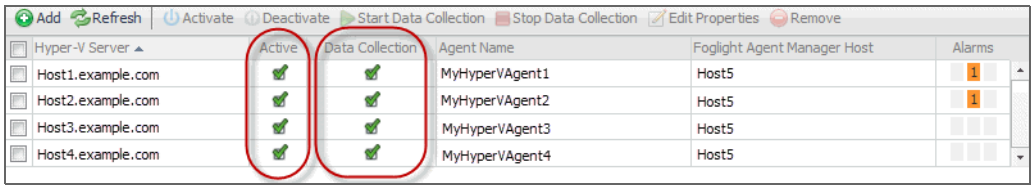
On the Agent Management dashboard, select the agents that you want to activate and click **Activate**.

18 Start the data collection for one or more agents.

On the Agent Management dashboard, select the agents whose data collection you want to start and click **Start Data Collection**.

19 Click **Refresh.**

The **Active** and **Data Collection** columns show green check marks indicating that the agents are active and collecting data.



If the agent unexpectedly fails or stops, this is an indicator of an incorrect configuration. Unknown host names or invalid WinRM configuration can cause the agent to fail. Incorrect configuration causes the agent to stop. If this happens, the agent generates an observation containing a message with more information about the failure.You can view the message contents in the Data Browser. For example, to find out any massages related to the Hyper-V Agent, in the Data Browser, navigate to **Hyper-V > Hyper-V Agents > <***Hyper-V Agent instance***> > Messages > History > <***message***>**. For more information about the Data Browser, see the *Data Model Guide*.

Configuring agent properties

NOTE: To use HTTPs connection, you need to import the CA certificate or the self-signed certificate to the KeyStore of FglAM. For more information, see Managing certificates for FglAM on page 28.

The Hyper-V, SCVMM, and SOFS Agents collect data from your virtual infrastructure and sends it to the Management Server. The agents keep track of resource utilization metrics and alerts you when certain pre-defined thresholds are reached.

When an agent connects to Foglight Management Server, it is provided with sets of properties that it uses to configure its correct running state. Each agent is provided with a combination of two types of properties: agent properties and shareable properties.

Default versions of these properties are installed with Hyper-V Monitoring in Foglight® Evolve Cloud. However, you can edit the default shareable and agent properties, configure agent properties that apply only to a specific agent instance, and create edited clones of shareable properties that are used by a subset of agents of a certain type.

There are two ways to access the Hyper-V, SCVMM, and SOFS Agent properties:

- On the Hyper-V Environment dashboard, on the **Administration** tab, select an agent instance and click **Edit Properties** (see Configuring monitoring agents on page 13).

  NOTE: This method only allows you to edit the **Configuration** properties, but not the **Data Collection Scheduler** properties.

- On the Agent Status dashboard, select an agent instance and click **Edit Properties**. This method provides access to the full set of Hyper-V Agent properties, and is described in this topic.

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

To modify the Hyper-V/SCVMM/SOFS Agent agent properties using the Agent Status dashboard:

1 Log in to the Foglight Evolve Cloud browser interface.

2 Ensure that the navigation panel is open.

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

3 Open the Agent Status dashboard and navigate to the agent properties.

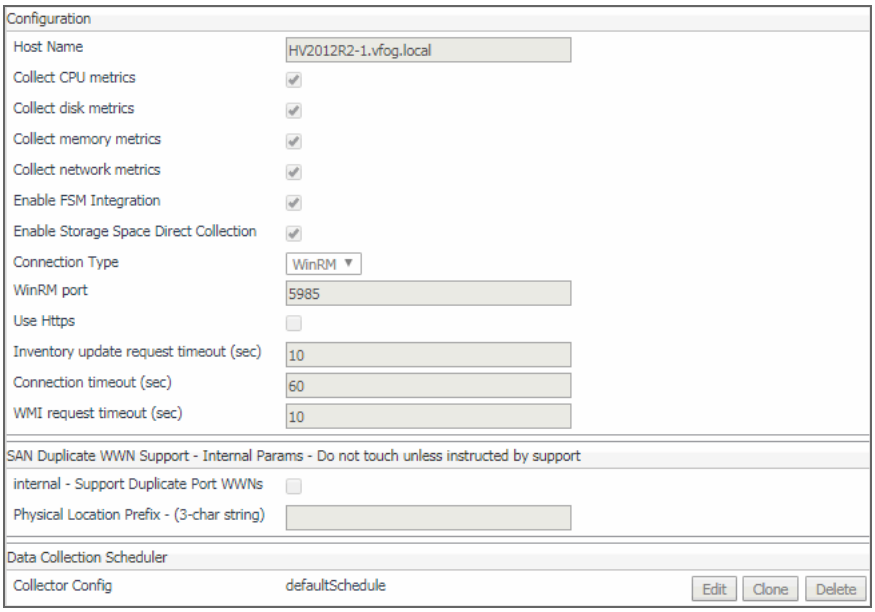
a On the navigation panel, under **Dashboards**, select **Administration > Agents > Agent Status**.

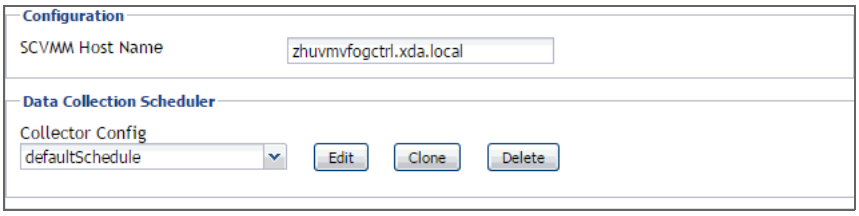
> **IMPORTANT:** Another way of editing agent properties is through the Agent Properties dashboard. The properties you specify on this dashboard apply to all instances of the selected type. To be certain that you are editing properties for a particular agent instance, without overwriting any properties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

b On the Agent Status dashboard, select the instance of the Hyper-V, SCVMM, or SOFS Agent whose properties you want to modify, and click **Edit Properties**.

c Indicate that you want to edit the properties of the agent instance.

A list of agent properties appears in the display area.



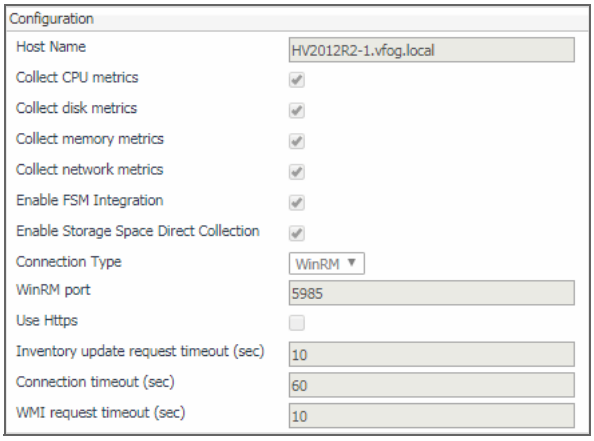


The position of the **Properties** pane depends on the dashboard you used to access agent properties. If you used the Agent Properties dashboard, the Properties pane appears to the right of the **Namespace > Type** pane in the display area. If you used the Agent Status dashboard, the **Properties** pane appears across the display area.

Setting the Hyper-V Agent Configuration properties

To monitor a desired Hyper-V® server, ensure the Hyper-V Agent's **Configuration** properties are set up as required.

Figure 4. Hyper-V Agent Configuration properties



To set the Hyper-V Agent Configuration properties:

1. Locate the Hyper-V Agent's **Configuration** properties.
2. Set the **Configuration** properties as follows:
   - **Host Name**: Type the fully qualified host name of the machine on which the monitored Hyper-V Server is running.
   - **Collect CPU metrics**: Select this option if you want to collect CPU metrics from the monitored Hyper-V environment.
   - **Collect disk metrics**: Select this option if you want to collect disk metrics from the monitored Hyper-V environment.
   - **Collect memory metrics**: Select this option if you want to collect memory metrics from the monitored Hyper-V environment.
   - **Collect network metrics**: Select this option if you want to collect network metrics from the monitored Hyper-V environment.
   - **Enable FSM Integration**: Select this option if you want to enable the integration with Foglight for Storage Management.
   - **Enable Storage Space Direct Collection**. Select this option if you want to collect Storage Space Direct (S2D) metrics from the monitored Hyper-V environment.
   - **Connection Type**. Specify the connection type. Quest recommends using *WinRM* as the connection type, as *DCOM* will be removed in future release.
   - **WinRM port**. Type the port number of WinRM.
   - **Use HTTPs**. Select this option if you want to use the HTTPS protocol.
   - **Inventory update request timeout (sec)**: Type the number of seconds after an inventory collection times out.
   - **Connection timeout (sec)**: Type the number of seconds after a connection times out.
   - **WMI request timeout (sec)**: Type the number of seconds after a WMI request times out.

Setting the SCVMM Agent Configuration properties

To monitor a desired System Center Virtual Machine Manager (SCVMM), ensure the SCVMM Agent's **Configuration** properties are set up as required.

Figure 5. SCVMM Agent Configuration properties

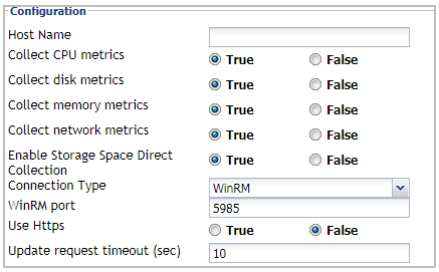
To set the SCVMM Agent Configuration properties:

1. Locate the SCVMM Agent's **Configuration** properties.
2. In the **Configuration** area, in the **SCVMM Host Name** box, type the name of the machine on which the Virtual Machine Manager is running.

Setting the SOFS Agent Configuration properties

To monitor a desired SOFS server, ensure the SOFS Agent's **Configuration** properties are set up as required.

Figure 6. SOFS Agent Configuration properties



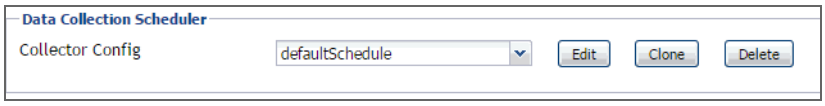
To set the SOFS Agent Configuration properties:

1. Locate the SOFS Agent's **Configuration** properties.
2. Set the **Configuration** properties as follows:
   - **Host Name**: Type the fully qualified host name of the machine on which the monitored Hyper-V Server is running.
   - **Collect CPU metrics**: Select this option if you want to collect CPU metrics from the monitored SOFS environment.
   - **Collect disk metrics**: Select this option if you want to collect disk metrics from the monitored SOFS environment.
   - **Collect memory metrics**: Select this option if you want to collect memory metrics from the monitored SOFS environment.
   - **Collect network metrics**: Select this option if you want to collect network metrics from the monitored SOFS environment.
   - **Enable Storage Space Direct Collection**. Select this option if you want to collect Storage Space Direct (S2D) metrics from the monitored Hyper-V environment.
   - **Connection Type**. Specify the connection type. Quest recommends using *WinRM* as the connection type, as *DCOM* will be removed in future release.
   - **WinRM port**. Type the port number of WinRM.
   - **Use HTTPs**. Select this option if you want to use the HTTPS protocol.
   - **Update request timeout (sec)**: Type the number of seconds after a collection times out.

Setting the Hyper-V/SCVMM/SOFSAgent Data Collection Scheduler properties

Use the **Data Collection Scheduler** properties to adjust how frequently the Hyper-V, SCVMM, or SOFS Agent collects data from the monitored server.

Figure 7. Data Collection Scheduler properties



To set the Data Collection Scheduler properties:

1 Locate the Hyper-V, SCVMM, or SoFS Agent **Data Collection Scheduler** properties.

2 Select the collection configuration list that you want to use.

Click **Collection Config**, and from the list that appears, select a collection list.

> **TIP:** The Inventory Collection process does not submit data back to the Management Server, it is used entirely to support the Essential and Resource metric collections.
>
> If you want to clone a list and associate it with the agent instance whose properties you are editing, select it and click **Clone**. When prompted, enter a name for the cloned list. For more information on cloning, see the *Administration and Configuration Help*.

The default **Data Collection** entry appears in the list. This collector is responsible for obtaining Hyper-V metrics from the monitored system.

3 Update the selected collection configuration list.

a Click the **Edit** button on the right of **Collector Config**.

A dialog box appears.

b Edit the entries in the list, as required.

c To edit a value in the table, double-click the table cell, and enter the required value. Each list has the following values:

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

d Save your changes to the list by clicking **Save Changes** in the dialog box.

The dialog box closes.

4 In the display area, click **Save**.

Managing certificates

Syntax Conventions

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

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

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

  C:\Quest\Foglight_Agent_Manager

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

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

Managing certificates for FglAM

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

Prerequisite

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

Add a certificate

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

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

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

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

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

    or

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

List installed certificates

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

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

Refer to the example output below:

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

Delete a certificate

Remove a certificate referred to by an `alias`.

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

A full example for managing certificate for FglAM

- Add an example certificate into FglAM certificate store

  ```
  C:\Quest\Foglight\fglam\bin>fglam.exe --add-certificate "Evolve-test"="D:/Evolve-test.crt"
  ```

  …

  ```
  2020-02-27 16:31:01.000 INFO  [native] Certificate added: Certificate from
    D:\Evolve-test.crt added as Evolve-test
  ```

- List the example certificate in the FglAM certificate store

  ```
  C:\Quest\Foglight\fglam\bin>fglam.exe --list-certificate
  ```

  …

  ```
    Alias                       Certificate
    -----                       -----------
    Evolve-test                         Issuer:
                                  CN: XXX
  ```

- Delete the example certificate from the FglAM certificate store

  ```
  C:\Quest\Foglight\fglam\bin>fglam.exe --delete-certificate "Evolve-test"
  ```

  …

  ```
  2020-02-27 16:28:21.000 INFO  [native] Certificate deleted: Certificate
    Evolve-test deleted
  ```

Managing certificates for FMS

Use the keytool utility shipped with Foglight to create, import, or export certificates. This utility can be found at: *<foglight_home>\jre\bin\keytool*.

There are two FMS running modes:

- None-FIPS (Federal Information Processing Standards) mode
- FIPS-compliant mode

Managing certificates for FMS in non-FIPS mode

The KeyStore Foglight used under non-FIPS mode is located at: *<foglight_home>/jre/lib/security/cacerts* (default password: `changeit`)

Add a certificate

Use the keytool command in FMS JRE located in *<foglight>/jre/bin*

```
keytool -import -trustcacerts -alias "<alias>" -file "<certificate path>" -keystore
<foglight_home>/jre/lib/security/cacerts -storepass changeit
```

- Validate the certificate and ensure the following:
  - It is not expired.
  - It is an X.509 format.
- Change the following before executing the command:
  - `<alias>`: The alias is required and is used in the list and delete operations to refer to the certificate. It can be anything.
  - `<foglight_home>`: The folder path where the Foglight is installed.
  - `<certificate path>`: Your custom certificate path.

List installed certificates

```
keytool -list -keystore <foglight_home>/jre/lib/security/cacerts -storepass changeit
```

Delete a certificate

Remove a certificate referred to by an `alias`.

```
keytool -delete -alias <alias> -keystore <foglight_home>/jre/lib/security/cacerts -
storepass changeit
```

A full example for managing certificate for FMS in non-FIPS mode

Add example certificate into FMS Certificate Store in non-FIPS mode

```
C:\Quest\Foglight\jre\bin> .\keytool.exe -import -trustcacerts -alias fveqaca -
file "C:\caca.cer" -keystore C:\Quest\Foglight\jre\lib\security\cacerts -
storepass changeit

Owner: CN=CA, DC=ca, DC=local

Issuer: CN=CA, DC=ca, DC=local

Serial number: xxxxxxxxxxx

Valid from: Mon Jun 15 10:56:05 CST 2015 until: Mon Sep 23 14:58:03 CST 2047

Certificate fingerprints:

         MD5:  xxxx

         SHA1: xxxx

         SHA256: xxxx

.....

Trust this certificate? [no]:  yes

Certificate was added to keystore
```

Managing certificates for FMS in FIPS-compliant mode

The KeyStore Foglight used in FIPS-compliant mode is located at:
<foglight_home>/config/security/trust.fips.keystore (default password: `nitrogen`)

Add a certificate in FIPS-compliant mode

Use the keytool command in FMS JRE located in *<foglight>/jre/bin.*

```
keytool -import -trustcacerts -alias "<alias>" -file "<certificate path>" -keystore
"<Foglight_home>/config/security/trust.fips.keystore" -deststoretype BCFKS -
provider org.bouncycastle.jcajce.provider.BouncyCastleFipsProvider -providerpath
"<Foglight_home>/server/core/bc-fips.jar" -storepass nitrogen
```

- Validate the certificate and ensure the following:
  - It is not expired.
  - It is an X.509 format.
- Change the following before executing the command
  - `<alias>`: The alias is required and is used in the list and delete operations to refer to the certificate. It can be anything.
  - `<Foglight_home>`: The folder path where Foglight is installed.
  - `<certificate path>`: Your custom certificate path.

List installed certificates

```
keytool -list -keystore "<Foglight_home>/config/security/trust.fips.keystore" -
deststoretype BCFKS -provider
org.bouncycastle.jcajce.provider.BouncyCastleFipsProvider -providerpath
"<Foglight_home>/server/core/bc-fips.jar" -storepass nitrogen
```

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

Refer to the example output below:

```
Keystore type: BCFKS

Keystore provider: BCFIPS

Your keystore contains 151 entries

camerfirmachambersignca [jdk], Dec 18, 2019, trustedCertEntry,

Certificate fingerprint (SHA1):
4A:BD:EE:EC:95:0D:35:9C:89:AE:C7:52:A1:2C:5B:29:F6:D6:AA:0C

entrust2048ca [jdk], Dec 18, 2019, trustedCertEntry

…
```

Delete a certificate

Remove a certificate referred to by an `alias`.

```
keytool -delete -alias <alias> -keystore
"<Foglight_home>/config/security/trust.fips.keystore" -deststoretype BCFKS -
provider org.bouncycastle.jcajce.provider.BouncyCastleFipsProvider -providerpath
"<Foglight_home>/server/core/bc-fips.jar" -storepass nitrogen
```

A full example for managing certificate for FMS in FIPS-compliant mode

Add example certificate into FMS certificate store in FIPS-compliant mode

```
C:\Quest\Foglight\jre\bin>keytool -import -trustcacerts -alias "Evolve-Test" -file
"D:/Evolve-test.crt" -keystore
```

```
"C:/Quest/Foglight/config/security/trust.fips.keystore" -deststoretype BCFKS -
provider org.bouncycastle.jcajce.provider.BouncyCastleFipsProvider -providerpath
"C:/Quest/Foglight/server/core/bc-fips.jar" -storepass nitrogen

Owner: CN=CA, DC=ca, DC=local

Issuer: CN=CA, DC=ca, DC=local

Serial number: xxxx

Valid from: Sun Jan 06 23:07:06 CST 2019 until: Wed Apr 06 23:07:06 CST 2022

Certificate fingerprints:

...


Extensions:

...

Trust this certificate? [no]:  yes

Certificate was added to keystore
```

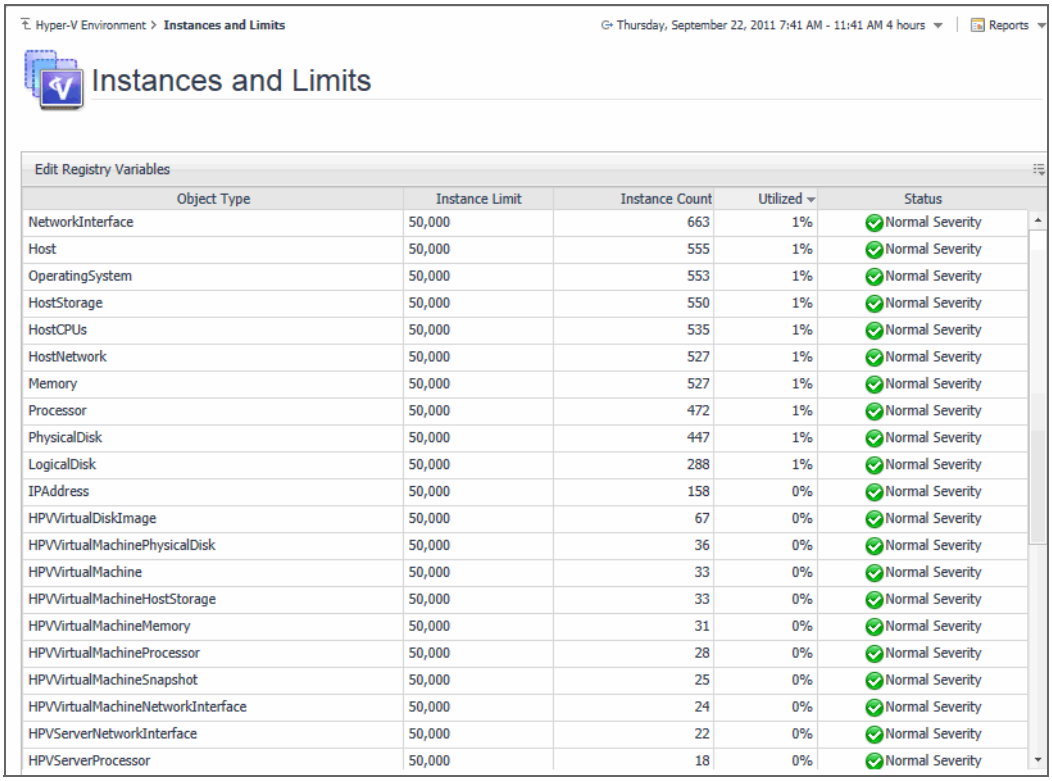
Reviewing object instances and deleting expired data

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

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

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

Figure 8. Instances and Limits view



Object Type	Instance Limit	Instance Count	Utilized	Status
NetworkInterface	50,000	663	1%	Normal Severity
Host	50,000	555	1%	Normal Severity
OperatingSystem	50,000	553	1%	Normal Severity
HostStorage	50,000	550	1%	Normal Severity
HostCPUs	50,000	535	1%	Normal Severity
HostNetwork	50,000	527	1%	Normal Severity
Memory	50,000	527	1%	Normal Severity
Processor	50,000	472	1%	Normal Severity
PhysicalDisk	50,000	447	1%	Normal Severity
LogicalDisk	50,000	288	1%	Normal Severity
IPAddress	50,000	158	0%	Normal Severity
HPVVirtualDiskImage	50,000	67	0%	Normal Severity
HPVVirtualMachinePhysicalDisk	50,000	36	0%	Normal Severity
HPVVirtualMachine	50,000	33	0%	Normal Severity
HPVVirtualMachineHostStorage	50,000	33	0%	Normal Severity
HPVVirtualMachineMemory	50,000	31	0%	Normal Severity
HPVVirtualMachineProcessor	50,000	28	0%	Normal Severity
HPVVirtualMachineSnapshot	50,000	25	0%	Normal Severity
HPVVirtualMachineNetworkInterface	50,000	24	0%	Normal Severity
HPVServerNetworkInterface	50,000	22	0%	Normal Severity
HPVServerProcessor	50,000	18	0%	Normal Severity

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

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

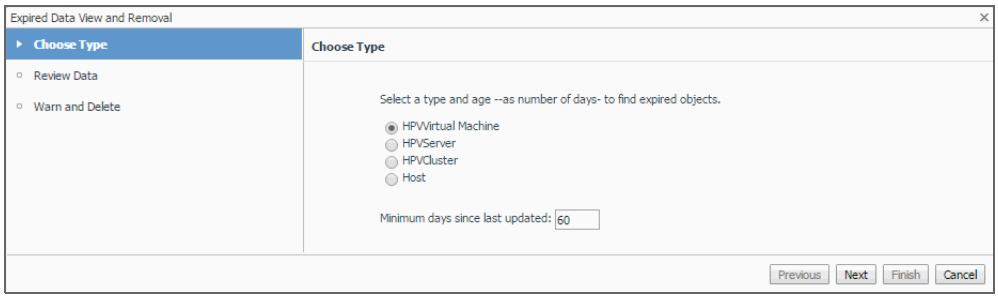
For reference information about this view, see Instances and Limits view on page 34.

To review and delete expired data:

1 On the Hyper-V Environment dashboard, open the **Administration** tab.

2 On the **Administration** tab, click **Review Expired Data**.

The **Expired Data View and Removal** dialog box appears.

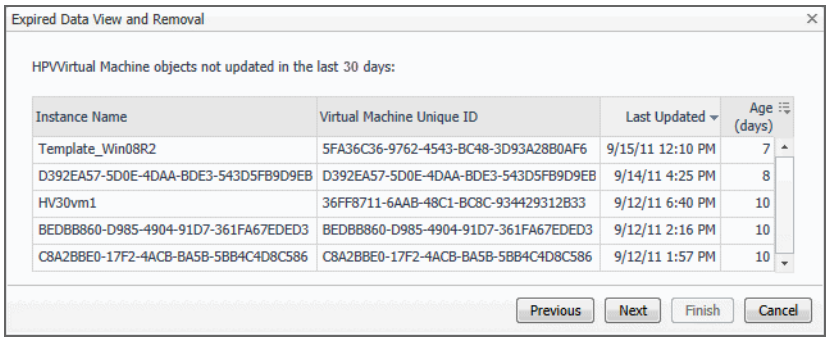


3 In the **Expired Data View and Removal** dialog box, select a category of object type that you want to review, and type the number of days during which the object instances were not updated.

For example, to view the object instances that are not updated in 30 days and are created when monitoring virtual machines, select **HPVVirtual Machine**, and in the **Minimum days since last updated** box, type 30.

4 Click **Next**.

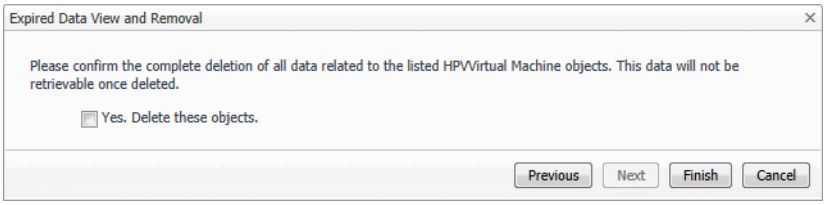
The **Expired Data View and Removal** dialog box refreshes, showing the object instances that meet the specified requirements.



5 Observe the results.

- If you want to delete all of the object instances, click **Next**.
- If you want to modify your search, click **Previous**, make your changes, and observe your results again. For example, to show fewer instances, click **Previous**, and increase the time period. When satisfied, click **Next**.
- If you do not want to delete any objects, click **Next**.

The **Expired Data View and Removal** dialog box refreshes.



6 To delete the selected object instances, select the check box.

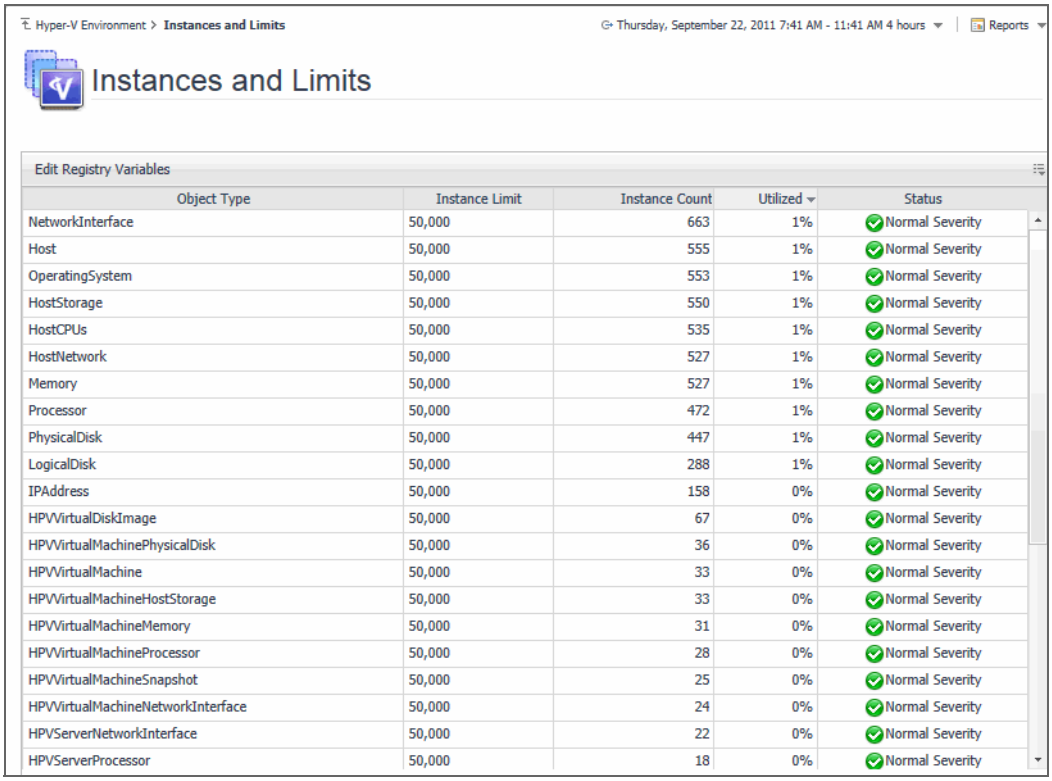
To keep the selected object instances, ensure the check box is clear.

7 Click **Finish**.

Instances and Limits view

This view displays the list of the existing Hyper-V object types. This information can give you insight into the size of your database and whether additional adjustments are required to improve your system performance.

Figure 9. Instances and Limits view



Object Type	Instance Limit	Instance Count	Utilized	Status
NetworkInterface	50,000	663	1%	Normal Severity
Host	50,000	555	1%	Normal Severity
OperatingSystem	50,000	553	1%	Normal Severity
HostStorage	50,000	550	1%	Normal Severity
HostCPUs	50,000	535	1%	Normal Severity
HostNetwork	50,000	527	1%	Normal Severity
Memory	50,000	527	1%	Normal Severity
Processor	50,000	472	1%	Normal Severity
PhysicalDisk	50,000	447	1%	Normal Severity
LogicalDisk	50,000	288	1%	Normal Severity
IPAddress	50,000	158	0%	Normal Severity
HPVVirtualDiskImage	50,000	67	0%	Normal Severity
HPVVirtualMachinePhysicalDisk	50,000	36	0%	Normal Severity
HPVVirtualMachine	50,000	33	0%	Normal Severity
HPVVirtualMachineHostStorage	50,000	33	0%	Normal Severity
HPVVirtualMachineMemory	50,000	31	0%	Normal Severity
HPVVirtualMachineProcessor	50,000	28	0%	Normal Severity
HPVVirtualMachineSnapshot	50,000	25	0%	Normal Severity
HPVVirtualMachineNetworkInterface	50,000	24	0%	Normal Severity
HPVServerNetworkInterface	50,000	22	0%	Normal Severity
HPVServerProcessor	50,000	18	0%	Normal Severity

Table 2. Description of the View

Data displayed	• **Instance Count**. The current number of object instances of this type. • **Instance Limit**. The maximum number of object instances of this type that can be instantiated. • **Object Type**. The type of the topology object. • **Status**. The current status representing the highest severity level associated with an instance of that type. • **Utilized**. The percentage of the object limit instance that is currently utilized.

3

Performance monitoring with the Hyper-V Environment dashboard

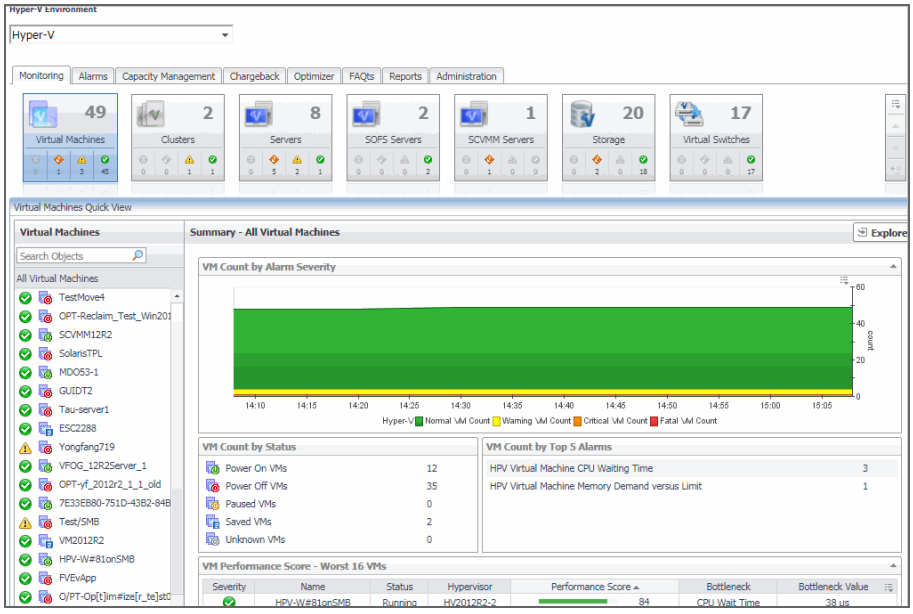
A typical virtual environment contains a set of physical servers and virtual machines. A physical server can be a part of a cluster, and can have one or more virtual machines associated with it. You can view the overall state of these components on the Hyper-V Environment dashboard.

- Accessing the Hyper-V Environment dashboard
- Monitoring tab
- About frequently asked questions
- About reports
- Foglight Evolve Cloud for Capacity Management
- Foglight Resource Optimizer for Hyper-V Environments

Accessing the Hyper-V Environment dashboard

When you navigate to the Hyper-V Environment dashboard for the first time, the **Monitoring** tab appears. This tab provides an overall summary of your virtual environment.

Figure 10. Hyper-V Environment dashboard



To access the Hyper-V Environment dashboard:

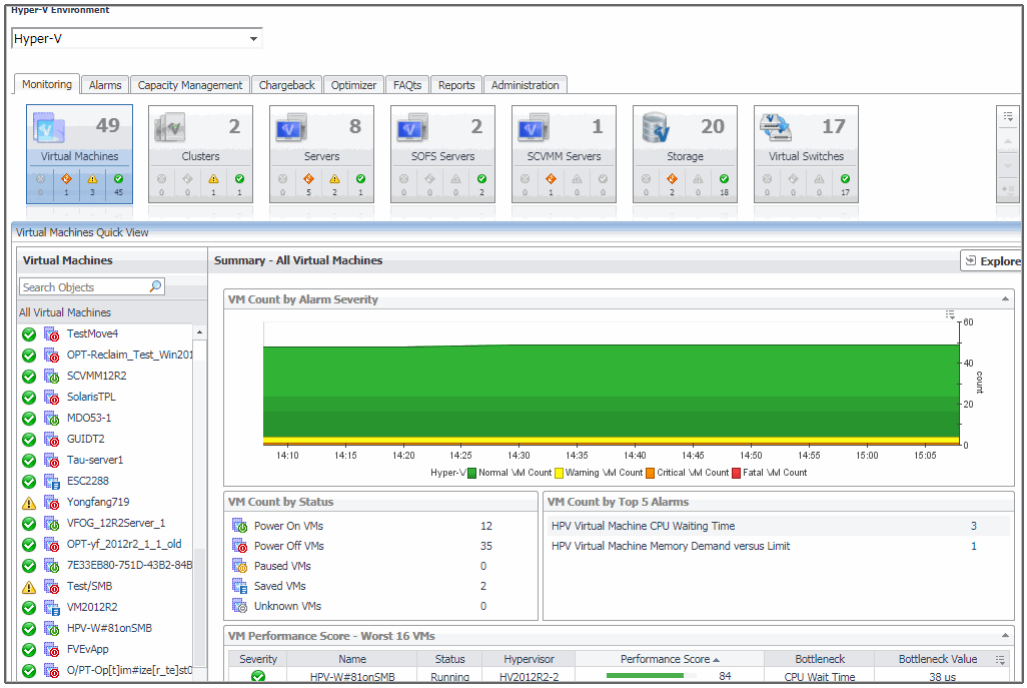
1 Log in to the Foglight Evolve Cloud browser interface.

2 Ensure that the navigation panel is open.

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

3 On the navigation panel, under **Homes**, click **Hyper-V Environment**.

The Hyper-V Environment dashboard appears in the display area.



The Hyper-V Environment dashboard shows summary information about the clusters, servers, and virtual machines in your environment, and additional information about each specific component.

4 Select the **Clusters**, **Servers**, **Virtual Machines**, **SOFS Servers, SCVMM Servers**, **Storage**, or **Virtual Switches** tile from the top left.

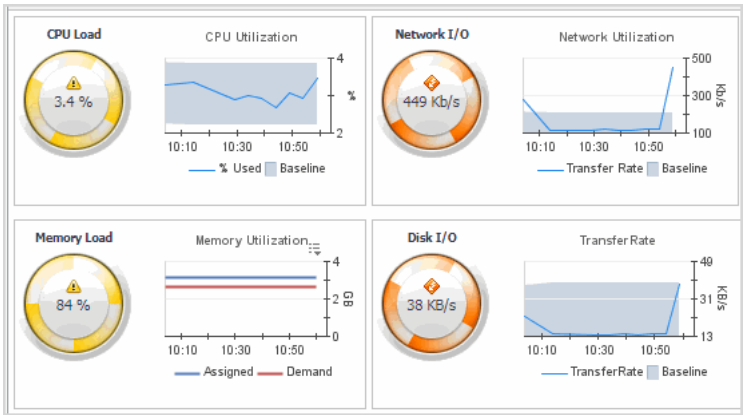
Monitoring tab

The Monitoring tab allows you to select a monitoring object or a group of objects, such as clusters, servers, virtual machines, virtual switches, or volumes, and review the data associated with your selection. For example, selecting all servers identifies the top three consumers of CPU, memory, network, and disk resources and shows the related alarm states. Selecting a specific server shows the CPU, memory, network, and disk usage for the selected server, along with high-level hardware and software configuration.

Gauge charts

The data of CPU, memory, network, and disk usage are represented using a spinner (also known as rotating wheel) which is divided into four severity levels, including Normal (in green), Warning (in yellow), Critical (in orange), and Fatal (in red).

Figure 11. Rotating wheels shown in monitored server/VM views



CPU load spinner

The severity of CPU Load is calculated based on the following formula: (*utilization* current average - *utilization* period average)/*utilization* period standardDeviation. If this value is:

- Larger than 4: the CPU load spinner will be show in red, which indicates its severity level is Fatal.
- Larger than 3 but less than/equal to 4: the CPU load spinner will be shown in orange, which indicates its severity level is Critical.
- Larger than 2 but less than/equal to 3: the CPU load spinner will be shown in yellow, which indicates its severity level is Warning.
- Less than or equal to 2: the CPU load spinner will be shown in green, which indicates its severity level is Normal.

Network I/O spinner

The severity of Network I/O is calculated based on the following formula: (*transferRate* current average - *transferRate* period average)/*transferRate* period standardDeviation. If this value is:

- Larger than 4: the Network I/O spinner will be show in red, which indicates its severity level is Fatal.
- Larger than 3 but less than/equal to 4: the Network I/O spinner will be shown in orange, which indicates its severity level is Critical.
- Larger than 2 but less than/equal to 3: the Network I/O spinner will be shown in yellow, which indicates its severity level is Warning.
- Less than or equal to 2: the Network I/O spinner will be shown in green, which indicates its severity level is Normal.

Memory Load spinner

The severity of Memory Load is calculated based on the following formula: (*currentPressure* current average - *currentPressure* period average)/*currentPressure* period standardDeviation. If this value is:

- Larger than 4: the Memory load spinner will be show in red, which indicates its severity level is Fatal.
- Larger than 3 but less than/equal to 4: the Memory load spinner will be shown in orange, which indicates its severity level is Critical.
- Larger than 2 but less than/equal to 3: the Memory load spinner will be shown in yellow, which indicates its severity level is Warning.
- Less than or equal to 2: the Memory load spinner will be shown in green, which indicates its severity level is Normal.

Disk I/O spinner

The severity of Disk usage is calculated based on the following formula: (*diskTransferRate* current average - *diskTransferRate* period average)/*diskTransferRate* period standardDeviation. If this value is:

- Larger than 4: the Disk usage spinner will be show in red, which indicates its severity level is Fatal.
- Larger than 3 but less than/equal to 4: the Disk usage spinner will be shown in orange, which indicates its severity level is Critical.
- Larger than 2 but less than/equal to 3: the Disk usage spinner will be shown in yellow, which indicates its severity level is Warning.
- Less than or equal to 2: the Disk usage spinner will be shown in green, which indicates its severity level is Normal.

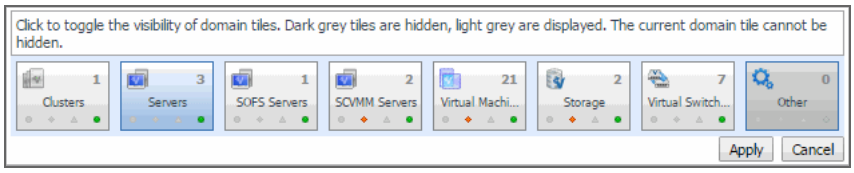
Virtual Environment view

This view appears in the upper part of the **Monitoring** tab, just above the Quick-View. It displays a high-level overview of the selected virtual environment. The view has a tile for each type of object in your virtual infrastructure: **Clusters**, **Servers**, **SCVMM Servers**, **SOFS Servers, Virtual Machines**, **Storage**, and **Virtual Switches**.

Figure 12. Virtual Environment view

Each tile shows how many of the corresponding object instances there are in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal). For example, the following image shows four physical servers: none in the Fatal, Critical or Warning states, and four in the Normal state.

Figure 13. Configuring tiles in the Virtual Environment view



You can move the tiles by dragging and dropping until you achieve the desired layout.

To hide one or more tiles:

1 On the tool bar on the right, click Edit .

2 In the dwell that appears, click a tile that you want to hide and click **Apply**.

The selected tile is hidden in the Virtual Environment view.

Clicking the object type icon, the object type name, or the object count, shows summary information for that object type in the Quick-View. Clicking an alarm state (for example, Warning) on a tile displays summary information in the Quick-View for the objects of that type that are in the selected alarm state. If an alarm state has a count of zero, then you cannot drill down on the alarm state.

This view contains the following tiles:

- Clusters

- Servers
- SOFS Servers
- SCVMM Servers
- Virtual Machines
- Storage
- Virtual Switches

Table 3. Clusters

Description	Shows the number of clusters in your environment and total alarm counts associated with those clusters.
Data displayed	• **Alarm counts**. The total counts of alarms associated with the clusters, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Cluster count**. The number of clusters in your environment.
Where to go next	Drill down on: • **Alarm counts**. Lists the clusters associated with the alarms in the Clusters view, appearing in the Quick-View. • **Clusters**. Displays cluster-related combination of views in the Quick-View.

Table 4. Servers

Description	Shows the number of servers in your environment and total alarm counts associated with those servers.
Data displayed	• **Alarm counts**. The total counts of alarms associated with the physical servers, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Server count**. The number of physical servers in your virtual environment.
Where to go next	Drill down on: • **Alarm counts**. Lists the servers associated with the alarms in the Servers view, appearing in the Quick-View. • **Servers**. Displays servers-related combination of views in the Quick-View.

Table 5. SCVMM Servers

Description	Shows the number of SCVMM servers in your environment and total alarm counts associated with those servers.
Data displayed	• **Alarm counts**. The total counts of alarms associated with the SCVMM servers, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Server count**. The number of SCVMM servers in your virtual environment.
Where to go next	Drill down on: • **Alarm counts**. Lists the SCVMM servers associated with the alarms in the SCVMM Servers view, appearing in the Quick-View. • **Servers**. Displays SCVMM server-related combination of views in the Quick-View.

Table 6. Virtual Machines

Description	Shows the number of virtual machines in your environment and a list of virtual machines with worst performance score.
Data displayed	• **VM Count by Alarm Severity**. The total counts of alarms associated with the virtual machines, broken down by alarm types (Normal, Warning, Critical, Fatal).

Table 6. Virtual Machines

	• **VM Count by Status.** The number of VMs associated with the virtual machines, broken down by VM status (Power On, Power Off, Paused, Saved, Unknown). • **VM Count by Top 5 Alarms.** The number of VMs that have top 5 alarms. • **VM Performance Score - Worst 16 VMs**. The list of VMs which have the worst performance score.
Where to go next	Drill down on: • **VM Count by Alarm Severity**. Lists the virtual machines associated with the alarms in the Virtual Machines view, appearing in the Quick-View. • **VM Count by Status.** Displays virtual machines views in the Quick-View. • **VM Count by Top 5 Alarms.** Displays the alarms in the Alarms view, appearing in the Quick-View. • **VM Performance Score - Worst 16 VMs**. Displays the Hyper-V Explorer Summary.

Table 7. Storage

Description	Shows the number of virtual volumes in your environment and total alarm counts associated with them.
Data displayed	• **Alarm counts**. The total counts of alarms associated with the virtual volumes, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Server count**. The number of virtual volumes in your environment.
Where to go next	Drill down on: • **Alarm counts**. Lists the virtual volumes associated with the alarms in the Storage view, appearing in the Quick-View. • **Virtual Machines**. Displays virtual volume views in the Quick-View.

Table 8. Virtual Switches

Description	Shows the number of virtual switches in your environment and total alarm counts associated with them.
Data displayed	• **Alarm counts**. The total counts of alarms associated with the virtual switch, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Server count**. The number of virtual switches in your environment.
Where to go next	Drill down on: • **Alarm counts**. Lists the virtual switches associated with the alarms in the Virtual Switches view, appearing in the Quick-View. • **Virtual Machines**. Displays virtual switch views in the Quick-View.

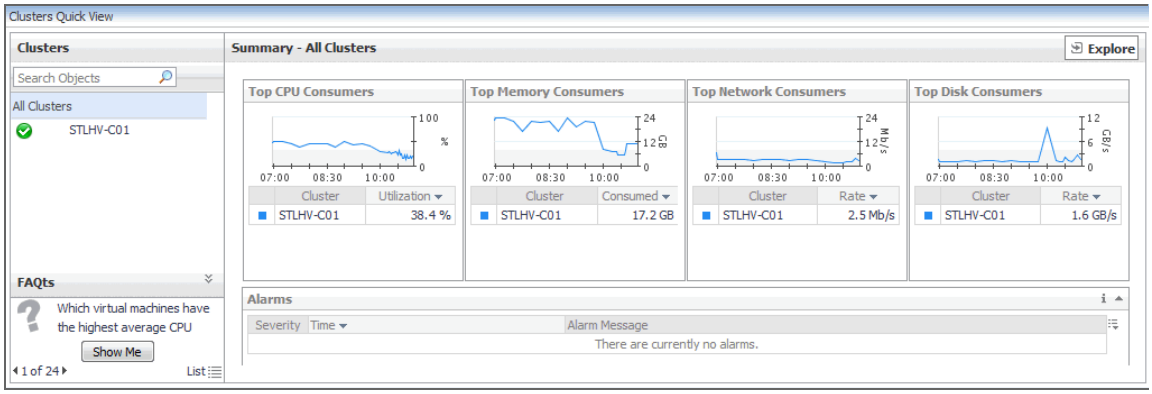
Table 9. SOFS Servers

Description	Shows the number of Scale-Out File Server (SOFS) in your environment and total alarm counts associated with them.
Data displayed	• **Alarm counts**. The total counts of alarms associated with the SOFS servers, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Server count**. The number of SOFS servers in your environment.
Where to go next	Drill down on: • **Alarm counts**. Lists the SOFS servers associated with the alarms in the SOFS Servers view, appearing in the Quick-View. • **Servers**. Displays servers-related combination of views in the Quick-View.

Quick-View

The **Quick-View** is a container view. It contains a combination of server or virtual machine views, depending on your selection in the pane on the left. It appears in the lower part of the Hyper-V Environment dashboard, just below the Virtual Environment view.

Figure 14. Quick-View



Alarms view

This view displays a list of alarms generated against the objects or group of objects selected in the Quick-View. Use this view to quickly identify any potential problems related to a specific object.

Figure 15. Alarms view

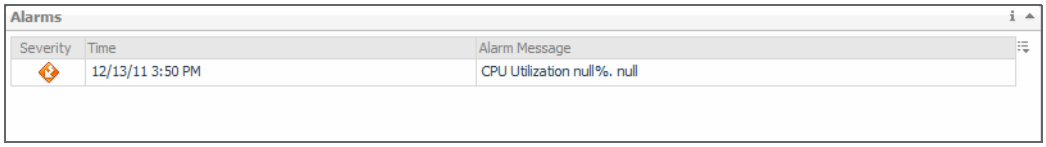
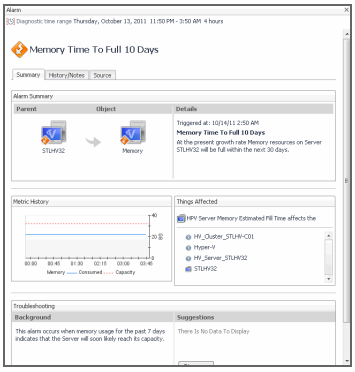


Table 10. Description of the View

Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. The alarm severity icon: Warning, Critical, or Fatal. • **Time**. The time when the alarm was generated.

Table 10. Description of the View

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.



Cluster monitoring

A cluster object is a group of Hyper-V servers that share common storage resources and network configurations.

To review data collected about a specific cluster or all clusters, make your selection in the Quick-View.

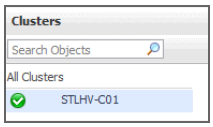
- Clusters view
- Summary - All Clusters view
- Cluster Summary view

Clusters view

The **Clusters** view is a tree view. It lists the clusters that exist in your environment and shows their state.

This view appears in the Quick-View on the left when you select the **Clusters** tile in the Virtual Environment view.

Figure 16. Clusters view



Selecting the **All Clusters** node displays overall resource utilization for all clusters in your integrated system and the elements that consume the highest amount of system resources in the **Cluster Summary (All Clusters)** view on the right. Similarly, selecting a cluster node shows cluster-specific metrics in the **Cluster Summary** view on the right.

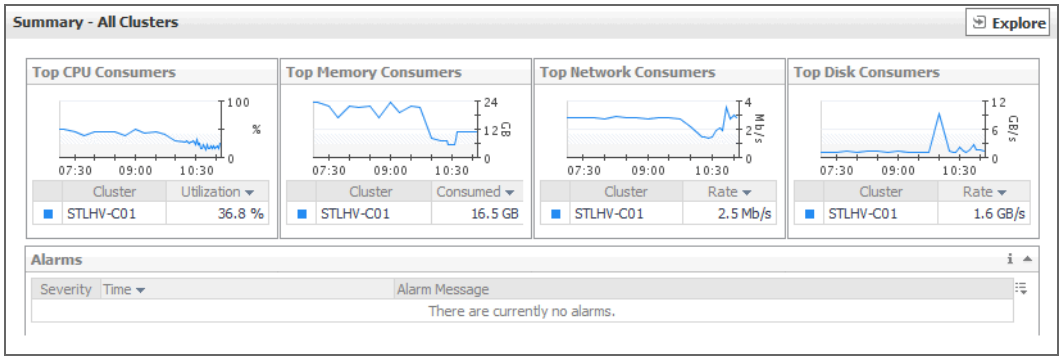
Table 11. Description of the View

Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated the cluster. • **All Clusters**. A parent node for the cluster object instances that appear in this view. • **Cluster**. The cluster name.
Where to go next	Drill down on: • **All Clusters**. Shows the Summary - All Clusters view in the Quick-View. • **Cluster**. Shows the Cluster Summary view in the Quick-View.

Summary - All Clusters view

The **Summary - All Clusters** view displays overall resource utilization information for a group of clusters, and shows the elements that consume the highest amount of system resources.

This view appears in the Quick-View on the left when you select **All Clusters** in the Clusters view.



This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 12. Alarms

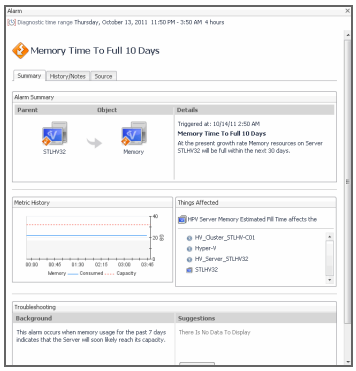
Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the Cluster Summary view. • **Severity**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*. **Figure 17. Alarm dialog box**  • **Time**. Links to the Cluster Summary view.

Table 13. Top CPU Consumers

Description	Shows the top three clusters with the highest average CPU utilization.
Data displayed	• **Clusters**. The name of the clusters that are the top three CPU utilization. • **CPU Utilization**. The total percentage of CPU utilization the top three CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on: • **Clusters**. For more information, see Hyper-V Explorer Summary tab on page 118. • **CPU Utilization** (in the graph). Displays the **Top Clusters - CPU Utilization** dialog box.

Figure 18. Top Clusters - CPU Utilization dialog box

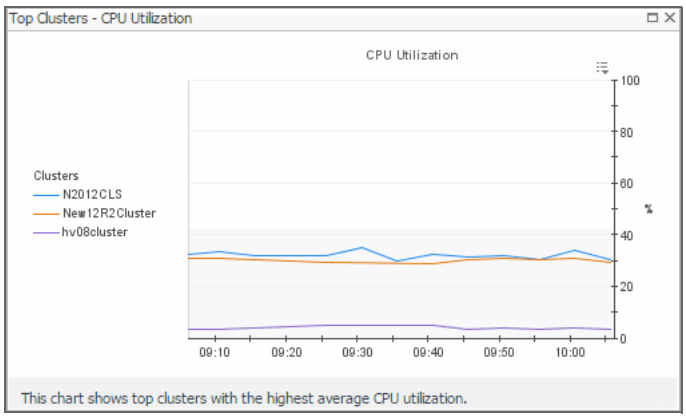


Table 14. Top Disk Consumers

Description	Shows the top three clusters with the highest average disk utilization.
Data displayed	• **Clusters**. The name of the clusters that are the top three disk utilization. • **Disk Transfer Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range.
Where to go next	Drill down on: • **Clusters**. For more information, see Hyper-V Explorer Summary tab on page 118. • **Disk Transfer Rate** (in the graph). Displays the **Top Clusters - Disk Transfer Rate** dialog box.

Figure 19. Top Clusters - Disk Transfer Rate dialog box

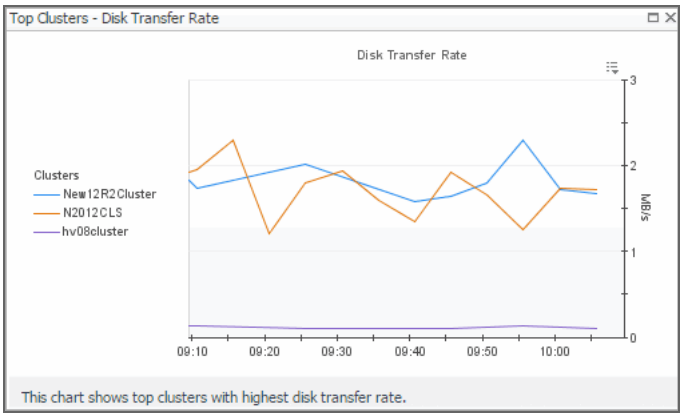


Table 15. Top Memory Consumers

Description	Shows the top three clusters with the highest average memory utilization.
Data displayed	• **Clusters**. The name of the cluster that are the top three memory consumers. • **Memory Consumed**. The amount of memory the top three memory consumers use during the selected time range.
Where to go next	Drill down on: • **Clusters**. For more information, see Hyper-V Explorer Summary tab on page 118. • **Memory Consumed**. Displays the **Top Clusters - Memory Consumed** dialog box.

Figure 20. Top Clusters - Memory Consumed dialog box

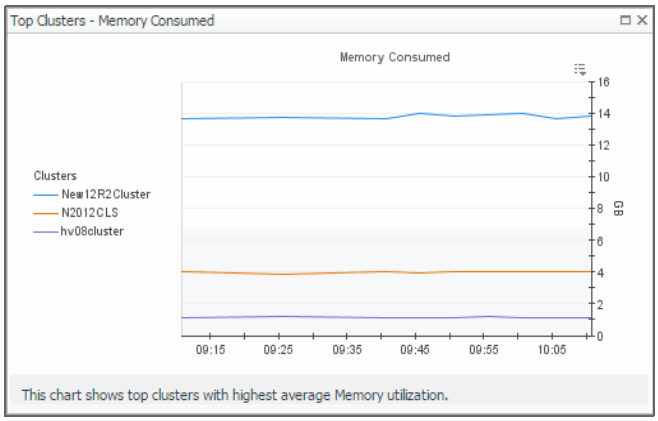
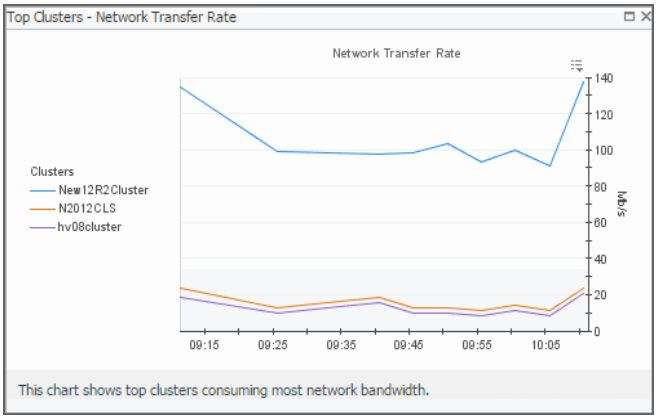


Table 16. Top Network Consumers

Description	Shows the top three clusters that are consuming most network bandwidth.
Data displayed	• **Cluster**s. The name of the cluster that are the top three network consumers. • **Network Transfer Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range.
Where to go next	Drill down on: • **Clusters** (in the table). For more information, see Hyper-V Explorer Summary tab on page 118. • **Network Transfer Rate**. Displays the **Top Clusters - Network Transfer Rate** dialog box.

Figure 21. Top Clusters - Network Transfer Rate dialog box

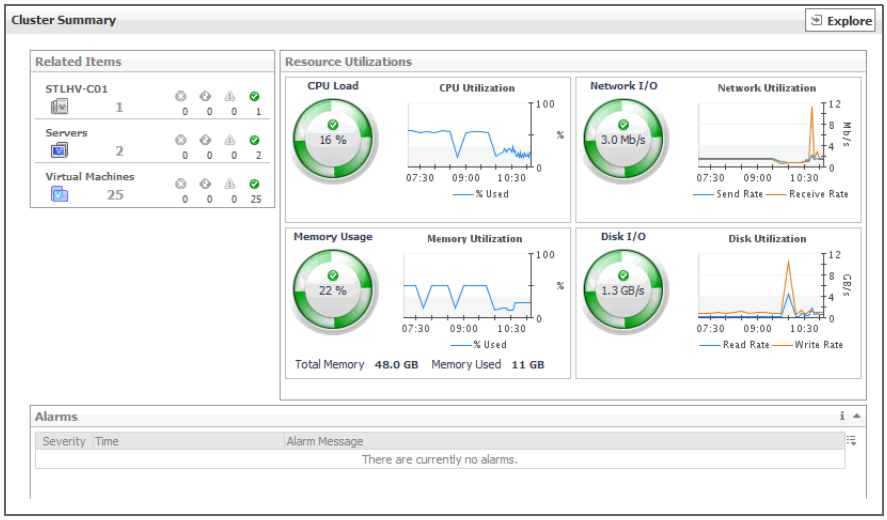


Cluster Summary view

The **Cluster Summary** view shows the overall resource utilization and the amounts of system resource consumption for a server cluster.

This view appears in the Quick-View on the left when you select a cluster in the Clusters view.

Figure 22. Cluster Summary view



This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 17. Alarms

Description	Lists the alarms generated against the selected cluster.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

Figure 23. Alarm dialog box

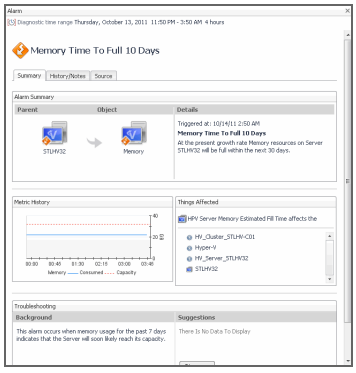


Table 18. Related Items

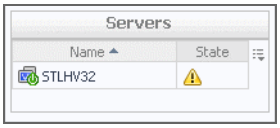
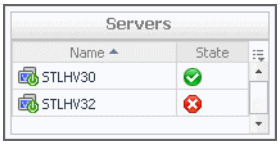
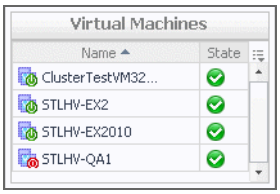
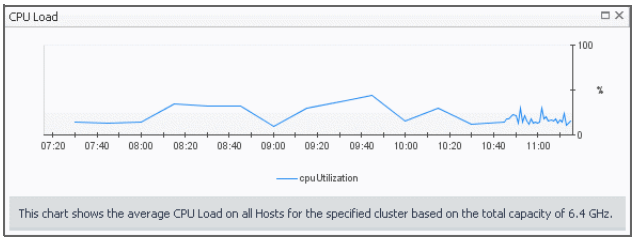
Description	Shows the numbers and states of the cluster, servers, and virtual machines, all related to the selected cluster.
Data displayed	• **Cluster**. The name of the selected cluster, followed by the counts of all alarms associated with the cluster, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Server**. The number of servers that belong to the selected cluster, followed by the counts of all alarms associated with those servers, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Virtual machines**. The number of the virtual machines that are running on the physical servers that belong to the selected cluster, followed by the counts of all alarms generated against those virtual machines, broken down by the alarm state (Normal, Warning, Critical, Fatal).
Where to go next	Drill down on: • **Alarm count**. Displays a dwell that shows the objects against which alarms are generated. **Figure 24. Object alarms dwell**  • **Alarm count** or **Cluster**. Displays the **Clusters** dwell, showing the name and state of the selected cluster. **Figure 25. Clusters dwell** • **Server**. Displays the **Servers** dwell, showing the names and states of the servers that belong to the selected cluster.  • **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of the virtual machines that are running on the physical servers that belong to the selected cluster. 

Table 19. Resource Utilizations

Description	Shows the resource consumption for the selected cluster, broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the CPU load, used by the servers that belong to the selected cluster to execute system code and user programs, based on the combined CPU capacity. • **CPU Utilization, % Used**. The percentage of the CPU utilization used by the servers that belong to the selected cluster to execute system code and user programs, during the selected time period. • **Disk I/O**. The current disk I/O rate for all servers that belong to the selected cluster. • **Disk Utilization, Read Rate**. The rate at which all servers that belong to the cluster read data from the disk, during the selected time period. • **Disk Utilization, Write Rate**. The rate at which data is written to the disks of all servers that belong to the cluster, during the selected time period. • **Memory Usage**. The current percentage of the average memory usage by all servers that belong to the selected cluster, based on the total memory capacity. • **Memory Utilization, % Used**. The percentage of the available memory that is used by all servers that belong to the cluster during the selected time period. • **Network I/O**. The current rate at which data is transferred from all servers that belong to the selected cluster to and from the network. • **Network Utilization, Receive Rate**. The rate at which all servers that belong to the selected cluster receive data from the network, during the selected time period. • **Network Utilization, Send Rate**. The rate at which data is transferred from all servers that belong to the selected cluster to the network, during the selected time period.
Where to go next	Drill down on: • **CPU Load** spinner. Displays the **CPU Load** dialog box.

Figure 26. CPU Load dialog box



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

Figure 27. CPU Utilization dialog box

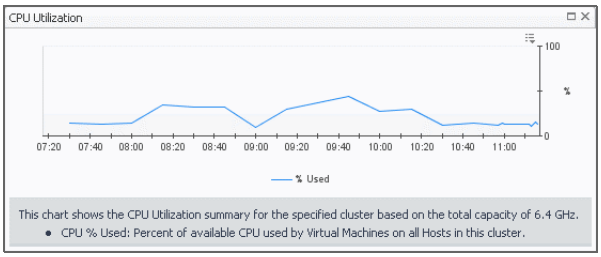
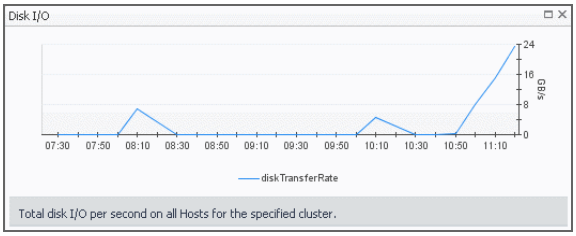


Table 19. Resource Utilizations

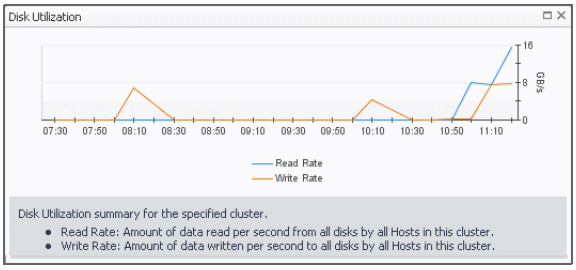
- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.

  Figure 28. Disk I/O dialog box

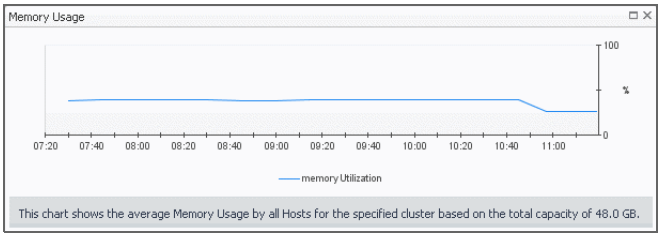
- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.

  Figure 29. Disk Utilization dialog box

- **Memory Usage** spinner. Displays the **Memory Usage** dialog box.

  Figure 30. Memory Usage dialog box

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

  Figure 31. Memory Utilization dialog box

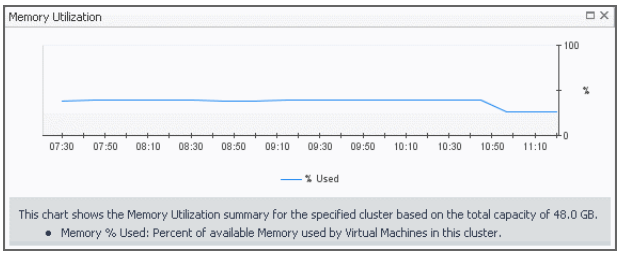
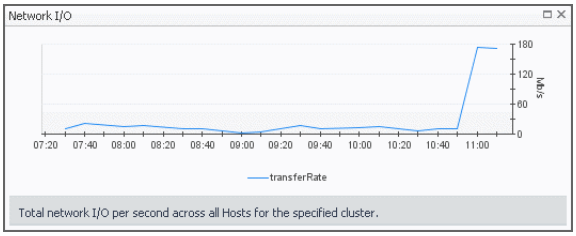
  

Table 19. Resource Utilizations

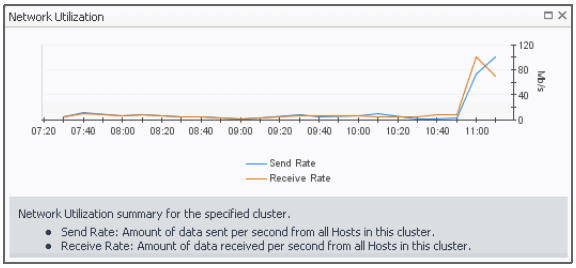
- **Network I/O** spinner. Displays the **Network I/O** dialog box.

  Figure 32. Network I/O dialog box

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

  Figure 33. Network Utilization dialog box

Server monitoring

A Hyper-V server is a physical component required to begin building a virtual infrastructure. Hyper-V servers provide hypervisor-based architecture for controlling and managing resources for the virtual machines that run on it. Virtual machines running on a Hyper-V server share the server's resources.

To review data collected about a specific server or all servers, make your selection in the Quick-View.

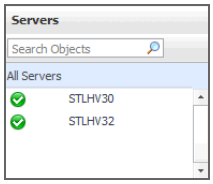
- Servers view
- Summary - All Servers view
- Server Summary view

Servers view

The **Servers** view is a tree view. It lists the servers that exist in your environment and shows their state.

This view appears in the Quick-View on the left when you select the **Servers** tile in the Virtual Environment view.

Figure 34. Servers view



Selecting the **All Servers** node displays overall resource utilization for all servers in your integrated system, and the elements that consume the highest amount of system resources in the Summary - All Servers view on the right. Similarly, selecting a server node shows server-specific metrics in the Server Summary view.

Table 20. Description of the View

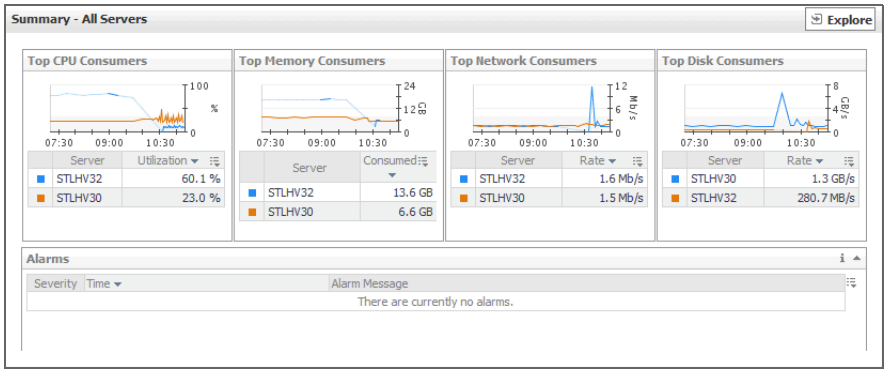
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated server. • **All Servers**. A parent node for the server object instances that appear in this view. • **Server**. The server name.
Where to go next	Drill down on: • **All Servers**. Shows the Summary - All Servers view in the Quick-View. • **Server**. Shows the Server Summary view in the Quick-View.

Summary - All Servers view

The **Summary - All Servers** view displays overall resource utilization information for a group of physical servers and shows the elements that consume the highest amount of system resources.

This view appears in the Quick-View on the left when you select **All Servers** in the Servers view.

Figure 35. Summary - All Servers view



This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

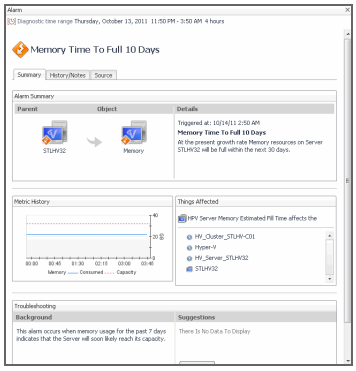
Table 21. Alarms

Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the Server Summary view.

Table 21. Alarms

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

Figure 36. Alarm dialog box



- **Time**. Links to the Server Summary view.

Table 22. Top CPU Consumers

Description	Shows the top three servers with the highest average CPU utilization.
Data displayed	• **Servers**. The name of the server. • **CPU Utilization**.The total percentage of CPU utilization the top three CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on: • **Servers**. For more information, see Hyper-V Explorer Summary tab on page 118. • **CPU Utilization** (in the graph). Displays the **Top Servers-CPU Utilization** dialog box.

Figure 37. Top Servers - CPU Utilization dialog box

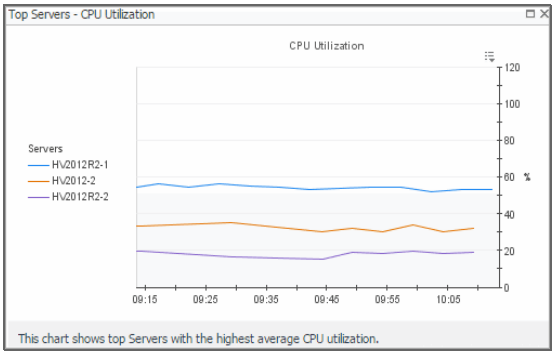


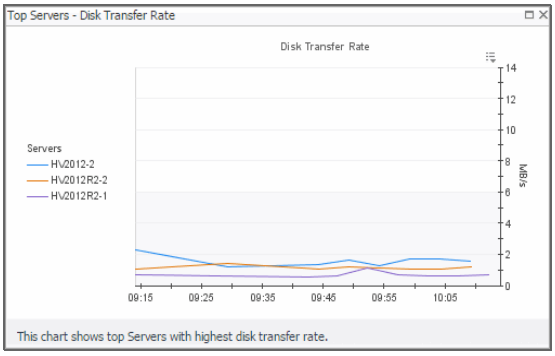
Table 23. Top Disk Consumers

Description	Shows the top three servers with the lowest available disk space.
Data displayed	• **Disk Transfer Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range. • **Servers**. The name of the server.
Where to go next	Drill down on:

Table 23. Top Disk Consumers

- **Disk Transfer Rate** (in the graph). Displays the **Top Servers - Disk Transfer Rate** dialog box.

Figure 38. Top Servers - Disk Transfer Rate dialog box

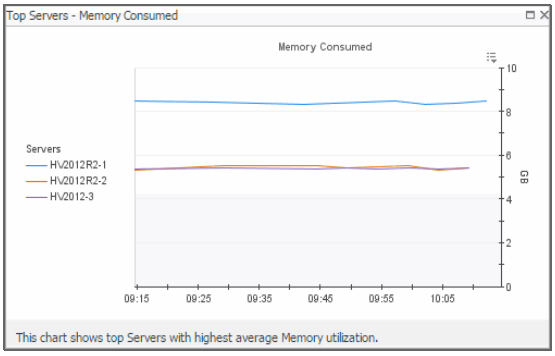


- **Server**. For more information, see Hyper-V Explorer Summary tab on page 118.

Table 24. Top Memory Consumers

Description	Shows the top three servers with the highest average memory utilization.
Data displayed	• **Memory Consumed**. The amount of memory the top three memory consumers use during the selected time range. • **Servers**. The name of the server that are the top three memory consumers.
Where to go next	Drill down on: • **Memory Consumed**. Displays the **Top Servers - Memory Consumed dialog** box.

Figure 39. Top Servers - Memory Consumed dialog box



- **Servers**. For more information, see Hyper-V Explorer Summary tab on page 118.

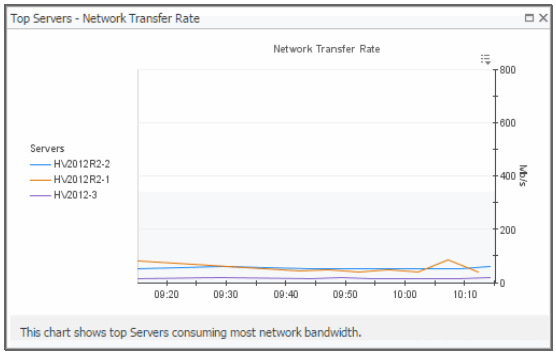
Table 25. Top Network Consumers

Description	Shows the top three servers that are consuming most network bandwidth.
Data displayed	• **Network Transfer Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range. • **Servers**. The name of the server that are the top three network consumers.
Where to go next	Drill down on:

Table 25. Top Network Consumers

- **Network Transfer Rate**. Displays the **Top Servers - Network Transfer Rate** dialog box.

  Figure 40. Top Servers - Network Transfer Rate dialog box

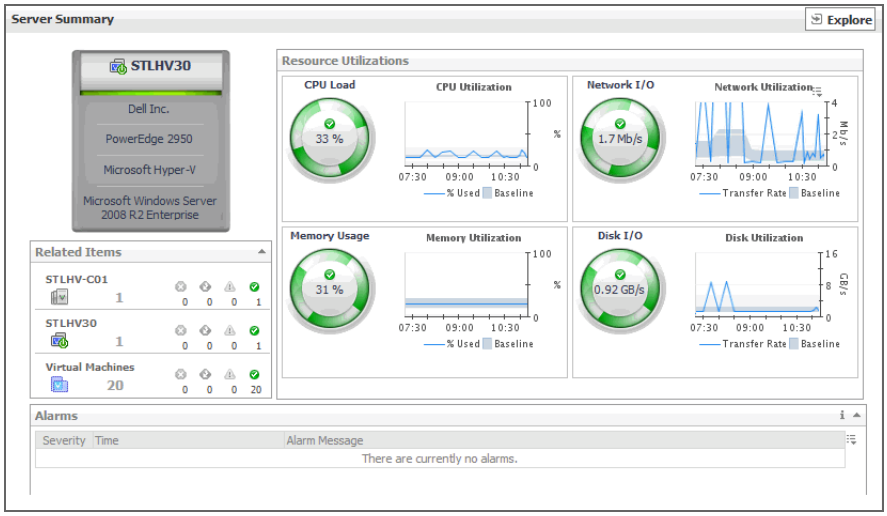
- **Servers** (in the table). For more information, see Hyper-V Explorer Summary tab on page 118.

Server Summary view

The **Server Summary** view shows the overall resource utilization and the amounts of system resource consumption for a physical server.

This view appears in the Quick-View on the left when you select a server in the Servers view.

Figure 41. Server Summary view



This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations
- Server Configuration

Table 26. Alarms

Description	Lists the alarms generated against the selected server.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

Figure 42. Alarm dialog box

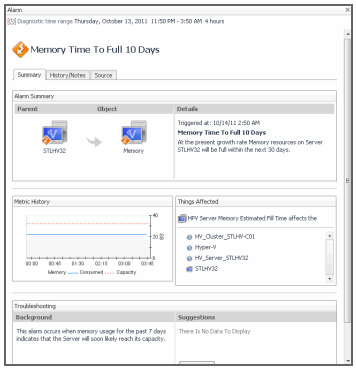


Table 27. Related Items

Description	Shows the numbers and states of the cluster the selected server belongs to, the selected server, and the virtual machine running on the selected server.
Data displayed	• **Cluster**. The name of the cluster to which the selected server belongs, followed by the counts of all alarms associated with the cluster, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Server**. The name of the selected server, followed by the counts of all alarms associated with that server, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Virtual machines**. The number of the virtual machines running on the selected server, followed by the counts of all alarms associated with those virtual machines, broken down by the alarm state (Normal, Warning, Critical, Fatal).
Where to go next	Drill down on: • **Alarm count**. Displays a dwell that shows the objects against which alarms are generated.

Figure 43. Related objects alarm dwell

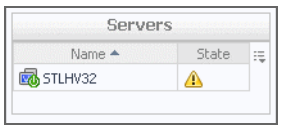


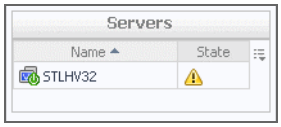
Table 27. Related Items

- **Cluster**. Displays the **Clusters** dwell, showing the name and state of the cluster the selected server belongs to.

  Figure 44. Clusters dwell

- **Server**. Displays the **Servers** dwell, showing the name and state of the selected server.

  Figure 45. Servers dwell

- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of the virtual machines that are running on the selected server.

  Figure 46. Virtual Machines dwell

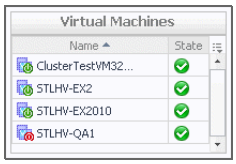
  

Table 28. Resource Utilizations

Description	Shows the resource consumption for the selected server broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected server's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, % Used**. The percentage of the server's CPU utilization spent on executing system code and user programs during the selected time period. • **CPU Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data. • **Disk I/O**. The current disk I/O rate for the selected server. • **Disk Utilization, Baseline**. An envelope indicating the expected disk utilization range based on historical data. • **Disk Utilization, Transfer Rate**. The rate at which the server reads and writes data to the disk during the selected time period. • **Memory Usage**. The current percentage of the average memory usage by the selected server, based on the total memory capacity. • **Memory Utilization, % Used**. The percentage of the available memory that the server uses during the selected time period. • **Memory Utilization, Baseline**. An envelope indicating the expected memory utilization range based on historical data. • **Network I/O**. The current rate at which the selected server transfers data from and to the network. • **Network Utilization, Baseline**. An envelope indicating the expected network utilization range based on historical data.

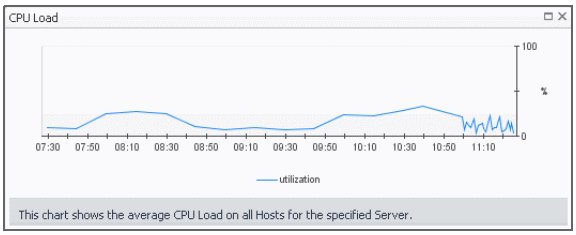
Table 28. Resource Utilizations

- **Network Utilization, Transfer Rate**. The rate at which the selected server transfers data from and to the network during the selected time period.

Where to go next Drill down on:

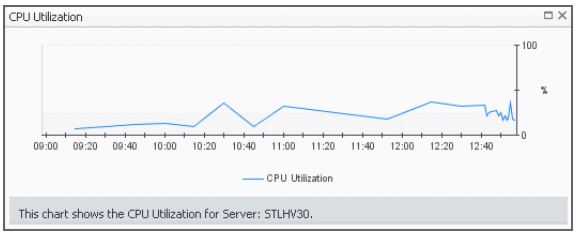
- **CPU Load** spinner. Displays the **CPU Load** dialog box.

Figure 47. CPU Load dialog box



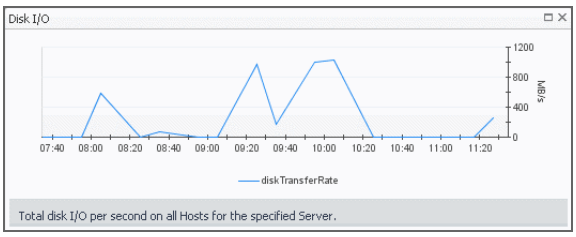
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.

Figure 48. CPU Utilization dialog box



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

Figure 49. Disk I/O dialog box



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

Figure 50. Disk Utilization dialog box

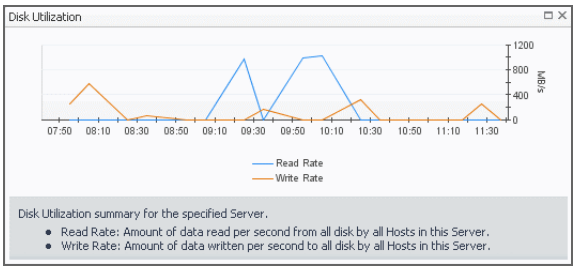
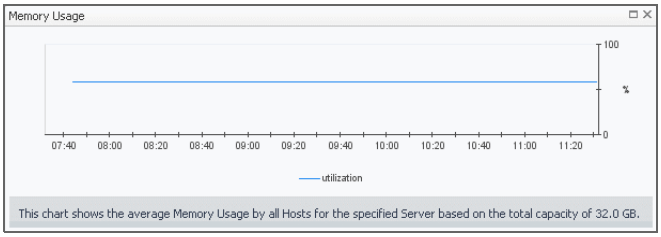


Table 28. Resource Utilizations

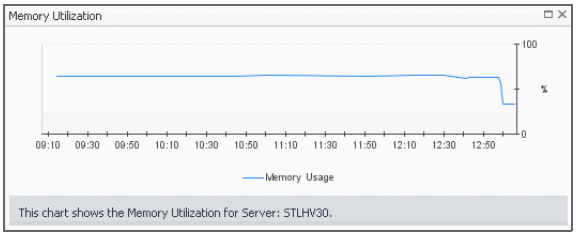
- **Memory Usage** spinner. Displays the **Memory Usage** dialog box.

  Figure 51. Memory Usage dialog box

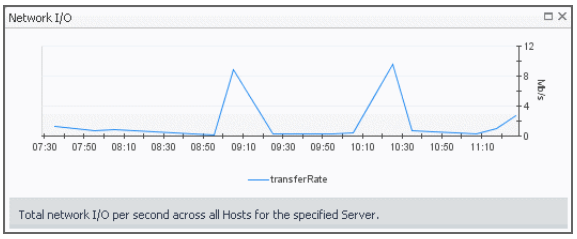
- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.

  Figure 52. Memory Utilization dialog box

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

  Figure 53. Network I/O dialog box

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

  Figure 54. Network Utilization dialog box

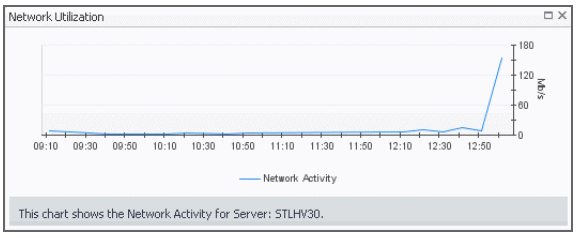
  

Table 29. Server Configuration

Description	Shows the name of the selected server and its basic configuration, including the hardware configuration, virtualization application (Microsoft Hyper-V), and the OS.

SOFS Server monitoring

A Scale-Out File Server (SOFS) server is a physical component required to begin building a virtual infrastructure. SOFS servers provide hypervisor-based architecture for controlling and managing resources for the virtual machines that run on it. Virtual machines running on an SOFS server share the server's resources.

To review data collected about a specific SOFS server or all SOFS servers, make your selection in the Quick-View.

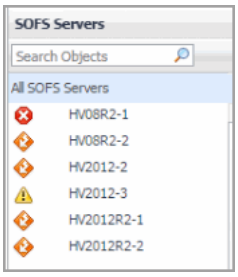
- SOFS Servers view
- Summary - All Servers view
- Server Summary view

SOFS Servers view

The **SOFS Servers** view is a tree view. It lists the SOFS servers that exist in your environment and shows their state.

This view appears in the Quick-View on the left when you select the **SOFS Servers** tile in the Virtual Environment view.

Figure 55. SOFS Servers view



Selecting the **All SOFS Servers** node displays overall resource utilization for all servers in your integrated system, and the elements that consume the highest amount of system resources in the Summary - All Servers view on the right. Similarly, selecting an SOFS server node shows server-specific metrics in the Server Summary view.

Table 30. Description of the View

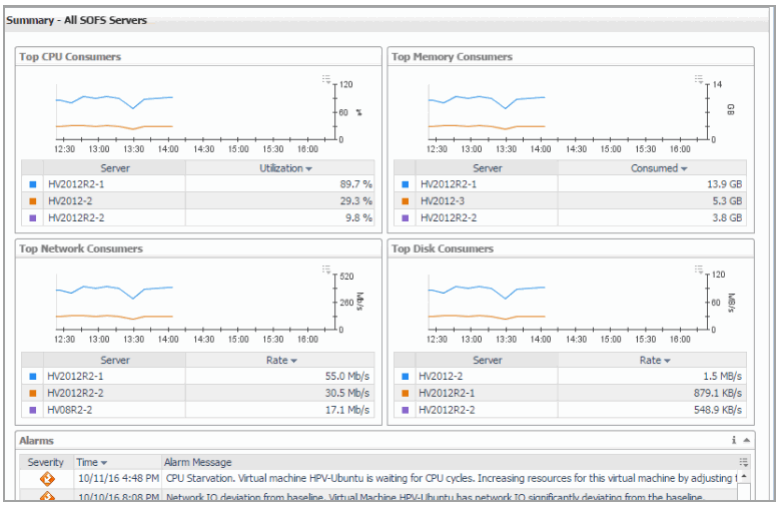
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated server. • **All SOFS Servers**. A parent node for the server object instances that appear in this view. • **Server**. The SOFS server name.
Where to go next	Drill down on: • **All SOFS Servers**. Shows the Summary - All Servers view in the Quick-View. • **Server**. Shows the Server Summary view in the Quick-View.

Summary - All SOFS Servers view

The **Summary - All SOFS Servers** view displays overall resource utilization information for a group of SOFS servers and shows the elements that consume the highest amount of system resources.

This view appears in the Quick-View on the left when you select **All SOFS Servers** in the SOFS Servers view.

Figure 56. Summary - All SOFS Servers view



This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 31. Alarms

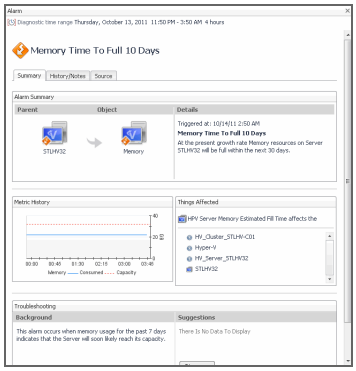
Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the Server Summary view. • **Severity**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*. **Figure 57. Alarm dialog box**  • **Time**. Links to the Server Summary view.

Table 32. Top CPU Consumers

Description	Shows the top three servers with the highest average CPU utilization.
Data displayed	• **Servers**. The name of the server. • **CPU Utilization**.The total percentage of CPU utilization the top three CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on: • **Servers**. For more information, see Hyper-V Explorer Summary tab on page 118. • **CPU Utilization** (in the graph). Displays the **Top Servers-CPU Utilization** dialog box.

Figure 58. Top Servers - CPU Utilization dialog box

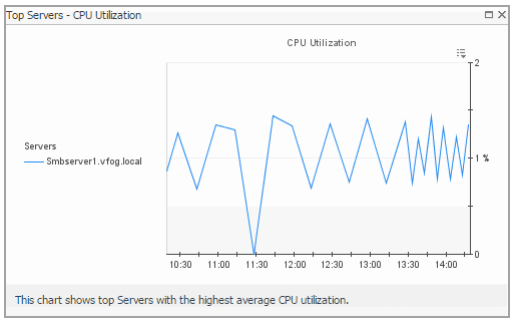
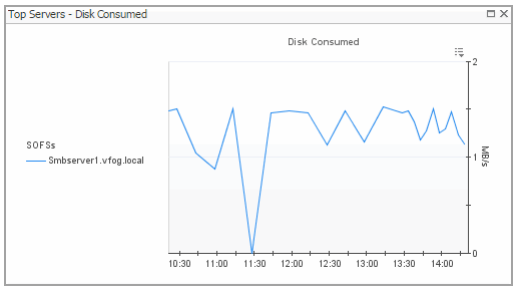


Table 33. Top Disk Consumers

Description	Shows the top three servers with the lowest available disk space.
Data displayed	• **Disk Transfer Rate**. The rate at which the top three disk consumers read or write data to the disk during the selected time range. • **Servers**. The name of the server.
Where to go next	Drill down on: • **Disk Transfer Rate** (in the graph). Displays the **Top Servers - Disk Transfer Rate** dialog box.

Figure 59. Top Servers - Disk Transfer Rate dialog box



- **Server**. For more information, see Hyper-V Explorer Summary tab on page 118.

Table 34. Top Memory Consumers

Description	Shows the top three servers with the highest average memory utilization.
Data displayed	• **Memory Consumed**. The amount of memory the top three memory consumers use during the selected time range.

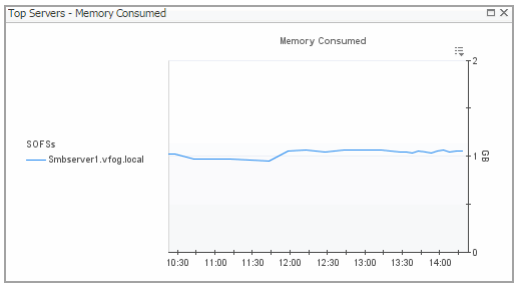
Table 34. Top Memory Consumers

- **Servers**. The name of the server that are the top three memory consumers.

Where to go next Drill down on:

- **Memory Consumed**. Displays the **Top Servers - Memory Consumed dialog** box.

Figure 60. Top Servers - Memory Consumed dialog box



- **Servers**. For more information, see Hyper-V Explorer Summary tab on page 118.

Table 35. Top Network Consumers

Description Shows the top three servers that are consuming most network bandwidth.

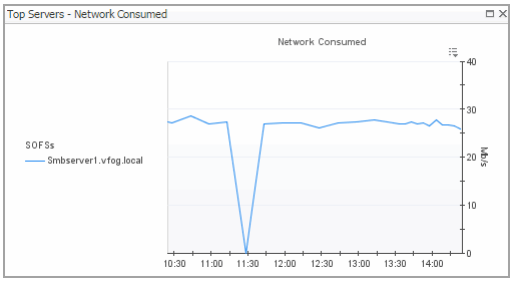
Data displayed

- **Network Transfer Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range.
- **Servers**. The name of the server that are the top three network consumers.

Where to go next Drill down on:

- **Network Transfer Rate**. Displays the **Top Servers - Network Transfer Rate** dialog box.

Figure 61. Top Servers - Network Transfer Rate dialog box



- **Servers** (in the table). For more information, see Hyper-V Explorer Summary tab on page 118.

SOFS Server Summary view

The **SOFS Server Summary** view shows the overall resource utilization and the amounts of system resource consumption for an SOFS server.

This view appears in the Quick-View on the left when you select an SOFS server in the SOFS Servers view.

Figure 62. Server Summary view

This view is made up of the following embedded views:

- Resource Utilizations
- SOFS Server Configuration

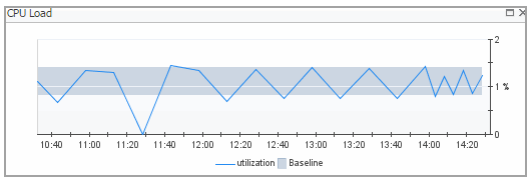
Table 36. Resource Utilizations

Description	Shows the resource consumption for the selected SOFS server broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected server's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, % Used**. The percentage of the server's CPU utilization spent on executing system code and user programs during the selected time period. • **CPU Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data. • **Disk I/O**. The current disk I/O rate for the selected server. • **Disk Utilization, Baseline**. An envelope indicating the expected disk utilization range based on historical data. • **Disk Utilization, Transfer Rate**. The rate at which the server reads and writes data to the disk during the selected time period. • **Memory Usage**. The current percentage of the average memory usage by the selected server, based on the total memory capacity. • **Memory Utilization, % Used**. The percentage of the available memory that the server uses during the selected time period. • **Memory Utilization, Baseline**. An envelope indicating the expected memory utilization range based on historical data. • **Network I/O**. The current rate at which the selected server transfers data from and to the network. • **Network Utilization, Baseline**. An envelope indicating the expected network utilization range based on historical data. • **Network Utilization, Transfer Rate**. The rate at which the selected server transfers data from and to the network during the selected time period.
Where to go next	Drill down on:

Table 36. Resource Utilizations

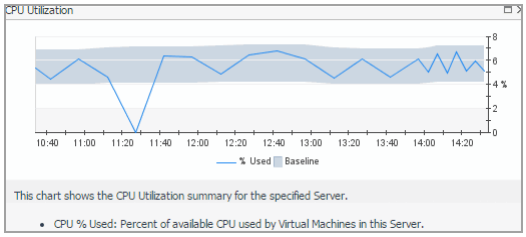
- **CPU Load** spinner. Displays the **CPU Load** dialog box.

  Figure 63. CPU Load dialog box

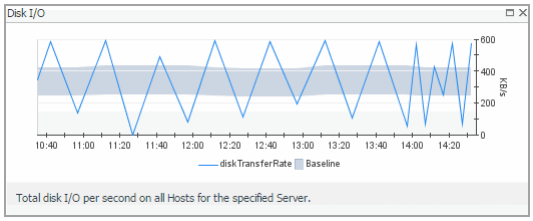
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.

  Figure 64. CPU Utilization dialog box

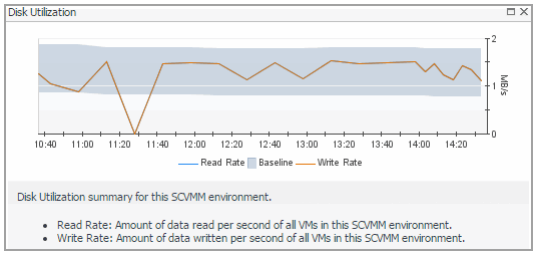
- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.

  Figure 65. Disk I/O dialog box

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

  Figure 66. Disk Utilization dialog box

- **Memory Usage** spinner. Displays the **Memory Usage** dialog box.

  Figure 67. Memory Usage dialog box

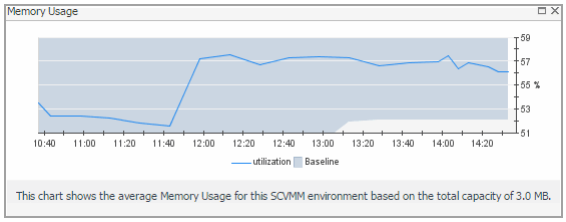
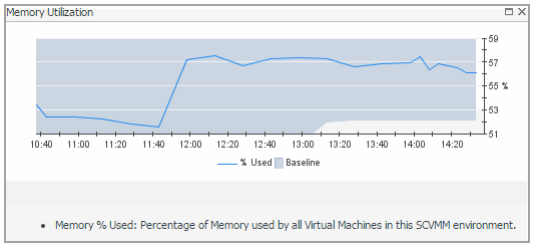
  

Table 36. Resource Utilizations

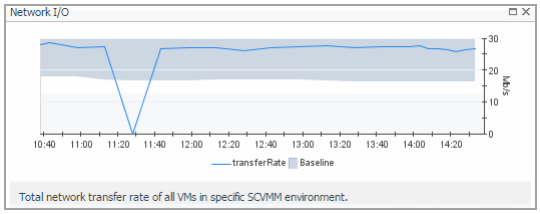
- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.

  Figure 68. Memory Utilization dialog box

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

  Figure 69. Network I/O dialog box

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

  Figure 70. Network Utilization dialog box

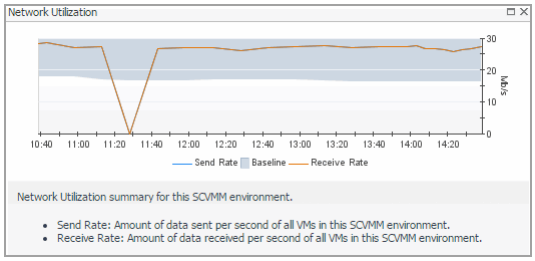
  

Table 37. SOFS Server Configuration

Description	Shows the name of the selected SOFS server and its basic configuration, including the Total I/O, IOPS, Latency, Volume, Total Space, Weekly Growth Rate, and Time to Full.

SCVMM server monitoring

A System Center Virtual Machine Manager (SCVMM) is a management solution for a Hyper-V environment. It allows you to manage host, networking, and storage resources when creating and deploying virtual machines to virtual clouds.

To review data collected about a specific SCVMM server or all SCVMM servers, make your selection in the Quick-View.

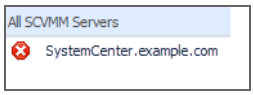
- SCVMM Servers view
- Summary - All SCVMM Servers view
- SCVMM Server Summary view

SCVMM Servers view

The **SCVMM Servers** view is a tree view. It lists the SCVMM servers that exist in your environment and shows their state.

This view appears in the Quick-View on the left when you select the SCVMM **Servers** tile in the Virtual Environment view.

Figure 71. SCVMM Servers view



Selecting the **All SCVMM Servers** node displays overall resource utilization for all SVCVMM servers in your integrated system, and identifies the elements that consume the highest amount of system resources in the Summary - All SCVMM Servers view on the right. Selecting a server node shows server-specific metrics in the SCVMM Server Summary view.

Table 38. Description of the View

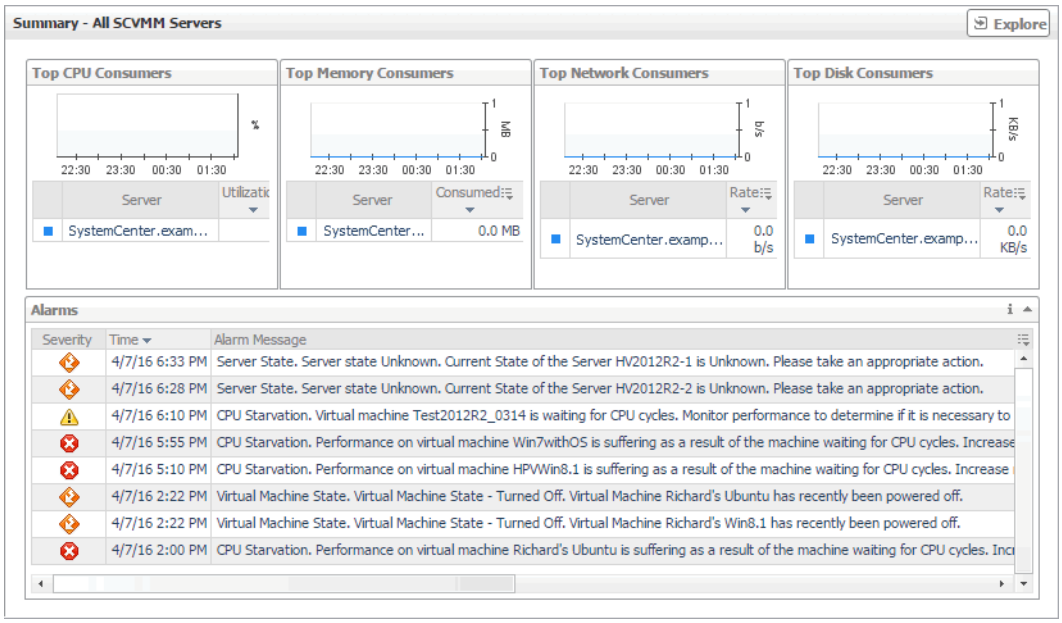
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated SCVMM server. • **All Servers**. A parent node for the SCVMM server object instances that appear in this view. • **SCVMM Server**. The SCVMM server name.
Where to go next	Drill down on: • **All** SCVMM **Servers**. Shows the Summary - All SCVMM Servers view in the Quick-View. • **Server**. Shows the SCVMM Server Summary view in the Quick-View.

Summary - All SCVMM Servers view

The **Summary - All SCVMM Servers** view displays overall resource utilization information for a group of SCVMM servers and identifies the elements that consume the highest amount of your system's resources.

This view appears in the Quick-View on the left when you select **All SCVMM Servers** in the SCVMM Servers view.

Figure 72. Summary - All SCVMM Servers view



This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Disk Consumers
- Top Memory Consumers
- Top Network Consumers

Table 39. Alarms

Description	Lists the alarms generated against the machine on which the SCVMM is installed.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Any column.** Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

Figure 73. Alarm dialog box

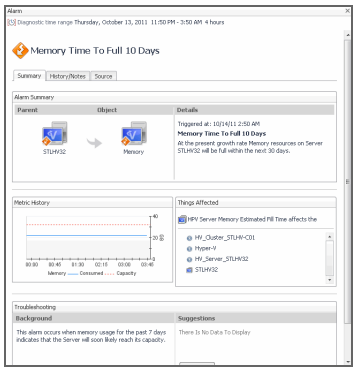


Table 40. Top CPU Consumers

Description	Lists the SVCMM servers with the highest average CPU utilization.
Data displayed	• **Servers**. The name of the machine on which the SCVMM is installed, identified among top CPU consumers. • **CPU Utilization**.The total percentage of CPU utilization the highest CPU consumers spend on executing system code and user programs, during the selected time range.
Where to go next	Drill down on: • **CPU Utilization** (in the graph). Displays the **Top Servers - CPU Utilization** dialog box.

Figure 74. Top Servers - CPU Utilization dialog box

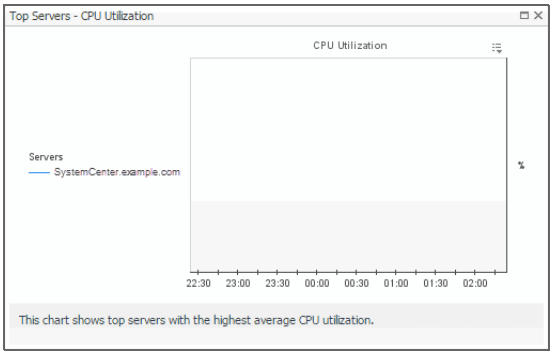


Table 41. Top Disk Consumers

Description	Lists the SCVMM servers with the highest disk transfer rate.
Data displayed	• **Disk Transfer Rate**. The rate at which the top disk consumers read or write data to the disk during the selected time range. • **Servers**. The name of the machine on which the SCVMM is installed, identified among top disk consumers.
Where to go next	Drill down on: • **Disk Transfer Rate** (in the graph). Displays the **Top Servers - Disk Transfer Rate** dialog box.

Figure 75. Top Servers - Disk Transfer Rate dialog box

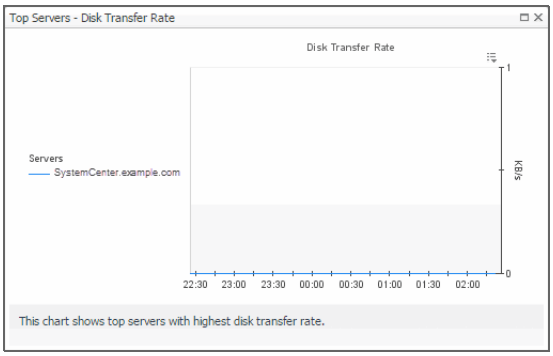


Table 42. Top Memory Consumers

Description	Lists the SCVMM servers with the highest memory consumption.
Data displayed	• **Memory Consumed**. The amount of memory the top consumers use during the selected time range. • **Servers**. The name of the machine on which the SCVMM is installed, identified among top memory consumers.
Where to go next	Drill down on: • **Memory Consumed**. Displays the **Top Servers - Memory Consumed dialog** box.

Figure 76. Top Servers - Memory Consumed dialog box

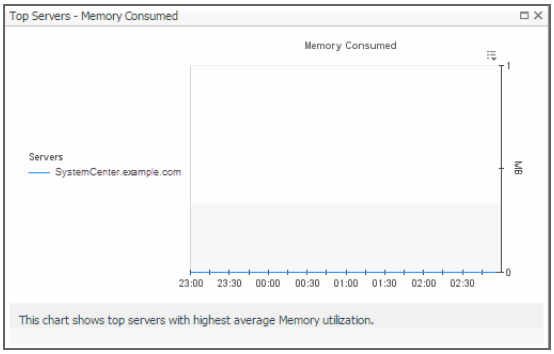
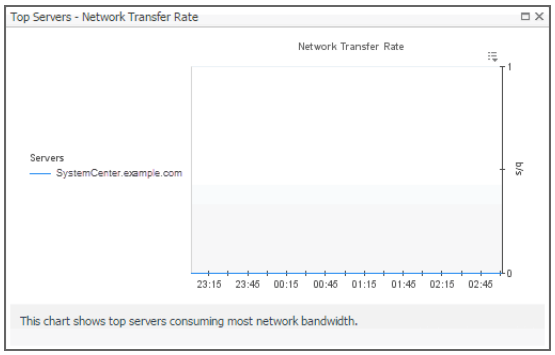


Table 43. Top Network Consumers

Description	Lists the SCVMM servers with the highest network bandwidth.
Data displayed	• **Network Transfer Rate**. The rate at which the highest network consumers transfer data to or from the network during the selected time range. • **Servers**. The name of the machine on which the SCVMM is installed, identified among top network consumers.
Where to go next	Drill down on: • **Network Transfer Rate**. Displays the **Top Servers - Network Transfer Rate** dialog box.

Figure 77. Top Servers - Network Transfer Rate dialog box



SCVMM Server Summary view

The **SCVMM Server Summary** view shows the overall resource utilization and the amounts of system resource consumption for a physical server.

This view appears in the Quick-View on the left when you select an SCVMM server in the SCVMM Servers view.

Figure 78. SCVMM Server Summary view

This view is made up of the following elements:

- Alarms
- Related Items
- Resource Utilizations
- Windows Service and Database Status
- The **Explorer** button: Allows you to open the **SCVMM Server: Explorer: Single** dashboard. For more information, see SCVMM Server: Explorer: Single dashboard on page 77.

Table 44. Alarms

Description	Lists the alarms generated against the machine on which the selected SCVMM is installed.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.

Table 44. Alarms

Where to go next	Drill down on: • **Any column**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

Figure 79. Alarm dialog box

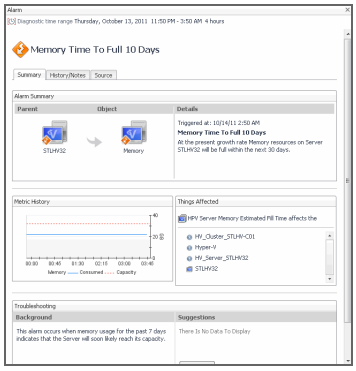


Table 45. Related Items

Description	Shows the numbers and states of the virtual and physical components associated with the selected SCVMM.
Data displayed	• **Cluster**s. The name of the cluster to which the selected SCVMM server belongs, followed by the counts of all alarms associated with the cluster, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Servers**. The number of the Hyper-V servers associated with the selected SCVMM, followed by the counts of all alarms associated with those servers, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Virtual Machines**. The number of the virtual machines associated with the selected SCVMM, followed by the counts of all alarms associated with those virtual machines, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Storage**. The number of the disk volumes associated with the selected SCVMM, followed by the counts of all alarms associated with those volumes, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Library Servers**. The number of the library servers associated with the selected SCVMM, followed by the counts of all alarms associated with those library servers, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Host Groups**. The number of the host groups associated with the selected SCVMM, followed by the counts of all alarms associated with those groups, broken down by the alarm state (Normal, Warning, Critical, Fatal).
Where to go next	Drill down on: • **Alarm count**. Displays a dwell that shows the objects against which alarms are generated.

Figure 80. Related objects alarm dwell

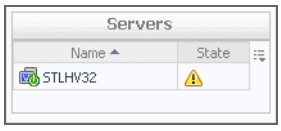


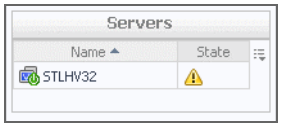
Table 45. Related Items

- **Cluster**. Displays the **Clusters** dwell, showing the name and state of the cluster the selected SCVMM server belongs to.

  Figure 81. Clusters dwell

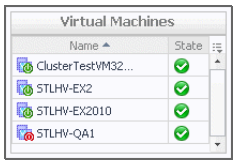
- **Server**. Displays the **Servers** dwell, showing the names and states of the Hyper-V servers associated with the selected SCVMM server.

  Figure 82. Servers dwell

- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of the virtual machines that are associated with the selected SCVMM server.

  Figure 83. Virtual Machines dwell

- **Volumes**. Displays the **Other Items Inventory** dwell, showing the names and states of the disk volumes that are associated with the selected SCVMM server.

  Figure 84. Other Items Inventory dwell

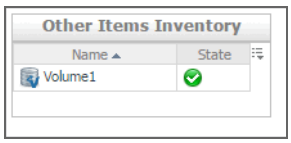
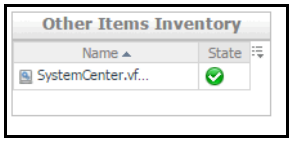
  

Table 45. Related Items

- **Library Servers**. Displays the **Other Items Inventory** dwell, showing the names and states of the library servers that are associated with the selected SCVMM server.

  Figure 85. Other Items Inventory dwell

- **Host Groups**. Displays the **Other Items Inventory** dwell, showing the names and states of the host groups that are associated with the selected SCVMM server.

  Figure 86. Other Items Inventory dwell

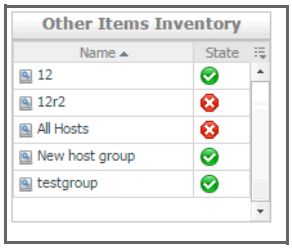
  

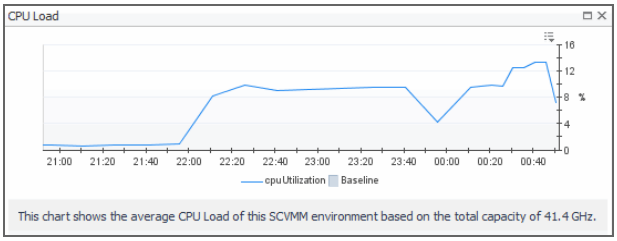
Table 46. Resource Utilizations

Description	Shows the resource consumption for the selected SCVMM server broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected SCVMM server's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **CPU Utilization, % Used**. The percentage of the SCVMM server's CPU utilization spent on executing system code and user programs during the selected time period. • **Disk I/O**. The current disk I/O rate for the selected SCVMM server. • **Disk Utilization, Read Rate**. The rate at which the SCVMM server reads data from the disk during the selected time period. • **Disk Utilization, Write Rate**. The rate at which the SCVMM server writes data to the disk during the selected time period. • **Memory Usage**. The current percentage of the average memory usage by the selected SCVMM server, based on the total memory capacity. • **Memory Usage, Total Memory**. The total memory capacity allocated to the selected SCVMM server. • **Memory Utilization, % Used**. The percentage of the available memory that the SCVMM server uses during the selected time period. • **Network I/O**. The current rate at which the selected SCVMM server transfers data from and to the network. • **Network Utilization, Receive Rate**. The rate at which the selected SCVMM server receives data from the network during the selected time period. • **Network Utilization, Send Rate**. The rate at which the selected SCVMM server sends data to the network during the selected time period.
Where to go next	Drill down on:

Table 46. Resource Utilizations

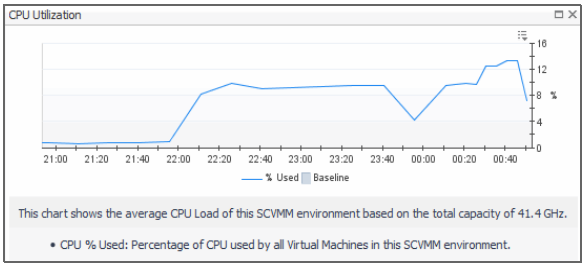
- **CPU Load** spinner. Displays the **CPU Load** dialog box.

  Figure 87. CPU Load dialog box

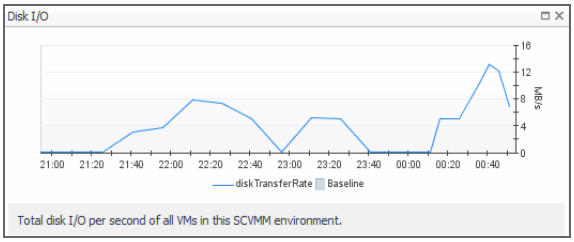
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.

  Figure 88. CPU Utilization dialog box

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

  Figure 89. Disk I/O dialog box

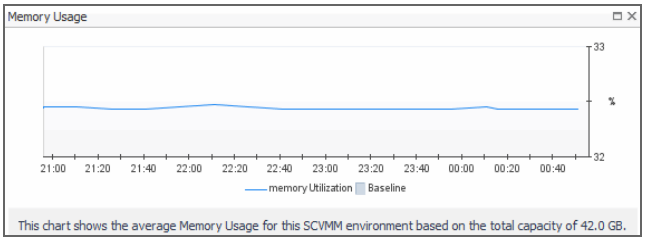
- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.

  Figure 90. Disk Utilization dialog box

Table 46. Resource Utilizations

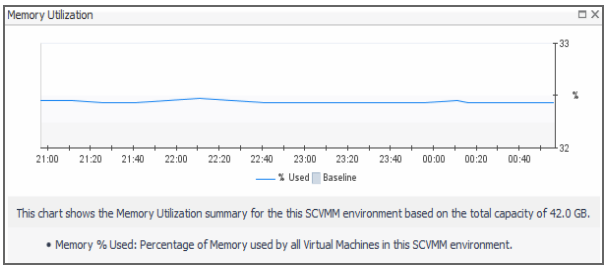
- **Memory Usage** spinner. Displays the **Memory Usage** dialog box.

  Figure 91. Memory Usage dialog box

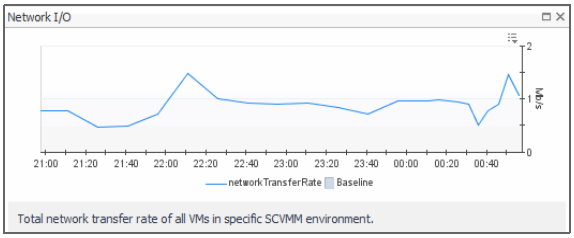
- **Memory Utilization** graph. Displays the **Memory Utilization** dialog box.

  Figure 92. Memory Utilization dialog box

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

  Figure 93. Network I/O dialog box

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

  Figure 94. Network Utilization dialog box

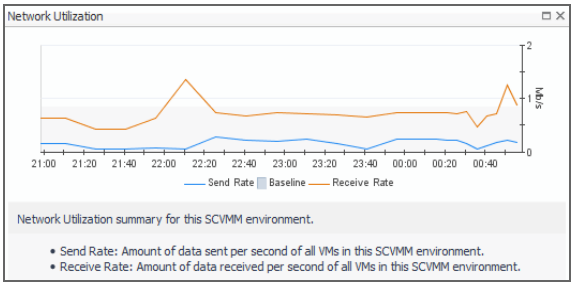
  

Table 47. Windows Service and Database Status

Description	Indicates the state of the SCVMM database and the SCVMM Windows service.
Data displayed	**Database Host**. The name of the machine on which the database is running.
	Database Name. The name of the SCVMM database.
	Database Status. The alarm state of the SCVMM database.

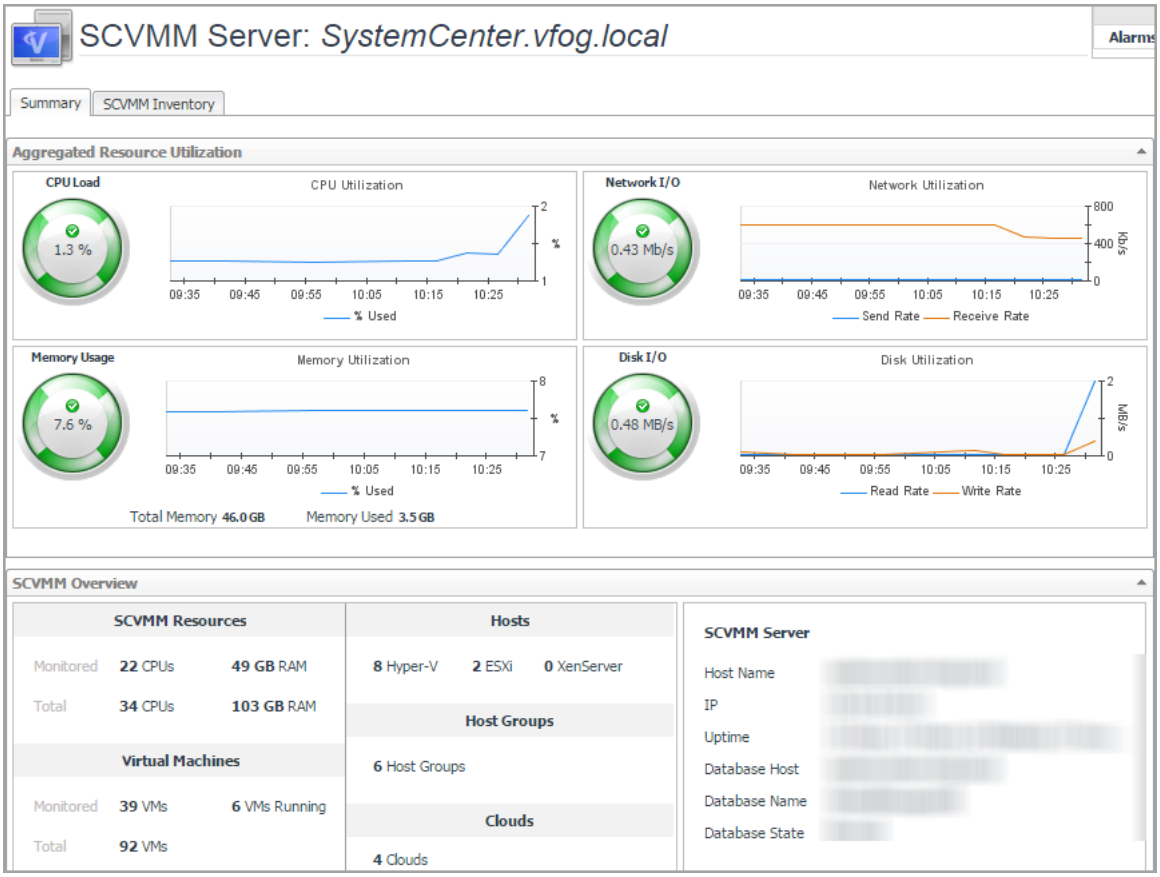
Table 47. Windows Service and Database Status

	SCVMM Host. The name of the machine on which the SCVMM is running.
	Service Status. The state of the SCVMM Windows service.

SCVMM Server: Explorer: Single dashboard

The *SCVMM Server: Explorer: Single* dashboard displays the overall SCVMM information, displays overall resource utilization information of a selected SCVMM server, and identifies the elements that consume the highest amount of your system resources.

Figure 95. SCVMM Server: Explorer: Single dashboard



The *SCVMM Server: Explorer: Single* dashboard consists of the following tabs:

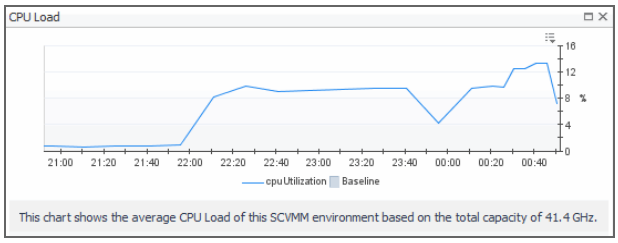
- **Summary**: Includes the following embedded views:
  - Aggregated Resource Utilization
  - SCVMM Overview
- **SCVMM Inventory**: Includes the following embedded views:
  - SCVMM Inventory - Clouds
  - SCVMM Inventory - Host Groups
  - SCMM Inventory - Library Servers
  - SCVMM Inventory - Networks
  - SCVMM Inventory - SCVMM Database
  - SCVMM Inventory - Services

- SCVMM Inventory - Storage

Table 48. Aggregated Resource Utilization

Description	Shows the resource consumption for the selected SCVMM server, broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected SCVMM server's CPU load, used to execute system code and user programs, based on the total CPU capacity allocated to that SCVMM server. • **CPU Utilization, % Used**. The percentage of the SCVMM server's CPU utilization spent on executing system code and user programs during the selected time period. • **Disk I/O**. The current disk I/O rate for the selected SCVMM server. • **Disk Utilization, Read Rate**. The rate at which the SCVMM server reads data from the disk during the selected time period. • **Disk Utilization, Write Rate**. The rate at which the SCVMM server writes data to the disk during the selected time period. • **Memory Usage**. The current percentage of the average memory usage by the selected SCVMM server, based on the total memory capacity. • **Memory Usage, Total Memory**. The total memory capacity allocated to the selected SCVMM server. • **Memory Utilization, % Used**. The percentage of the available memory that the SCVMM server uses during the selected time period. • **Network I/O**. The current rate at which the selected SCVMM server transfers data from and to the network. • **Network Utilization, Receive Rate**. The rate at which the selected SCVMM server receives data from the network during the selected time period. • **Network Utilization, Send Rate**. The rate at which the selected SCVMM server sends data to the network during the selected time period .
Where to go next	Drill down on: • **CPU Load** spinner. Displays the **CPU Load** dialog box.

Figure 96. CPU Load dialog box



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

Figure 97. CPU Utilization dialog box

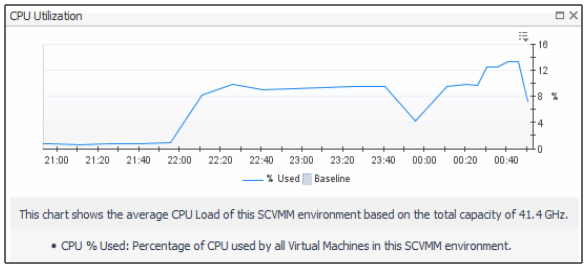
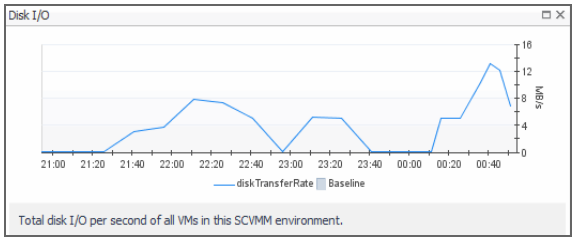


Table 48. Aggregated Resource Utilization

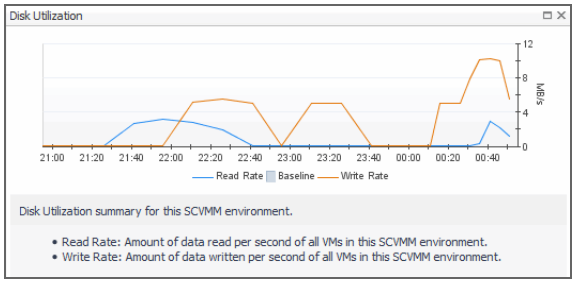
- **Disk I/O** spinner. Displays the **Disk I/O** dialog box.

  Figure 98. Disk I/O dialog box

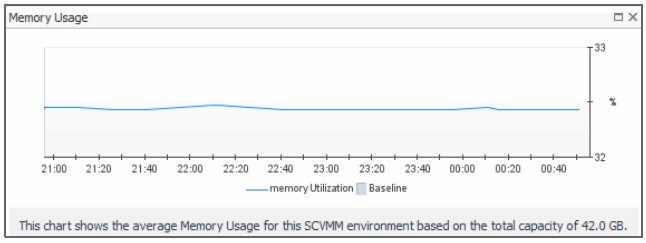
- **Disk Utilization** graph. Displays the **Disk Utilization** dialog box.

  Figure 99. Disk Utilization dialog box

- **Memory Usage** spinner. Displays the **Memory Usage** dialog box.

  Figure 100. Memory Usage dialog box

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

  Figure 101. Memory Utilization dialog box

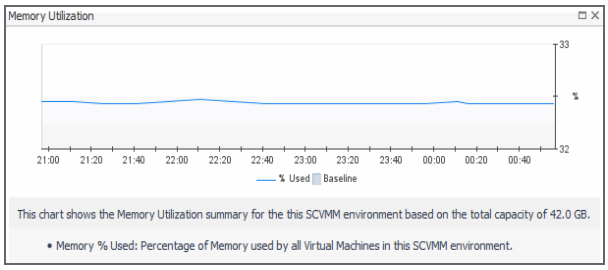
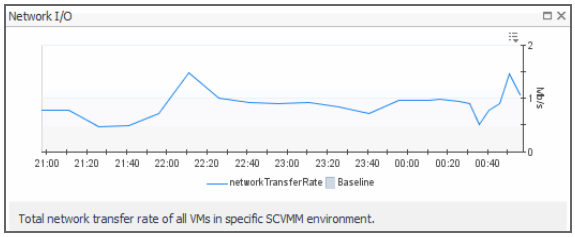
  

Table 48. Aggregated Resource Utilization

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

Figure 102. Network I/O dialog box



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

Figure 103. Network Utilization dialog box

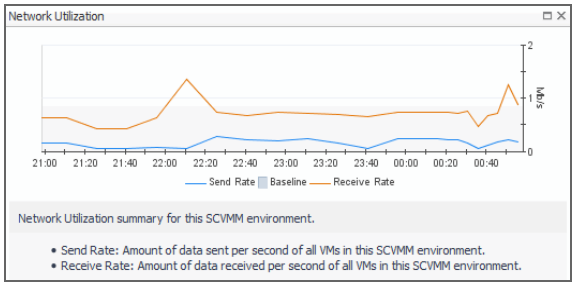


Table 49. SCVMM Overview

Description	Indicates the overall information of the selected SCVMM server.
Data displayed	**SCVMM Resources**. Shows the CPU and memory information. • **Monitored**: Shows the number of CPU and memory of Hyper-V servers that are managed by the selected SCVMM server and are also monitored by the Hyper-V agents. • **Total**: Shows the numbers of CPU and memory that are managed by the selected SCVMM server. **Virtual Machines**. Shows the VM related information. • **Monitored**: Shows the number of VMs/running VMs that are managed by the selected SCVMM server and are also monitored by the Hyper-V agents. • **Total**: Shows the total number of virtual machines that are managed by the selected SCVMM server. **Hosts**. Shows the list of hosts available in the selected SCVMM Server. **Host Groups**. Shows the number of host groups available in selected SCVMM Server. **Clouds**. Shows the number of clouds available in the selected SCVMM Server. **SCVMM Server**. Shows the state of the selected SCVMM Server, including *Host Name*, *IP*, *Uptime*, *Database Host, Database Name*, and *Database State.* If there are no *IP* and *Uptime* metrics displayed in the **SCVMM Server** area, this should be caused by one of the following: • The selected SCVMM server is not monitored by host agents. In this case, create a host agent to monitor this SCVMM server to obtain the *IP* and *Uptime* metrics. For more information about creating a host agent, see the *Foglight Agent Manager Guide*. • The selected SCVMM server is a virtual machine on Hyper-V that is not monitored by Hyper-V agents. In this case, create a Hyper-V agent to monitor the relevant Hyper-V server and to obtain the *IP* and *Uptime* metrics. For more information, see Configuring monitoring agents on page 13.

Table 50. SCVMM Inventory - Clouds

Description	Indicates the information of clouds that are monitored by the selected SCVMM server.
Data displayed	**Name**. The name of cloud on which the selected SCVMM server is monitored.
	Host Groups. The name of the host group that is used by the cloud.
	Logical Networks. The name of the logical network that is used by the cloud.
	VM Usage. The number of virtual machines that are used by the cloud.
	Custom Quota Usage. The points of custom quota.
	CPU Usage. The number of virtual CPUs that are used by the cloud.
	Memory Usage. The maximum memory (in megabyte) that can be used by all virtual machines.
	Storage Used. The number of storage (in gigabyte) that is used by the cloud.
	Storage Committed. The total storage capacity (in gigabyte) of all virtual hard disks on the cloud.

Table 51. SCVMM Inventory - Host Groups

Description	Indicates the information of Host Groups that are monitored by the selected SCVMM server.
Data displayed	**Name**. The name of the Host Group.
	Host Count. The number of hosts.
	VM Count. The number of the virtual machines.
	Hypervisors. The type of hypervisor included in the host group.

Table 52. SCMM Inventory - Library Servers

Description	Indicates the information of Library Servers that are monitored by the selected SCVMM server.
Data displayed	**Library Server**. The name of the Library Server.
	Computer Name. The host name of the Library Server.
	SCVMM Name. The Fully Qualified Domain Name (FQDN) of the selected SCVMM server.
	Allow Unencrypted Transfers. Specifies whether the unencrypted transfer is allowed or not.
	Domain Name. The name of domain.
	Description. Describes the Library Server.
	Is Virtual Cluster Name. Specifies whether the Library Server is a virtual cluster or not.
	iscsi SAN Status. Indicates the status of the ISCSI SAN that is connected to the Library Server.
	Is Cluster Node. Specifies whether the Library Server is a cluster node or not.

Table 53. SCVMM Inventory - Networks

Description	Indicates the information of networks that are monitored by the selected SCVMM server.

Table 53. SCVMM Inventory - Networks

Data displayed	**Select a Network**. Lists available networks in the selected SCVMM server. **Networks - <*name of selected network*>**. • **Description**. Includes the following information: *SVCMM Server, Network Virtualization, useGRE,* and *isPVLAN*. • **Host Group(s)**. Lists available Host Groups on the selected network. • **Clouds**. Lists available Clouds on the selected network. • **VMNetworks**. Lists available virtual machine networks on the selected network.

Table 54. SCVMM Inventory - SCVMM Database

Description	Indicates the information of database servers that are monitored by the selected SCVMM server.
Data displayed	**SCVMM Server.** The FQDN of the selected SCVMM server. **Availability**. Specifies whether the database is available or not. **Database Host**. The host name of the database server. **Database Instance**. The instance name of the database server. **Database**. The name of the database server.

Table 55. SCVMM Inventory - Services

Description	Indicates the information of Services that are monitored by the selected SCVMM server.
Data displayed	**Services Deployed to Clouds.** • **Name**. The name of the service. • **Clouds**. The name of the cloud. • **Deployment State**. Shows the deployment state of the service. • **In Servicing Mode**. Specifies the service enters the servicing mode or not. • **Computer Tiers**. Indicates the tier type. • **Description**. Descriptions of the service. **Services Deployed to Host Groups.** • **Name**. The name of the service. • **Host Groups**. Lists the virtual machine host groups. • **Deployment State**. Shows the deployment state of the service. • **In Servicing Mode**. Specifies the service enters the servicing mode or not. • **Computer Tiers**. Indicates the tier type. • **Description**. Descriptions of the service.

Table 56. SCVMM Inventory - Storage

Description	Indicates the information of storage that is monitored by the selected SCVMM server.

Table 56. SCVMM Inventory - Storage

Data displayed	**Storage Classifications**. • **Storage Name**. The name of storage. • **Description**. Descriptions of the selected storage. • **Enabled**. Specifies whether the storage is enabled or not. • **Clouds**. Lists the clouds that are using the selected storage. **Storage Providers.** • **Storage Name**. The name of storage provider. • **Provider Type**. The type of the storage provider. • **Description**. Descriptions of the storage provider. • **Enabled**. Specifies whether the storage is enabled or not. • **SCVMM Name**. The name of the SCVMM server. • **Network Address**. The network address of the selected storage. • **Provider Status**. Indicates the status of the storage provider. • **Provider Flags**. Indicates the flag of the storage provider.

Virtual machine monitoring

A virtual machine resides on a Hyper-V server. Virtual machines share many of the characteristics of physical systems (like storage and network interaction), but they do not have direct access to the hardware that is used to process. Each virtual machine runs on a guest operating system, for example, Microsoft Windows XP, and is allocated access to a specific set of the server's resources, that includes the number of processors and the amount of memory it can leverage.

To review data collected about a specific virtual machine or all virtual machines, make your selection in the Quick-View.

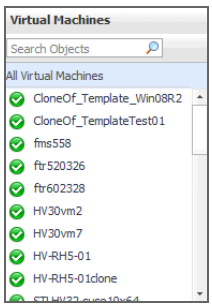
- Virtual Machines view
- Summary - All Virtual Machines view
- Virtual Machine Summary view

Virtual Machines view

The **Virtual Machines** tree view lists the virtual machines existing in your environment and shows their state.

This view appears in the Quick-View on the left when you select the **Virtual Machines** tile in the Virtual Environment view.

Figure 104. Virtual Machines view



Selecting the **All Virtual Machines** node displays overall resource utilization for all virtual machines in your integrated system and the elements that consume the highest amount of system resources in the Summary - All

Virtual Machines view on the right. Similarly, selecting a virtual machine node shows virtual machine-specific metrics in the Virtual Machine Summary view on the right.

Table 57. Description of the View

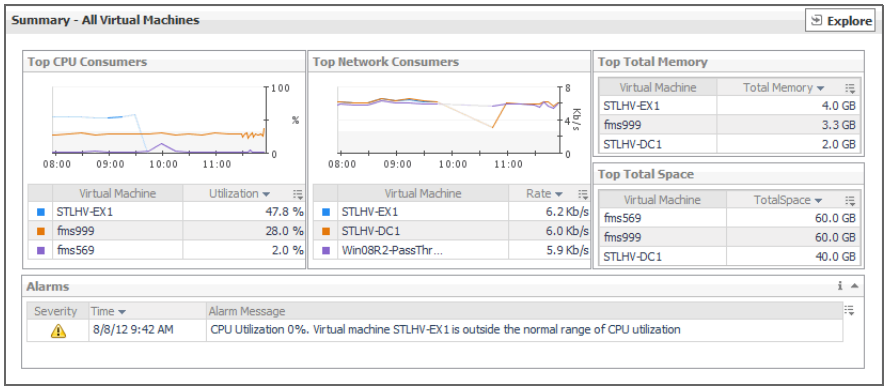
Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the associated virtual machine. • **All Virtual Machines**. A parent node for the virtual machine object instances that appear in this view. • **Virtual machine**. The virtual machine name.
Where to go next	Drill down on: • **All Virtual Machines**. Shows the Summary - All Virtual Machines view in the Quick-View. • **Virtual machine**. Shows the Virtual Machine Summary view in the Quick-View.

Summary - All Virtual Machines view

The **Summary - All Virtual Machines** view displays overall resource utilization information for a group of virtual machines and shows the elements that consume the highest amount of system resources.

This view appears in the Quick-View on the left when you select **All Virtual Machines** in the Virtual Machines view.

Figure 105. Summary - All Virtual Machines view



This view is made up of the following embedded views:

- Alarms
- Top CPU Consumers
- Top Network Consumers
- Top Total Memory
- Top Total Space

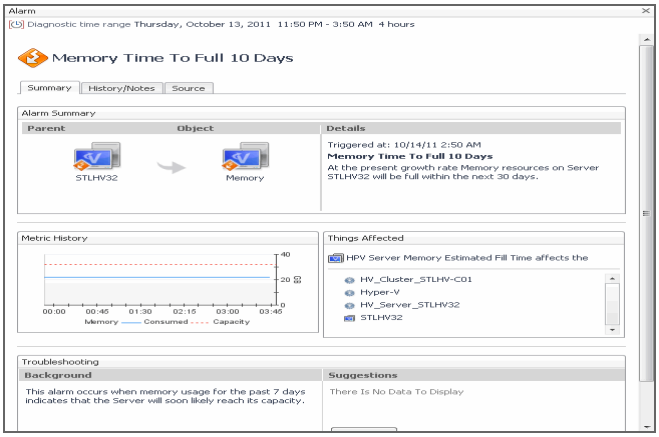
Table 58. Alarms

Description	Lists the alarms generated against the monitored system.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**. Links to the Virtual Machine Summary view.

Table 58. Alarms

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

Figure 106. Alarm dialog box

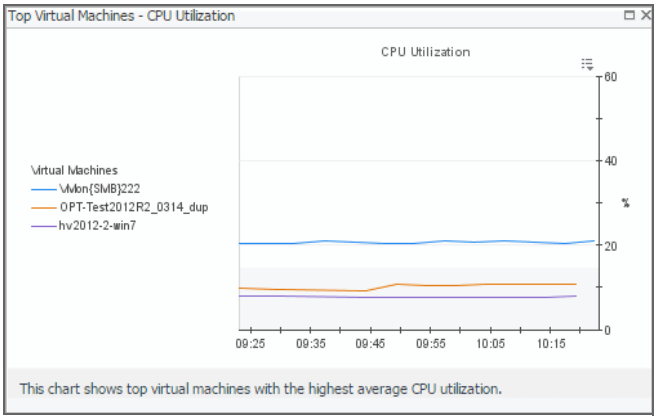


- **Time**. Links to the Virtual Machine Summary view.

Table 59. Top CPU Consumers

Description	Shows the top three virtual machines with the highest average CPU utilization.
Data displayed	• **Utilization**. The total percentage of CPU utilization the top three CPU consumers spend on executing system code and user programs, during the selected time range. • **Virtual Machine**. The name of the virtual machine.
Where to go next	Drill down on: • **Utilization** (in the graph). Displays the **Top Virtual Machines - CPU Utilization** dialog box.

Figure 107. Top Virtual Machines - CPU Utilization dialog box



- **Virtual Machine**. For more information, see Hyper-V Explorer Summary tab on page 118.

Table 60. Top Network Consumers

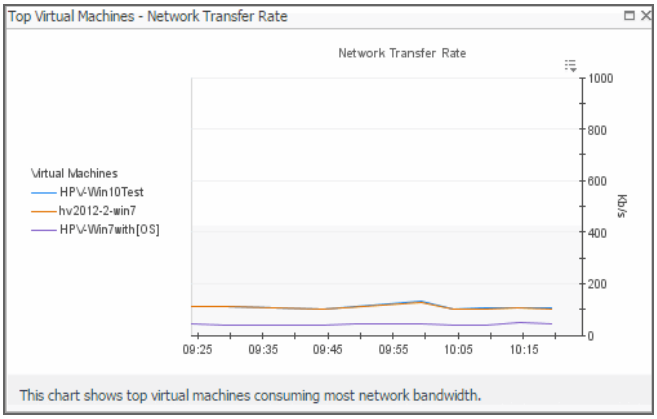
Description	Shows the top three virtual machines that are consuming most network bandwidth.
Data displayed	• **Rate**. The rate at which the top three network consumers transfer data to or from the network during the selected time range. • **Virtual Machine**. The name of the virtual machine that is one of the top three network consumers.
Where to go next	Drill down on: • **Rate**. Displays the **Top Virtual Machines - Network Transfer Rate** dialog box. **Figure 108. Top Virtual Machines - Network Transfer Rate dialog box**  • **Virtual Machine**. For more information, see Hyper-V Explorer Summary tab on page 118.

Table 61. Top Total Memory

Description	Shows the top three virtual machines with the highest average memory utilization.
Data displayed	• **Virtual Machine**. The name of the virtual machine that is one of the top three memory consumers. • **Total Memory**. The current amount of memory available to the virtual machine.
Where to go next	Drill down on: • **Virtual Machine** or **Total Memory**. For more information, see Hyper-V Explorer Summary tab on page 118.

Table 62. Top Total Space

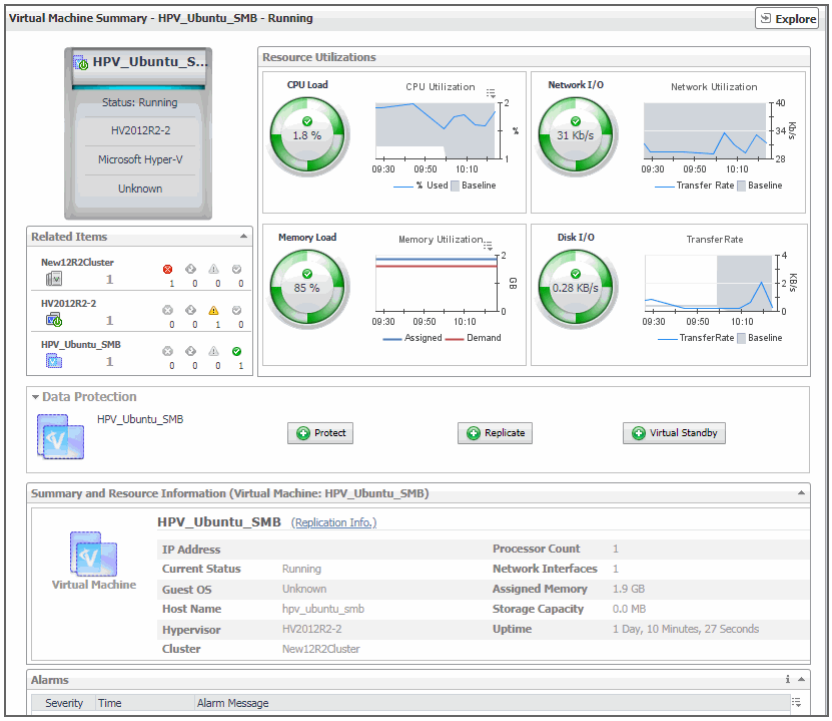
Description	Shows the top three virtual machines with the highest available disk space.
Data displayed	• **Virtual Machine**. The name of the virtual machine that is one of the top three disk consumers. • **Total Space**. The total amount of disk space available to the virtual machine.
Where to go next	Drill down on: • **Virtual Machine** or **Total Space**. For more information, see Hyper-V Explorer Summary tab on page 118.

Virtual Machine Summary view

The **Virtual Machine Summary** view shows the overall resource utilization and the amounts of system resource consumption for a virtual machine.

This view appears in the Quick-View on the left when you select a virtual machine in the Virtual Machines view.

Figure 109. Virtual Machine Summary view



This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations
- Virtual Machine Configuration

Table 63. Alarms

Description	Lists the alarms generated against the selected virtual machine.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.

Table 63. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm Created** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

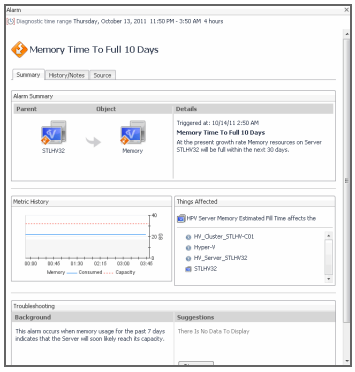


Table 64. Related Items

Description	Shows the numbers and states of the cluster and the server on which the selected virtual machine is running, and the virtual machine running on the selected server.
Data displayed	• **Cluster**. The name of the cluster in which the selected virtual machine is running, followed by the counts of all alarms associated with the cluster, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Server**. The name of the server on which the selected virtual machine is running on, followed by the counts of all alarms associated with that server, broken down by the alarm state (Normal, Warning, Critical, Fatal). • **Virtual machines**. The name of the selected virtual machine, followed by the counts of all alarms associated with that virtual machine, broken down by the alarm state (Normal, Warning, Critical, Fatal).
Where to go next	Drill down on: • **Alarm count**. Displays a dwell that shows the objects against which alarms are generated.

Figure 110. Related objects alarm dwell

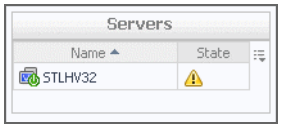
- **Cluster**. Displays the **Clusters** dwell, showing the name and state of the cluster in which the selected virtual machine is running.

Figure 111. Clusters dwell

Table 64. Related Items

- **Server**. Displays the **Servers** dwell, showing the name and state of the server on which the selected virtual machine is running.

  Figure 112. Servers dwell

- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the name and state of the selected virtual machine.

  Figure 113. Virtual Machines dwell

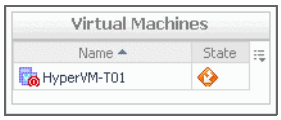
  

Table 65. Resource Utilizations

Description	Shows the resource consumption for the selected virtual machine, broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected virtual machine's CPU load, used to execute system code and user programs, based on the total CPU capacity allocated to that virtual machine. • **CPU Utilization, % Used**. The percentage of the virtual machine's CPU utilization spent on executing system code and user programs during the selected time period. • **CPU Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data. • **Disk I/O**. The current disk I/O rate for the selected virtual machine. • **Disk Transfer Rate**. The rate at which data was read from or written to the disks associated with the selected virtual machine during the specified time period. • **Disk Transfer Rate, Baseline**. An envelope indicating the expected disk utilization range based on historical data. • **Memory, Static Memory**. The total amount of static memory available to the selected virtual machine. **NOTE:** This metric appears only if the DRAM (dynamic random-access memory) is disabled on the selected virtual machine. • **Memory Load**. The current percentage of the average memory usage by the selected virtual machine. **NOTE:** This metric appears only if the DRAM (dynamic random-access memory) is enabled on the selected virtual machine. • **Memory Utilization, Assigned**. The amount of memory that is allocated to the selected virtual machine during the specified time period. **NOTE:** This metric appears only if the DRAM (dynamic random-access memory) is enabled on the selected virtual machine. • **Memory Utilization, Demand**. The amount of memory that the selected virtual machine needs during the specified time period. **NOTE:** This metric appears only if the DRAM (dynamic random-access memory) is enabled on the selected virtual machine. • **Network I/O**. The current rate at which the selected virtual machine transfers data from and to the network.

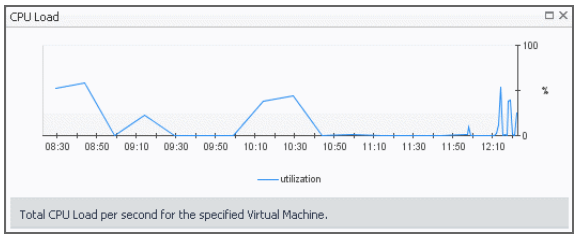
Table 65. Resource Utilizations

- **Network Utilization, Baseline**. An envelope indicating the expected network utilization range based on historical data.
- **Network Utilization, Transfer Rate**. The rate at which the selected virtual machine transfer data to and from the network during the selected time period.
- **Total Memory**. The total amount of memory that is available to the selected virtual machine.

Where to go next Drill down on:

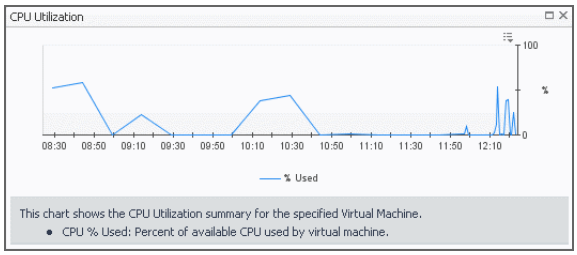
- **CPU Load** spinner. Displays the **CPU Load** dialog box.

Figure 114. CPU Load dialog box



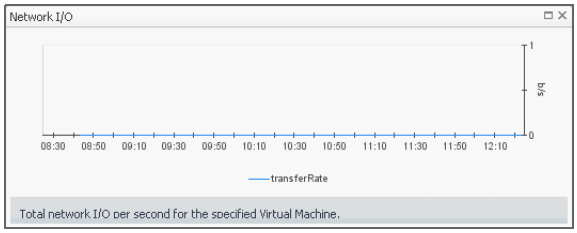
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.

Figure 115. CPU Utilization dialog box



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

Figure 116. Network I/O dialog box



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

Figure 117. Network Utilization dialog box

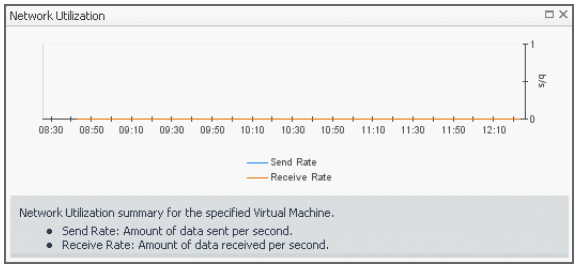


Table 66. Virtual Machine Configuration

Description	Shows the name of the selected virtual machine, its status, and the basic configuration, including the name of the physical server associated with this virtual machine, virtualization application (Microsoft Hyper-V), and the OS. **NOTE:** This view only appears in the **Virtual Machine Summary** composite view.

Storage monitoring

A Microsoft Windows Cluster Shared Volume (CSV) is a shared disk available for read and write operations by all nodes within a Windows Server Failover Cluster. A Windows Server Failover Cluster is a group of computers that provides continued service when system components fail.

To review data collected about a specific volume or all volumes, make your selection in the Quick-View.

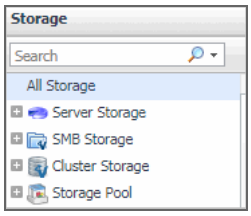
- Storage view
- Summary - All Storage view
- Volumes Summary view
- Volume Summary view
- Volume view

Storage view

The **Storage** view is a tree view. It lists the server volumes and cluster volumes existing in your environment, and shows their severity state.

This view appears in the Quick-View on the left when you select the **Storage** tile in the Virtual Environment view.

Figure 118. Storage view



Selecting the **All Storage** node displays the overall resource utilization for all volumes in your integrated system and identifies the ones that consume the highest amount of system resources in the Summary - All Storage view on the right. Similarly, selecting a storage node shows storage-specific metrics in the Volume Summary view.

Table 67. Description of the View

Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the volume. • **All Storage**. A parent node for the instances of all volumes that appear in this view. • **Server Storage**. The parent node for the instances of all server storage. • **SMB Storage.** The parent node for the instances of all SMB storage. • **Cluster Storage**. The parent node for the instances of all cluster storage. • **Storage Pool.** The parent node for the instances of all storage pools.
Where to go next	Drill down on: • **All Storage**. Shows the Summary - All Storage view in the Quick-View. • **Server Storage**. Shows the Volume Summary view in the Quick-View.

Table 67. Description of the View

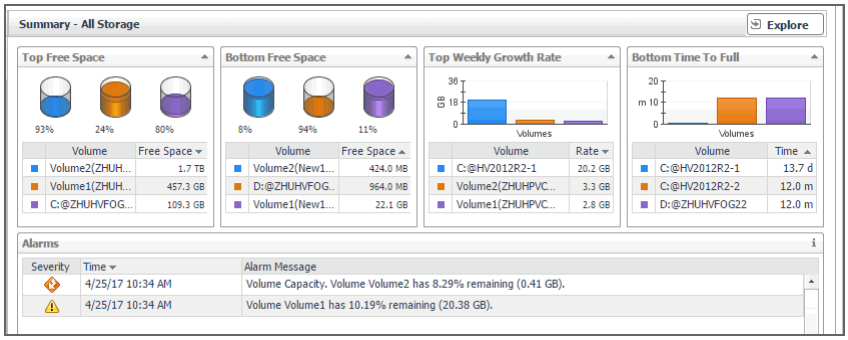
- **SMB Storage.** Shows the Volume Summary view in the Quick-View.
- **Cluster Storage**. Shows the Volume Summary view in the Quick-View.
- **Storage Pool.** Shows the Volume Summary view in the Quick-View.

Summary - All Storage view

The **Summary - All Storage** view displays overall resource utilization information for all volumes in the selected service and identifies the elements that consume the highest amount of resources.

This view appears in the Quick-View on the left when you select **All Storage** in the Storage view.

Figure 119. Summary - All Storage view



This view is made up of the following embedded views:

- Alarms
- Bottom Free Space
- Bottom Time to Full
- Top Free Space
- Top Weekly Growth Rate

Table 68. Alarms

Description	Lists the alarms generated against the monitored volumes.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.

Table 68. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

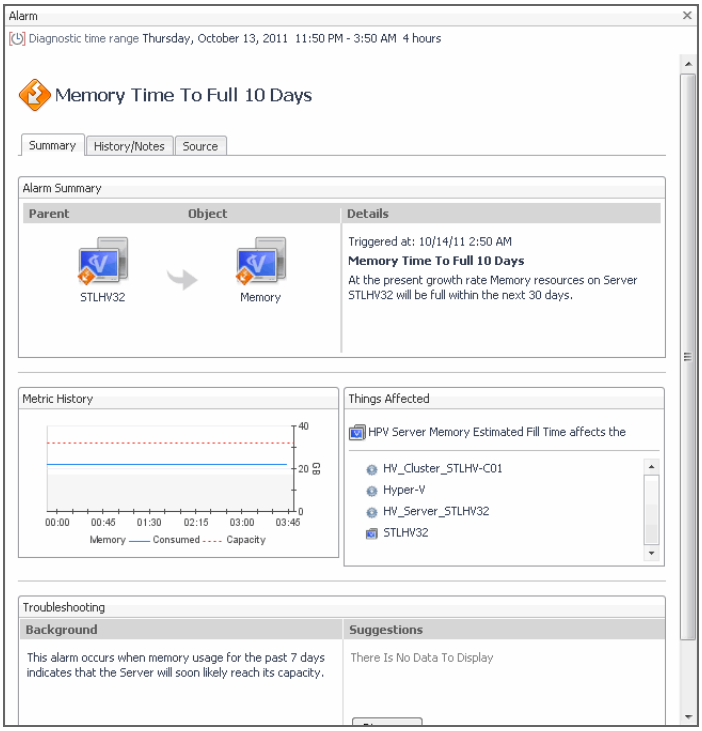


Table 69. Bottom Free Space

Description	Identifies the volumes with the smallest amounts of free space during the selected time range.
Data displayed	• **Volume**. The name of the volume identified amongst those with the lowest amount of free space. • **Free space**. The amount of available space on the volume.
Where to go next	Drill down on: • **Volume**. Shows the Volume view.

Table 70. Bottom Time to Full

Description	Identifies the volumes that are most likely to become full during the selected time range.
Data displayed	• **Volume**. The name of the volume identified as being likely to become full. • **Rate**. The projected amount of time after which the volume becomes full.
Where to go next	Drill down on: • **Volume**. Shows the Volume view.

Table 71. Top Free Space

Description	Identifies the volumes with the highest amounts of free space during the selected time range.
Data displayed	• **Volume**. The name of the volume identified as having a high amount of free space.

Table 71. Top Free Space

	• **Free space**. The amount of space available on the volume.
Where to go next	Drill down on: • **Volume**. Shows the Volume view.

Table 72. Top Weekly Growth Rate

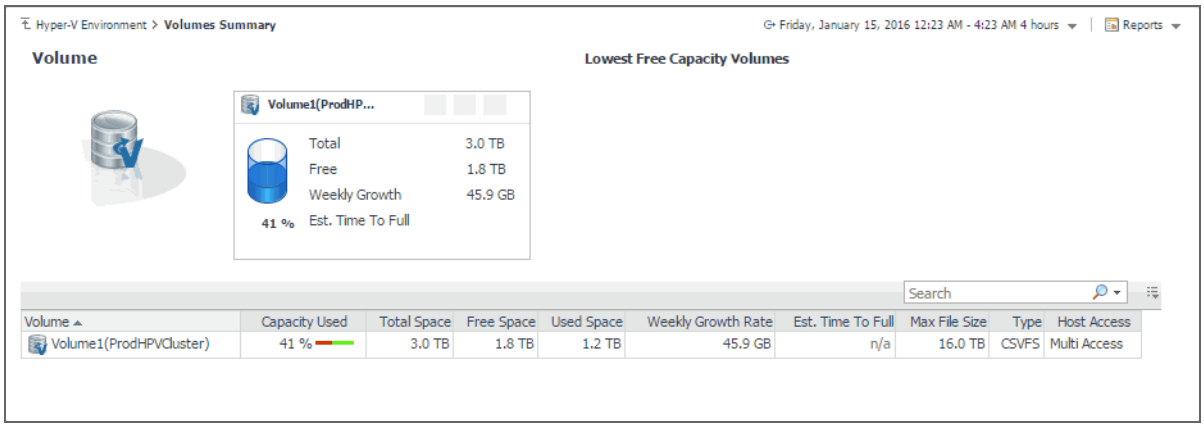
Description	Identifies the volumes with the highest growth rate of used disk space on a weekly basis.
Data displayed	• **Volume**. The name of the volume identified as having high weekly growth rate. • **Rate**. The rate at which the associated virtual machines use the disk space.
Where to go next	Drill down on: • **Volume**. Shows the Volume view.

Volumes Summary view

The Volumes **Summary** view displays complete details for all volumes in the selected service and identifies the ones that consume the lowest amounts of disk resources.

This view appears in the display area when you click **Explore** in the Summary - All Storage view.

Figure 120. Volumes Summary view



This view is made up of the following embedded views:

- Volume table
- Volume tile

Table 73. Volume table

Description	Lists all volumes that are available in the selected service.
Data displayed	• **Capacity Used**. The percentage of the volume space that is currently in use. • **Est. Time Until Full**. The estimated amount of time after which the selected volume becomes full. • **Free Space**. The amount of volume space that is available for use. • **Host Access**. Indicates if multiple servers can access to this host. • **Max File Size**. The maximum file size on the selected volume. • **Total Space**. The total amount of volume space, including free and used space. • **Type**. The file system on the selected volume. • **URL**. The URL to the selected volume.

Table 73. Volume table

	• **Used Space**. The amount of volume space that is currently in use. • **Volume**. The name of the volume identified amongst those with the lowest amount of free space. • **Weekly Growth Rate**. The projected amount of the volume space that becomes in use on a weekly basis.
Where to go next	Drill down on: • **Any column**. Shows the volume details in the Volume view.

Table 74. Volume tile

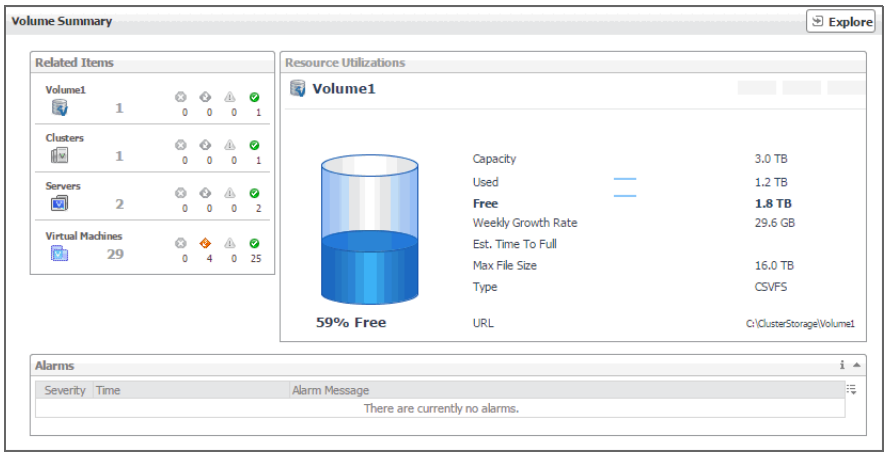
Description	For each volume identified amongst those with lowest capacity, this tile provides some basic resource usage indicators.
Data displayed	• **Free**. The amount of volume space that is available for use. • **Percent Free**. The percentage of volume space that is available for use. • **Total**. The total amount of volume space, including free and used space. • **Volume**. The name of the volume, followed by the related alarm counts. • **Weekly Growth Rate**. The projected amount of the volume space that becomes in use on a weekly basis.

Volume Summary view

The **Volume Summary** view shows the levels of resource utilization and consumption for a selected volume.

This view appears in the display area when you select **a volume** in the Summary - All Storage view.

Figure 121. Volume Summary view



This view is made up of the following embedded views:

- Alarms
- Related Items
- Resource Utilizations

Table 75. Alarms

Description	Lists the alarms generated against the selected datastore.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal.

Table 75. Alarms

- **Time**. The time at which the alarm was generated.

Where to go next Drill down on:

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

Figure 122. Alarm dialog box

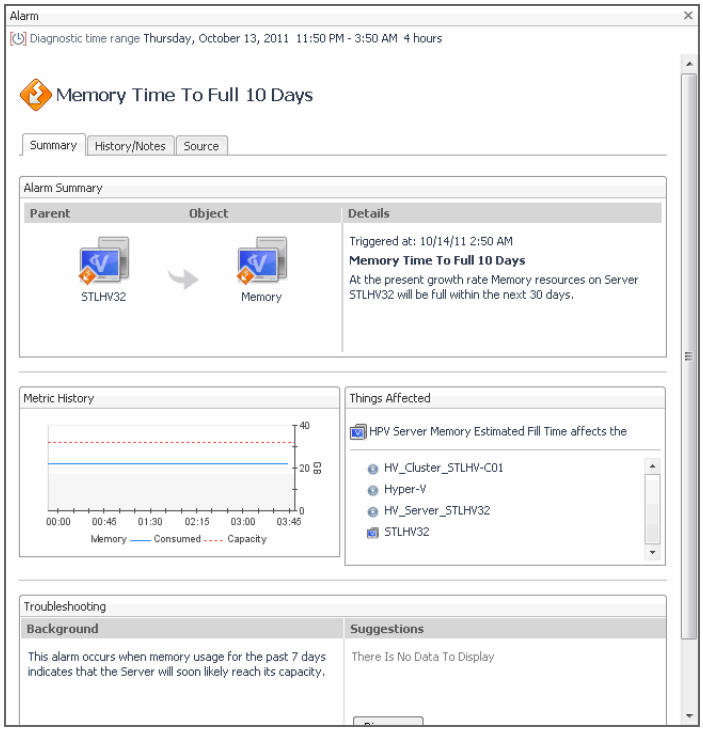


Table 76. Related Items

Description Shows the selected volume and other components associated with it in your virtual infrastructure.

Data displayed

- **Clusters**. The number of clusters associated with the selected volume, followed by the related alarm counts.
- **Servers**. The number of servers associated with the selected volume, followed by the related alarm counts.
- **Virtual Machines**. The number of virtual machines that are associated with the selected volume, followed by the related alarm counts.
- **Volume**. Represents the selected volume. Shows the counts of the alarms generated against the volume.

Where to go next Drill down on:

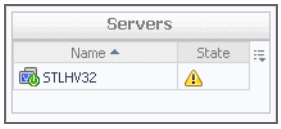
- **Clusters**. Displays the **Clusters** dwell, showing the names and states of all clusters that are associated with the selected volume.

Figure 123. Clusters dwell

Table 76. Related Items

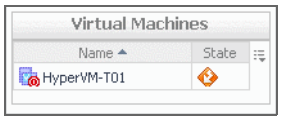
- **Server**. Displays the **Servers** dwell, showing the names and state of the servers associated with the selected volume.

  Figure 124. Servers dwell

- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines that are associated with the selected volume.

  Figure 125. Virtual Machines dwell

- **Volume**. Displays the **Other Items Inventory** dwell, showing the state of the selected volume.

  Figure 126. Other Items Inventory dwell

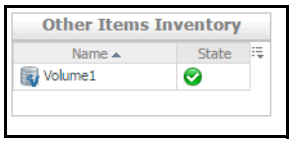
  

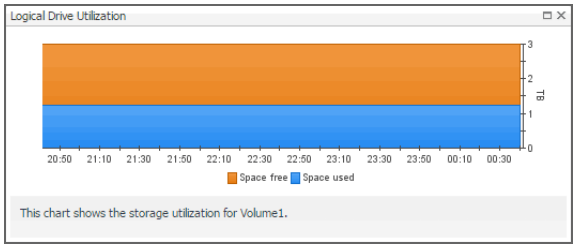
Table 77. Resource Utilizations

Description	Shows the resource consumption for the selected volume.
Data displayed	• **Capacity**. The total amount of volume space, including free and used space. • **Est. Time Until Full**. The estimated amount of time after which the selected volume becomes full. • **Free**. The amount of volume space that is available for use. • **Max File Size**. The maximum file size on the selected volume. • **Percent Free**. The percentage of volume space on the that is available for use. • **Type**. The file system on the selected volume. • **URL**. The URL to the selected volume. • **Used**. The amount of volume space that is currently in use. • **Volume**. The name of the selected volume, followed by the related alarm counts. • **Weekly Growth Rate**. The projected amount of the volume space that becomes in use on a weekly basis.
Where to go next	Drill down on:

Table 77. Resource Utilizations

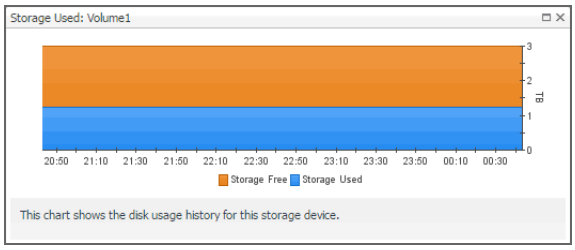
- **Free** or **Used**. Displays the **Logical Drive Utilization** dialog box.

  Figure 127. Logical Drive Utilization dialog box

- **Percent Free**. Displays the **Storage Used** dialog box.

  Figure 128. Storage Used dialog box

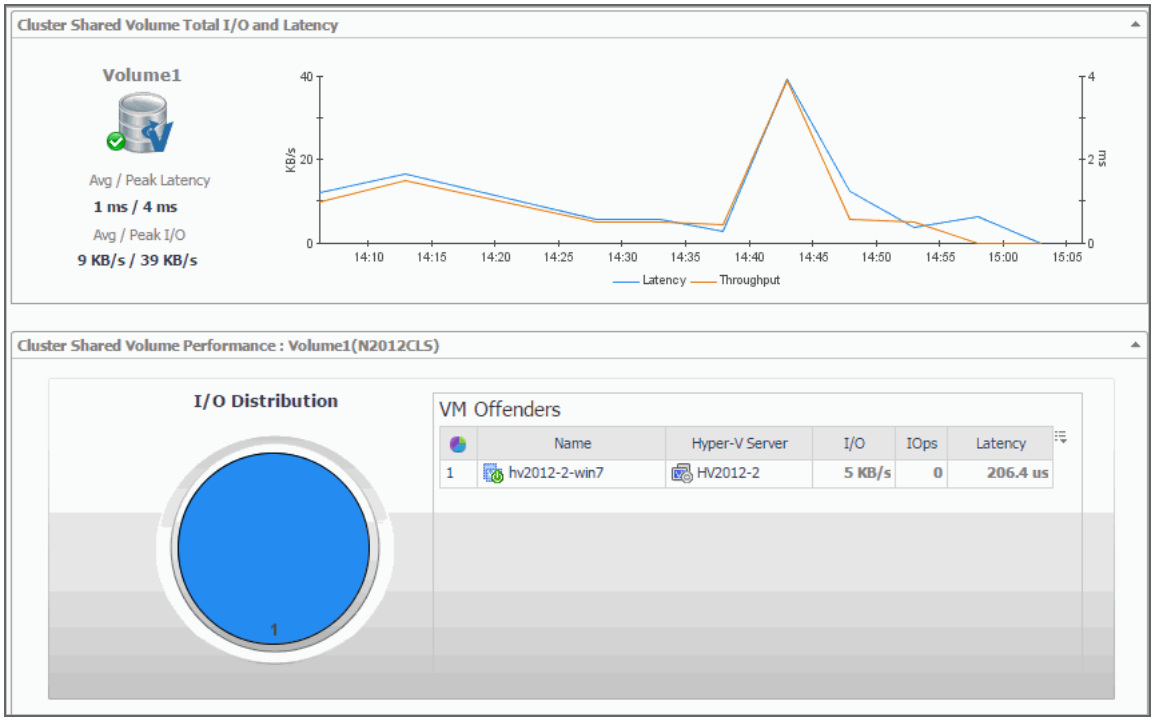
  

Volume view

The **Volume** view shows the data transfer rates and latency detected for the selected volume. It also identifies the virtual machines that use the highest amounts of the volume resources.The information provided on this tab can help you prevent potential bottlenecks by reallocating disk resources where they are most needed.

This view appears in the display area when you click in the Volume Summary view.

Figure 129. Volume view



This view is made up of the following embedded views:

- Cluster Shared Volume Performance
- Cluster Shared Volume Total I/O and Latency

Table 78. Cluster Shared Volume Performance

Description	Shows the amount of the volume I/O resources used by the virtual machines associated with the selected volume.
Data displayed	• **I/O Distribution**. A pie chart indicating how much each virtual machine associated with the selected volume contributes to the overall use of I/O resources. • **VM Offenders, Hyper-V Server**. The name of the Hyper-V server on which the virtual machine is running. • **VM Offenders, I/O**. The rate at which the virtual machine writes to and reads from the volume. • **VM Offenders, IOps**. The number of disk read and write operations the virtual machine performed from the beginning of the selected time range. • **VM Offenders, Latency**. The latency rate detected for the disk read and write operations the virtual machine performed from the beginning of the selected time range. • **VM Offenders, Name**. The name of the virtual machine.
Where to go next	Drill down on: • **VM Offenders, Hyper-V Server**. Shows the Hyper-V server details in the Hyper-V Explorer Summary tab. • **VM Offenders, Name**. Shows the virtual machine details in the Hyper-V Explorer Summary tab.

Table 79. Cluster Shared Volume Total I/O and Latency

Description	Displays the data transfer rates and latency detected for the selected volume.
Data displayed	• **Avg/Peak I/O**. The average and peak data transfer rates detected for the selected volume. • **Avg/Peak Latency**. The average and peak latency rates detected for the selected volume. • **Latency**. The latency detected for the selected volume over the selected time range. • **Throughput**. The data transfer rates detected for the selected volume over the selected time range. • **Volume**. The name of the selected volume and its alarm state.

Virtual switch monitoring

A Hyper-V Virtual Switch is a software-based layer-2 Ethernet network switch. The switch connects virtual machines to virtual and physical networks.

To review data collected about a specific volume or all volumes, make your selection in the Quick-View.

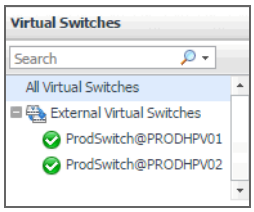
- Virtual Switches view on page 100
- Summary - All Virtual Switches view on page 101
- Summary - Virtual Switch view on page 103
- Virtual Switch Topology view on page 106

Virtual Switches view

The **Virtual Switches** tree view lists the available volumes and indicates their severity state.

This view appears in the Quick-View on the left when you select the **Virtual Switches** tile in the Virtual Environment view.

Figure 130. Virtual Switches view



Selecting the **All Virtual Switches** node displays the overall resource utilization for all virtual switches in your integrated system and identifies the ones that consume the highest amount of network resources in the Summary - All Virtual Switches view on the right. Similarly, selecting a virtual switch node shows switch-specific metrics in the Summary - Virtual Switch view.

Table 80. Description of the View

Data displayed	• **Alarm severity**. The state of the most recent alarm raised against the virtual switch. • **All Volumes**. A parent node for the instances of all virtual switches that appear in this view. • **Volume**. The name of the virtual switch.
Where to go next	Drill down on:

Table 80. Description of the View

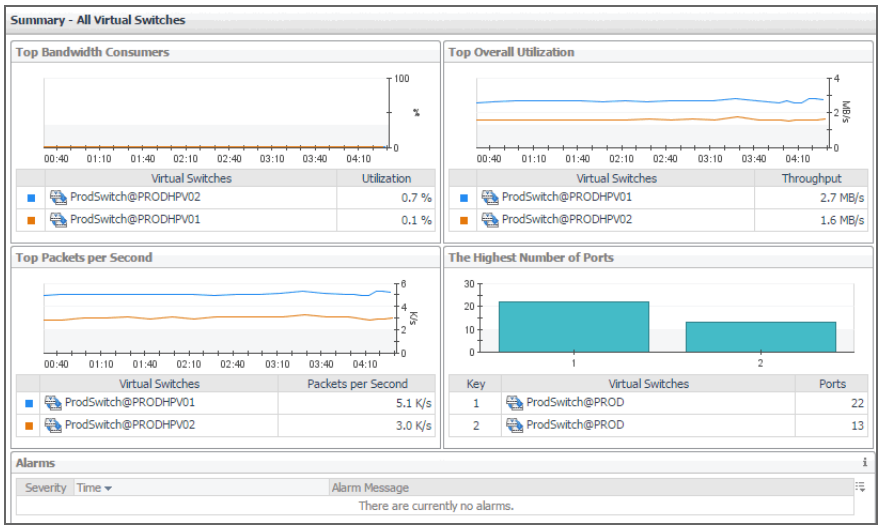
- **All Volumes**. Shows the Summary - All Virtual Switches view in the Quick-View.
- **Volume**. Shows the Summary - Virtual Switch view in the Quick-View.

Summary - All Virtual Switches view

The **Summary - All Virtual Switches** view displays overall resource utilization information for a group of virtual switches and identifies the ones that consume the highest amounts of system resources, potentially causing performance bottlenecks.

This view appears in the Quick-View on the left when you select **All Virtual Switches** in the Virtual Environment view.

Figure 131. Summary - All Virtual Switches view



This view is made up of the following embedded views:

- Alarms
- Top Bandwidth Consumers
- The Highest Number of Ports
- Top Overall Utilization
- Top Packets per Second

Table 81. Alarms

Description	Lists the alarms generated against the monitored virtual switches.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.

Table 81. Alarms

Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

Figure 132. Alarm dialog box

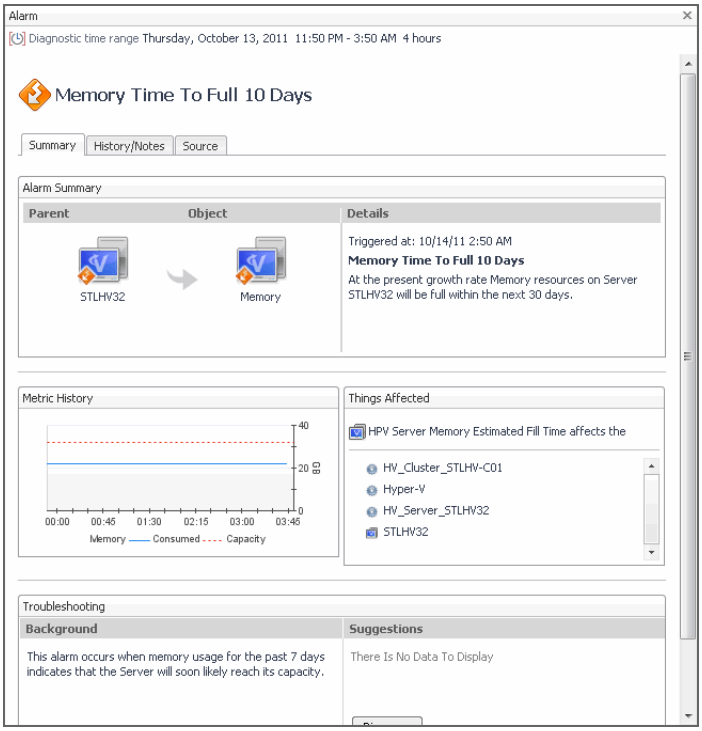


Table 82. Top Bandwidth Consumers

Description	Identifies the virtual switches with the highest percentage of network utilization.
Data displayed	• **Top Bandwidth Consumers** chart. For each identified virtual switch, the chart displays the percentage of network resources available to it that are in use over the selected time period. • **Utilization**. The percentage of network resources available to the virtual switch that is currently in use. • **Virtual Switches**. The name of the virtual switch identified amongst top bandwidth consumers.
Where to go next	Drill down on: • **Virtual Switch** or **Utilization**. Shows the virtual switch details in the Summary - Virtual Switch view.

Table 83. The Highest Number of Ports

Description	Identifies the virtual switches with the highest numbers of available ports.
Data displayed	• **Ports**. The number of ports available on the virtual switch. • **The Highest Number of Ports** chart. For each identified virtual switch, the chart displays the number of available ports. • **Virtual Switches**. The name of the virtual switch.

Table 83. The Highest Number of Ports

Where to go next	Drill down on: • **Virtual Switch** or **Ports**. Shows the virtual switch details in the Summary - Virtual Switch view.

Table 84. Top Overall Utilization

Description	Identifies the virtual switches with the highest network transfer rates.
Data displayed	• **Throughput**. The current rate of network throughput for the selected virtual switch. • **Top Overall Utilization** chart. For each identified virtual switch, the chart displays the network throughput rate over the selected time period. • **Virtual Switches**. The name of the virtual switch identified amongst top network consumers.
Where to go next	Drill down on: • **Virtual Switch** or **Throughput**. Shows the virtual switch details in the Summary - Virtual Switch view.

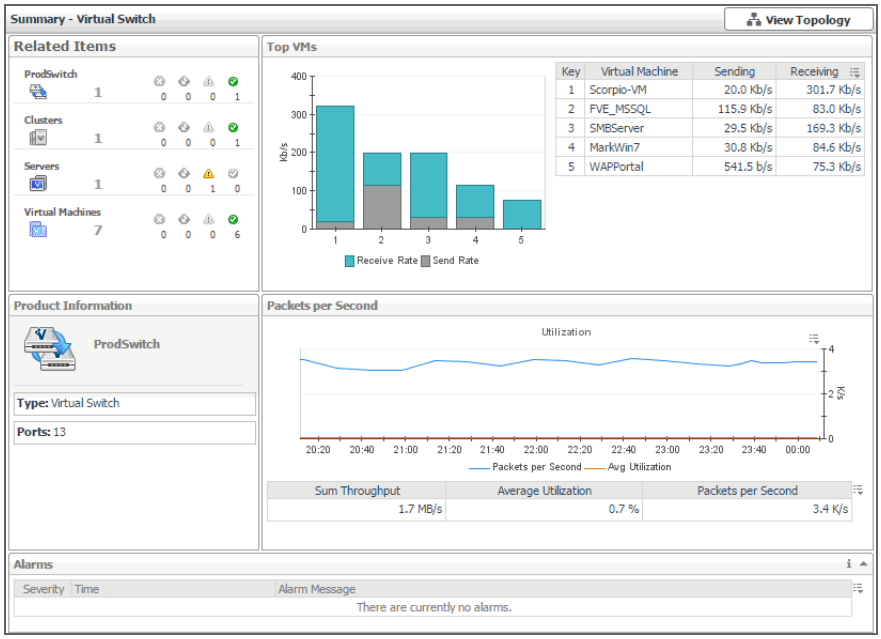
Table 85. Top Packets per Second

Description	Identifies the virtual switches with the highest data packet traffic.
Data displayed	• **Packets per Second**. The average rate of the data packets that are sent to the virtual switch. • **Top Packets per Second** chart. Identifies the virtual switches with the highest rates of data packet traffic over the selected time period. • **Virtual Switches**. The name of the virtual switch identified as having a high rate of data packet traffic.
Where to go next	Drill down on: • **Virtual Switch** or **Packets per Second**. Shows the virtual switch details in the Summary - Virtual Switch view.

Summary - Virtual Switch view

The **Summary - Virtual Switch** view illustrates the overall network utilization and the levels of overall network traffic for a selected virtual switch.

This view appears in the Quick-View on the left when you select **a** virtual switch in the Virtual Switches view.



This view is made up of the following embedded views:

- Alarms
- Packets Per Second
- Product Information
- Related Items
- Top VMs

Table 86. Alarms

Description	Lists the alarms generated against the selected virtual switch.
Data displayed	• **Alarm Message**. An explanation about why the alarm occurred. • **Severity**. Indicates the alarm severity: Warning, Critical, or Fatal. • **Time**. The time at which the alarm was generated.
Where to go next	Drill down on: • **Alarm Message**, **Severity**, or **Time**. Displays the **Alarm** dialog box, showing additional information about the alarm. For more information about alarms in Foglight Evolve Cloud, see the *Foglight Evolve Cloud User Help*.

Table 87. Packets Per Second

Description	Displays the utilization of the selected switch expressed thorough the rate of data packets it receives. This view illustrates the overall switch efficiency.
Data displayed	• **Utilization chart, Avg Utilization**. The average percentage of the network resources available to the switch that are in use over the selected time period. • **Utilization chart, Packets per Second**. The average rate of the data packets that are sent to the virtual switch over the selected time period. • **Utilization table, Average Utilization**. The average percentage of the network resources available to the switch that are currently in use. • **Utilization table, Packets per Second**. The average rate of the data packets that are sent to the virtual switch. • **Utilization table, Sum Throughput**. The current rate of network throughput for the selected switch.

Table 87. Packets Per Second

Where to go next	Drill down on: • **Utilization chart**. Displays the **Utilization** dialog box.

Figure 133. Utilization dialog box

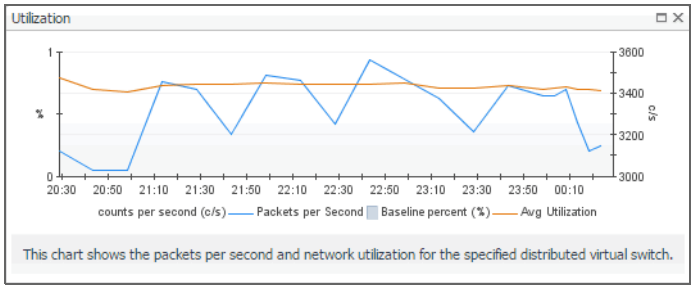


Table 88. Product Information

Description	Shows the name of the selected virtual switch along with some basic configuration information.
Data displayed	• **Ports**. The number of ports that are available for use on the selected virtual switch. • **Type**. The type of the switch: **Virtual Switch**.

Table 89. Related Items

Description	Shows the numbers and states of the objects in your environment associated with the selected virtual switch.
Data displayed	• **Clusters**. The number of clusters associated with the selected virtual switch, followed by the related alarm counts. • **Servers**. The number of servers associated with the selected virtual switch, followed by the related alarm counts. • **Virtual Machines**. The number of virtual machines that are associated with the selected virtual switch, followed by the related alarm counts. • **Virtual Switch**. Represents the selected virtual switch. Shows the counts of alarm generated against the switch.
Where to go next	Drill down on: • **Clusters**. Displays the **Clusters** dwell, showing the names and states of all clusters that are associated with the selected virtual switch.

Figure 134. Clusters dwell

- **Servers**. Displays the **Servers** dwell, showing the names and state of the servers associated with the selected virtual switch.

Figure 135. Servers dwell

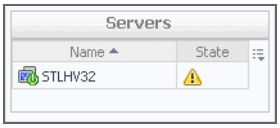
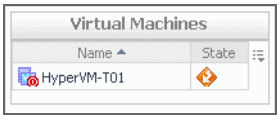


Table 89. Related Items

- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines that are associated with the selected virtual switch.

  Figure 136. Virtual Machines dwell

- **Virtual Switch**. Displays the **Other Items Inventory** dwell, showing the state of the selected virtual switch.

  Figure 137. Other Items Inventory dwell

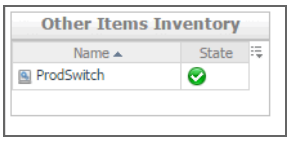
  

Table 90. Top VMs

Description	Identifies the virtual machines whose network traffic is managed by the selected virtual switch that have the highest network transfer rate.
Data displayed	• **Key**. An indicator of how virtual machine ranks in the list of top consumers. • **Receiving**. The average inbound data transfer rate for the virtual machine. • **Sending**. The average outbound data transfer rate for the virtual machine. • **Top VM chart, Receive Rate**. The average inbound data transfer rate for the monitored switch over the selected time period. • **Top VM chart, Send Rate**. The average outbound data transfer rate for the monitored switch over the selected time period. • **Virtual Machine**. The name of the virtual machine identified amongst top network consumers.

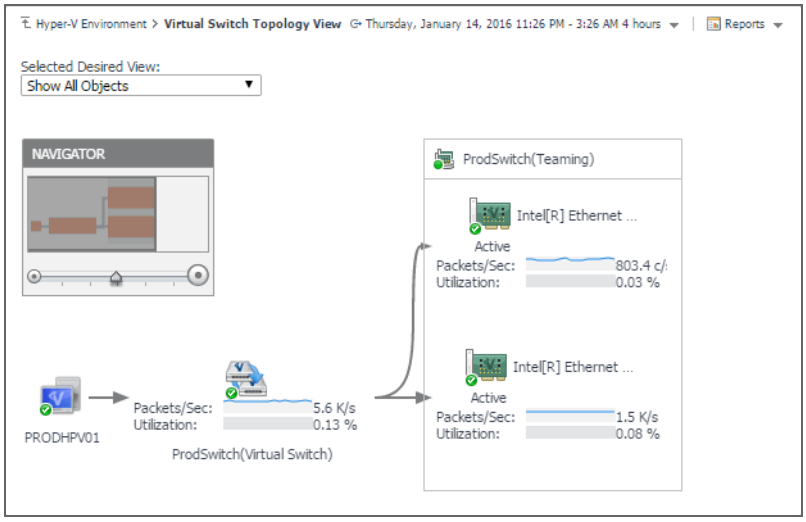
Virtual Switch Topology view

A typical Hyper-V environment consists of many interrelated components. Understanding the dependencies between virtual switches and other components of your monitored environment allows you to better understand resource-related issues, potentially affecting the stability of your system. This can help you predict the impact a potential outage may have on your environment, and to prevent such events, by reallocating resources where they are most needed.

The Virtual **Switch Topology View** visualizes the relationships between the objects in your environment through an interactive map. The map illustrates how different components relate to each other, and the levels of the available resources available to them.

This view appears in the display area when you click **View Topology** In the Summary - Virtual Switch view.

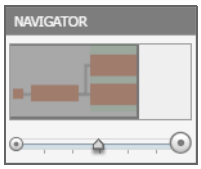
Figure 138. Virtual Switch Topology view



The complexity of the information appearing in a dependency map depends on the selected object and the dependencies that object has with other objects within your integrated infrastructure.

In a large multi-component environment, dependency maps are likely complex and may not fit your screen. The **NAVIGATOR** in the top-right corner allows you to easily set the zoom level by dragging the slider into the appropriate position.

Figure 139. Navigator view

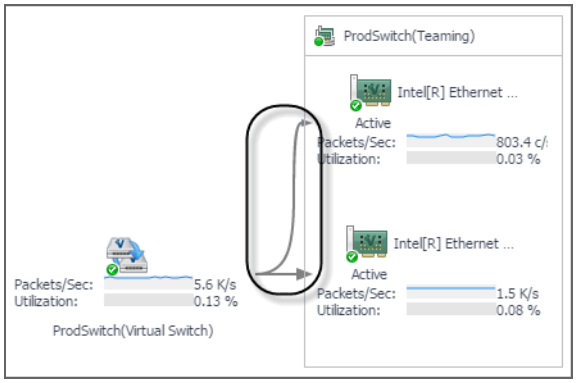


In a dependency map, some objects are represented with container tiles, others with single-object tiles or just icons. Every object in the map includes an indicator of its health.

Figure 140. Object health indicators

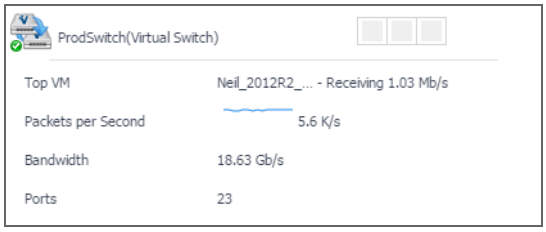
Dependencies between the objects in a map are illustrated with single-directional arrows. The color of the arrow reflects the alarm state of the target object: gray for Normal, yellow for Warning, orange for Critical, and red for the Fatal state.

Figure 141. Object dependencies



To find out more about an object appearing in the dependency map, click the object icon. A dwell appears, displaying more details about that object. The type and range of information appearing in the dialog box depends on the selected object's type. For example, drilling down on a virtual switch shows the switch name, alarm counts top virtual machine consumers, levels of traffic utilization, percentage of packet loss, current traffic types, available bandwidth, the numbers of available and all ports, and the number of active versus standby NICs.

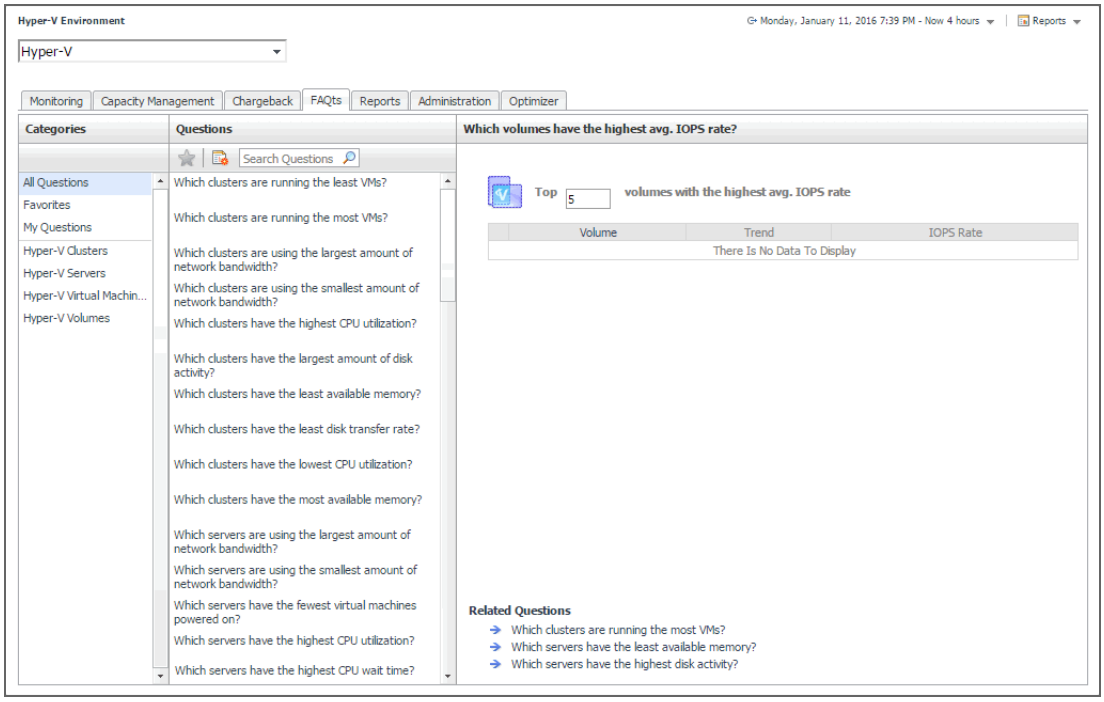
Figure 142. Virtual switch drilldown



About frequently asked questions

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

Figure 143. FAQts tab



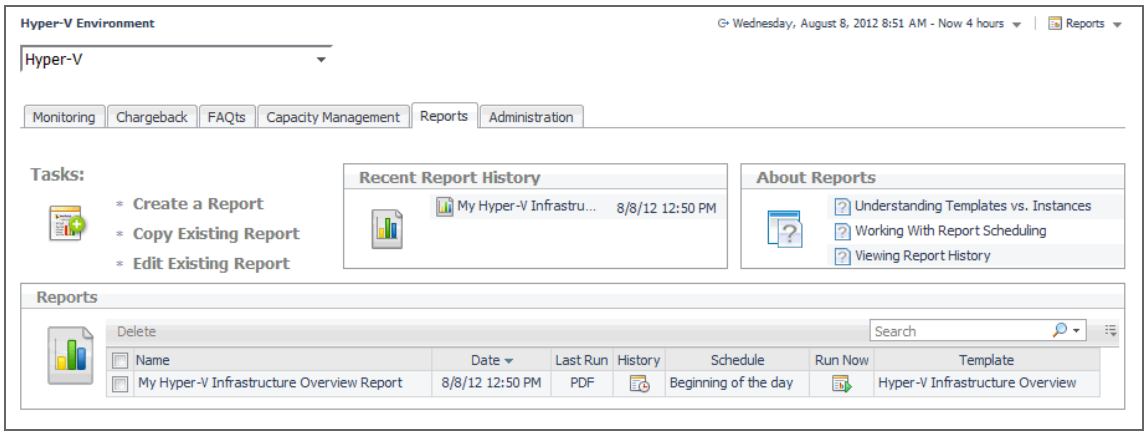
This tab also appears in the Hyper-V Explorer. For reference information about this tab, see Hyper-V Explorer FAQts.

About reports

Hyper-V Monitoring in Foglight Evolve Cloud includes a report generation ability. This allows you to create reports using a set of predefined templates to report on the various aspects of your database environment. Hyper-V Monitoring in Foglight Evolve Cloud includes a collection of predefined report templates.

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

Figure 144. Reports tab



For more information on how to use this tab to create and manage reports, see the *Managing Capacity in Virtual Environments User Guide*. For more information about the Reports dashboard, see the *Foglight Evolve Cloud User Help*.

Report templates

The following templates are available with Hyper-V Monitoring in Foglight Evolve Cloud.

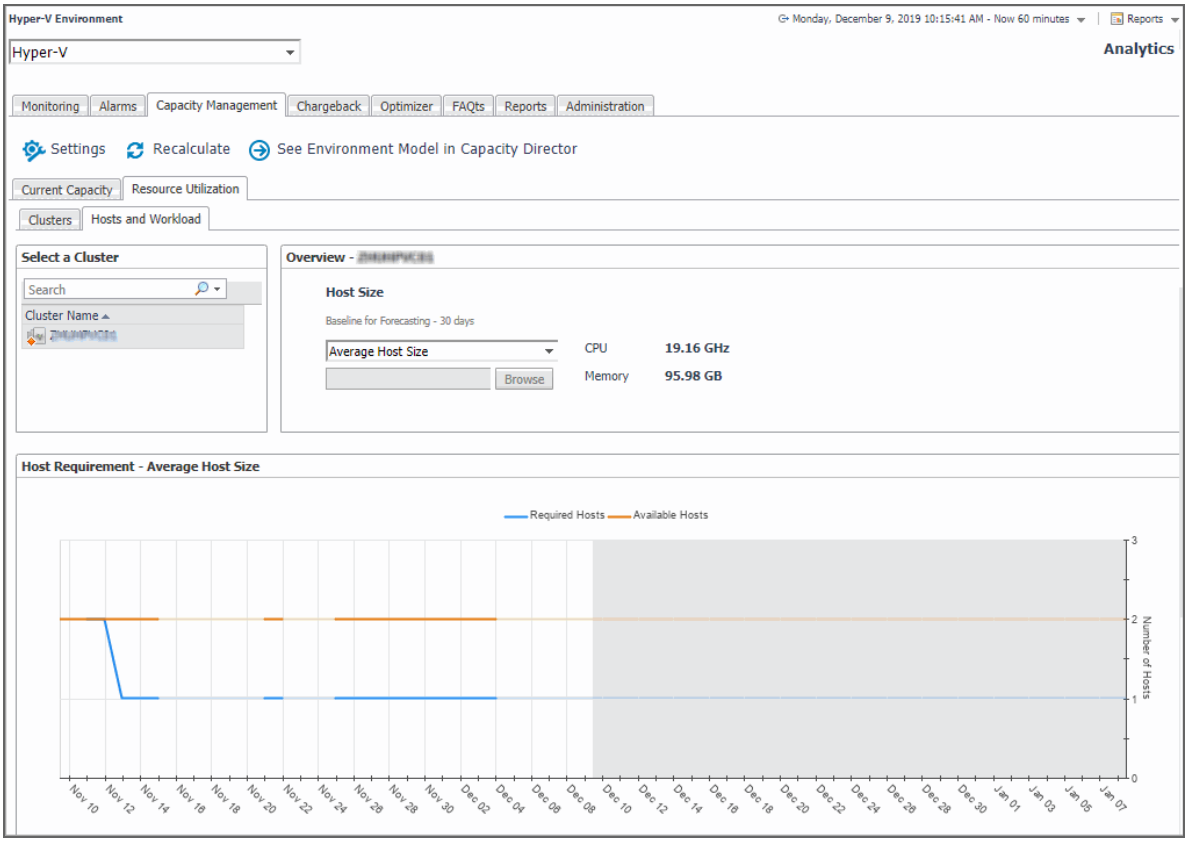
Table 91. Report templates

Report Template Name	This template can be used to generate a report that…
Hyper-V Infrastructure Overview	Summarizes your virtual infrastructure, so that you can be sure you are in compliance with the Hyper-V Monitoring in Foglight Evolve Cloud license.
Hyper-V Server Capacity and Performance - Detail	Contains the capacity and performance details for the selected Hyper-V Server.
Hyper-V Server Capacity and Performance - Summary	Summarizes the capacity and performance details of the selected Hyper-V Server.
Hyper-V Servers Configurations	Shows the configurations for the Hyper-V Servers in the selected environment.
Hyper-V Servers in Service: Summary	Contains the summary details for the Hyper-V Servers contained within the selected service.
Hyper-V Servers Network Performance	Contains the network performance details for the Hyper-V Server.
Hyper-V Servers Performance by Service - Detail	Contains the performance details for the Hyper-V Servers in the selected service.
Hyper-V Servers Performance by Service - Summary	Summarizes the performance details of the Hyper-V Servers in the selected service.
Hyper-V Servers Utilization - Detail	Shows the top *N* and bottom *N* Hyper-V Servers based on CPU utilization, CPU percent ready, memory utilization, disk transfer rate, and network transfer rate over a user-specified time range. The value of *N* is also user-specified. The report takes into consideration only the Hyper-V Servers in the service specified.
Hyper-V Servers Utilization - Summary	Shows the top 5 and bottom 5 Hyper-V Servers based on CPU utilization, CPU percent ready, memory utilization, disk transfer rate, and network transfer rate over a user-specified time range. The report takes into consideration only the Hyper-V Servers in the service specified.
Powered Off Virtual Machines	Lists the powered off virtual machines in a specified environment.
Virtual Infrastructure Alarm Summary	This template can be used to generate a report that contains the alarm (or event) history for the selected environment.
Virtual Machines Configurations	Shows the configurations for the virtual machines in the selected environment.
Virtual Machines Network Performance - Service	Contains the network performance details for the virtual machines in the selected service.
Virtual Machines Utilization - Detail	Shows the top *N* and bottom *N* virtual machines based on CPU-used Hz, CPU percent ready, memory consumed, disk growth rate, disk transfer rate, and network transfer rate over a user-specified time range. The value of *N* is also user-specified. The report takes into consideration only the virtual machines in the service specified.
Virtual Machines Utilization - Summary	Shows the top 5 and bottom 5 virtual machines based on CPU-used Hz, CPU percent ready, memory consumed, disk growth rate, disk transfer rate, and network transfer rate over a user-specified time range. The report takes into consideration only the virtual machines in the service specified.

Foglight Evolve Cloud for Capacity Management

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

Figure 145. Capacity Management tab

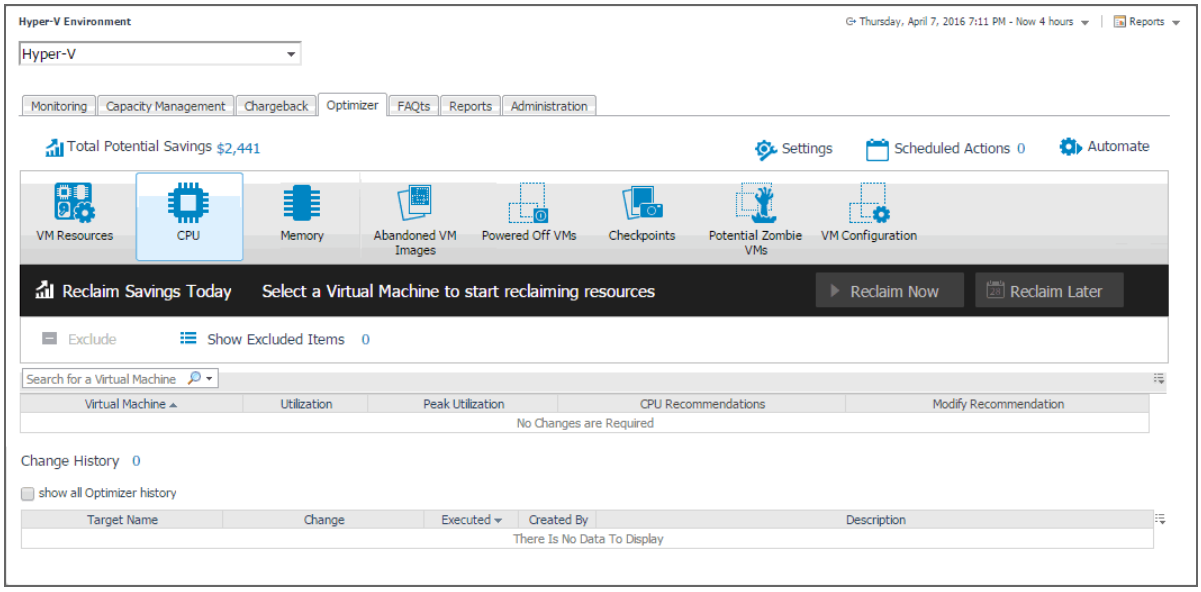


For complete information about this tab, see the *Foglight Evolve Cloud™ for Capacity Management User Guide*.

Foglight Resource Optimizer for Hyper-V Environments

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

Figure 146. Optimizer tab



For complete information about this tab, see the *Foglight Evolve Cloud™ Resource Optimizer for Hyper-V Environments User Guide*.

4

Performance investigation with the Hyper-V Explorer

The Hyper-V Explorer provides a great deal of value to administrators who leverage Hyper-V Monitoring in Foglight® Evolve Cloud to monitor their virtual infrastructure. It has a hierarchical interface that displays various performance metrics and alarms within the virtual infrastructure. It provides several informative views through which you can quickly and easily access detailed information about any of the available components (physical or virtual) within the monitored environment.

- About the Hyper-V Explorer
- Accessing the Hyper-V Explorer
- About the Hyper-V Explorer topology
- Hyper-V Explorer Summary
- Hyper-V Explorer VMs
- Hyper-V Explorer Monitor
- Hyper-V Explorer FAQts
- Hyper-V Explorer Event Analytics
- Hyper-V Explorer Storage
- Hyper-V Explorer Processes
- Hyper-V Explorer Cost
- Hyper-V server and virtual machine administration

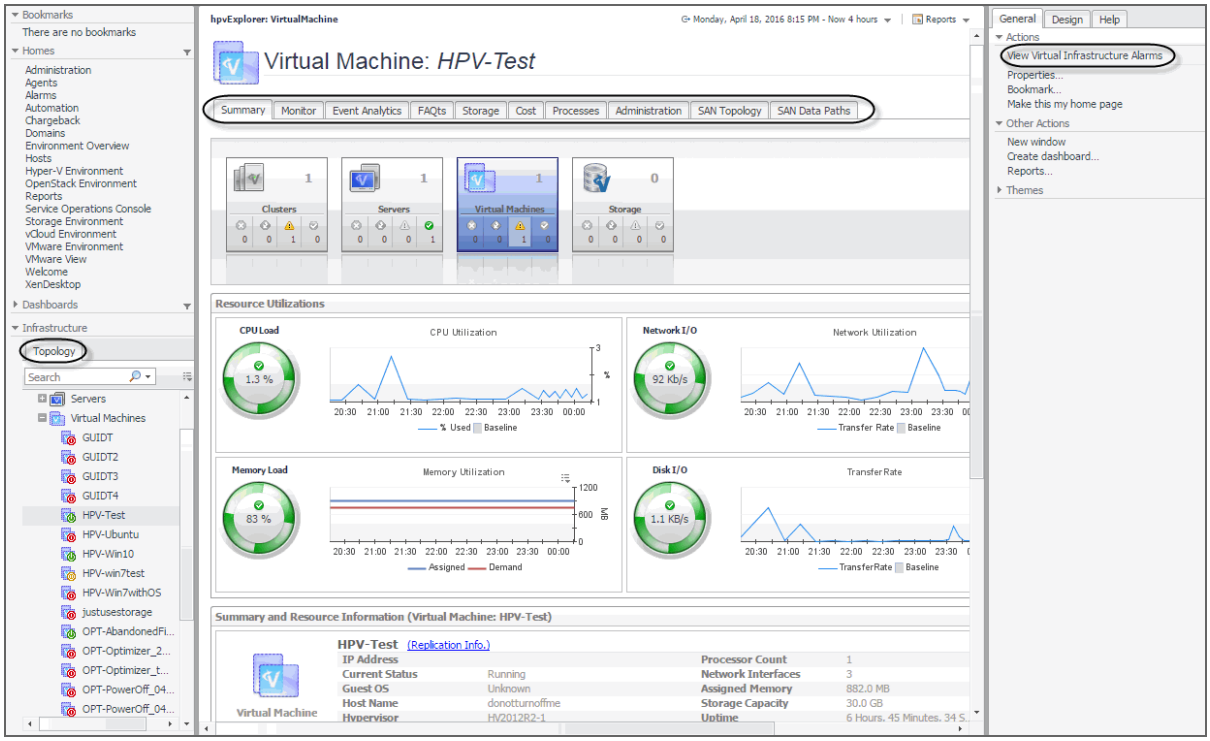
About the Hyper-V Explorer

The Hyper-V Explorer provides detailed performance metrics about an object or a group of objects selected on the **Hyper-V Explorer Topology tab**.The upper part of the Hyper-V Explorer consists of three main components: a selected tile, an alarm summary for the selected object, and navigation tabs.

The alarm summary in the top right shows the number of alarms at each severity level that are outstanding for the selected object type: clusters, servers, and virtual machines. Clicking an alarm count shows a list of the active alarms for the selected object or group of objects.

The range of navigation tabs varies from object to object, but generally includes a tab that displays the selected object's summary (typically the default view), a tab displaying the selected object's performance monitoring details, and one or more tabs with other relevant information. There are tabs that appear in the display area and a tab displaying a topology tree on the navigation panel. In addition, the action panel also provides instant access to a number of useful actions and tasks.

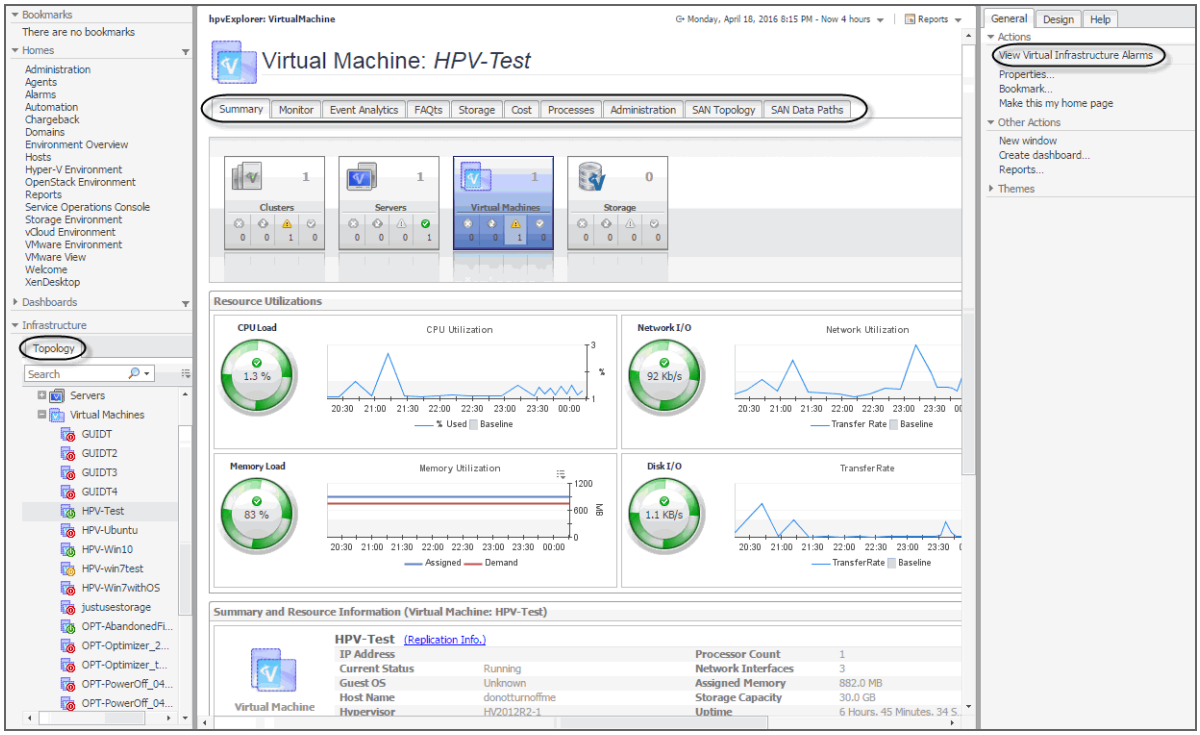
Figure 147. Hyper-V Explorer



Accessing the Hyper-V Explorer

The Hyper-V Explorer provides detailed performance metrics about an object or a group of objects selected on the Hyper-V Explorer Topology tab.

Figure 148. Hyper-V Explorer



To access the Hyper-V Explorer

1 Log in to the Foglight Evolve Cloud browser interface.

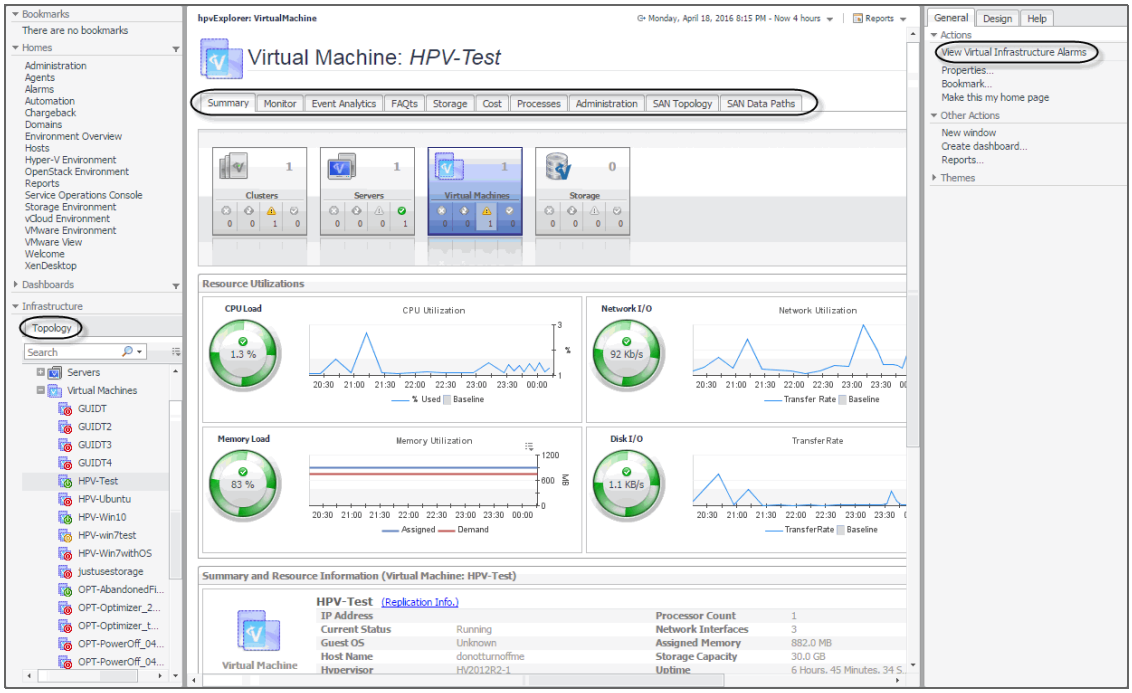
2 Ensure that the navigation panel is open.

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

3 On the navigation panel, under **Dashboards**, click **Hyper-V > Hyper-V Explorer**.

The Hyper-V Explorer appears in the display area.

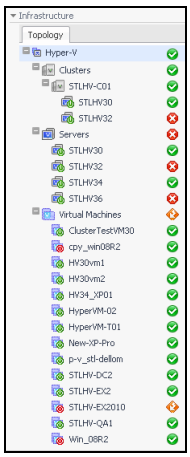
Figure 149. Hyper-V Explorer



About the Hyper-V Explorer topology

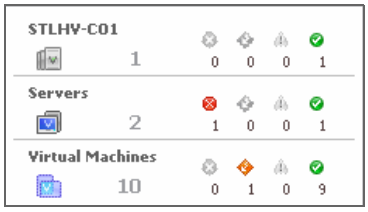
The **Topology** tab appears on the navigation panel when you access the Hyper-V Explorer. It displays a tree showing a hierarchical structure of the elements in your virtual infrastructure.

Figure 150. Topology tab



Use it to quickly select an object or object container and view the related information in the display area. Hovering over a specific node in this tree shows a dwell that gives you more information about that component, the related elements, and their alarm status. For example, hovering over a cluster node shows the name, the number of servers in that cluster, and the number of virtual machines running on the servers that belong to that cluster. It also shows the alarm counts for each component type and alarm severity.

Figure 151. Related information dwell

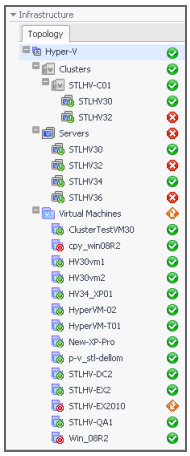


Hyper-V Explorer Topology tab

The Hyper-V Explorer **Topology** tab contains an organized view of the virtual infrastructure objects that are monitored by Hyper-V Monitoring in Foglight Evolve Cloud: clusters, servers, and virtual machines.

This tab appears on the navigation panel, under **Infrastructure**.

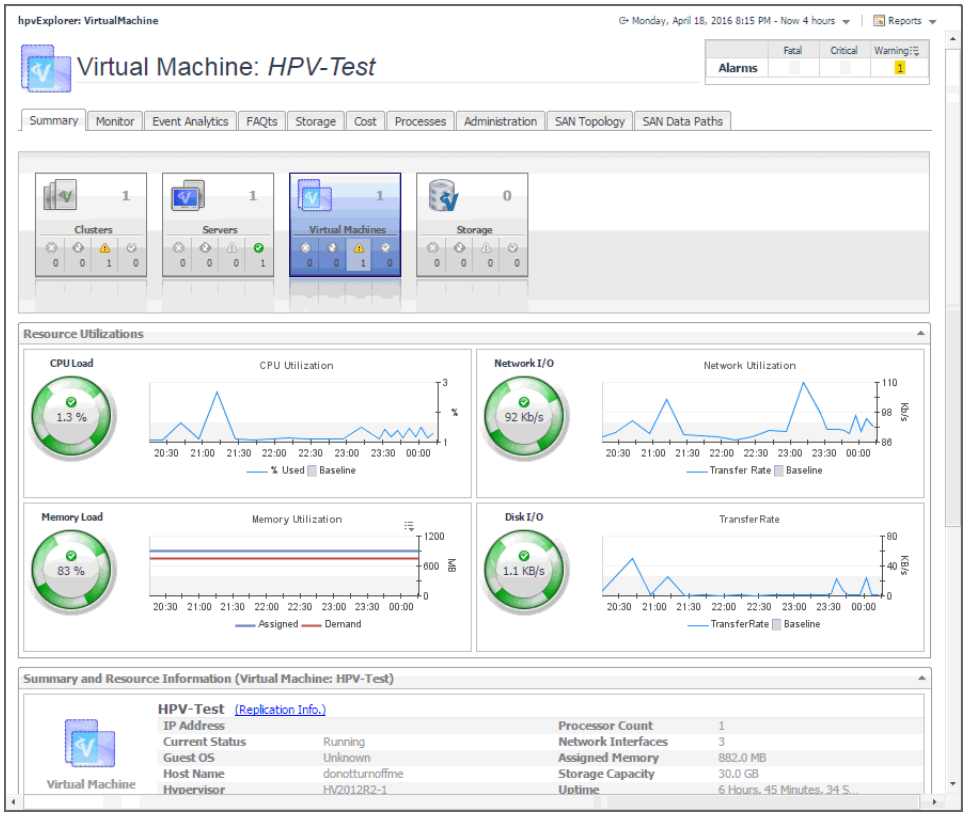
Figure 152. Topology tab



Hyper-V Explorer Summary

This is the first tab that appears open by default when you access the Hyper-V Explorer. It displays high-level information about the resource utilization and the selected component's resources, such as its operating system, physical host, storage capacity, and others. The appearance of this tab depends on the object or group of object selected. For example, exploring a group of clusters shows a combined CPU consumption chart followed by a list of clusters, while exploring a virtual machine displays detailed resource consumption for the selected virtual machine.

Figure 153. Hyper-V Explorer Summary tab

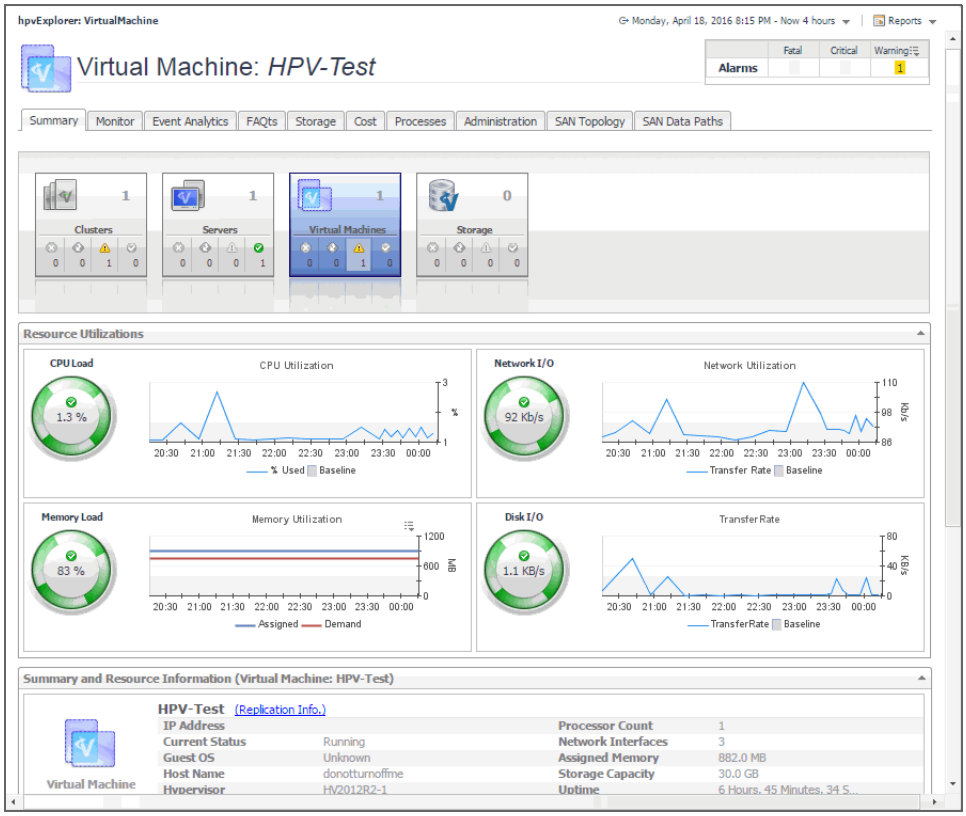


Hyper-V Explorer Summary tab

The Hyper-V Explorer **Summary** tab shows a summary of system resources for a selected cluster, server, or virtual machine.

This tab appears in the Hyper-V Explorer when you select a cluster, server, or virtual machine instance on the Hyper-V Explorer Topology tab.

Figure 154. Summary tab



This tab is made up of the following embedded views:

- Notes
- Resource Utilizations
- Servers
- Summary and Resource Information
- Virtual Environment
- Virtual Machines

Table 92. Notes

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

Table 93. Resource Utilizations

Description	Shows the resource consumption for the selected cluster, server, or virtual machine broken down into four simple views.
Data displayed	• **CPU Load**. The current percentage of the selected component's (cluster, server, or virtual machine) CPU load, used to execute system code and user programs, based on the total CPU capacity available to that component. • **CPU Utilization, % Used**. The percentage of the selected component's (cluster, server, or virtual machine) CPU utilization spent on executing system code and user programs during the selected time period.

Table 93. Resource Utilizations

- **CPU Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data.

NOTE: This metric only appears when exploring server or virtual machine details.

- **Disk I/O**. The current disk I/O rate for the selected cluster, server or virtual machine.
- **Disk Transfer Rate**. The rate at which data was read from or written to the disks associated with the selected cluster, server, or virtual machine) during the specified time period.
- **Disk Transfer Rate, Baseline**. An envelope indicating the expected disk utilization range based on historical data.

NOTE: This metric only appears when exploring server or virtual machine details.

- **Memory, Static Memory**. The total amount of static memory available to the selected cluster, server, or virtual machine.

NOTE: This metric appears only if the DRAM (dynamic random-access memory) is disabled on the selected cluster, server, or virtual machine.

- **Memory Load**. The current percentage of the average memory usage by the selected cluster, server, or virtual machine.

NOTE: This metric appears only if the DRAM (dynamic random-access memory) is enabled on the selected cluster, server, or virtual machine.

- **Memory Utilization, Assigned**. The amount of memory that is allocated to the selected server or cluster) during the specified time period.

NOTE: This metric appears only if the DRAM (dynamic random-access memory) is enabled on the selected cluster, server, or virtual machine.

- **Memory Utilization, Demand**. The amount of memory that the selected cluster, server or virtual machine requires during the specified time period.

NOTE: This metric appears only if the DRAM (dynamic random-access memory) is enabled on the selected cluster, server, or virtual machine.

- **Network I/O**. The current rate at which the selected component (cluster, server, or virtual machine) transfers data from and to the network.
- **Network Utilization, Baseline**. An envelope indicating the expected CPU utilization range based on historical data.

NOTE: This metric only appears when exploring server or virtual machine details.

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

Where to go next

Drill down on:

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

Figure 155. CPU Load dialog box

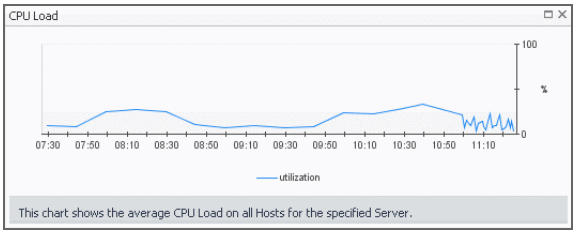
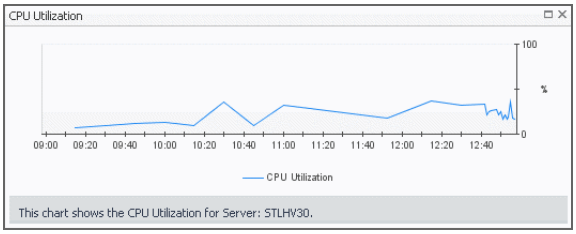


Table 93. Resource Utilizations

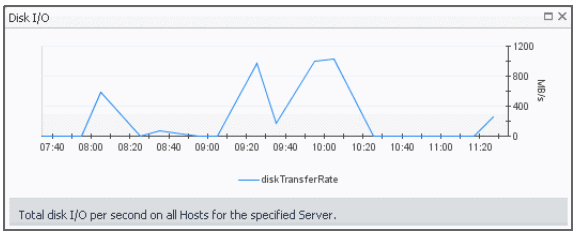
- **CPU Utilization** graph. Displays the **CPU Utilization** dialog box.

  Figure 156. CPU Utilization dialog box

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

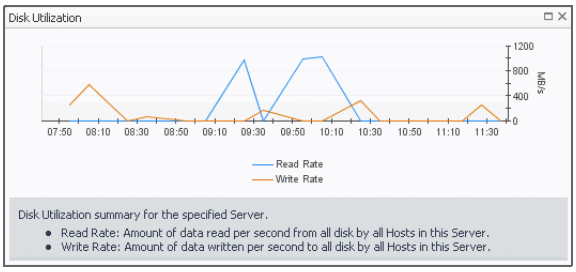
  Figure 157. Disk I/O dialog box

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

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

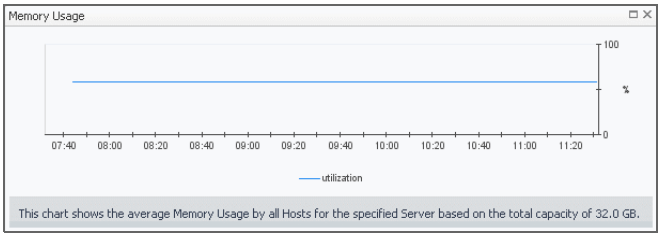
  Figure 158. Disk Utilization dialog box

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

- **Memory Usage** spinner. Displays the **Memory Usage** dialog box.

  Figure 159. Memory Usage dialog box

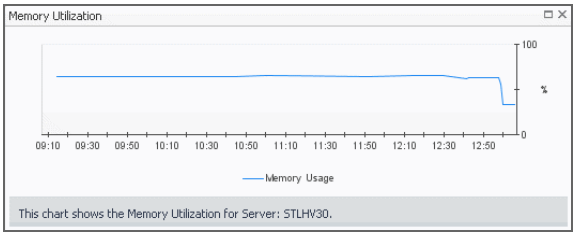
  

NOTE: This drilldown is only available when viewing server or cluster details in the Hyper-V Explorer.

Table 93. Resource Utilizations

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

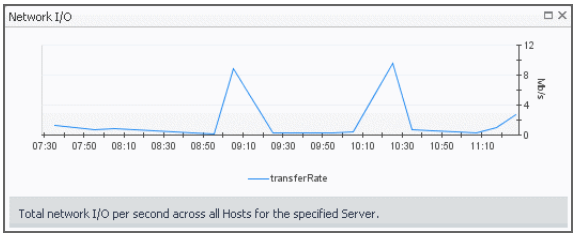
Figure 160. Memory Utilization dialog box



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

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

Figure 161. Network I/O dialog box



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

Figure 162. Network Utilization dialog box

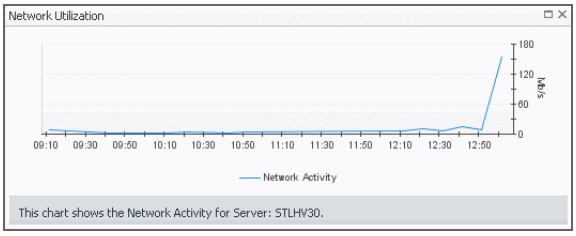


Table 94. Servers

Description	Shows a list of servers that belong to the selected cluster. **NOTE:** This view only appears when viewing cluster details.
Data displayed	• **Server, CPU**. The current percentage of the server's CPU load, used to execute system code and user programs, based on the total CPU capacity. • **Server, Memory**. The current percentage of the server's memory usage by the selected component. • **Server, NICs**. The number of network interface cards that the server uses. • **Server, Server Name**. The server name. • **Server, Status**. The server status, associated with any alarms raised against that server. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the alarm severity (Warning, Critical, or Fatal). • **Server, Version**. The operating system version. • **Virtual Machines, Configured**. The number of virtual machines that exist on the server.

Table 94. Servers

	• **Virtual Machines, Running**. The number of virtual machines that are currently running on the server.
Where to go next	Drill down on any server entry. The Hyper-V Explorer dashboard appears, showing the server details on the Hyper-V Explorer Summary tab.

Table 95. Summary and Resource Information

Description	Shows physical configuration details for the selected cluster, server or virtual machine.
Data displayed	**Data appearing when viewing cluster details:** • **Hypervisor**. The name of the hypervisor application, **Microsoft Hyper-V**. • **Memory Capacity**. The combined memory capacity of the servers that belong to the selected cluster. • **Network Interfaces**. The number of network interface cards used by the servers that belong to the selected cluster. • **Processing Power**. The CPU speed available to the selected cluster. • **Processor Count**. The number of CPUs used by the servers that belong to the selected cluster. • **Servers**. The number of servers that belong to the selected cluster. • **Virtual Machines Count**. The number of virtual machines running in the selected cluster. **Data appearing when viewing server details:** • **Cluster**. The name of the cluster to which the selected server belongs. • **Current Status**. The current status of the selected server: `Turned off` or `Running`. • **Hypervisor**. The name of the hypervisor application: **Hyper-V**. • **IP Address**. The IP address of the selected server. • **Manufacturer**. The manufacturer of the physical machine. • **Memory Capacity**. The memory capacity of the selected server. • **Model Number**. The model number of the physical machine. • **Network Interfaces**. The number of network interface cards used by the selected server. • **Processor Count**. The number of CPUs used by the selected server. • **Processor Type**. The processor type of the physical machine. • **Uptime**. The length of time the selected server is running. • **Version**. The version of the OS that is running on the selected server. • **Virtual Machines Count**. The number of virtual machines running on the selected server. **Data appearing when viewing virtual machine details:** • **Cluster**. The name of the cluster to which the selected virtual machine belongs. • **Current Status**. The current status of the selected virtual machine: `Turned off` or `Running`. • **Guest OS**. The name of the operating system used by the selected virtual machine. • **Host Name**. The host name of the selected virtual machine. • **Hypervisor**. The name of the hypervisor application: **Hyper-V**. • **IP Address**. The IP address of the selected virtual machine. • **Memory Capacity**. The memory capacity of the selected virtual machine. • **Network Interfaces**. The number of network interface cards used by the selected virtual machine.

Table 95. Summary and Resource Information

- **Processor Count**. The number of CPUs used by the selected virtual machine.
- **Storage Capacity**. The storage capacity of the selected virtual machine.
- **Uptime**. The length of time the selected virtual machine is running.

Table 96. Virtual Environment

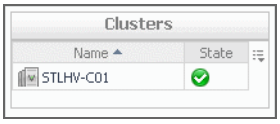
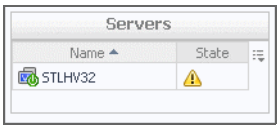
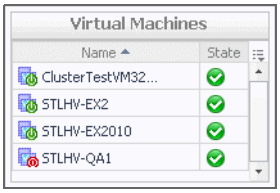
Description	The Hyper-V Explorer's Virtual Environment view displays a high-level overview of your virtual environment. The view has a tile for each object type: **Clusters**, **Servers**, and **Virtual Machines**. Each tile shows how many of the corresponding object instances there are in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).
Data displayed	• **Alarm counts**. The total counts of alarms associated with the clusters, servers, or virtual machines, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Cluster count**. The number of clusters in your virtual environment. • **Server count**. The number of physical servers in your virtual environment. • **Virtual Machine count**. The number of virtual machines in your environment.
Where to go next	Drill down on: • **Clusters**. Displays the **Clusters** dwell, showing the names and states of all clusters in your environment. **Figure 163. Clusters dwell**  • **Servers**. Displays the **Servers** dwell, showing the names and states of all servers in your environment. **Figure 164. Clusters dwell**  • **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines in your environment. **Figure 165. Virtual Machines dwell** 

Table 97. Virtual Machines

Description	Shows a list of virtual machines associated with the selected cluster or server. **NOTE:** This view only appears when viewing cluster or server details.
Data displayed	• **Name**. The virtual machine name.

Table 97. Virtual Machines

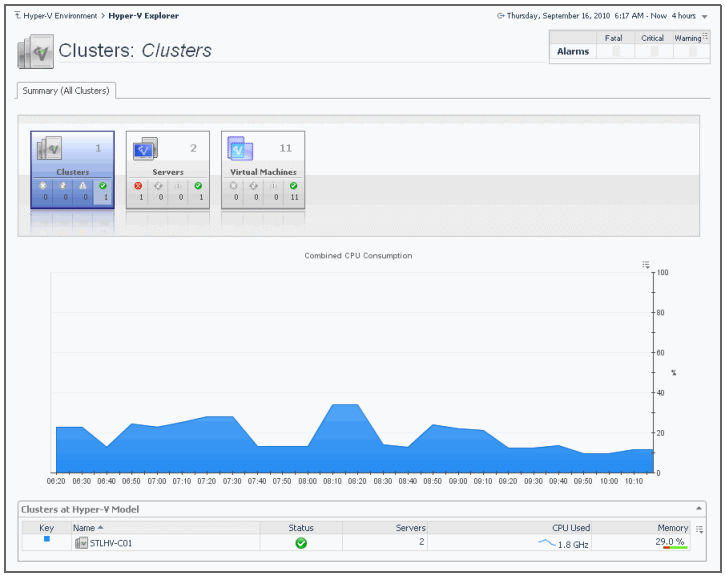
	• **Status**. The status of the virtual machine, associated with any alarms raised against that virtual machine. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the alarm severity (Warning, Critical, or Fatal).
Where to go next	Drill down on any virtual machine entry. The Hyper-V Explorer dashboard appears, showing the virtual machine details on the Hyper-V Explorer Summary tab.

Hyper-V Explorer Summary (All Clusters) tab

The **Hyper-V Explorer Summary (All Clusters)** tab shows a summary of system resources for all available clusters.

This tab appears in the Hyper-V Explorer when you select the **Clusters** node on the Hyper-V Explorer Topology tab.

Figure 166. Hyper-V Explorer Summary (All Clusters) tab



This tab is made up of the following embedded views:

- Clusters at Hyper-V Model
- Combined CPU Consumption
- Virtual Environment

Table 98. Clusters at Hyper-V Model

Description	This tabular view lists the clusters that exist in your environment.
Data displayed	• **CPU Used**. The current amount of the CPU speed used by the servers in the cluster. • **Key**. The color used in the Combined CPU Consumption chart to represent the cluster. • **Memory**. The current percentage of memory used by all servers in the cluster. • **Name**. Cluster name. • **Servers**. The number of servers in the cluster.

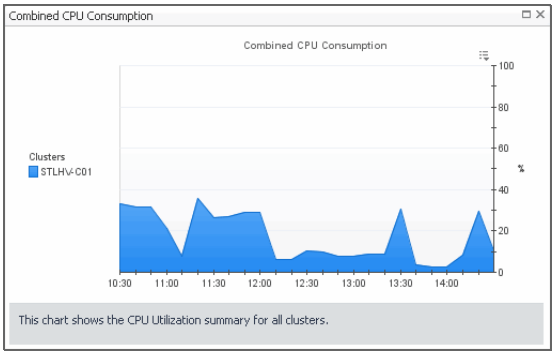
Table 98. Clusters at Hyper-V Model

	• **Status**. The status of the cluster, associated with any alarms raised against that cluster. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal).
Where to go next	Drill down on any server entry. The Hyper-V Environment dashboard appears, showing the server details on the Hyper-V Explorer Summary tab.

Combined CPU Consumption

Description	Shows the combined percentage of the CPU usage for all clusters in the system.
Data displayed	• **Combined CPU Consumption, %**. The combined percentage of the CPU utilization used by all servers in all clusters to execute system code and user programs during the selected time period.
Where to go next	Drill down on: • **Combined CPU Consumption %**. Displays the **Combined CPU Consumption** dialog box.

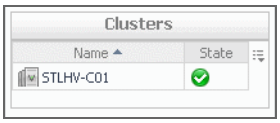
Figure 167. Combined CPU Consumption dialog box



Virtual Environment

Description	Displays a high-level overview of your virtual environment. The view has a tile for each type of object in your virtual infrastructure: **Clusters**, **Servers**, and **Virtual Machines**. Each tile shows how many of the corresponding object instances there are in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).
Data displayed	• **Alarm counts**. The total counts of alarms associated with the clusters, servers, or virtual machines, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Cluster count**. The number of clusters in your virtual environment. • **Server count**. The number of physical servers in your virtual environment. • **Virtual Machine count**. The number of virtual machines that are running on the physical servers that belong to the selected cluster.
Where to go next	Drill down on: • **Clusters**. Displays the **Clusters** dwell, showing the names and states of all clusters in your environment.

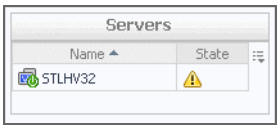
Figure 168. Clusters dwell



Virtual Environment

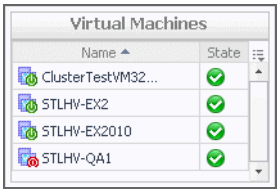
- **Servers**. Displays the **Servers** dwell, showing the name and state of all servers in your environment.

  Figure 169. Servers dwell

- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines that are running on the physical servers that belong to the selected cluster.

  Figure 170. Virtual Machines dwell

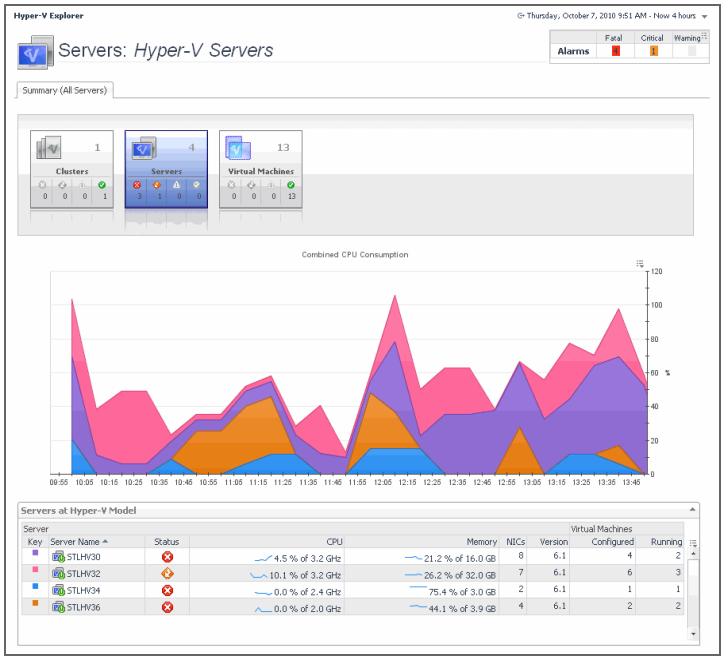
  

Hyper-V Explorer Summary (All Servers) tab

The **Hyper-V Explorer Summary (All Servers)** tab shows a summary of system resources for all physical servers that currently exist in your integrated infrastructure.

This tab appears in the Hyper-V Explorer when you select the **Servers** node on the Hyper-V Explorer Topology tab.

Figure 171. Hyper-V Explorer Summary (All Servers) tab



- Combined CPU Consumption
- Servers at Hyper-V Model

- Virtual Environment

Table 99. Combined CPU Consumption

Description	Shows the combined percentage of the CPU usage for all servers in the system.
Data displayed	• **Combined CPU Consumption %**. The combined percentage of the CPU utilization used by all servers to execute system code and user programs during the selected time period.
Where to go next	Drill down on: • **Combined CPU Consumption %**. Displays the **Combined CPU Consumption** dialog box.

Figure 172. Combined CPU Consumption dialog box

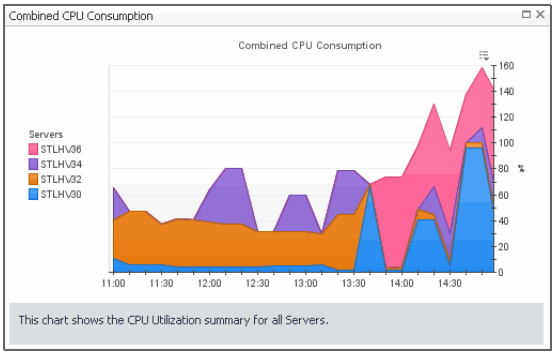
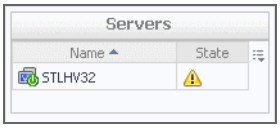
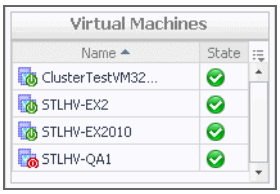


Table 100. Servers at Hyper-V Model

Description	This tabular view lists all servers that exist in your environment.
Data displayed	• **Server, CPU**. The current amount of the CPU speed that is used by the server. • **Server, Key**. The color used in the Combined CPU Consumption chart to represent the server. • **Server, Memory**. The current percentage of memory that is used by the server. • **Server, NICs**. The number of network interface cards used by the server. • **Server, Server Name**. Server name. • **Server, Status**. The server status, associated with any alarms raised against it. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal). • **Server, Version**. The version number of the Windows OS running on the server. • **Virtual Machines, Configured**. The number of virtual machines that exist on the server. • **Virtual Machines, Running**. The number of virtual machines that are running on the server.
Where to go next	Drill down on any server entry. The Hyper-V Environment dashboard appears, showing the server details on the Hyper-V Explorer Summary tab.

Table 101. Virtual Environment

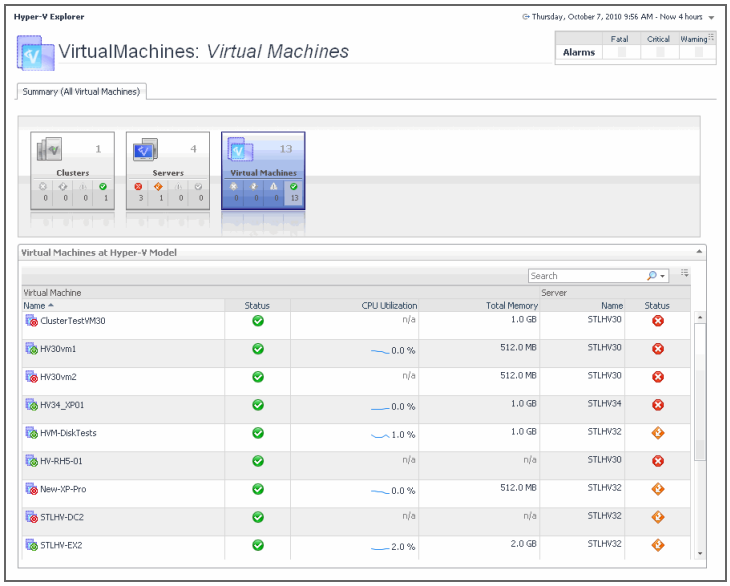
Description	The Hyper-V Explorer's Virtual Environment view displays a high-level overview of your virtual environment. The view has a tile for each type of object in your virtual infrastructure: **Clusters**, **Servers**, and **Virtual Machines**. Each tile shows how many of the corresponding object instances there are in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).
Data displayed	• **Alarm counts**. The total counts of alarms associated with the clusters, servers, or virtual machines, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Cluster count**. The number of physical servers in your virtual environment. • **Server count**. The number of physical servers in your virtual environment. • **Virtual Machine count**. The number of virtual machines in your environment.
Where to go next	Drill down on: • **Clusters**. Displays the **Clusters** dwell, showing the names and states of all clusters in your environment. **Figure 173. Clusters dwell** • **Servers**. Displays the **Servers** dwell, showing the name and state of all servers in your environment. **Figure 174. Servers dwell**  • **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines in your environment. **Figure 175. Virtual Machines dwell** 

Hyper-V Explorer Summary (All Virtual Machines) tab

The **Hyper-V Explorer Summary (All Virtual Machines)** tab shows a summary of system resources for all virtual machines that currently exist in your integrated infrastructure.

This tab appears in the Hyper-V Explorer when you select the **Virtual Machines** node on the Hyper-V Explorer Topology tab.

Figure 176. Hyper-V Explorer Summary (All Virtual Machines) tab



This tab is made up of the following embedded views:

- Virtual Environment
- Virtual Machines at Hyper-V Model

Table 102. Virtual Environment

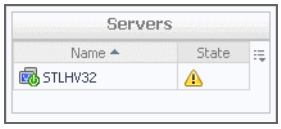
Description	The Hyper-V Explorer's Virtual Environment view displays a high-level overview of your virtual environment. The view has a tile for each type of object in your virtual infrastructure: **Clusters**, **Servers**, and **Virtual Machines**. Each tile shows how many of the corresponding object instances there are in your virtual infrastructure, as well as the count of objects of that type in each of the alarm states (Normal, Warning, Critical, Fatal).
Data displayed	• **Alarm counts**. The total counts of alarms associated with the clusters, servers, or virtual machines, broken down by alarm types (Normal, Warning, Critical, Fatal). • **Cluster count**. The number of physical servers in your virtual environment. • **Server count**. The number of physical servers in your virtual environment. • **Virtual Machine count**. The number of virtual machines in your environment.
Where to go next	Drill down on: • **Clusters**. Displays the **Clusters** dwell, showing the name and state of all clusters in your environment.

Figure 177. Clusters dwell

Table 102. Virtual Environment

- **Servers**. Displays the **Servers** dwell, showing the name and state of all servers in your environment.

  Figure 178. Servers dwell

- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines in your environment.

  Figure 179. Virtual Machines dwell

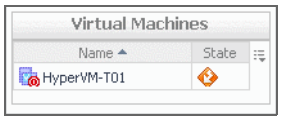
  

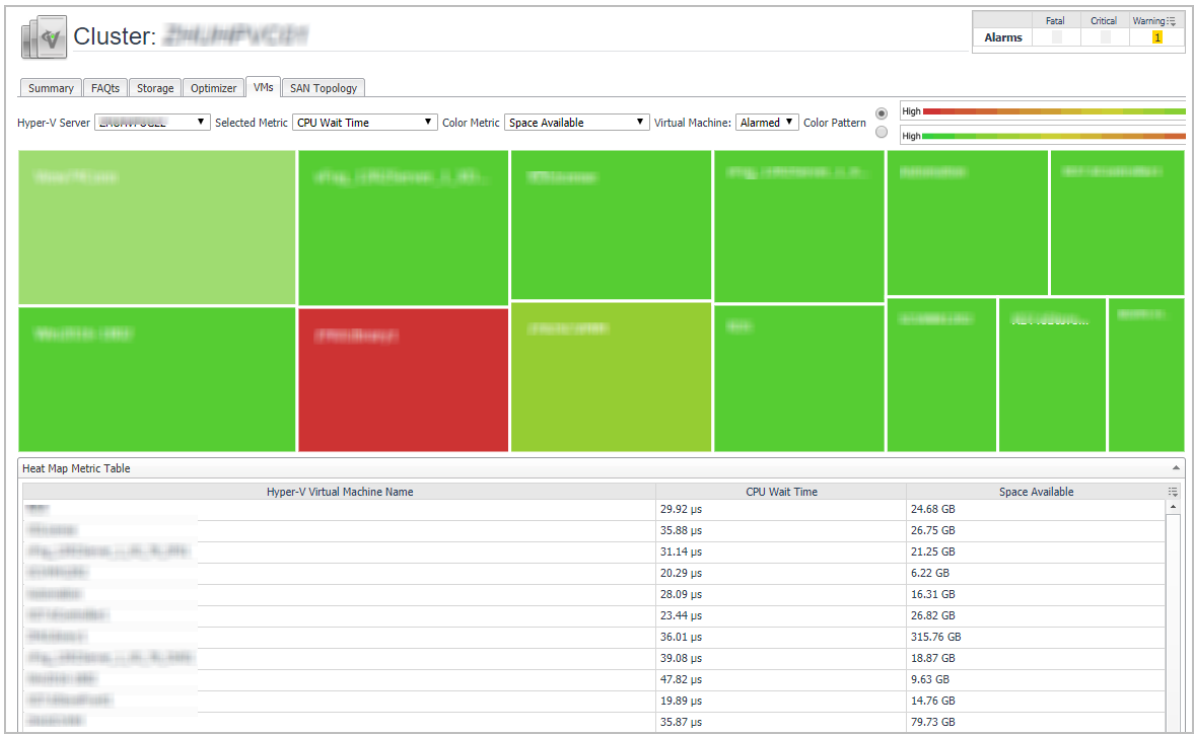
Table 103. Virtual Machines at Hyper-V Model

Description	This tabular view lists all virtual machines that exist in your environment.
Data displayed	• **Server, Name**. The name of the server on which the virtual machine is running. • **Server, Status**. The status of the server on which the virtual machine is running, associated with any alarms raised against it. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal). • **Virtual Machine, CPU Utilization**. The percentage of the virtual machine's CPU utilization spent on executing system code and user programs. • **Virtual Machine, Name**. The virtual machine name. • **Virtual Machine, Status**. The virtual machine status, associated with any alarms raised against it. If no alarms are fired, the status appears as Normal. Otherwise, the status is set to the highest alarm severity (Warning, Critical, or Fatal). • **Virtual Machine, Total Memory**. The total amount of memory allocated to the virtual machine.
Where to go next	Drill down on any virtual machine entry. The Hyper-V Environment dashboard appears, showing the server details on the Hyper-V Explorer Summary tab.

Hyper-V Explorer VMs

The Hyper-V Explorer **VMs** tab appears when you are exploring individual clusters. The VMs tab is consisted by a Heat Map Chart: and a Metric Table:.

Figure 180. VMs tab



- Heat Map Chart:

  Heat maps will be refreshed automatically when you change either of the following fields:

  - Hyper-V server: Lists all the Hyper-V servers available in the monitored environment.
  - Selected Metric: Populates a rectangle based upon the selected metrics. For example, if you select Memory Consumed from the Selected Metric drop-down list, the rectangle area will be populated based on the used memory for the selected topology object.
  - Virtual Machine: Select to display all virtual machines, or virtual machines with alarms.
  - Rendering related metrics: For example, if you select CPU Utilization and Red to Green, the rectangle of the topology object that has larger value of CPU Utilization will be rendered in red.
    - Color Metric: Renders the color of rectangle based upon the selected color metric.
    - Color Pattern: Offers two patterns, Red to Green (larger value shows in red) or Green to Red (larger value shows in green).

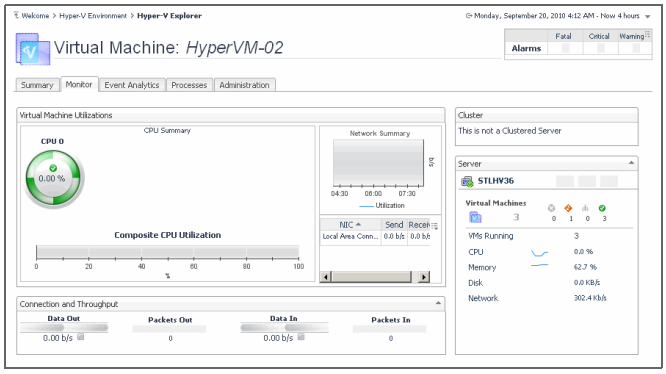
- Metric Table:

  Metric table lists the metrics of the Hyper-V virtual machine. The column values will vary with the Selected Metric and Color Metric.

Hyper-V Explorer Monitor

The Hyper-V Explorer **Monitor** tab appears when you are exploring individual servers and virtual machines. It provides more details about the component's resource usage, such as the utilization of each individual CPU, server, and cluster performance, and the data throughput rate.

Figure 181. Monitor tab

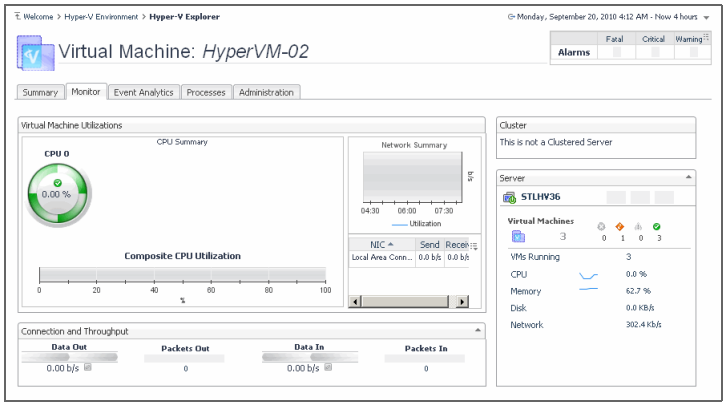


Hyper-V Explorer Monitor tab

The Hyper-V Explorer **Monitor** tab shows details of system resources consumption for a server or a virtual machine.

This tab appears in the Hyper-V Explorer when you select a server or a virtual machine on the Hyper-V Explorer Topology tab.

Figure 182. Monitor tab



This tab is made up of the following embedded views:

- Cluster
- Connection and Throughput
- Server
- Server Utilizations
- Virtual Machines
- Virtual Machine Utilizations

Table 104. Cluster

Description	Shows the details about the cluster to which the selected server belongs. **NOTE:** This view only appears when you are exploring server details.
Data displayed	• **Cluster**. The name of the server cluster to which the selected server belongs, followed by the total counts of alarms associated with the cluster, broken down by alarm types (Normal, Warning, Critical, Fatal).

Table 104. Cluster

- **Servers**. The number of all servers associated with the cluster, including running and turned-off servers.
- **VMs**. The number of all virtual machines that exist on the selected server, including running and powered-off virtual machines.
- Drill down on any alarm count. Displays the **Alarms** dialog box that shows a list of all related alarms.

Where to go next

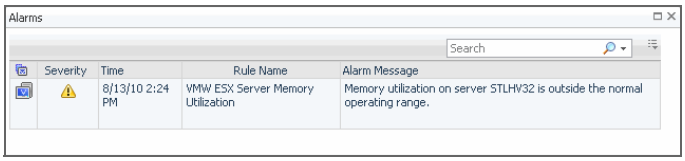


Table 105. Connection and Throughput

Description

When exploring virtual machines, this view shows the dynamics of network traffic. For servers, this view also illustrates disk and memory input and output rates.

Data displayed

- **Memory Swap In**. The rate at which memory swap-ins occur.

NOTE: This data only appears when exploring server details.

- **Memory Swap Out**. The rate at which memory swap-outs occur. When memory becomes scarce, the OS swaps out sleeping processes, then swaps out active processes that use large amounts of memory. If swap-outs occur, the swap space can become critically low.

NOTE: This data only appears when exploring server details.

- **Network Data In**. The rate at which data is received from the network during the selected time period.
- **Network Data Out**. The rate at which data is transferred to the network during the selected time period.
- **Network Packets In**. The rate at which network packets are received during the selected time period.
- **Network Packets Out**. The rate at which network packets are sent during the selected time period.
- **Storage Read Rate**. The rate at which data is read from the disk during the selected time period.

NOTE: This data only appears when exploring server details.

- **Storage Reads**. The percentage of elapsed time that the disk is busy servicing read requests during the selected time period.

NOTE: This data only appears when exploring server details.

- **Storage Write Rate**. The rate at which data is written to the disk during the selected time period.

NOTE: This data only appears when exploring server details.

- **Storage Writes**. The percentage of elapsed time that the disk is busy servicing write requests during the selected time period.

NOTE: This data only appears when exploring server details.

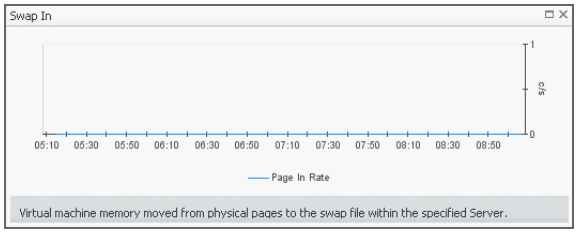
Where to go next

Drill down on:

Table 105. Connection and Throughput

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

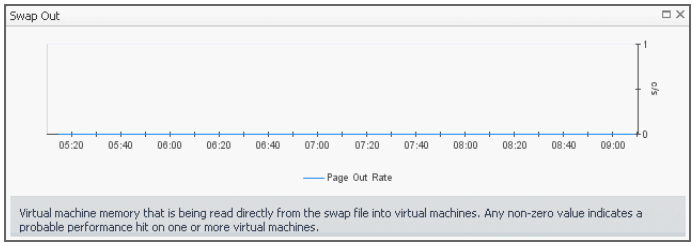
Figure 183. Swap In dialog box



NOTE: This drilldown is only available when exploring server details.

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

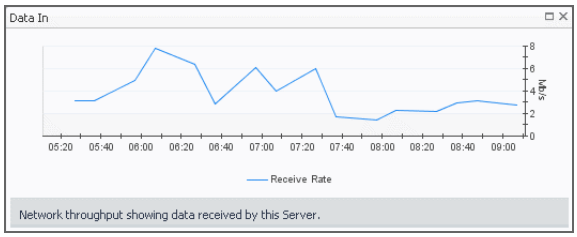
Figure 184. Swap Out dialog box



NOTE: This drilldown is only available when exploring server details.

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

Figure 185. Data In dialog box



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

Figure 186. Data Out dialog box

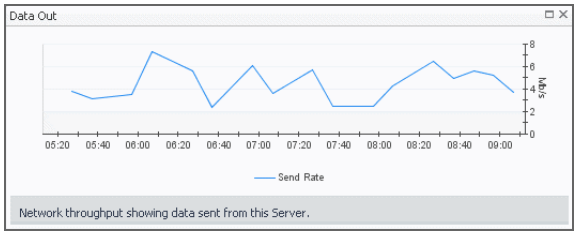
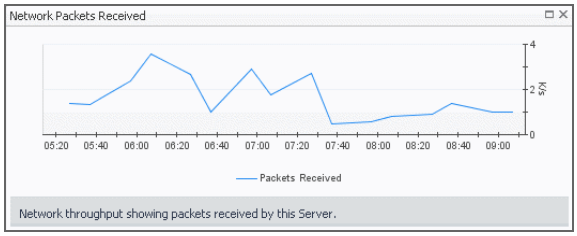


Table 105. Connection and Throughput

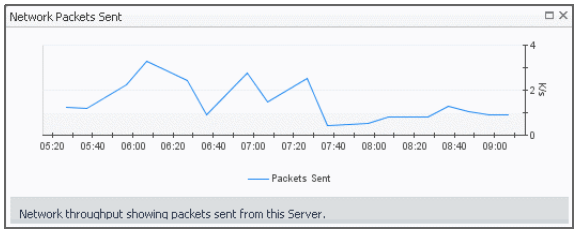
- **Network Packets In**. Displays the **Network Packets Received** dialog box.

Figure 187. Network Packets Received dialog box



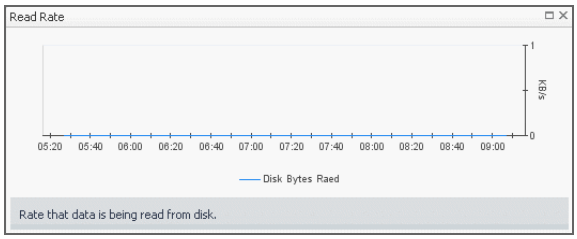
- **Network Packets Out**. Displays the **Network Packets Sent** dialog box.

Figure 188. Network Packets Sent dialog box



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

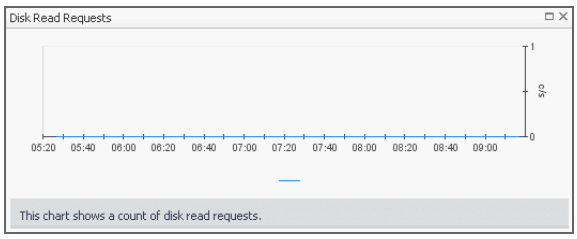
Figure 189. Read Rate dialog box



NOTE: This drilldown is only available when exploring server details.

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

Figure 190. Disk Read Requests dialog box

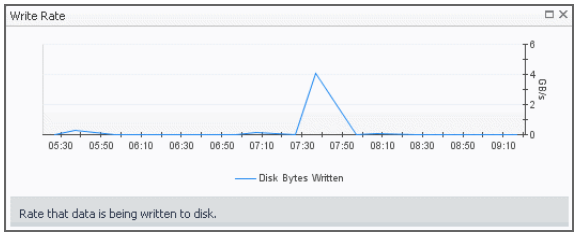


NOTE: This drilldown is only available when exploring server details.

Table 105. Connection and Throughput

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

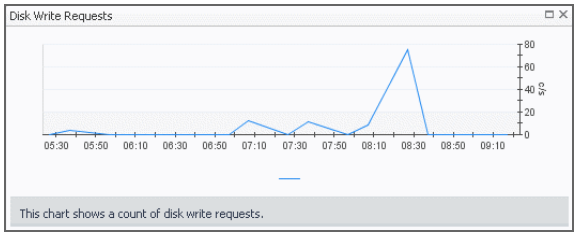
Figure 191. Write Rate dialog box



NOTE: This drilldown is only available when exploring server details.

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

Figure 192. Disk Write Requests dialog box



NOTE: This drilldown is only available when exploring server details.

Table 106. Server

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

Figure 193. Alarms dialog box

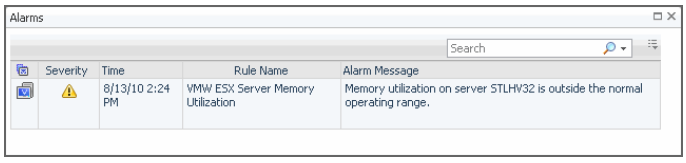
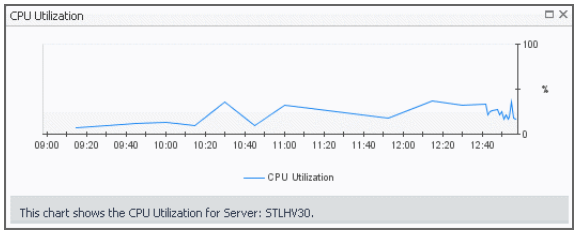


Table 106. Server

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

Figure 194. CPU Utilization dialog box



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

Figure 195. Disk Reads and Writes dialog box

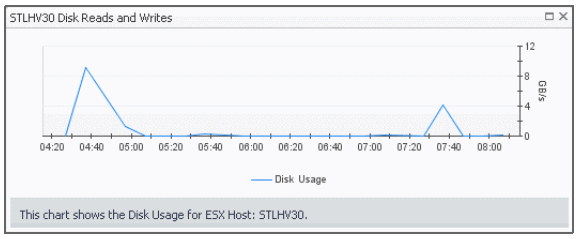
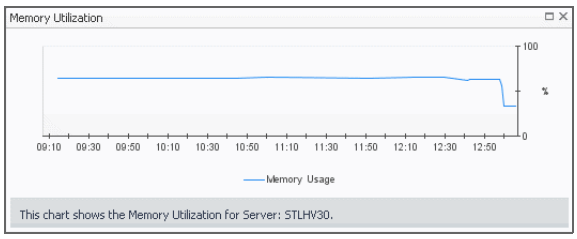


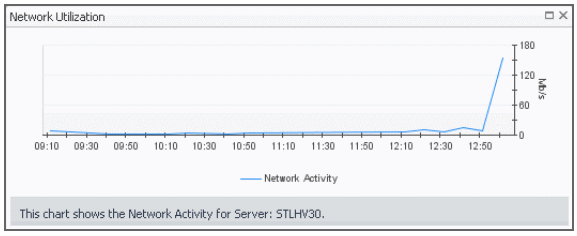
Figure 196. Memory. Displays the Memory Utilization dialog box.

- **Memory Utilization** dialog box



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

Figure 197. Network Utilization dialog box



- **Server**. Displays the servers details in the Hyper-V Explorer Summary tab.
- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines name associated with the server.

Figure 198. Virtual Machines dwell

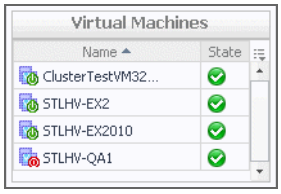
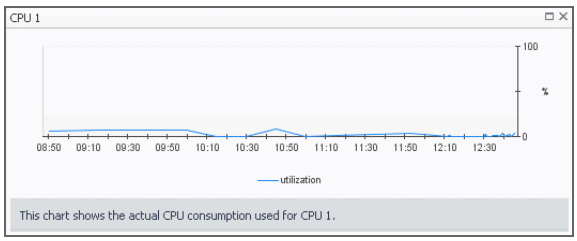


Table 107. Server Utilizations

Description	Shows the utilization of the selected server's resources. **NOTE:** This view only appears when exploring server details.
Data displayed	• **Composite CPU Utilization**. The combined CPU utilization across all CPUs on the selected server. • **CPU 0-*N***. The current percentage of each individual CPU's load, used to execute system code and user programs, based on the its total CPU capacity. • **Memory Summary, Consumed**. The amount of memory that is used over the selected time period. • **Memory Utilization**. The percentage of the server memory that is currently in use. • **Network Summary, NIC**. The name of a network interface card. • **Network Summary, Receive**. The current rate at which a network interface card receives data from the network. • **Network Summary, Send**. The current rate at which a network interface card transfers data to the network. • **Network Summary, Utilization**. The current rate at which the server transfers data to and from the network during the selected time period. • **Storage Summary, Disk Usage**. The rate at which the server reads from or writes data to disk during the selected time period.
Where to go next	Drill down on: • **CPU 0-*N***. Displays the **CPU** *N* dialog box.

Figure 199. CPU *N* dialog box



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

Figure 200. Composite CPU Utilization dialog box

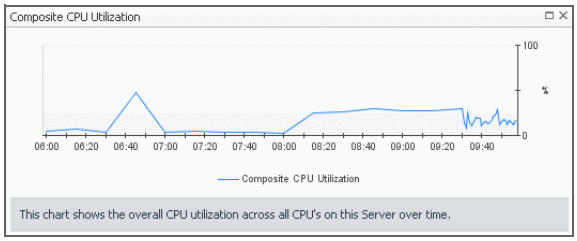
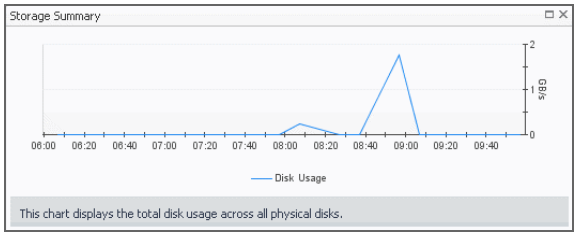


Table 107. Server Utilizations

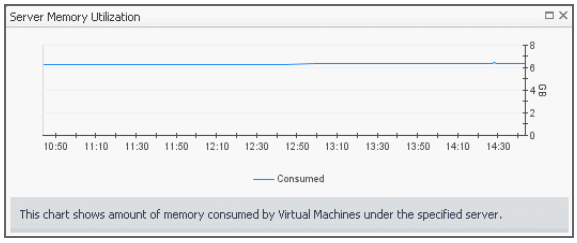
- **Disk Usage**. Displays the **Storage Summary** dialog box.

  Figure 201. Storage Summary dialog box

- **Memory Summary, Consumed**. Displays the **Memory Consumed** dialog box.

  Figure 202. Memory Consumed dialog box

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

  Figure 203. Server Memory Utilization dialog box

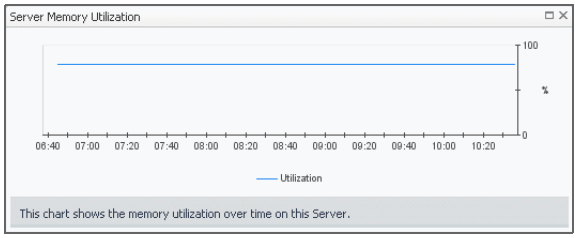
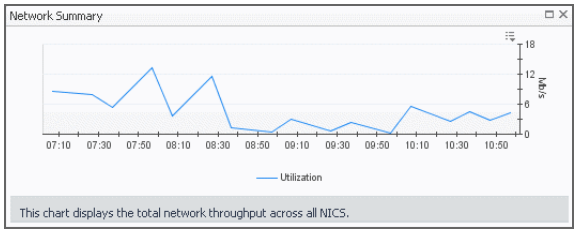
  

Table 107. Server Utilizations

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

Figure 204. Network Summary dialog box



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

Figure 205. NIC Statistics dialog box

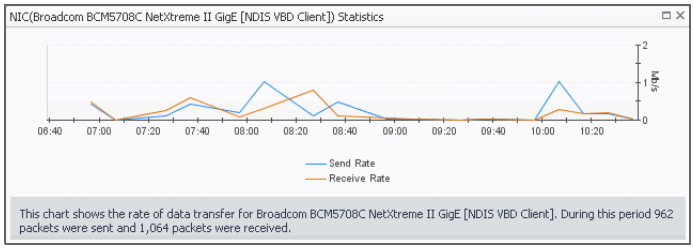


Table 108. Virtual Machines

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

Figure 206. Alarms dialog box

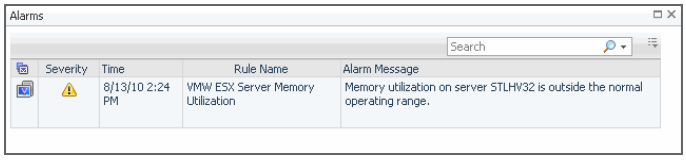


Table 108. Virtual Machines

- **Virtual Machine**. Displays the virtual machine details in the Hyper-V Explorer Summary tab.
- **Virtual Machines**. Displays the **Virtual Machines** dwell, showing the names and states of all virtual machines associated with the server.

Figure 207. Virtual Machines dwell

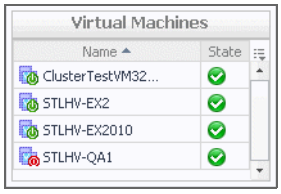
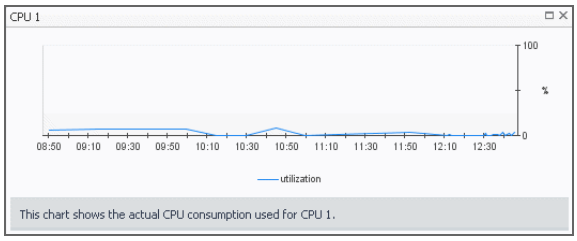


Table 109. Virtual Machine Utilizations

Description	Shows a list of virtual machines associated with the selected server. **NOTE:** This view only appears when exploring virtual machine details.
Data displayed	• **Composite CPU Utilization**. The combined CPU utilization across all CPUs on the selected virtual machine. • **CPU 0-*N***. The current percentage of each individual CPU's load, used to execute system code and user programs, based on the its total CPU capacity. • **Network Summary, NIC**. The name of a network interface card used by the selected virtual machine. • **Network Summary, Receive**. The current rate at which a network interface card receives data from the network. • **Network Summary, Send**. The current rate at which a network interface card transfers data to the network. • **Network Summary, Utilization**. The current rate at which the virtual machine transfers data to and from the network during the selected time period.
Where to go next	Drill down on: • **CPU 0-*N***. Displays the **CPU** *N* dialog box.

Figure 208. CPU *N* dialog box



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

Figure 209. Composite CPU Utilization dialog box

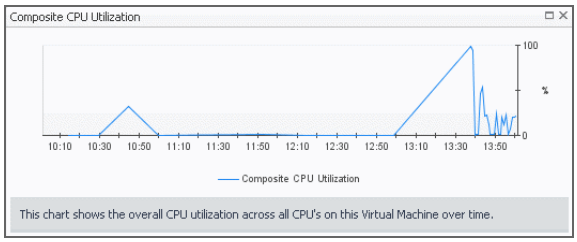
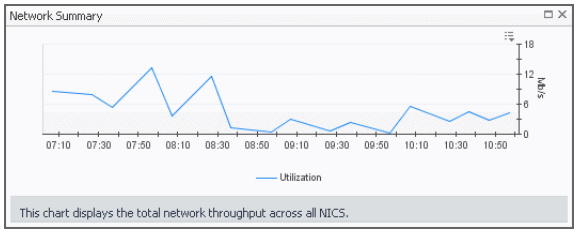


Table 109. Virtual Machine Utilizations

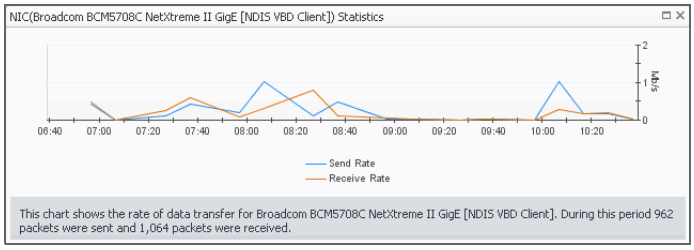
- **Network Summary Utilization**. Displays the **Network Summary** dialog box.

Figure 210. Network Summary dialog box



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

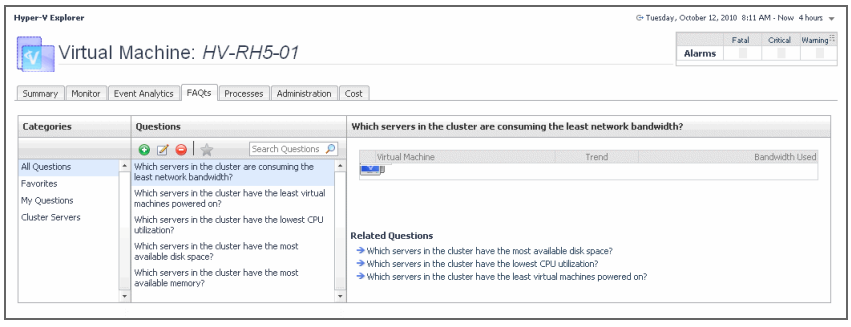
Figure 211. NIC Statistics dialog box



Hyper-V Explorer FAQts

This tab only appears when you are exploring individual clusters, servers, and virtual machines. It gives you answers to common questions related to the selected component. For example, when you select a Hyper-V server and open this tab you can quickly find out which servers in the cluster are consuming the least network bandwidth or have the most available memory.

Figure 212. FAQts tab

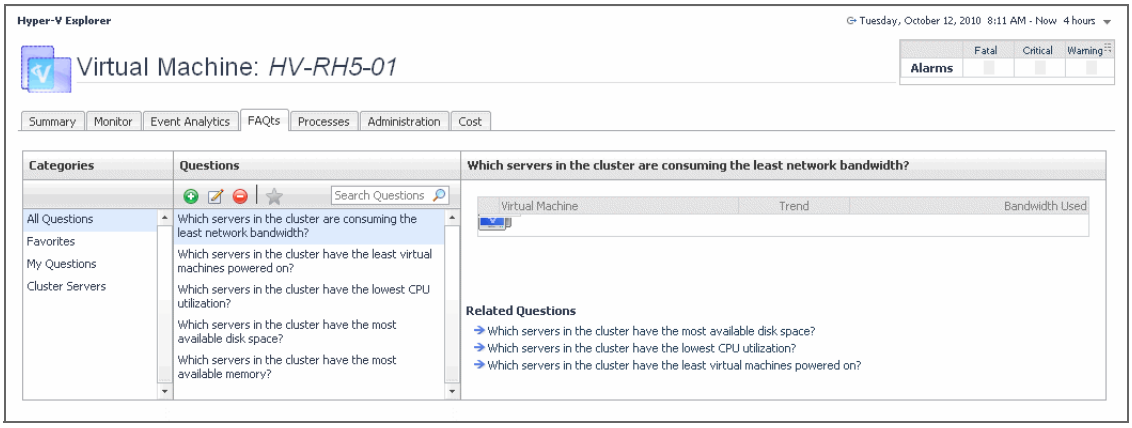


Hyper-V Explorer FAQts tab

The Hyper-V Explorer's **FAQts** tab shows answers to common questions related to a selected cluster, server, or a virtual machine.

This tab appears in the Hyper-V Explorer when you select a cluster, server, or a virtual machine on the Hyper-V Explorer Topology tab.

Figure 213. FAQts tab



This tab is made up of the following embedded views:

- Answer
- Categories
- Questions

Answer

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

Top *x <objects of category>…*

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

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

Categories

This view lists the categories for which questions can be answered for you by Hyper-V Monitoring in Foglight Evolve Cloud.

Click a category in the list to select it.

Questions

This view lists the questions, for the category selected in the Categories, that can be answered for you by Hyper-V Monitoring in Foglight Evolve Cloud.

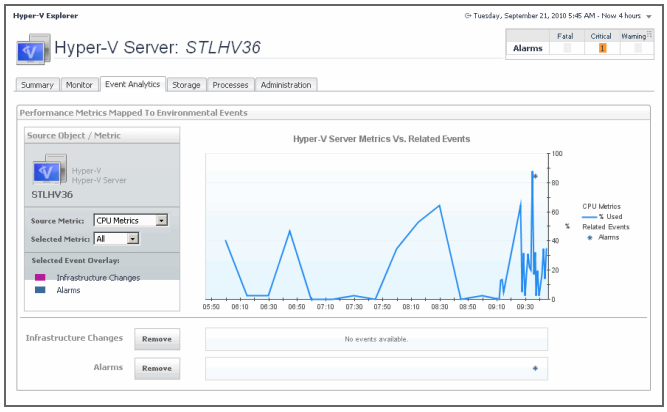
Click a question in the list to select it.

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

Hyper-V Explorer Event Analytics

This tab only appears when you are exploring individual servers and virtual machines. It provides more details about the state of resource-related metrics over a selected time period and also shows any events that occur during that time-frame. This can give you a good idea of how the current resource consumption affects your environment as a whole. For example, a steady increase in memory consumption can often trigger memory utilization alarms, which typically indicates that you need to allocate more memory to the affected component.

Figure 214. Event Analytics tab

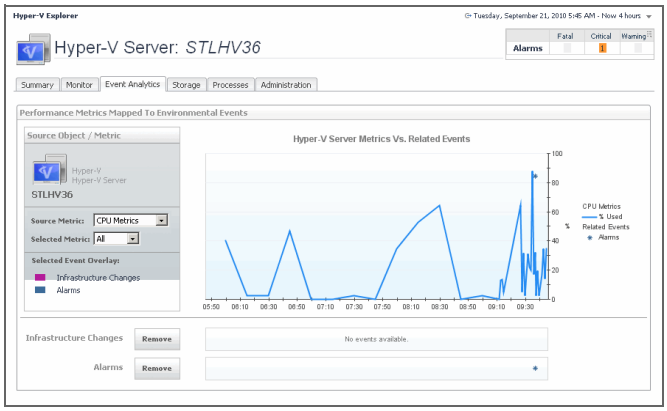


Hyper-V Explorer Event Analytics tab

The Hyper-V Explorer **Event Analytics** tab contains details about the state of resource-related metrics for a server or virtual machine over a selected time period, and also shows any events that occur during that time frame.

This tab appears in the Hyper-V Explorer when you select a server or virtual machine on the Hyper-V Explorer Topology tab.

Figure 215. Event Analytics tab



This tab is made up of the following embedded views:

- Hyper-V Server Metrics Vs. Related Events
- Infrastructure Changes and Alarms
- Source Object/Metric
- VM Metrics Vs. Related Events

Table 110. Hyper-V Server Metrics Vs. Related Events

Description	Shows a chart indicating the values for one or more metric values selected in the Source Object/Metric view. **NOTE:** This view only appears when you are exploring server details.
Data displayed	• **Alarms**. If any alarms are generated against the selected server during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart.

Table 110. Hyper-V Server Metrics Vs. Related Events

- **CPU Metrics, % Used**. The percentage of the server's CPU utilization spent on executing system code and user programs during the selected time period.
- **Disk Metrics, Read Rate**. The rate at which the server reads data from the disk during the selected time period.
- **Disk Metrics, Write Rate**. The rate at which the server writes data to the disk during the selected time period.
- **Infrastructure changes**. If any infrastructure changes occur for the selected server during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart. An infrastructure change is any configuration change that affects the properties of the selected server. This includes the server startup, shutdown, pause, changed shares, changes to memory settings, and similar types of changes.
- **Memory Metrics, % Used**. The percentage of the available memory that the server uses during the selected time period.
- **Network Metrics, Receive Rate**. The rate at which the server receives data from the network during the selected time period.
- **Network Metrics, Send Rate**. The rate at which the server sends data to the network during the selected time period.

Where to go next Drill down on:

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

Figure 216. Event Details dialog box

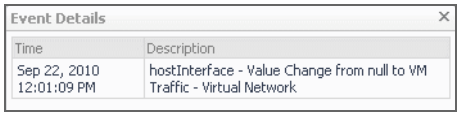


Table 111. Infrastructure Changes and Alarms

Description Allows you to add events as overlays to the chart and correlate the resource consumption with the stability of your environment.

Data displayed

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

Where to go next Drill down on:

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

Figure 217. Event Details dialog box

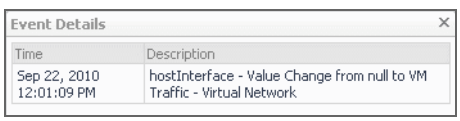


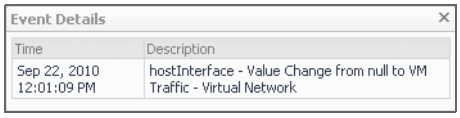
Table 112. Source Object/Metric

Description	Identifies the monitored object (server or virtual machine) and the metrics that appear in the chart view on the right.
Data displayed	• **Selected Event Overlay**. Indicates if the chart on the right shows any color-coded overlays that represent infrastructure and/or alarm events, in addition to the selected source metric. • **Server/virtual machine name**. The name of the selected object (server or virtual machine instance). • **Source metric**. Identifies the combination of the metrics whose values appear in the chart on the right. Possible metric types include: **CPU Metrics**, **Disk Metrics**, **Memory Metrics**, and **Network Metrics**. For each metric type, you can display the values of a selected metric, or all metric values associated with that type. For example, selecting **Disk Metrics** gives you an option of displaying **Read Rate**, **Write Rate**, or both metrics (**All**) in the chart.

Table 113. VM Metrics Vs. Related Events

Description	Shows a chart indicating the utilization percentage for one or more metric values selected in the Source Object/Metric view. **NOTE:** This view only appears when you explore virtual machine details.
Data displayed	• **Alarms**. If any alarms are generated against the selected virtual machine during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart. • **CPU Metrics, % Used**. The percentage of the virtual machine's CPU utilization spent on executing system code and user programs during the selected time period. • **Disk Metrics, Read Rate**. The rate at which the virtual machine reads data from disk during the selected time period. • **Disk Metrics, Write Rate**. The rate at which the virtual machine writes data to disk during the selected time period. • **Infrastructure changes**. If any infrastructure changes occur for the selected virtual machine during the selected time period, and are added as an overlay to the chart using the Infrastructure Changes and Alarms view, they also appear in the chart. An infrastructure change is any configuration change that affects the properties of the selected virtual machine. This includes the virtual machine startup, shutdown, pause, changed shares, changes to memory settings, and similar types of changes. • **Memory Metrics, % Used**. The percentage of the available memory that the virtual machine uses during the selected time period. • **Network Metrics, Receive Rate**. The rate at which the virtual machine receives data from the network during the selected time period. • **Network Metrics, Send Rate**. The rate at which the virtual machine sends data to the network during the selected time period.
Where to go next	Drill down on: • **Alarm** or **infrastructure change**. Displays the **Event Details** dialog box.

Figure 218. Event Details dialog box

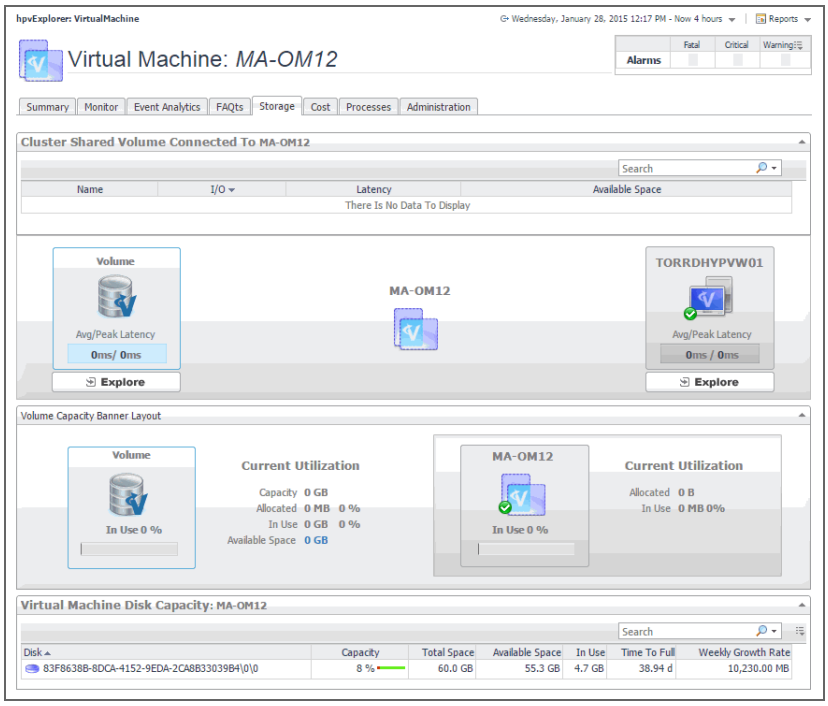


Hyper-V Explorer Storage

This tab only appears when you are exploring individual servers. It displays an organized view of physical drive and logical disk activity. It identifies the physical drives with the highest disk activity, and the logical drives with the lowest capacity. Use this information to fine-tune your configuration, achieve optimal results, and avoid bottlenecks. In addition, this tab lists all physical drives for the selected server, their read and write rates, along with the logical drives, the space used on each drive, data growth patterns, and related estimates.

The appearance of this tab depends on the object or group of object selected. For example, exploring a cluster shows data transfer rates for each disk volume connected to the selected cluster, among other metrics, while exploring a virtual machine reveals the current utilization of disk resources for that virtual machine.

Figure 219. Storage tab

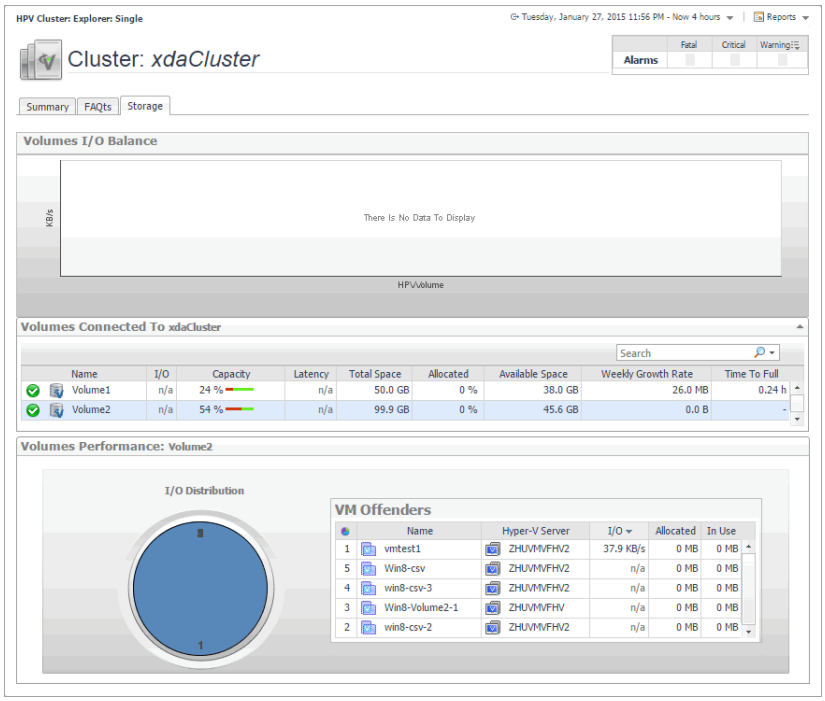


Hyper-V Explorer Storage tab (clusters)

The Hyper-V Explorer **Storage** tab displays combination of embedded views displaying disk volumes associated with the selected cluster. It identifies the virtual machines that spend the highest amounts of disk resources. Use this tab to find out more about the overall consumption of disk resources for a given cluster. The information provided on this tab can help you prevent potential bottlenecks by reallocating disk resources where they are most needed.

This tab appears in the Hyper-V Explorer when you select a cluster on the Hyper-V Explorer Topology tab.

Figure 220. Storage tab (clusters)



This tab is made up of the following embedded views:

- Volumes I/O Balance
- Volumes Connected To Cluster
- Volumes Performance: Volume

Table 114. Volumes I/O Balance

Description	Shows the data transfer rates for each disk volume connected to the selected cluster.

Table 115. Volumes Connected To *Cluster*

Description	Lists the disk volumes connected to the selected cluster and shows performance metrics associated with each volume.
Data displayed	• **Allocated**. The amount of space allocated to the selected cluster. • **Available Space**. The amount of space available on the disk volume. • **Capacity**. The percentage of the disk space that is currently in use. • **I/O**. The disk volume's current data transfer rate. • **Latency**. The current latency of the disk volume. • **Name**. The name of the disk volume. The indicator on the left shows the disk volume's alarm state: Normal, Warning, Critical, or Fatal. • **Time to Full**. The estimated amount of time until which the disk volume will become full. • **Total Space**. The total amount of disk space. • **Weekly Growth Rate**. The average amount of space by which the amount of data stored on the disk volume grows every week.

Table 116. Volumes Performance: *Volume*

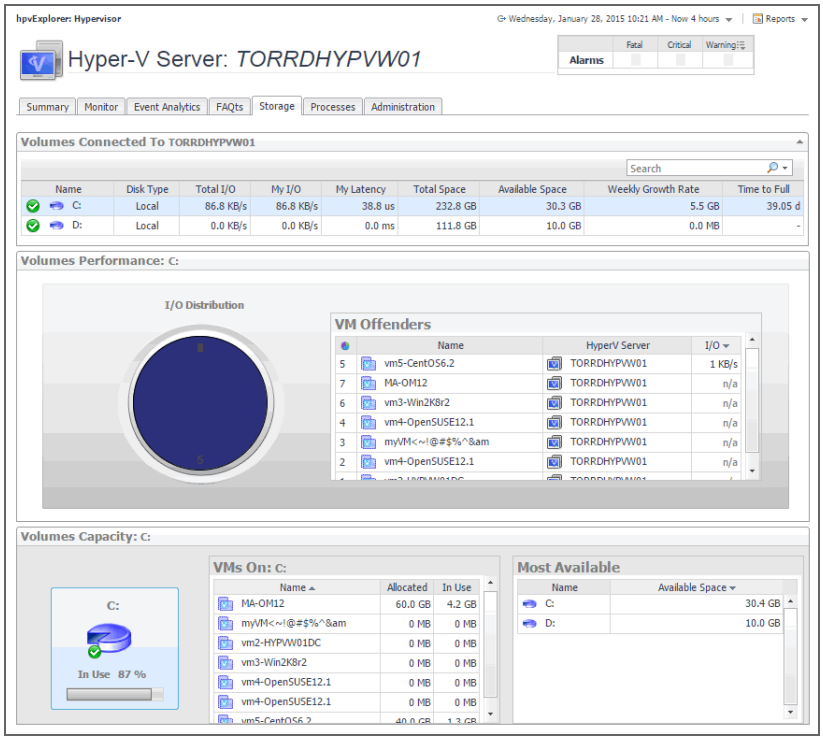
Description	Shows the amount I/O resources used by the virtual machines associated with the disk volume selected in the Volumes Connected To Cluster view.
Data displayed	• **I/O Distribution**. A pie chart indicating how much the individual virtual machines using the selected disk volume contribute to the use of I/O resources. • **VM Offenders, Allocated**. The amount of disk space allocated to the virtual machine. • **VM Offenders, Hyper-V Server**. The name of the Hyper-V server on which the virtual machine is running. • **VM Offenders, I/O**. The data transfer rate utilized by the virtual machine. • **VM Offenders, In Use**. The amount of disk space the virtual machine currently uses. • **VM Offenders, Name**. The name of the virtual machine.

Hyper-V Explorer Storage tab (Hyper-V servers)

The Hyper-V Explorer **Storage** tab displays combination of embedded views displaying disk volumes associated with the selected Hyper-V server. It identifies the virtual machines that spend the highest amounts of disk resources. Use this tab to find out more about the overall consumption of disk resources for a given Hyper-V server. The information provided on this tab can help you prevent potential bottlenecks by reallocating disk resources where they are most needed.

This tab appears in the Hyper-V Explorer when you select a Hyper-V server on the Hyper-V Explorer Topology tab.

Figure 221. Storage tab (Hyper-V servers)



This tab is made up of the following embedded views:

- Volumes Connected To Hyper-V Server
- Volumes Performance: Volume
- Volumes Capacity: Volume

Table 117. Volumes Connected To *Hyper-V Server*

Description	Lists the disk volumes connected to the selected Hyper-V server and shows performance metrics associated with each volume.
Data displayed	• **Available Space**. The amount of space available on the disk volume. • **Disk Type**. Indicates the disk type, for example, **Local**. • **My I/O**. The data transfer rate utilized on the disk volume by the selected Hyper-V server. • **My Latency**. The current latency of requests initiated by the Hyper-V server on the disk volume. • **Name**. The name of the disk volume. The indicator on the left shows the disk volume's alarm state: Normal, Warning, Critical, or Fatal. • **Time to Full**. The estimated amount of time until which the disk volume will become full. • **Total I/O**. The data transfer rate utilized on the disk volume. • **Total Space**. The total amount of disk space. • **Weekly Growth Rate**. The average amount of space by which the amount of data stored on the disk volume grows every week.

Table 118. Volumes Performance: *Volume*

Description	Shows the amount I/O resources used by the virtual machines associated with the disk volume selected in the Volumes Connected To Hyper-V Server view.
Data displayed	• **VM Offenders, Hyper-V Server**. The name of the Hyper-V server on which the virtual machine is running. • **VM Offenders, I/O**. The data transfer rate utilized by the virtual machine. • **VM Offenders, Name**. The name of the virtual machine.

Table 119. Volumes Capacity: *Volume*

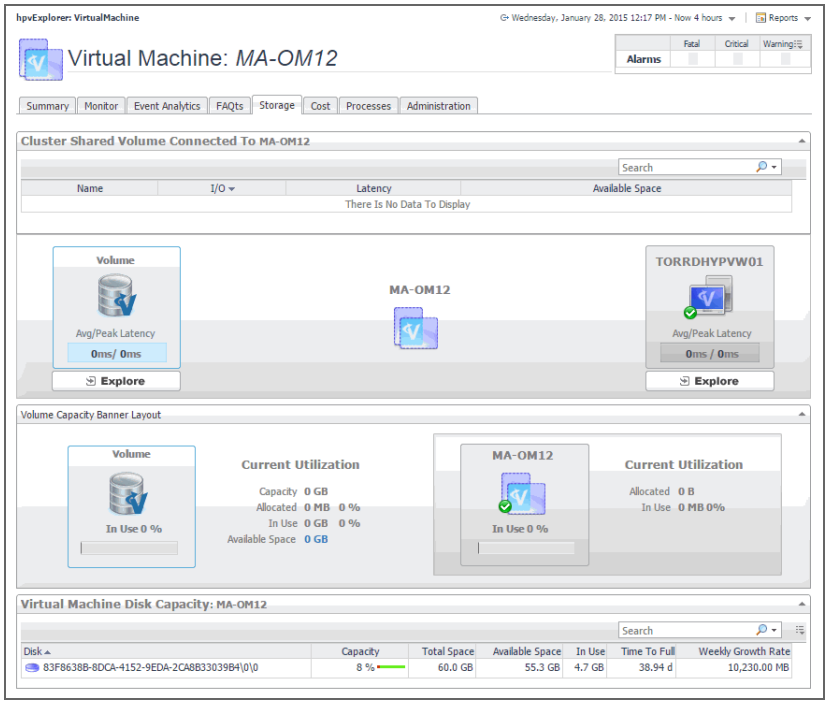
Description	Shows the amount I/O resources used by the virtual machines associated with the selected disk volume.
Data displayed	• ***Disk volume*, In Use**. The percentage of disk space in use. • **Most Available, Available Space**. The amount of space available on the disk volume. • **Most Available, Name**. The disk volume. • **VMs On *disk volume*, Allocated**. The amount of memory allocated to the virtual machine. • **VMs On *disk volume*, In Use**. The amount of memory used by the virtual machine. • **VMs On *disk volume*, Name**. The name of the virtual machine associated with the disk volume.

Hyper-V Explorer Storage tab (virtual machines)

The Hyper-V Explorer **Storage** tab displays combination of embedded views displaying disk volumes associated with a selected virtual machine. It identifies the virtual machines that spend the highest amounts of disk resources. Use this tab to find out more about the overall consumption of disk resources for a given virtual machine. The information provided on this tab can help you prevent potential bottlenecks by reallocating disk resources where they are most needed.

This tab appears in the Hyper-V Explorer when you select a virtual machine on the Hyper-V Explorer Topology tab.

Figure 222. Storage tab (virtual machines)



This tab is made up of the following embedded views:

- Cluster Shared Volume Connected To Virtual Machine
- Volume Capacity Banner Layout
- Virtual Machine Disk Capacity: Virtual Machine

Table 120. Cluster Shared Volume Connected To Virtual Machine

Description	Lists the disk volumes associated with the selected virtual machine and shows performance metrics associated with each disk volumes.
Data displayed	• **Available Space**. The amount of space available on the disk volume. • **I/O**. The data transfer rate of the disk volume. • **Latency**. The disk volume latency. • **Name**. The disk volume. • ***Disk Volume*, Avg/Peak Latency**. The average and peak latency rates for the selected disk. • ***Hyper-V Server*, Avg/Peak Latency**. The average and peak latency rates for the Hyper-V server associated with the selected virtual machine.

Table 121. Volume Capacity Banner Layout

Description	Contains information about the current utilization of disk resources for the selected virtual machine.
Data displayed	• ***Virtual Machine*, Current Utilization, Allocated**. The amount and percentage of disk space allocated to the virtual machine. • ***Virtual Machine*, Current Utilization, In Use**. The amount and percentage of disk space the virtual machine uses. • ***Virtual Machine*, In Use**. The percentage of disk space in use by the virtual machine.

Table 121. Volume Capacity Banner Layout

- **Volume, Current Utilization, Allocated**. The amount and percentage of disk space that is allocated for use.
- **Volume, Current Utilization, Available Space**. The disk space available for allocation.
- **Volume, Current Utilization, Capacity**. The total amount of disk space.
- **Volume, Current Utilization, In Use**. The amount and percentage of disk space that is currently in use.
- **Volume, In Use**. The percentage of disk space that is currently in use.

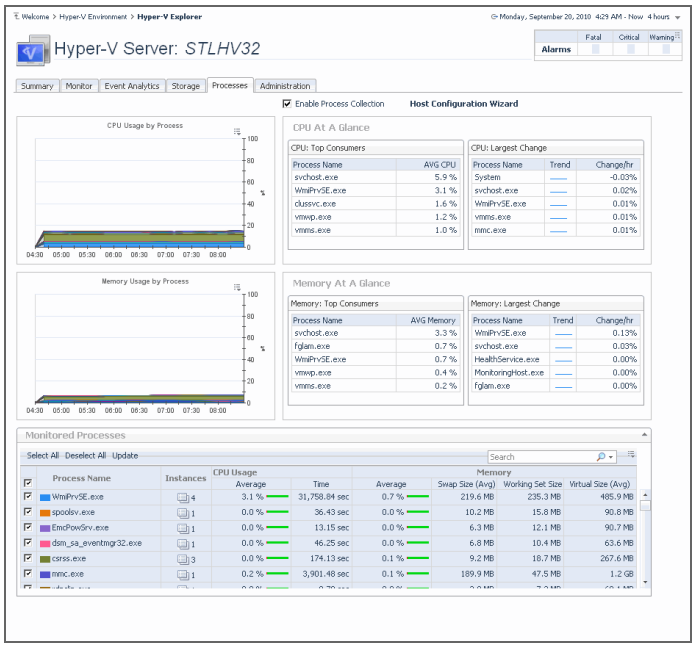
Table 122. Virtual Machine Disk Capacity: *Virtual Machine*

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

Hyper-V Explorer Processes

This tab only appears when you are exploring individual servers and virtual machines, and have Foglight Evolve Cloud for Infrastructure installed. It displays an organized view of process information gathered by Foglight Evolve Cloud for Infrastructure agents from a virtual or physical machine configured to send process information. When you open this tab, the process information for the selected server or virtual machine appears, allowing you to view the current CPU, memory, and monitored process statistics.

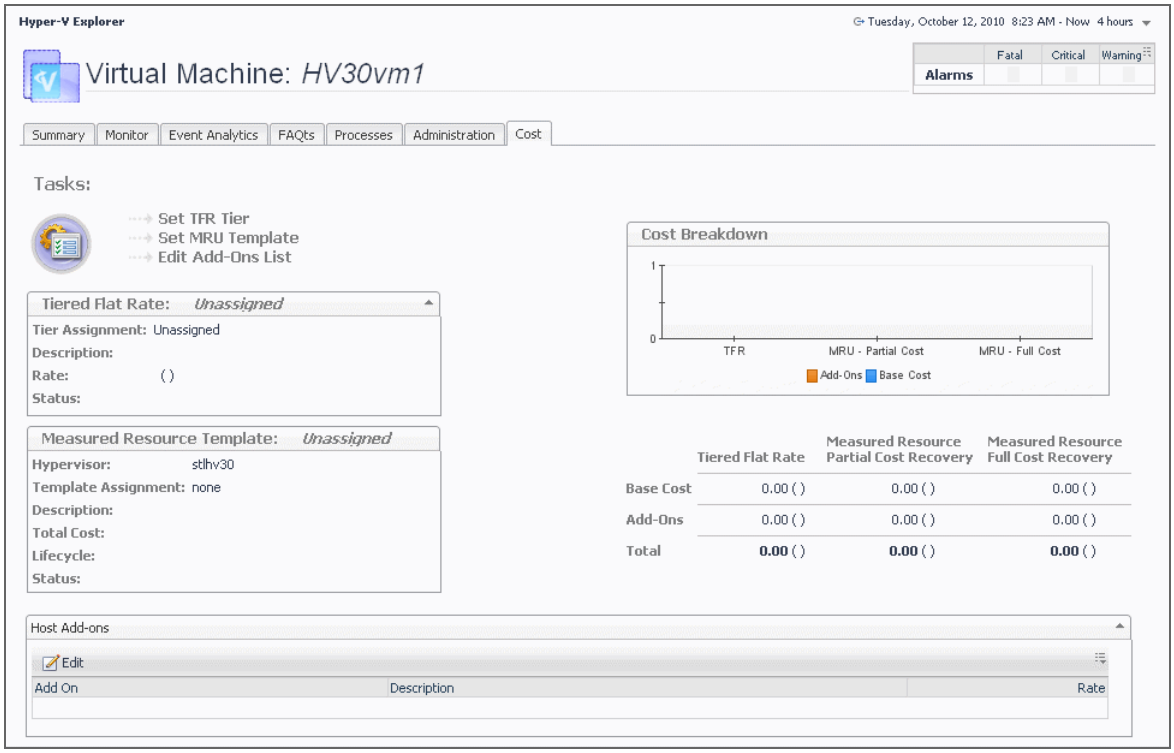
Figure 223. Processes tab



Hyper-V Explorer Cost

This tab only appears when you are exploring individual virtual machines. It provides information about the costs associated with the selected host usage. For example, an organization decides to build a new virtual infrastructure, mandating that any new physical machine must first be created as a virtual machine. Use this tab to verify the potential workload. If the results show that the virtual machine cannot properly handle the application requirements, you can explore possible physical machine options.

Figure 224. Cost tab

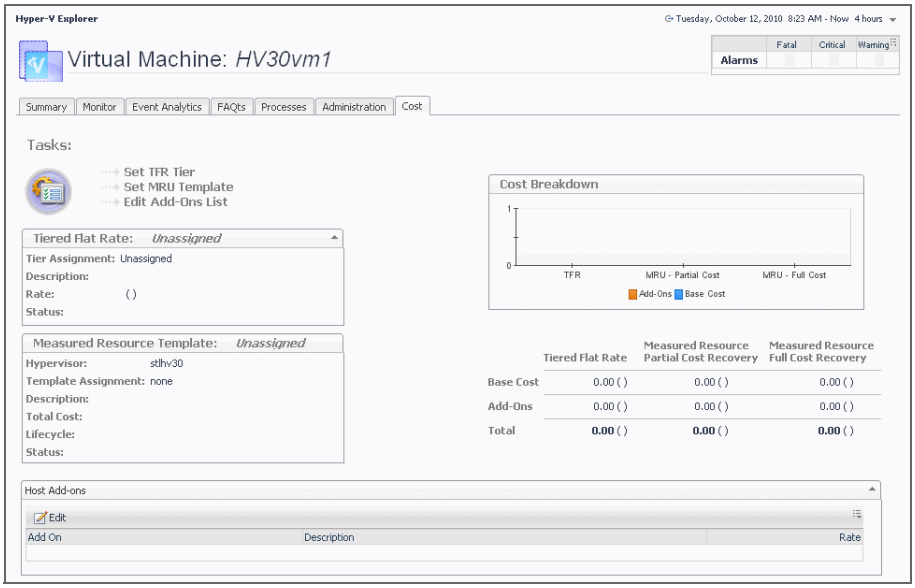


Hyper-V Explorer Cost tab

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

This tab appears in the Hyper-V Explorer when you select a virtual machine instance on the Hyper-V Explorer Topology tab.

Figure 225. Cost tab



This tab is made up of the following embedded views:

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

Table 123. Cost Breakdown

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

Table 124. Host Add-ons

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

Table 125. Measured Resource Template

Description	Provides an overview of the measured resource template host assigned to the host. Measured Resource Utilization (MRU) is based on actual percentage utilizations of CPU, Memory, Network, and disk IO weight. You can create templates based on these levels.
Data displayed	• **Description**. The description of the template associated with the selected virtual machine.

Table 125. Measured Resource Template

	• **Hypervisor**. The name of the server in which the virtual machine is running. • **Lifecycle**. The length of time the selected virtual machine will be used. • **Status**. The template status. • **Template Assignment**. The name of the template associated with the selected virtual machine. • **Total Cost**. The total cost of the selected virtual machine for the duration of its life cycle.

Table 126. Tasks

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

Table 127. Tiered Flat Rate

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

Hyper-V server and virtual machine administration

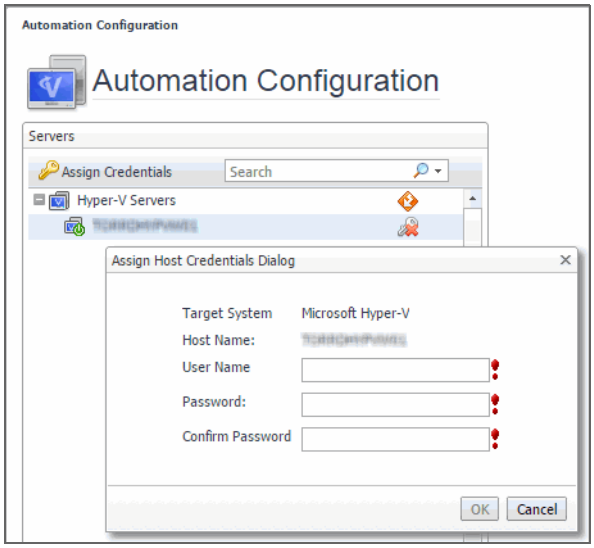
A Hyper-V® environment typically includes a collection of clusters, server, and virtual machines. A cluster can have one or more servers associated with it, one or more virtual machines can run on each server. Each virtual machine is allocated a portion of the server's resources, including disk, CPU, memory, and network resources. A virtual machine has its own machine name and IP address, and it runs a guest OS (for example, Microsoft® Windows® XP), along with other applications.

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

These actions require that you set up credentials for the virtual center on the Automation Configuration dashboard. To do that, on the navigation panel, under **Dashboards**, choose **Hyper-V > Automation Configuration**. On the Automation Configuration dashboard that appears, in the **Servers** view, select a Hyper-V server, click **Assign**

Credentials, and provide host credentials in the **Assign Host Credentials Dialog** box. Failing to configure host credentials results prevents the automated tasks from being executed.

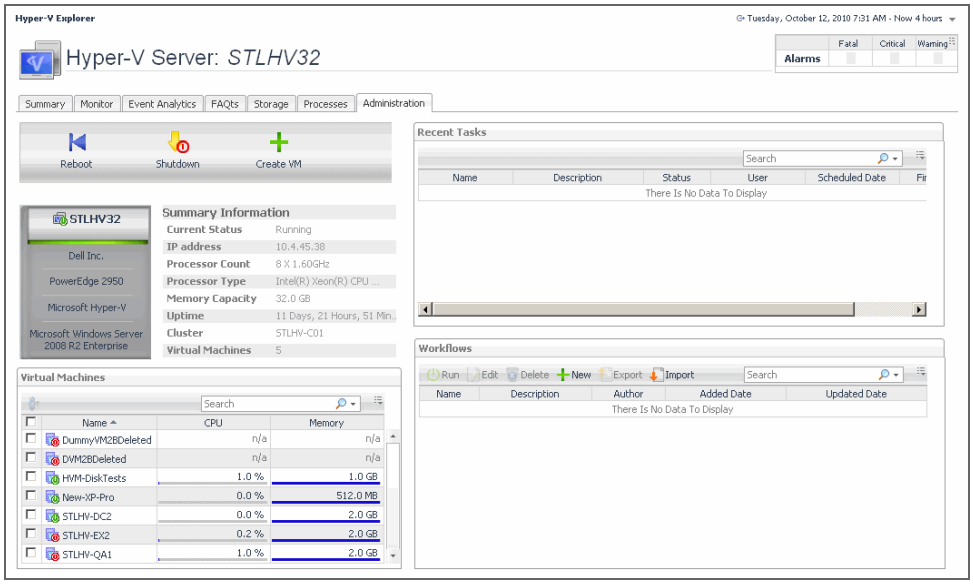
Figure 226. Providing host credentials



The Hyper-V Explorer's Administration tab provides access to most of these administration tasks. Use it to shut down or reboot physical servers and virtual machines or create virtual machines and edit their resource allocation. This tab also provides quick access to creating and editing virtual machine snapshots and server workflows.

NOTE: The Hyper-V Explorer **Administration** tab is only available when the *Virtual-HyperV-Admin-<version>.car* and *Virtual-HyperV-<version>.car* are installed. This tab is accessible if your Foglight user account includes the Hyper-V Automation User role, when you are exploring individual servers and virtual machines.

Figure 227. Administration tab



Accessing the Hyper-V Explorer Administration tab

The Hyper-V Explorer **Administration** tab provides quick access to common administrative tasks that include server shutdown, virtual machine creation, resource allocation, and others. The range of available tasks depends on whether you are exploring server or virtual machine objects. For example, when exploring server details, use this tab to access server-related workflows, such as rebooting or shutting down servers, or adding virtual machines. Similarly, when you select a virtual machine in the Hyper-V Explorer, use this tab to power off, shut down, save, pause, delete, clone, move, or edit resource allocation for the selected virtual machine. For more information about the administrative tasks, see Hyper-V server and virtual machine administration on page 156.

This tab also lists the related workflows and snapshots updated in real time, and allows you to edit and re-run them to simplify your daily administration load quickly and easily.

NOTE: The Hyper-V Explorer **Administration** tab is only available when the *Virtual-HyperV-Admin-<version>.car* and *Virtual-HyperV-<version>.car* are installed. This tab is accessible if your Foglight user account includes the Hyper-V Automation User role, when you are exploring individual servers and virtual machines.

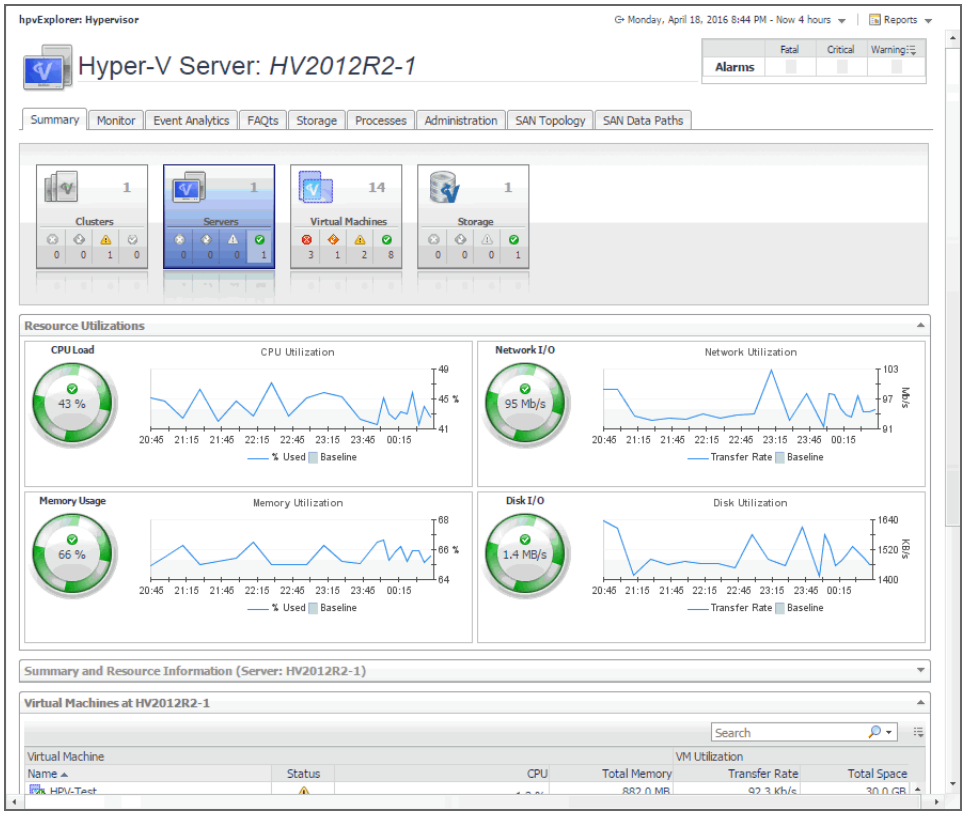
To access the Hyper-V Explorer's Administration tab:

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

   To open the navigation panel, click the right-facing arrow on the left.
3. On the navigation panel, under **Dashboards**, choose **Hyper-V > Hyper-V Explorer**.

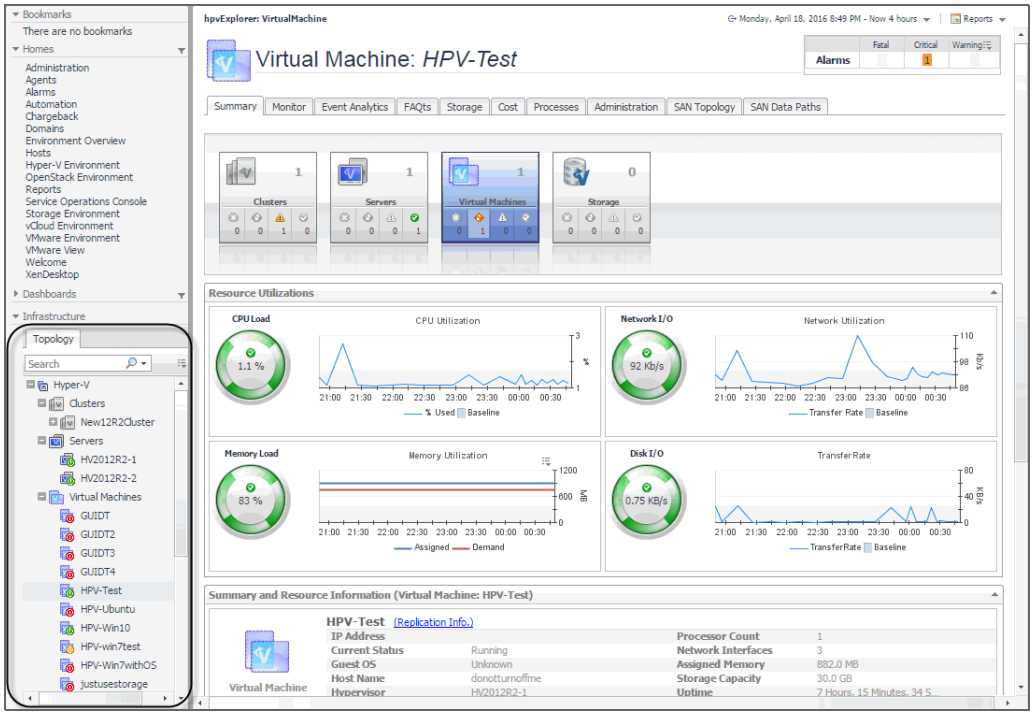
   The Hyper-V Explorer appears in the display area, with the **Summary** tab open.

Figure 228. Hyper-V Explorer



4 On the navigation panel, under **Infrastructure**, on the **Topology** tab, select a server or virtual machine object instance in the navigation tree.

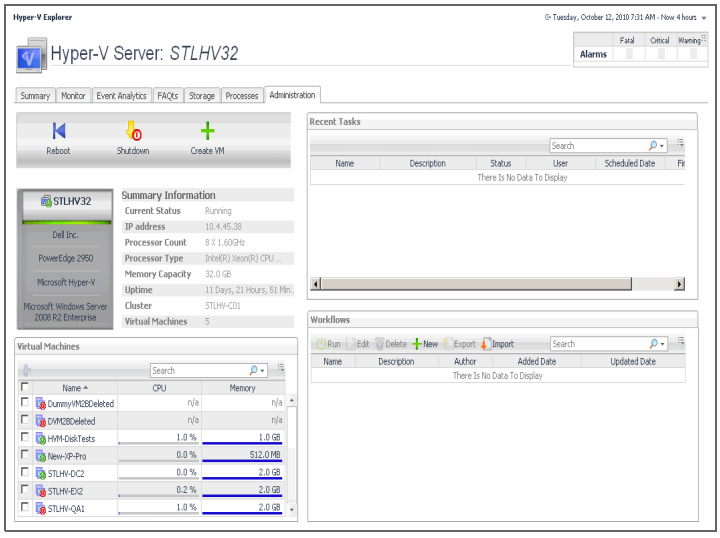
Figure 229. Topology tab



5 In the Hyper-V Explorer, open the **Administration** tab.

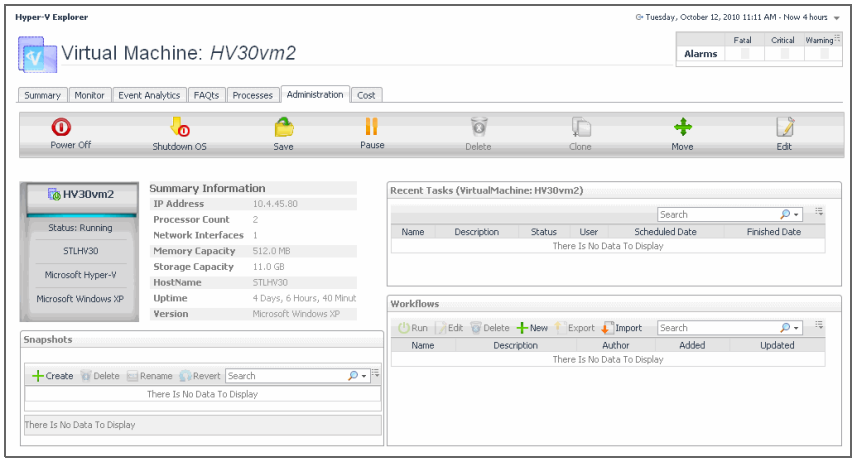
This image illustrates the content of the **Administration** tab when exploring server details.

Figure 230. Administering Hyper-V servers



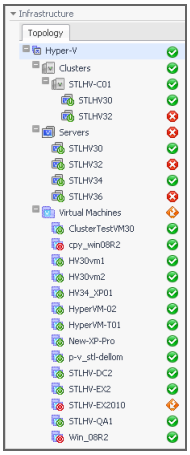
When you select a virtual machine in the Hyper-V Explorer, a slightly different set of tasks appears.

Figure 231. Administering virtual machines



TIP: Use the **Topology** tab to quickly switch between object instances and display their details in the Hyper-V Explorer.

Figure 232. Topology tab



For more information about this tab, see Hyper-V Explorer Topology tab on page 117.

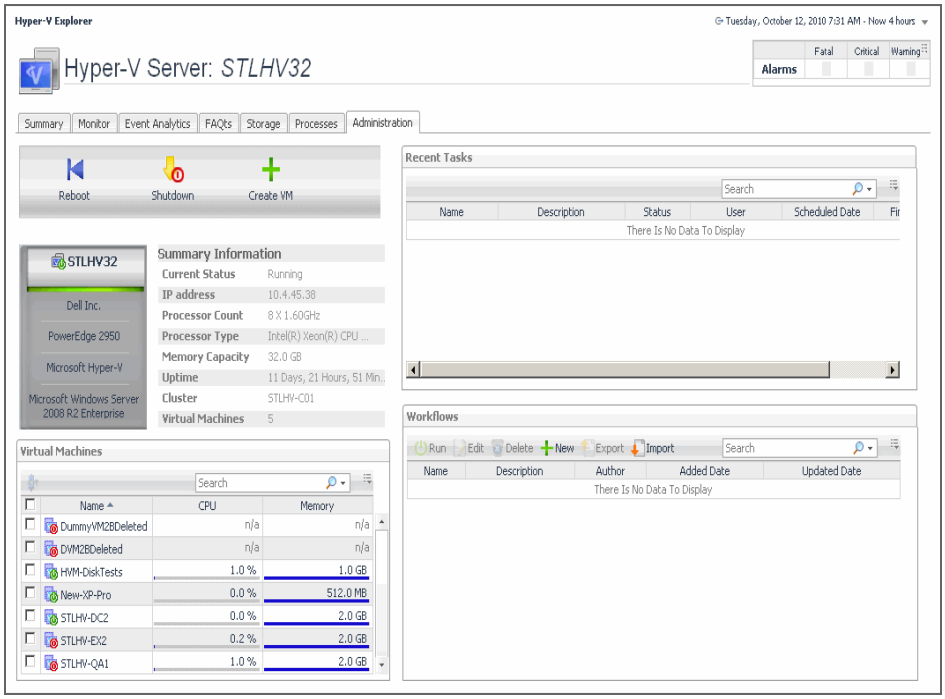
Hyper-V Explorer Administration tab

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

NOTE: The Hyper-V Explorer **Administration** tab is only available when the Virtual-HyperV-Admin and Virtual-HyperV cartridges are installed. It is accessible if your Foglight Evolve Cloud™ user account includes the Hyper-V Automation User role, while exploring individual servers and virtual machines.

This tab appears in the Hyper-V Explorer when you select a Hyper-V server or a virtual machine on the Hyper-V Explorer Topology tab.

Figure 233. Administration tab



This tab is made up of the following embedded views:

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

Table 128. Recent Tasks

Description	This table lists the tasks that are performed for the selected server or virtual machine.
Data displayed	• **Description**. The task description. • **Finished Date**. The date on which the task finished. • **Name**. The task name. • **Scheduled Date**. The date on which the task is scheduled to run. • **Status**. The task status. • **User**. The Hyper-V Monitoring in Foglight Evolve Cloud user who started the task.

Table 129. Server Configuration

Description	Shows the name of the selected server and its basic configuration, including the hardware configuration, virtualization application (Microsoft® Hyper-V®), and the OS. **NOTE:** This view only appears when you are exploring server details.

Table 130. Server Summary Information

Description	Shows physical configuration details for the selected server. **NOTE:** This view only appears when you are exploring server details.
Data displayed	• **Cluster**. The name of the cluster to which the selected server belongs, if applicable. • **IP Address**. The IP address of the selected server. • **Memory Capacity**. The memory capacity of the selected server. • **Processor Count**. The number of CPUs used by the selected server. • **Processor Type**. The processor type of the physical machine. • **Uptime**. The length of time the selected server is running • **Virtual Machines**. The number of virtual machines running on the selected server.

Table 131. Server Toolbar

Description	Contains buttons for initiating common administrative tasks. For complete information, see Hyper-V server and virtual machine administration on page 156. **NOTE:** This view only appears when you are exploring server details.
Data displayed	• **Create VM**. Creates a virtual machine on the selected server. • **Reboot**. Reboots the selected server. • **Shutdown**. Shuts down the selected server.

Table 132. Snapshots

Description	Contains a hierarchical view of the selected virtual machine's snapshots. It also contains buttons for initiating common administrative tasks. For complete information, see Hyper-V server and virtual machine administration on page 156. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **Create**. Creates a virtual machine snapshot. • **Delete**. Deletes a selected virtual machine snapshot. • **Rename**. Renames a selected virtual machine snapshot. • **Revert**. Reverts to a selected virtual machine snapshot.

Table 133. Virtual Machine Configuration

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

Table 134. Virtual Machines

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

Table 135. Virtual Machine Summary Information

Description	Shows physical configuration details for the selected virtual machine. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **IP Address**. The IP address of the selected virtual machine. • **Processor Count**. The number of CPUs used by the selected virtual machine. • **Network Interfaces**. The number of network interface cards used by the selected virtual machine. • **Memory Capacity**. The amount of memory available to the selected virtual machine. • **Storage Capacity**. The amount of disk storage available to the selected virtual machine. • **Services**. The services associated with the selected virtual machine. • **Uptime**. The length of time the selected virtual machine is running. • **Version**. The name of the operating system used by the selected virtual machine.

Table 136. Virtual Machine Toolbar

Description	Contains buttons for initiating common administrative tasks. For complete information, see Hyper-V server and virtual machine administration on page 156. **NOTE:** This view only appears when you are exploring virtual machine details.
Data displayed	• **Clone**. Clones the selected virtual machine. • **Delete**. Deletes the selected virtual machine. • **Edit**. Edits the settings of the selected virtual machine. • **Move**. Moves the selected virtual machine. • **Pause**. Pauses the selected virtual machine. • **Power Off**. Powers off the selected virtual machine. • **Save**. Saves the selected virtual machine's settings. • **Shutdown OS**. Shuts down the guest OS on the selected virtual machine.

Table 137. Workflows

Description	Contains a list of the available workflows. It also contains buttons for creating and editing workflows. For complete information, see Hyper-V server and virtual machine administration on page 156.
Data displayed	• **Added**. The date on which the workflow was added. • **Author**. The name of the Hyper-V Monitoring in Foglight Evolve Cloud user who created the workflow. • **Delete**. Deletes a selected workflow. • **Description**. The workflow description.

Table 137. Workflows

- **Edit**. Edits a selected workflow.
- **Export**. Exports a selected workflow to a file.
- **Import**. Imports a workflow from a file.
- **Name**. The workflow name.
- **New**. Creates a new workflow.
- **Run**. Runs a selected workflow.
- **Updated**. The date on which the workflow was updated.

Shutting down and rebooting Hyper-V servers

Use the **Reboot** and **Shutdown** buttons on the Hyper-V **Administration** tab to reboot and shut down servers, as required.

Figure 234. Reboot and Shutdown buttons

To reboot a server:

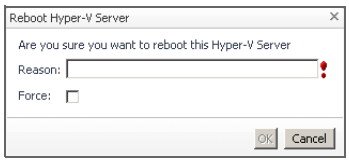
1 Select a server object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Reboot**.

The **Reboot Hyper-V Server** dialog box appears.

Figure 235. Reboot Hyper-V Server dialog box



3 In the **Reboot Hyper-V Server** dialog box, in the **Reason** box, type the reason for rebooting the server.

4 To force the server to reboot, select the **Force** check box.

> **TIP:** This is useful in situations when the server has applications running and may not respond to the reboot command.

5 In the **Reboot Hyper-V Server** dialog box, click **OK**.

To shut down a server:

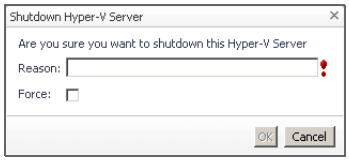
1 Select a server object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Shutdown**.

The **Shutdown Hyper-V Server** dialog box appears.

Figure 236. Shutdown Hyper-V Server dialog box



3 In the **Shutdown Hyper-V Server** dialog box, in the **Reason** box, type the reason for shutting down the server.

4 To force the server to shut down, select the **Force** check box.

> **TIP:** This is useful in situations when the server has applications running and may not respond to the shut down command.

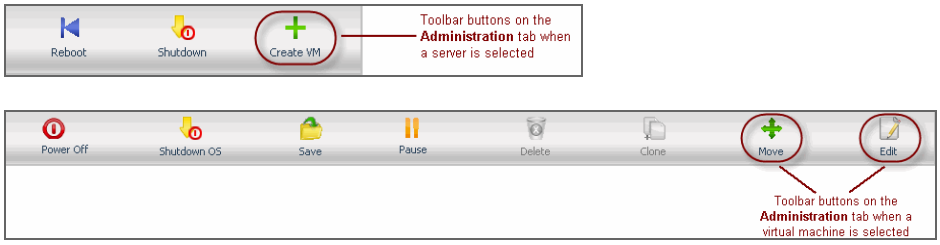
5 Click **OK**.

Creating, re-configuring, and moving virtual machines

Use the **Create VM**, **Edit**, and **Move** buttons on the Hyper-V Explorer **Administration** tab to create virtual machines and move them, as required.

> **TIP:** The selection of buttons that appear on the toolbar depends on the object selection.The Create VM button appears on the toolbar when a server is selected; Edit and Move appear when a virtual machine is selected.

Figure 237. Create VM, Edit, and Move buttons



To create a virtual machine:

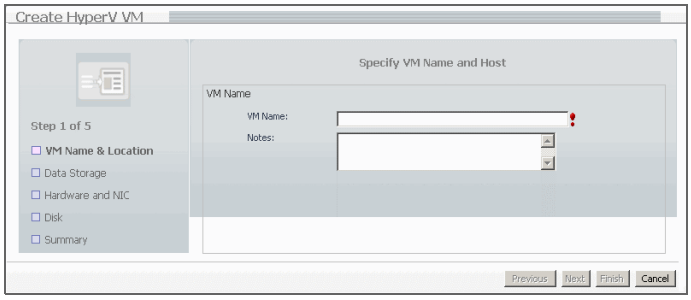
1 Select a server object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Create VM**.

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

Figure 238. Create HyperV VM dialog box



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

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

   Optional. Add any notes, if necessary.

   b On the **Select Data Storage** page, specify the location of the virtual machine or select the **use default location** check box.

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

   d On the **Customize VM Disk(s)** page, allocate disk resources to the virtual machine. You can choose from existing disk drives or create a new one.

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

To reconfigure a virtual machine:

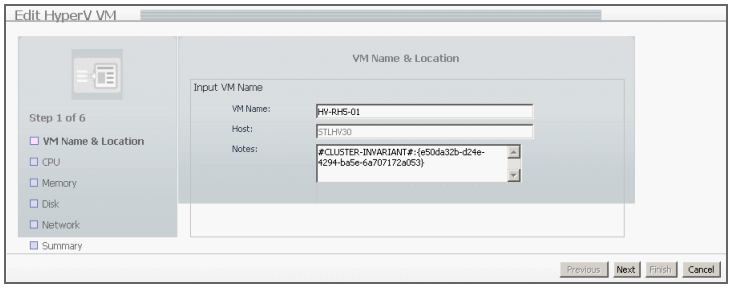
1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Edit**.

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

Figure 239. Edit HyperV VM dialog box



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

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

   Optional. Add any notes, if necessary.

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

c On the **Customize Memory Usage** page, edit the memory amount that is allocated to the virtual machine.

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

e On the **VM Network** page, add or remove any network adapters, and edit their IP addresses, as required.

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

To move a virtual machine to a different server:

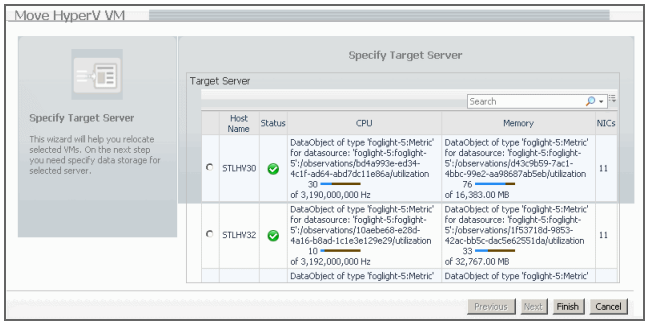
1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Move**.

The **Move HyperV VM** dialog box appears.

Figure 240. Move HyperV VM dialog box



3 Select the monitored server to which you want to move the virtual machine and click **Finish**.

Pausing, powering off virtual machines, and shutting down their guest OS

Use the **Pause**, **Power Off**, and **Shutdown OS** buttons on the Hyper-V **Administration** tab to pause and power off virtual machines, and to shut down their OS, as required.

Figure 241. Pause, Power Off, and Shutdown OS buttons

To pause a virtual machine:

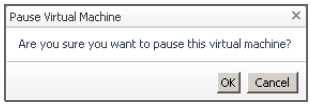
1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Pause**.

The **Pause Virtual Machine** dialog box appears.

Figure 242. Pause Virtual Machine dialog box



3 Click **OK**.

To power off a virtual machine:

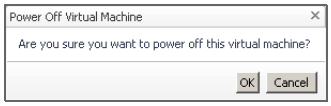
1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Power Off**.

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

Figure 243. Power Off Virtual Machine dialog box



3 Click **OK**.

To shut down a virtual machine's OS:

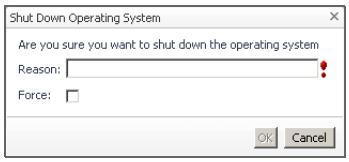
1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Shutdown OS**.

The **Shut Down Operating System** dialog box appears.

Figure 244. Shut Down Operating System dialog box



3 In the **Shutdown Operating System** dialog box, in the **Reason** box, type the reason for shutting down the virtual machine's OS.

4 To force the virtual machine to shut down, select the **Force** check box.

> **TIP:** This is useful in situations when the virtual machine has applications running and may not respond to the shutdown command.

5 Click **OK**.

Cloning, deleting, and saving virtual machines

Use the **Clone**, **Delete**, and **Save** buttons on the Hyper-V **Administration** tab to clone, delete, and save changes to virtual machines, as required.

Figure 245. Clone, Delete, and Save buttons

To clone a virtual machine:

1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Clone**.

To delete a virtual machine:

1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Delete**.

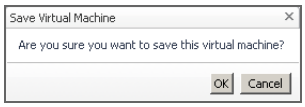
To save a virtual machine:

1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, click **Save**.

The **Save Virtual Machine** dialog box appears.

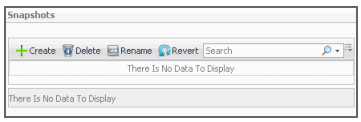


3 Click **OK**.

Creating, managing, and reverting to virtual machine snapshots

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

Figure 246. Snapshots view



To create a virtual machine snapshot:

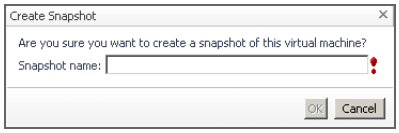
1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, in the **Snapshots** view, click **Create**.

The **Create Snapshot** dialog box appears.

Figure 247. Create Snapshot dialog box



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

4 Click **OK**.

To delete a virtual machine snapshot:

1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

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

3 Click **Delete**.

To rename a virtual machine snapshot:

1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

2 On the Hyper-V Explorer **Administration** tab, in the **Snapshots** view, select the virtual machine snapshot that you want to rename.

3 Click **Rename**.

The **Rename Snapshot** dialog box appears.

Figure 248. Rename Snapshot dialog box

4 In the **Rename Snapshot** dialog box, type the snapshot name.

5 Click **OK**.

To revert to a virtual machine snapshot:

1 Select a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

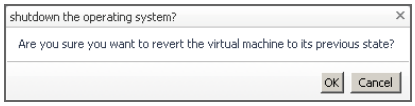
> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

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

3 Click **Revert**.

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

Figure 249. Shutdown the operating system dialog box

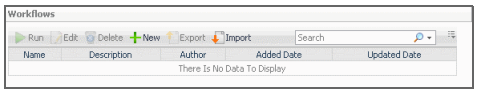


4 Click **OK**.

Automating Hyper-V administration with workflows

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

Figure 250. Workflows view



To create or edit a workflow:

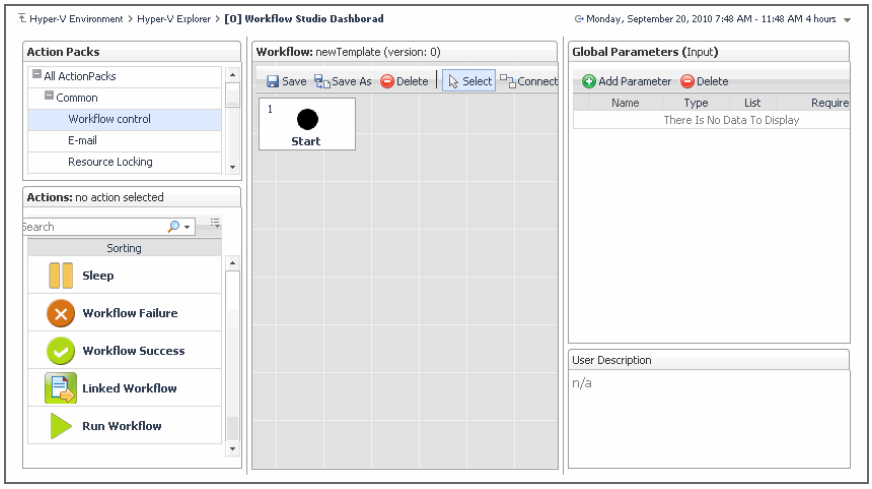
1 Select a server or a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

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

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

The Workflow Studio dashboard appears in the display area.



3 Define the workflow, as required.

TIP: The Workflow Studio dashboard is included with the Hyper-V Monitoring in Foglight Evolve Cloud Cartridge for Automation. For complete details about this dashboard, see the Cartridge for Automation documentation.

4 To return to the Hyper-V Explorer, use the bread crumb trail.

To run a server workflow:

1 Select a server or a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

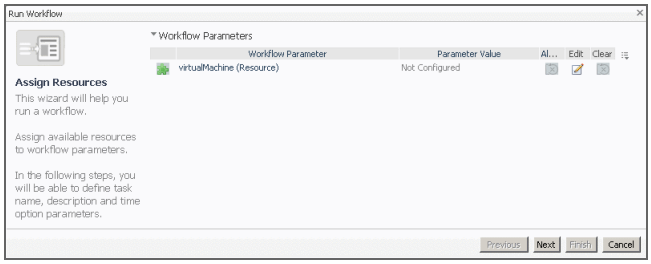
> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

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

3 Click **Run**.

The **Run Workflow** dialog box appears.

Figure 251. Run Workflow dialog box



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

Click **Next**.

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

To delete a server workflow:

1 Select a server or a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

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

3 Click **Delete**.

To export a server workflow to a file:

1 Select a server or a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

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

3 Click **Export**.

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

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

To import a server workflow from a file:

1 Select a server or a virtual machine object instance and open the Hyper-V Explorer **Administration** tab.

> **TIP:** For instructions, see To access the Hyper-V Explorer's Administration tab: on page 158.

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

3 Click **Import**.

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

Figure 252. Import a Workflow dialog box

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

5

Hyper-V Monitoring in Foglight Evolve Cloud alarms

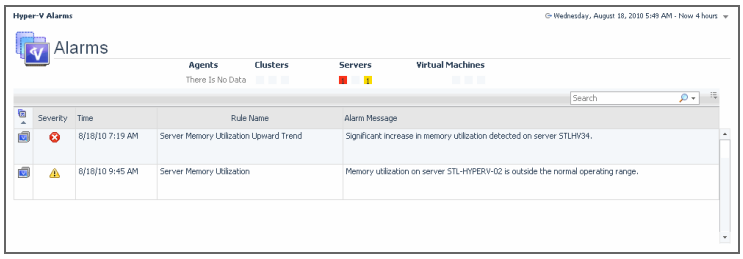
Hyper-V Monitoring in Foglight Evolve Cloud triggers alarms when certain thresholds are reached. You can review the existing alarms on the Hyper-V Alarms dashboard.

- Accessing the Hyper-V Alarms dashboard
- Alarm overview
- Alarm table
- Setting the alarm sensitivity level
- Finding alarms using the action panel

Accessing the Hyper-V Alarms dashboard

The Hyper-V Alarms dashboard is a simple dashboard that shows the alarms that have been triggered but not cleared. It can be used to isolate alarms specific to the virtualized environment.

Figure 253. Hyper-V Alarms dashboard



To access the Hyper-V Alarms dashboard:

1 Log in to the Foglight Evolve Cloud browser interface.

2 Ensure that the navigation panel is open.

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

3 On the navigation panel, under **Dashboards**, choose **Hyper-V > Hyper-V Alarms**.

The Hyper-V Alarms dashboard appears in the display area.

Alarm overview

The Alarms Overview shows the Hyper-V Monitoring in Foglight Evolve Cloud alarms, grouped by object type and severity level. Use it as a starting point when monitoring alarms to quickly identify the sources of problems within the virtual infrastructure.

This view appears along the top of the Hyper-V Alarms dashboard, just above the Alarm table.

Figure 254. Alarms Overview

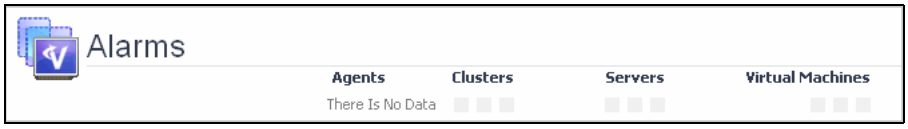
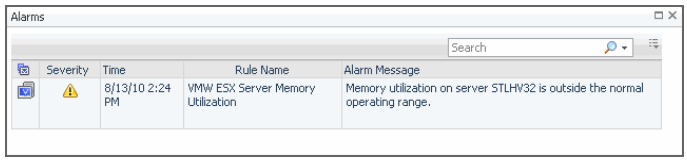


Table 138. Description of the View

Data displayed	• **Alarm counts**. The total counts of alarms associated with the physical servers, broken down by alarm types (Normal, Warning, Critical, Fatal). • Drill down on any alarm count. Displays the **Alarms** dialog box that shows a list of all related alarms.
Where to go next	**Figure 255. Alarms dialog box** 

Alarm table

The Alarms List view shows all alarms fired in your Hyper-V® environment. For each alarm entry, it shows its severity, the time it was fired, the rule name that triggered the alarm, and the alarm message.

This view appears on the Hyper-V Alarms dashboard, just below the Alarm overview.

Figure 256. Alarms List view

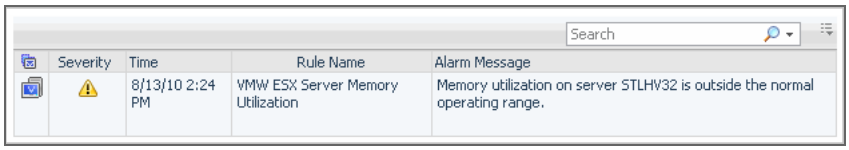


Table 139. Description of the View

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

Table 139. Description of the View

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

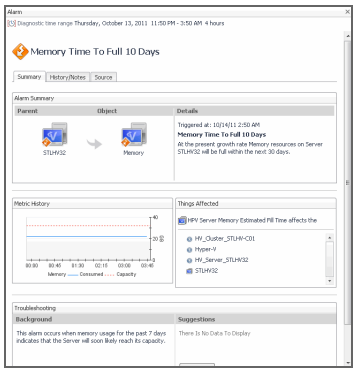
  Figure 257. Select Drilldown dwell

  From here, selecting **Explorer** shows the selected server or virtual machine in the Hyper-V Explorer, with the Hyper-V Explorer Summary tab open. Selecting **Quick View** shows the selected server or virtual machine in the Server Summary view or Virtual Machine Summary view.

  Drilling down on a cluster displays a dwell showing additional information about the cluster.

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

  Figure 258. Alarm Created dialog box

Setting the alarm sensitivity level

Alarms are triggered by bottlenecks in your monitored environment. Hyper-V Monitoring in Foglight Evolve Cloud generates alarms when a rule determines that certain pre-defined conditions are met.

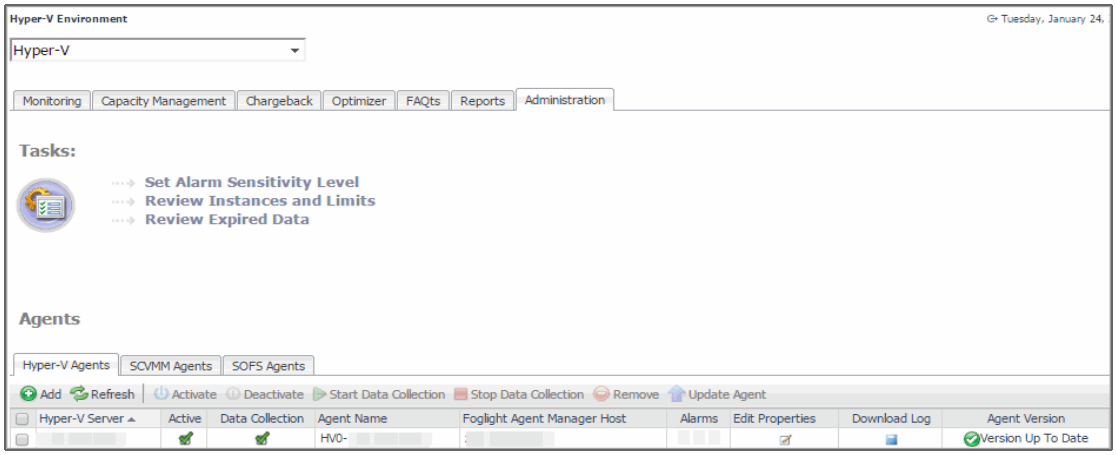
The alarm sensitivity in Hyper-V Monitoring in Foglight Evolve Cloud dictates the level of alarms the system generates, stores, and displays. You can configure the level of alarm sensitivity through the Hyper-V Configuration dashboard. The alarm sensitivity level you set here applies to your entire Hyper-V infrastructure.

To set the alarm sensitivity level:

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

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

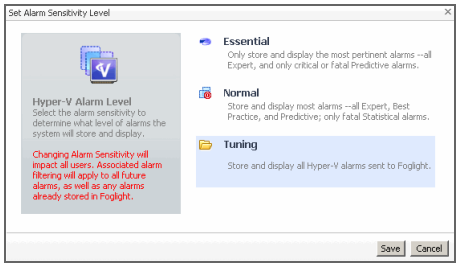
Figure 259. Administration tab



5 On the **Administration** tab, click **Set Alarm Sensitivity Level**.

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

Figure 260. Set Alarm Sensitivity Level dialog box



6 In the **Set Alarm Sensitivity Level** dialog box, select the desired sensitivity level: **Essential**, **Normal**, or **Tuning**.

7 Click **Save**.

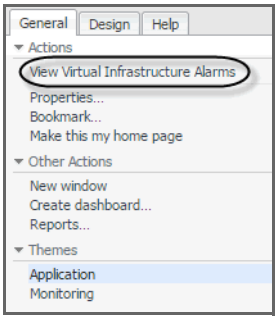
The **Set Alarm Sensitivity Level** dialog box closes.

Finding alarms using the action panel

The action panel gives you quick access to a number of useful actions and tasks. It provides additional actions provided with Hyper-V Monitoring in Foglight® Evolve Cloud when you are viewing the Hyper-V Explorer dashboard.

The action panel operates like a drawer. Its default position is closed. To open the action panel, click the arrow at the far right of the Hyper-V Monitoring in Foglight Evolve Cloudbrowser interface.

Figure 261. Hyper-V Monitoring in Foglight Evolve Cloud Actions



To view Hyper-V Monitoring in Foglight Evolve Cloud alarms:

1 Log in to the Foglight Evolve Cloud browser interface.

2 Ensure that the navigation panel is open.

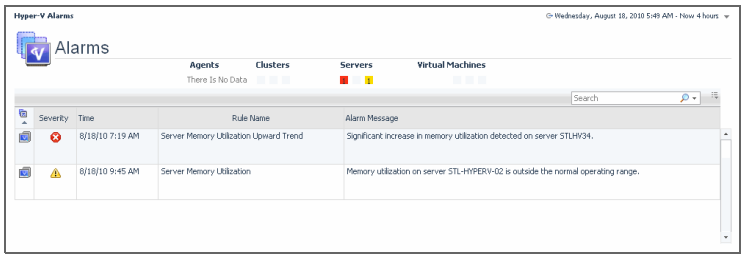
To open the navigation panel, click the right-facing arrow on the left.

3 On the navigation panel, under **Dashboards**, choose **Hyper-V > Hyper-V Explorer**.

4 On the action panel, on the **General** tab, under **Actions**, click **View Virtual Infrastructure Alarms.**

The Hyper-V Alarms dashboard appears in the display area.

Figure 262. Hyper-V Alarms dashboard



A

Appendix: Hyper-V Agent error codes

This appendix lists the error codes that the Hyper-V Agent returns when it encounters a connection problem. The error codes result in messages that appear in the alarms raised by the `HPV Cluster CPU Estimated Fill Time` rule.

Table 140. Hyper-V Agent error codes

Error code	Meaning
Controller error message	
1001	Null command
1002	Controller failure
1003	Unsupported platform
1004	End point failure
1005	Async not enabled
1006	Null listener
1007	Null host configuration
1008	Thread service failure
1009	Login failure
WinRM wrong host name or DNS issue	
1010	Unknown host
1011	Connection failure
WinRM wrong port	
1012	Connection time-out
WinRM soap fault system error	
1013	Internal error
WinRM wrong user name or password	
1014	Access denied
1099	Unknown error
End point errors	
1100	Invalid WQL (WMI Query Language)
1101	Unsupported query type
1110	Invalid commandlet
1111	Invalid commandlet parameter
1112	Server error commandlet
WISEMAN errors	
WS2001	No scheme
WS2002	No domain
WS2003	No agent home

Table 140. Hyper-V Agent error codes

Error code	Meaning
WS2004	Unsupported scheme
WS2005	Unsupported authorization
WS2006	WinRM service unavailable
WS2007	No key domain controller
controller	Sub-system controller
winrm-wiseman	Sub-system wiseman

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