Veeam MP for Microsoft Hyper-V

Version 8.0 Update 6

User Guide

April, 2019
NOTE:
Please read the End User Software License Agreement before using the accompanying software program(s). Using any part of the software indicates that you accept the terms of the End User Software License Agreement.
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Contacting Veeam Software

At Veeam Software we value the feedback from our customers. It is important not only to help you quickly with your technical issues, but it is our mission to listen to your input, and build products that incorporate your suggestions.

Customer Support

Should you have a technical concern, suggestion or question, please visit our Customer Center Portal at www.veeam.com/support.html to open a case, search our knowledge base, reference documentation, manage your license or obtain the latest product release.

Company Contacts

For the most up to date information about company contacts and offices location, please visit www.veeam.com/contacts.html.

Online Support

If you have any questions about Veeam products, you can use the following resources:

- Full documentation set: www.veeam.com/documentation-guides-datasheets.html
- Community forum at forums.veeam.com
About This Document

This document describes the features included in the Veeam Management Pack for System Center, specifically for Microsoft Hyper-V. It gives instructions for installing the Management Pack and monitoring your Hyper-V infrastructure and services in Microsoft System Center Operations Manager.

Document Revision History

<table>
<thead>
<tr>
<th>Revision #</th>
<th>Date</th>
<th>Description of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revision 3</td>
<td>04/10/2019</td>
<td>Update for Veeam Management Pack 8.0 – Update 6 for System Center: System Requirements.</td>
</tr>
<tr>
<td>Revision 2</td>
<td>08/30/2018</td>
<td>Initial version of the document for Veeam Management Pack 8.0 – Update 6 for System Center.</td>
</tr>
<tr>
<td>Revision 1</td>
<td>03/06/2018</td>
<td>Initial version of the document for Veeam Management Pack 8.0 – Update 5 for System Center.</td>
</tr>
</tbody>
</table>
Welcome to Veeam Hyper-V MP

The Veeam Management Pack for Microsoft Hyper-V (Veeam Hyper-V MP) — part of the Veeam Management Pack for System Center — integrates Microsoft Hyper-V virtual infrastructure and services into the enterprise-wide automated management, monitoring and alerting workflow implemented using Microsoft System Center Operations Manager (Ops Mgr).

Key Features

The Veeam Hyper-V MP provides the following advanced features for virtualized systems and the associated network and storage fabric:

- Discovers complete Hyper-V infrastructure topology, including System Center Virtual Machine Manager (if present), Hyper-V failover clusters, Hyper-V hosts, VMs, and related network and storage resources.
- Provides customizable dashboard views for monitoring the configuration, resource utilization and health state of the virtualized systems.
- Includes a set of performance and status monitors that diagnose the state of Hyper-V hosts, virtual machines, and associated storage and network fabric.
- Includes an extensive knowledge base to speed up root-cause diagnosis and reduce resolution time for detected issues.
- Allows on-demand realtime analysis of key performance counters for Hyper-V clusters, hosts and running VMs in a ‘Task-manager’ style view.
- Includes analysis and capacity planning reports for forecasting resource utilization and planning a hybrid cloud environment.
Licensing

The Veeam Hyper-V MP is licensed per CPU socket. 'CPU socket' is defined as a single, physical processor chip on a Hyper-V host in the monitored environment. The number of cores on a physical CPU is not a factor in Veeam MP licensing.

The license file is obtained from Veeam Software and is a requirement during installation. A free 30-day trial license is available.

License Editions


<table>
<thead>
<tr>
<th>Feature</th>
<th>Enterprise</th>
<th>Enterprise Plus</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monitoring</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage, network and compute topology views</td>
<td>✓</td>
<td>✓</td>
<td>Topology diagrams provide app-to-metal visibility and show relationships and dependencies between physical and virtual resources.</td>
</tr>
<tr>
<td>Alerting rules and monitors</td>
<td>✓</td>
<td>✓</td>
<td>Numerous out-of-the-box rules and monitors ensure complete visibility of the virtual infrastructure, track health state and alert on potential issues to help you meet service levels and eliminate problems.</td>
</tr>
<tr>
<td>Built-in knowledge base</td>
<td>✓</td>
<td>✓</td>
<td>Built-in knowledge articles with expert guidance provide context to warnings and alerts, offer corrective actions and help decrease the resolution time.</td>
</tr>
<tr>
<td>Veeam Morning Coffee Dashboard®</td>
<td>✗</td>
<td>✓</td>
<td>The dashboard provides at-a-glance real-time overview of your infrastructure. It tracks the state of infrastructure objects and the overall resource utilization, and immediately displays these changes in a single view.</td>
</tr>
<tr>
<td>Advanced Heatmap and Traffic Light dashboards</td>
<td>✓</td>
<td>✓</td>
<td>Real-time performance dashboards, top dashboards with 'traffic lights', and heatmaps give at-a-glance view of the infrastructure health state, performance and resource usage.</td>
</tr>
<tr>
<td>Capacity Planning dashboards</td>
<td>✗</td>
<td>✓</td>
<td>The Capacity Planning report functionality of Enterprise Plus is also available as a dashboard widget, showing forecasting projections for resource usage.</td>
</tr>
<tr>
<td>Veeam Widget Library</td>
<td>✓</td>
<td>✓</td>
<td>Customizable widgets for Ops Mgr dashboards help you plan and optimize any resources in your infrastructure. The widgets can display data about any items in Ops Mgr – not just Veeam MP objects.</td>
</tr>
<tr>
<td>Veeam Task Manager for Hyper-V</td>
<td>✓</td>
<td>✓</td>
<td>Veeam Task Manager for Hyper-V allows on-demand real-time analysis of key performance counters for Hyper-V hosts and running VMs in a 'Task-manager' style window.</td>
</tr>
<tr>
<td>Feature</td>
<td>Enterprise</td>
<td>Enterprise Plus</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------------</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Reporting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veeam Report Library</td>
<td>✓</td>
<td>✓</td>
<td>Veeam Report Library includes a set of proprietary generic reports that extend functionality of the Microsoft Generic Report Library and offer a number of additional useful features. The reports included in the library can be used to analyze health and performance of any types of infrastructure objects and performance counter instances, both in the physical and virtual environments.</td>
</tr>
<tr>
<td>Capacity Planning for Hybrid Cloud reports</td>
<td>✗</td>
<td>✓</td>
<td>Veeam Capacity Planning for Hybrid Clouds MP includes reports that analyze your on-premises virtual workloads and get recommendations for the IaaS resources required in Microsoft Azure or VMware Hybrid Cloud.</td>
</tr>
<tr>
<td>Veeam Hyper-V Analysis Reports</td>
<td>✗</td>
<td>✓</td>
<td>Veeam Hyper-V Analysis Reports analyze health and performance of virtual infrastructure objects, evaluate the efficiency of resource utilization and optimize VMs’ resource provisioning.</td>
</tr>
<tr>
<td>Veeam Hyper-V Capacity Planning Reports</td>
<td>✗</td>
<td>✓</td>
<td>Veeam Hyper-V Capacity Planning Reports forecast when available virtual infrastructure resources will reach their limits. These reports allow you to optimize performance and resource utilization in your virtual environment and maintain the sufficient level of resources.</td>
</tr>
<tr>
<td>MP for Veeam Backup &amp; Replication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veeam backup infrastructure monitoring</td>
<td>✓</td>
<td>✓</td>
<td>MP for Veeam Backup &amp; Replication provides real-time alerting on the status of Veeam Backup &amp; Replication jobs, and the health, performance and availability of the Veeam Backup infrastructure — services, repositories, proxies, and WAN accelerators.</td>
</tr>
<tr>
<td>Veeam Backup Reports</td>
<td>✗</td>
<td>✓</td>
<td>Veeam Backup Reports help you track the overall state of your backup infrastructure and optimize backup protection of VMs.</td>
</tr>
<tr>
<td>Other Features</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEShell</td>
<td>✗</td>
<td>✓</td>
<td>VEShell provides a set of cmdlets for automating configuration and management of Veeam Virtualization Extensions Service.</td>
</tr>
</tbody>
</table>

For further information on Veeam MP licensing, see [FAQs on Veeam Management Pack for System Center](#)

For details on checking and updating Veeam MP license, see [Veeam UI](#)
System Requirements

Before you start installing the product, make sure your environment meets the following hardware and software requirements.

NOTES:

1. Only English (US) Windows OS is fully QA tested for Veeam components. However, Veeam will support customers using any other-language OS, to reproduce problems and establish if root cause is a language-related issue.

2. Any system configuration which is not supported by the platform vendor (Microsoft, VMware) is also unsupported by Veeam.

Microsoft Hyper-V Infrastructure

The Veeam Hyper-V MP supports the following Hyper-V infrastructure components:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hosts</strong></td>
<td>• Windows Server Hyper-V 2019</td>
</tr>
<tr>
<td></td>
<td>• Windows Server Hyper-V 2016</td>
</tr>
<tr>
<td></td>
<td>• Windows Server Hyper-V 2012 R2</td>
</tr>
<tr>
<td></td>
<td>• Windows Server Hyper-V 2012</td>
</tr>
<tr>
<td><strong>Notes:</strong></td>
<td>o Windows Nano Server (with Hyper-V role installed) is not supported.</td>
</tr>
<tr>
<td></td>
<td>o Windows Server Hyper-V 2008 is not supported.</td>
</tr>
<tr>
<td><strong>SCVMM</strong></td>
<td>System Center Virtual Machine Manager is not a requirement. However, the following versions are supported:</td>
</tr>
<tr>
<td></td>
<td>• Microsoft System Center Virtual Machine Manager 2019</td>
</tr>
<tr>
<td></td>
<td>• Microsoft System Center Virtual Machine Manager 2018</td>
</tr>
<tr>
<td></td>
<td>• Microsoft System Center Virtual Machine Manager 2017</td>
</tr>
<tr>
<td></td>
<td>• Microsoft System Center Virtual Machine Manager 2016</td>
</tr>
<tr>
<td></td>
<td>• Microsoft System Center Virtual Machine Manager 2012</td>
</tr>
</tbody>
</table>

**Additional Software**

Ops Mgr agents must be installed on every Hyper-V host.

**Note:** For system requirements for Ops Mgr agents, please refer to the Ops Mgr documentation.
Microsoft System Center Operations Manager

The Veeam Hyper-V MP supports the following versions and components of Operation Manager:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
</tr>
</thead>
</table>
| **Ops Mgr**   | • Microsoft System Center Operations Manager 2019  
                  • Microsoft System Center Operations Manager 1807  
                  • Microsoft System Center Operations Manager 1801  
                  • Microsoft System Center Operations Manager 2016  
                  • Microsoft System Center Operations Manager 2012 R2  
                  • Microsoft System Center Operations Manager 2012 SP1 |
| **Note:**     | Make sure that the latest available updates for System Center Operations Manager are installed. |
| **Additional Software** | Ops Mgr Reporting server and Data Warehouse (required for reporting).  

Veeam Virtualization Extensions Service

Veeam Virtualization Extensions Service maintains a central license pool for distribution to monitored Hyper-V hosts.

**NOTE:**

Veeam Virtualization Extensions Service must be installed on an **Ops Mgr Management Server**.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
</tr>
</thead>
</table>
| **Hardware**  | **Hard disk space:** minimum 2GB — required for .NET Framework installation, binaries and logfiles.  
                             **Memory and Processor:** processor architecture must be x64.  
                             **Note:** the Virtualization Extensions Service does not perform heavy-load data processing. The minimum hardware requirement for a SCOM management server will support the Virtualization Extensions Service with no significant additional load generated. |
| **OS**        | • Microsoft Windows Server 2019  
                  • Microsoft Windows Server 2016  
                  • Microsoft Windows Server 2012 R2  
                  • Microsoft Windows Server 2012  
                  • Microsoft Windows Server 2008 R2 SP1 |
| **Note:**     | All current operating system security updates and patches must be installed. |
| **Additional Software** | • Windows Remote Management must be enabled for the management server  
                             • Microsoft .NET Framework 4.0 or later  
                             • Windows PowerShell 2.0 or later — required for Veeam Virtualization Extensions Shell |
Veeam Virtualization Extensions UI (Veeam UI)

The Veeam Virtualization Extensions User Interface is an IIS-based web application that allows authorized users to view discovered Hyper-V hosts, include/exclude hosts from monitoring and update the Veeam MP for Hyper-V license. Veeam UI can be installed together with the Veeam Virtualization Extensions Service, or on a separate machine.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td><strong>Hard disk space:</strong> minimum 2GB — required for .NET Framework installation, binaries and logfiles.</td>
</tr>
<tr>
<td>OS</td>
<td>• Microsoft Windows Server 2019</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Windows Server 2016</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Windows Server 2012 R2</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Windows Server 2012</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Windows Server 2008 R2 SP1</td>
</tr>
<tr>
<td>Note</td>
<td>All current operating system security updates and patches must be installed.</td>
</tr>
<tr>
<td>Additional Software</td>
<td>• Microsoft Internet Information Services 7.0 or later (IIS with required features is installed as part of Veeam UI installation)</td>
</tr>
<tr>
<td></td>
<td>• Microsoft .NET Framework 4.0 or later</td>
</tr>
<tr>
<td></td>
<td>• Internet Explorer 8 or later</td>
</tr>
<tr>
<td></td>
<td>• Mozilla Firefox 23.0.1 or later</td>
</tr>
</tbody>
</table>

**Ports**

For the proper communication between the Veeam Hyper-V MP components, open the following ports in the firewall:

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Protocol</th>
<th>Port</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer running Ops Mgr console</td>
<td>Hyper-V host</td>
<td>TCP</td>
<td>445</td>
<td>Required to enable data collection for Veeam Hyper-V Task Manager.</td>
</tr>
<tr>
<td>Veeam UI</td>
<td>Veeam Virtualization Extensions Service</td>
<td>Secured</td>
<td>8084</td>
<td>Required for communications between Veeam Virtualization Extensions Service and Veeam Virtualization Extensions UI (port number can be chosen during setup).</td>
</tr>
<tr>
<td>Workstation Web browser</td>
<td>Veeam UI</td>
<td>HTTP</td>
<td>4430</td>
<td>Required to use Veeam UI from remote web browser (port number can be chosen during setup).</td>
</tr>
</tbody>
</table>
Required Permissions

When installing Veeam Hyper-V MP, you should take into account following security considerations.

Ops Mgr Agent Operation

The Ops Mgr agent action account must have the Administrator permissions on the Hyper-V host. To be able to monitor Veeam Backup & Replication infrastructure, you must assign the Veeam Backup Administrator role to this account as well. For more information on how to assign roles in Veeam Backup & Replication, see the Veeam Backup & Replication User Guide for Microsoft Hyper-V, section Roles and Users.

Veeam Virtualization Extensions Service

The account under which the Veeam Virtualization Extensions Service runs must be a member of the Veeam Virtualization Extensions Users local group and have Administrator rights on the server.

Connection to SCVMM (if present)

The account used to run discovery rules on System Center Virtual Machine Manager must have the following permissions to allow Ops Mgr agent on the SCVMM Server to discover and insert SCVMM-specific topology objects into Ops Mgr:

- The account must have at minimum Read-Only Administrator privileges to the VMM SDK.
- The account must be a Windows account.
- The account must be a member of the Virtual Machine Manager Servers group on the SCVMM server.

Configure the Run As profile in Ops Mgr to use such an account.

NOTE:

SCVMM is not a requirement for Veeam MP functionality. If discovered, VMM will be used as a container in Veeam MP Hyper-V Topology views; and certain additional properties will be collected (such as Cloud Name for each VM). However core monitoring and reporting functionality in Veeam MP does not require VMM.

Ops Mgr SDK Connection

To assign Veeam licenses to monitored Hyper-V hosts, it is required that there is SDK connection between the Veeam Virtualization Extensions Service and Ops Mgr. For this reason, VES must be installed on an Ops Mgr Management Server, and the VES service account must have the Operator or Author role assigned in Ops Mgr.

Veeam Task Manager for Hyper-V

Veeam Task Manager for Hyper-V is an on-demand dashboard which makes a direct connection to a Hyper-V cluster or host, independent of the Ops Mgr console.

To enable remote connections to Hyper-V hosts, as a minimum the account of the logged on console user must at minimum be added to the Performance Log Users group on all monitored Hyper-V hosts.
Installing Veeam Hyper-V MP

To deploy the Veeam Hyper-V MP, follow these steps:

1. Deploy Ops Mgr agents to Hyper-V hosts.
2. Configure Ops Mgr agents to allow Proxying.

**NOTE:**
Veeam Web UI may be installed on a different (non-Management Server) machine.

Before You Begin

Before you begin installation, take the following steps:

1. Make sure that your environment meets the prerequisite conditions described in section System Requirements.
2. Download the product installation VES_8.0.iso file from the Veeam downloads page. You can burn the downloaded .iso image file to a CD/DVD or mount the installation image to the target machine using disk image emulation software.

Step 1. Deploy Ops Mgr Agents to Hyper-V Hosts

Before installing the Veeam Hyper-V MP, deploy Ops Mgr agents to all hosts in your Hyper-V infrastructure.

For details on installing Ops Mgr agents, see Microsoft technical documentation.
Step 2. Configure Ops Mgr Agent Proxy Settings

The Ops Mgr agent running on Hyper-V hosts must be granted the privilege to insert new objects into Ops Mgr as the Hyper-V topology is discovered. This is known as Proxying.

To grant this privilege, do the following:

1. Open the Ops Mgr console using the account with administrative rights.
2. Go to the Administration section.
3. Select the Device Management > Agent Managed node.
4. In the right pane, for each Ops Mgr agent running on a Hyper-V host, double-click to open Agent Properties dialog.
5. Go to the Security tab and make sure the Allow this agent to act as a proxy and discover managed objects on other computers check box is selected.

6. Click OK. Allow several minutes for the setting change to propagate through the system.
Step 3. Install Veeam Virtualization Extensions Service, UI and Veeam Management Packs

At this step, the following Veeam MP components will be installed on an Ops Mgr Management Server:

- Veeam Virtualization Extensions Service — maintains a central license pool for distribution to monitored Hyper-V hosts.
- Veeam Virtualization Extensions UI — allows users to view discovered Hyper-V hosts, include/exclude hosts from monitoring and update the Veeam MP for Hyper-V license.
- Veeam Management Packs — a set of discovery, monitoring and reporting management packs.
  Veeam MP includes the following management packs: Hyper-V MP, Backup MP and Library MP.
  - The Library MP is a common management pack on which other packs are dependent.
  - The Backup MP integrates Veeam Backup & Replication infrastructure, services and jobs into Microsoft System Center Operations Manager. For details on Backup MP, see MP for Veeam Backup & Replication User Guide.

To install Veeam Virtualization Extensions Service, UI and Veeam Management Packs:

1. Log on to the Management Server using an account with local Administrator rights.
2. Insert the installation disc into the CD/DVD drive or mount the installation image. The setup will open the splash screen with Veeam Management Pack installation options.
   On the install menu of the splash screen, click Veeam Management Pack Suite.
3. Click **Next** to start the installation.

   ![Installation Welcome Screen](image1)

   **Welcome to the Veeam Management Pack Setup**

   This setup will guide you through the installation of Veeam Management Pack on your computer. To continue, click Next.

   **WARNING**: This computer program is protected by copyright law and international treaties. Unauthorized duplication and distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.

4. Read and accept the license agreement. If you reject the agreement, you will not be able to continue installation.

   ![License Agreement Screen](image2)

   **License Agreement**

   Please read the following license agreement carefully.

   **Veeam Software (“Veeam”)**

   **End User Software License Agreement (“EULA”)**

   **IMPORTANT - READ CAREFULLY**

   This EULA is a legally binding agreement between the licensee and End User and Veeam setting forth the terms and conditions governing the use and operation of Veeam’s proprietary computer software products (the “Software”) and the written technical specifications for the use and operation of the Software and the “Documentation”. Where the sense and context permit, references in this EULA to the Software include the Documentation. By downloading and installing, copying or otherwise using the Software, and/or otherwise accepting this EULA, End User agrees to be bound by the terms and conditions set forth herein.

   - I accept the terms in the license agreement
   - I do not accept the terms in the license agreement

   ![License Agreement Options](image3)
5. When prompted for the license, click **Browse** and locate the .lic file supplied to you by Veeam. You will not be able to continue installation without providing a license.

6. At the **Program Features** step, choose the following components:
   
   - Veeam Virtualization Extensions Service
   - Veeam Virtualization Extensions UI
   - Hyper-V MPs
   - Backup MPs (optional, if you also have Veeam Backup & Replication in your environment)

   If necessary, you can change the installation directory at this step.
7. Perform a system configuration check.

Before proceeding with the installation, the installer will check whether all prerequisite software is available on the target system. If some of the required software components are missing, the wizard will offer to install missing software automatically. To do that, click **Install**.

When all required software is installed, click **Re-run** to repeat verification.
8. Specify the TCP port that will be used by the Veeam Virtualization Extensions Service and the port for connection with the UI website. Default ports are:

- **8084** for Veeam Virtualization Extensions Service
- **4430** for connection with the UI website

9. Enter credentials of the account under which the Veeam Virtualization Extensions Service will run. For the account requirements, see **Required Permissions**.

   The user name should be specified in the **DOMAIN\USERNAME** format.
10. Review installation configuration. Click **Install** to begin installation.

![Veeam Management Pack Setup](image)

**NOTE:**

Keep in mind that MP deployment continues even after all Management Packs are imported: reports are deployed to the Ops Mgr reporting server; SQL Server stored procedures required for widgets are deployed in the background.

This process might take several hours depending on the Ops Mgr infrastructure performance. During this period, some widgets may not function, and reports may not be visible in the Ops Mgr console.
After You Install

When installation completes, do the following:

1. Perform logoff/logon on the server where VES is installed to initialize the *Veeam Virtualization Extensions Users* local group that will be used to accommodate the service account. Also add any other accounts to this group for users who will need to access the Veeam UI to configure Hyper-V monitoring.

2. Confirm installation of the Veeam UI and Virtualization Extensions Service.
   - In Windows Server 2012 and later, open **Start > All Apps** and find **Veeam Management Pack for System Center**.
   - In earlier Windows versions, open **Start > All Programs > Veeam > Veeam Management Pack for System Center**.

The web interface should open in the default browser. Enter valid credentials and you will see the Veeam UI as shown below.

As soon as the Virtualization Extensions Service discovers Hyper-V clusters and hosts, the **Hyper-V current status** section will display the number of monitored Hyper-V hosts and number of remaining license sockets.
Open the **Hyper-V Servers** tab to move to the page, where each Hyper-V host discovered with the Veeam Virtualization Extensions Service will be shown under the **Discovered Hyper-V Servers** tree.

If you do not see Hyper-V hosts displayed in the Veeam UI, it may be because discovery is still running. Ensure that Ops Mgr agents on all Hyper-V hosts have Proxy enabled. Use the **Update Monitored Hosts** link in the **Actions** pane to refresh the view. See the **Troubleshooting** section of this document for more details.

If you have chosen the option of including System Center Virtual Machine Manager (SCVMM) in your environment, you will see the SCVMM server as a container for Hyper-V hosts and clusters in the Veeam UI. For optional SCVMM configuration, see **Appendix A**.
Upgrading Veeam Hyper-V MP

To upgrade Veeam Hyper-V MP to version 8.0, you will need to upgrade VE Service and Veeam UI, and to import new management packs:

1. Log on to the Management Server using an account with local Administrator rights.
2. Insert the installation disc into the CD/DVD drive or mount the installation image. The setup will open the splash screen with Veeam Management Pack installation options.

On the install menu of the splash screen, click **Veeam Management Pack Suite**.
3. Click **Next** to start the installation.

4. Read and accept the license agreement. If you reject the agreement, you will not be able to continue installation.
5. Review Veeam MP components installed on the server.

6. Click **Browse** to locate the .lic file supplied to you by Veeam. You will not be able to continue installation without providing a license.
7. Choose management packs to import.

8. Perform the system configuration check.
9. Enter credentials of the account under which the VE Service will run. For the account requirements, see Required Permissions.

The user name should be specified in the **DOMAIN\USERNAME** format.

10. Click **Install** to begin installation.
Veeam Hyper-V MP Discovery

The Veeam Hyper-V MP uses cascaded discovery methods to populate Ops Mgr with Hyper-V objects. These discoveries use scripts and custom time-based datasources.

How Hyper-V Objects are Discovered

The discovery process is performed as follows:

1. After you import Veeam Hyper-V MPs, the Veeam Base Discovery management pack is deployed on all Ops Mgr agents. This pack discovers servers with the Hyper-V role.
   
   Note that this initial discovery consists of hidden objects, not visible in default Ops Mgr views.

2. Hyper-V Hosts and Clusters discovered as above will first appear under the Discovered Hyper-V Servers tree on the Hyper-V Servers tab in the Veeam UI. All hosts will be checked (monitoring enabled) by default, if sufficient Veeam licenses are available.
   
   The Veeam Extensions Service will scan Ops Mgr via the SDK to add newly discovered hosts once per hour.

3. When the host has appeared in the Veeam UI and is checked, then additional topology discovery scripts running on the host will populate Veeam MP views with clusters, hosts, virtual machines, virtual network switches, storage disks and volumes, etc.
   
   The additional discovery stage can take between 1 – 3 hours.

If you experience a delay in discovery of hosts, VMs or other components, a restart of the Ops Mgr service on Hyper-V hosts will force initial discovery:

- In Ops Mgr 2012 R2, restart Microsoft Monitoring Agent Service
- In Ops Mgr 2012 SP1, restart System Center Management Service

For details, see section Troubleshooting on Hyper-V hosts not discovered in Ops Mgr.

After discovery is completed, monitors and rules will be loaded and dashboards and reports will begin to populate. Note that some views will require additional time to initialize, for details see section Troubleshooting on Veeam MP views or dashboards are empty.

Using the Veeam UI, you can enable and disable monitoring for specific hosts, check and update license, and discover new Hyper-V hosts. For details, see Veeam UI.

All Hyper-V object discoveries are enabled by default. You can use overrides to disable or change discovery settings. For the list of discovery rules and their default configuration, see Appendix B.
Veeam UI

Veeam UI is a web-based console that you can use to view discovered Hyper-V hosts, include and exclude hosts from monitoring, and update the Veeam MP license.

Accessing Veeam UI

When connecting to the Veeam Virtualization Extensions Service, you will receive a login prompt. You may log in using your Windows credentials or by typing credentials.

To access the UI, the user account must be a member of the Veeam Virtualization Extensions Users group (a local group created during installation of the Veeam Virtualization Extensions Service).

Accessing Veeam UI via Web Browser

To access the Veeam UI locally, on the server where it is installed:

- In Windows Server 2012 or later, open **Start > All Apps** and find **Veeam Management Pack for System Center**.
- In earlier Windows versions, open **Start > All Programs > Veeam > Veeam Management Pack for System Center**.

To access the Veeam UI remotely using your Internet browser, browse to the following address (assuming default 4430 port):

```
http://<web_server_name>:4430
```

For details on required browser settings, see **Troubleshooting**.
Accessing Veeam UI via Veeam MP Licensing View

To access the Veeam UI via Veeam MP Licensing View:

1. In Ops Mgr, open Monitoring.
2. Select the Veeam for Hyper-V > Veeam MP Licensing node.
3. Expand the details pane and click the Veeam UI URL. This will open the Veeam UI in a new browser window.

**NOTE:**

Access to the Veeam UI will still require authentication via the Veeam Virtualization Extensions Users group.
Dashboard Tab

The Dashboard tab is the primary Veeam UI workspace that provides an overall picture of the monitoring configuration.

Configuration

The Hyper-V MP Configuration section contains a list of actions that you may want to perform for monitoring your Hyper-V environment. You can use this section to:

- Discover new Hyper-V hosts. Click the Discover button to open the Hyper-V Servers tab. For details, see Hyper-V Servers Tab.
- Enable/Disable monitoring of Hyper-V hosts. Click the Configure button to open the Hyper-V Servers tab. For details, see Hyper-V Servers Tab.

Current Status

The Hyper-V Current Status section provides information on the current configuration status, including:

- The number and status of monitored Hyper-V hosts
- The number of remaining license sockets and license expiry date.

You can view license information or update the expired license:

1. Click the License link.
   The License window will be opened. Here you can view information about the license in use.
2. To update the license, click Update.
3. In the Choose File window, browse to the new license file.

Resources

The Resources section contains a set of links to online and offline documentation and Veeam MP resources.
Hyper-V Servers Tab

The Hyper-V Servers tab provides information on Hyper-V hosts discovered by the Veeam Management Pack. You can use this tab to disable or enable monitoring for specific hosts, discover new hosts and test Ops Mgr SDK connection.

The hierarchy tree on the left shows Virtual Machine Manager Server (optional), and the list of monitored Hyper-V clusters and hosts. Select the necessary node in the tree to view details for the selected Hyper-V object.

Enabling and Disabling Monitoring

You can exclude a SCVMM Server, Hyper-V cluster or host from monitoring. Use the Discovered Hyper-V Servers hierarchy on the left to disable or enable monitoring:

- To disable monitoring, clear the check box next to the necessary object in the hierarchy.
  When you exclude a host from monitoring, the unused sockets for this host will be revoked and returned to the license pool.
- To start monitoring again, select the check box next to the necessary object in the hierarchy.

Discovering new Hyper-V Hosts

After you deploy Ops Mgr agents on Hyper-V hosts, the hosts are automatically discovered by the Veeam Management Pack and populated under the Discovered Hyper-V Servers tree. For details on Veeam Hyper-V discovery process, see Veeam Hyper-V MP Discovery.

The discovery process runs with the frequency intervals specified in Appendix B. However, you can run the discovery immediately. To do that, click the Update monitored Hosts link in the Actions pane on the right.
Testing OM SDK Connection

Veeam Virtualization Extensions Service assigns licenses to hosts and enables monitoring for them. To perform these actions requires an SDK connection between the Veeam Virtualization Extensions Service and Ops Mgr. If there is no SDK connection, hosts will not be discovered. To test the status of the Ops Mgr SDK connection:

1. Select the upper level of the **Discovered Hyper-V Servers** hierarchy.
2. Click the **Test OM SDK Connection** link.

If SDK connection is unavailable:

- Check whether the System Center Data Access Service is running on the Management Server.
- Check whether the account used to run the Virtualization Extensions Service meets the requirements described in **Required Permissions**.
Monitoring with Veeam Hyper-V MP

The Veeam Hyper-V MP includes a comprehensive set of views available under the Veeam for Hyper-V folder in the Ops Mgr console Monitoring tree. The folder includes views for alerts, performance, state and diagrams. Subfolders allow drill-down into filtered views for Hyper-V storage, hosts, clusters and virtual machines.
Morning Coffee Dashboard

The **Morning Coffee Dashboard** is the first thing to see once you get to work. This dashboard provides at-a-glance real-time overview of your infrastructure.

The dashboard tracks the state of SCVMMs (if present), physical hosts, clusters, VMs, storage and the overall resource utilization, and immediately displays these changes in a single view. The **Morning Coffee Dashboard** is available in the root Veeam for Hyper-V folder.

The **Health Status** pane shows discovered groups of virtual infrastructure objects and the total number of objects in each group. For each group, the pane also displays a colored bar whose cells represent current health state of objects in that group:

- Green: an object is in the ‘Healthy’ state;
- Yellow: an object is in the ‘Warning’ state;
- Red: an object is in the ‘Critical’ state.

The **Resource Usage** pane shows total amount of resources in the discovered virtual infrastructure and displays current resource usage (in percentage) as colored pie charts. Colors on the charts depend on whether resource usage thresholds are breached.

The default configuration of the Morning Coffee widget can be customized. For details on changing widget settings, see section **Personalizing Veeam Dashboard Widgets**.
Topology Diagram Views

There are 5 pre-defined topology views available in the Veeam Hyper-V MP:

- **Topology – Compute**
  - System Center Virtual Machine Manager Server (if present)
  - Hyper-V clusters
  - Hyper-V hosts
  - Host local storage
  - Host network components
  - Virtual machines
  - Ops Mgr agents (if installed) running inside virtual machines

- **Topology – Network**
  - Virtual Switches
  - Virtual and physical network adapters
  - Virtual machines
  - Ops Mgr agents (if installed) running inside virtual machines

- **Topology – Storage**
  - Virtual Machine Manager Server (if present)
  - Hyper-V clusters
  - Hyper-V cluster storage disks
  - Hyper-V cluster shared volumes
  - Virtual machines
  - Ops Mgr agents (if installed) running inside virtual machines

- **Topology – Local Physical Disks and VMs**
  - Hyper-V local physical disks
  - Hyper-V local volumes
  - Virtual machines
  - Ops Mgr agents (if installed) running inside virtual machines

- **Veeam MP Managed Infrastructure**
  - Management Server where Veeam UI is installed
  - Hyper-V clusters
  - Hyper-V hosts

Screenshots illustrating these views are displayed in the following sections.
Topology – Compute

Compute topology, showing SCVMM Server, clusters, Hyper-V hosts, VMs and Ops Mgr agent running inside a VM.

Topology – Network

Network topology, showing vSwitches, physical and virtual NICS, VMs, and Ops Mgr agent running inside a VM.
Topology – Storage

Storage topology, showing SCVMM Server, Hyper-V cluster, cluster storage disks, cluster shared volume, contained VMs, and Ops Mgr agent running inside a VM.

Topology – Local Physical Disks and VMs

Storage topology, showing local physical disks, local volumes, contained VMs, and Ops Mgr agent running inside a VM.
Veeam MP Managed Infrastructure

Veeam MP topology as seen in Veeam UI (discovered Hyper-V clusters and hosts).

Diagram Dashboards

In-context Apps on this VM and Hosts for this VM Dashboards can be launched directly from an open monitor alert or any view in-context of the target object.
The **Apps on this VM** dashboard shows all applications installed on the VM and discovered by the Ops Mgr agent running in the VM.

The **Host for this VM** dashboard shows the host on which the VM runs, all other VMs which run on the host, and host hardware (NICs, HBAs, and hardware sensors).
State Views

A set of state views is available in view subfolders, showing the state and properties of discovered Hyper-V infrastructure components and services.

In addition, there are grouped state views available, with group filtering using properties:

- Hosts by Model
- Hosts by Windows Build Version
- Cluster Volumes by Cluster
- Local Volumes by Host
- VMs by Dynamic Memory
- VMs by Guest OS
- VMs by Integration Services
Example screenshot below shows Cluster Shared Volumes grouped by cluster.
Monitors

Veeam Hyper-V MP includes a set of availability and performance monitors to diagnose the state of Hyper-V infrastructure components.

Hyper-V Cluster Storage Monitors

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Cluster Storage Status</td>
<td>This monitor tracks status of cluster-attached storage disks for discovered Hyper-V clusters (Critical/Failed/Offline, etc).</td>
</tr>
<tr>
<td>Veeam HyperV: Host Cluster Disk Status</td>
<td>This monitor tracks the status of the cluster-attached storage disks from the host perspective.</td>
</tr>
</tbody>
</table>

VM Status Monitors

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: VM Health</td>
<td>This monitor tracks health state and operational status of the Hyper-V VM.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Heartbeat</td>
<td>This monitor tracks heartbeat state of the Hyper-V VM.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Power State</td>
<td>This monitor tracks power state of the Hyper-V VM.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Cluster Resource Status</td>
<td>This monitor tracks the state of a virtual machine clustered role in a failover cluster configuration.</td>
</tr>
</tbody>
</table>

Hyper-V Integration Services Monitors

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: VM Integration Services Status</td>
<td>This monitor tracks state of all enabled Hyper-V Integration Services inside a running virtual machine:</td>
</tr>
<tr>
<td></td>
<td>• Hyper-V Heartbeat Service (vmicheartbeat)</td>
</tr>
<tr>
<td></td>
<td>• Hyper-V Guest Shutdown Service (vmicshutdown)</td>
</tr>
<tr>
<td></td>
<td>• Hyper-V Data Exchange Service (vmickvpexchange)</td>
</tr>
<tr>
<td></td>
<td>• Hyper-V Time Synchronization Service (vmictimesync)</td>
</tr>
<tr>
<td></td>
<td>• Hyper-V Remote Desktop Virtualization Service (vmicrodv)</td>
</tr>
<tr>
<td></td>
<td>• Hyper-V Volume Shadow-Copy Requestor Service (vmicvss)</td>
</tr>
</tbody>
</table>
Hyper-V Host Network Container Monitors

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Network Adapter Status</td>
<td>This monitor tracks the internal state of the host physical NIC.</td>
</tr>
<tr>
<td>Veeam HyperV: Network Adapter Team Status</td>
<td>This monitor tracks the internal state of the host teamed network adapter.</td>
</tr>
<tr>
<td>Veeam HyperV: Host Network connectivity problem</td>
<td>This monitor tracks the state of all physical network adapters available on the Hyper-V host.</td>
</tr>
</tbody>
</table>

Hyper-V Host Virtual Switch Monitors

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Network connectivity problem on Host Virtual Switch</td>
<td>This monitor tracks the state of the physical network adapter or teamed network adapters configured as an uplink for the Hyper-V host virtual switch.</td>
</tr>
</tbody>
</table>

Self-Monitoring

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: SCVMM Connection Account (Read-only) configuration state</td>
<td>This monitor alerts that the Run As account in profile Veeam Hyper-V MP SCVMM Connection Account (Read-only) is not configured. Note if you do not have SCVMM in your environment you may disable this monitor.</td>
</tr>
<tr>
<td>Veeam HyperV: Licensed socket count exceeded</td>
<td>This monitor is watching the status of the Veeam License installed on the Veeam Virtualization Extensions Server. This license is defined as the total number of CPU sockets on physical Hyper-V hosts that are monitored by the Veeam Management Pack.</td>
</tr>
</tbody>
</table>

Performance Monitors

The following monitors analyze performance metrics for Hyper-V clusters, hosts and VMs:

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Cluster CPU Usage</td>
<td>This monitor tracks CPU usage in the cluster (in percentage).</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Disk Latency Analysis</td>
<td>This monitor tracks latency for cluster disks.</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Memory Usage</td>
<td>This monitor tracks memory usage and demand for VM workloads on hosts in a cluster.</td>
</tr>
<tr>
<td>Monitor</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Volume Free Space</td>
<td>This monitor tracks percentage of free space on the Hyper-V Cluster Shared Volumes.</td>
</tr>
<tr>
<td>Veeam HyperV: Host CPU Usage Analysis</td>
<td>This monitor tracks CPU usage on the Hyper-V host (including host partition usage and VMs usage).</td>
</tr>
<tr>
<td>Veeam HyperV: Host Memory Pages/sec</td>
<td>This monitor tracks host partition memory demand.</td>
</tr>
<tr>
<td>Veeam HyperV: Host Memory Usage Analysis</td>
<td>This monitor tracks percentage of memory that is currently allocated to either VMs or host partition (compared to all available memory).</td>
</tr>
<tr>
<td>Veeam HyperV: Host Network Queue Length</td>
<td>These monitors track the number of threads waiting on the physical and virtual network adapters.</td>
</tr>
<tr>
<td>Veeam HyperV: Host Local Disk Latency Analysis</td>
<td>This monitor tracks read and write latency values for Hyper-V host local disks (if used for VM storage).</td>
</tr>
<tr>
<td>Veeam HyperV: Local Volume Free Space</td>
<td>This monitor tracks percentage of free space on Hyper-V host local volumes (if used for VM storage).</td>
</tr>
<tr>
<td>Veeam HyperV: VM Checkpoint Analysis</td>
<td>This monitor tracks the age and size of VM checkpoints.</td>
</tr>
<tr>
<td>Veeam HyperV: VM CPU Usage</td>
<td>This monitor tracks CPU usage for the guest OS.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Memory Pressure Analysis</td>
<td>This monitor tracks memory demand for the VM.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Storage Errors</td>
<td>This monitor tracks errors that have occurred on the virtual storage device.</td>
</tr>
</tbody>
</table>

Full description of all Veeam Hyper-V MP monitors is provided in Appendix C.
Performance Views

A set of performance views is available in view subfolders, showing the performance of discovered Hyper-V cluster, hosts and virtual machines. The following performance views are available in the Veeam Hyper-V MP:

- **Cluster Performance**
  Shows CPU and memory utilization statistics for the cluster.

- **Host Performance**
  Shows statistics on Hyper-V host CPU, memory, network and disk utilization, number of configured virtual processors and number of VMs running on the host.

- **SMB Shared Volume Performance**
  Shows statistics for free space left on SMB shares.

- **Cluster Disk Performance**
  Shows disk usage performance statistics for the cluster.

- **Cluster Volume Performance**
  Shows statistics for free space left on CSVs.

- **Local Disk Performance**
  Shows disk usage performance statistics for host local disks.

- **Local Volume Performance**
  Shows statistics for free space left on host local disks.

- **VM In-Guest Performance**
  Shows in-guest performance statistics for virtual machines that have Ops Mgr agent installed in the OS.

- **VM Performance**
  Shows statistics on virtual machine CPU, memory, network and disk performance.

Example screenshot below shows CPU and memory usage for the Hyper-V cluster.
Analysis Dashboards

In-context Analysis Dashboards help you quickly drill down into the root cause of a problem and speed the troubleshooting process. These dashboards can be launched directly from any view in-context of the target object and allow you to analyze the metric history for a specific performance area.

The screenshot below shows a Hyper-V host selected — this makes the Host Compute Analysis Dashboard available in the Navigation pane of the Tasks sidebar.

The Host Compute Analysis dashboard is shown below.
Top Dashboards

Top dashboards show top virtual infrastructure objects for resource usage. There are three top dashboards available in the root Veeam for Hyper-V folder:

- Top Hosts
- Top Clustered Storage
- Top SMB Storage
- Top Virtual Machines

One additional top dashboard is within the Storage subfolder of views — Top Local Storage.

Example screenshot below shows the top hosts for CPU usage, memory usage, memory pressure and memory pages/sec.

To speed up performance analysis and identify infrastructure objects with performance issues, Veeam Top Dashboards feature Traffic Lights functionality — that is, warning and critical thresholds that are used to color objects in the widgets. For example, the screenshot above shows that one host is in yellow (warning) state for % Memory Used, and one host is in red (critical) state.

**NOTE:**

Performance data in Top dashboards is averaged over the last 4 hours.

The bars on the charts will be highlighted with traffic light colors:

- If the Critical threshold is breached, performance metric value will be highlighted with Red
- If the Warning threshold is breached, performance metric value will be highlighted with Yellow
- If the none of the thresholds is breached, performance metric value will be highlighted with Green

The default configuration of the traffic light widgets can be customized. For details on changing widget settings, see section Personalizing Veeam Dashboard Widgets.
Heatmap Dashboards

Heatmap dashboards compare two dimensions of performance metric values for objects and represent data as a heatmap. Heatmap objects are represented both by size of each heatmap tile, and by the color of each tile. Tiles are also grouped.

There are three heatmap dashboards available in the root Veeam for Hyper-V folder:

- **Heatmap - Host Compute** dashboard shows CPU and memory usage for Hyper-V hosts.
- **Heatmap - Checkpoint Finder** dashboard shows used storage space and snapshot age for virtual machines residing on clustered storage volumes.
- **Heatmap - VM Storage and Power VM** dashboard shows used storage space and the state of virtual machines residing on clustered storage volumes.

Two additional heatmaps are within the Storage subfolder of views:

- **Heatmap - VM Checkpoint Finder (by Host)** dashboard shows allocated storage space and snapshot age for virtual machines grouped by Host. This allows viewing of VMs which run only on host local storage.
- **Heatmap - VM Storage and Power (by Host)** dashboard shows used storage space and the state of virtual machines grouped by Host. This allows viewing of VMs which run only on host local storage.

Heatmaps are also leveraged in the in-context dashboards, available in the Navigation section of the Tasks pane of Ops Mgr console when certain objects/alerts are selected:

- Select a Hyper-V Cluster to make the Cluster Compute Analysis and VM Compute Heatmaps dashboards available
- Select a Hyper-V Host to make the Host Compute Analysis dashboard available

Example screenshot below shows the heatmap for host CPU and memory usage. The size of each tile represents the available CPU or memory for each host; and the color of the tile represents the % usage of CPU or memory.

The default configuration of the heatmap widgets can be customized. For details on changing widget settings, see section Personalizing Veeam Dashboard Widgets.
Capacity Planning Dashboards

Capacity planning dashboards allow you to forecast the resource utilization for Hyper-V infrastructure objects. To calculate future performance values, Veeam MP analyzes historical performance data for the specified period in the past, calculates the performance utilization trend and applies this trend to the forecast horizon.

**NOTE:**
Capacity Planning dashboards, as with Capacity Planning reports, require an Enterprise Plus license for the Veeam MP.

There are 2 capacity forecast dashboards available in the root Veeam for Hyper-V folder:

- **Cluster Capacity Forecast** — forecasts how many days remain before the level of CPU and memory utilization in a Hyper-V cluster reaches the specified threshold values.

- **Storage Capacity Forecast** — forecasts how many days remain before the free space on clustered storage volumes reaches the specified threshold values.

Example screenshot below shows the forecast on the number of days left before the level of free space on storage reaches 5%:

The default configuration of the capacity planning widgets can be customized. For details on changing widget settings, see section **Personalizing Veeam Dashboard Widgets**.
Personalizing Veeam Dashboard Widgets

You can customize the default widget settings to personalize these Veeam MP dashboards:

- Morning Coffee Dashboard
- Top Dashboards
- Heatmap Dashboards
- Capacity Planning Dashboards

This section describes how you can change widget settings for inbuilt Veeam MP dashboards. To learn how to create new widgets, see Appendix D.

Morning Coffee Dashboard

To change the default settings for the Morning Coffee widget:

1. Open the Morning Coffee Dashboard.
2. Click the gear icon to the right of the widget name and select **Personalize**.
3. Specify values for the **CPU**, **RAM** and **Storage** thresholds.

**NOTE:**

Configured thresholds will apply only to the Resource Usage pane of the widget.

Click **Finish**.
As a result, the **Resource Usage** pie charts on the heatmap will be highlighted as follows:

- Chart slices that display free resources left will be highlighted with *Gray*.
- If a **Warning** resource usage threshold is breached, a chart slice will be highlighted with *Yellow*.
- If a **Critical** resource usage threshold is breached, a chart slice will be highlighted with *Red*.
- If none of thresholds is breached, a chart slice will be highlighted with *Green*.

To return back to the default widget settings, choose to personalize the widget and click **Revert**.
Personalizing Traffic Lights Widgets

You can enable the traffic light feature for Top Dashboard widgets, or change the default widget thresholds:

1. Open a Top Dashboard.
2. Click the gear icon to the right of the widget name and select **Personalize**.
3. Select the **Use Warning (yellow) and Critical (red) thresholds for the bar color** check box.
4. Specify values for the **Warning** and **Critical** thresholds.
5. Click **Finish**.

As a result, the bars on the charts will be highlighted with traffic light colors:

- If the **Critical** threshold is breached, performance metric value will be highlighted with **Red**.
- If the **Warning** threshold is breached, performance metric value will be highlighted with **Yellow**.
- If none of the thresholds is breached, performance metric value will be highlighted with **Green**.

For example, the screenshot below shows the Top Hosts dashboard with the % CPU Used and % Memory Used metrics set to 80% for **Warning** and 90% for **Critical** thresholds.
To return back to the default widget settings, choose to personalize the widget and click **Revert**.

**Personalizing Heatmap Widgets**

To change the default settings for a Heatmap widget:

1. Open a Heatmap Dashboard.
2. Click the gear icon to the right of the widget name and select **Personalize**.
3. Clear the **Automatic (the maximum value will be used for Red)** check box.
4. Specify values for the **Minimum** and **Maximum** thresholds.
5. Select the **Display the color range bar and value range below the widget** check box to show a legend bar with threshold below the heatmap.
6. Click **Finish**.

As a result, the object tiles on the heatmap will be highlighted as follows:

- If the **Minimum** threshold is breached, an object on the heatmap will be highlighted with **Yellow**.
- If the **Maximum** threshold is breached, an object on the heatmap will be highlighted with **Red**.
- If none of the thresholds is breached, an object on the heatmap will be highlighted with **Green**.
- If no metric value is available, an object on the heatmap will be highlighted with **Gray**.
For example, the screenshot below shows the Heatmap - Host Compute dashboard with thresholds set for the Host CPU and Host Memory metrics.

To return back to the default widget settings, choose to personalize the widget and click Revert.
Personalizing Capacity Planning Widgets

To change the default settings for a Capacity Planning widget:

1. Open a Capacity Planning Dashboard.
2. Click the gear icon to the right of the widget name and select Personalize.
3. At the **Specify forecast horizon** step, specify the data collection period and forecast horizon.

   - The first parameter defines a date in the past starting from which historical performance data will be used to calculate the performance trend. The report analyzes historical performance data starting from this date to the current date.
   
   - The second parameter defines the forecast period. The calculated performance utilization trend is applied to the time interval that starts from the current date to the forecast horizon date.
4. At the **Resources** step, define a threshold for a performance metric.

As a result, for each metric, the widget will calculate the number of days after which resource utilization threshold will be breached:

- The period remaining before a threshold is breached will be highlighted with **Green**.
- The period after the threshold is breached will be highlighted with **Red**.

For example, the screenshot below shows the Storage Capacity Forecast dashboard with the 5% threshold for the **% Free Space** metric.

![Storage Capacity Forecast](image)

To return back to the default widget settings, choose to personalize the widget and click **Revert**.
Veeam Task Manager for Hyper-V

The Task Manager built-in to Windows is not useful in a Hyper-V host; because the CPU and memory usage shown there does not show which virtual machines are using those resources. Veeam Task Manager for Hyper-V solves that problem with a unique **realtime** view of cluster, host and VM compute resources, embedded into Operations Manager as an on-demand dashboard.

Veeam Task Manager for Hyper-V is available as an in-context widget when a Hyper-V cluster or host is selected.

Example screenshot below shows CPU and memory usage for a Hyper-V host.

![Veeam Task Manager for Hyper-V screenshot](image-url)
NOTE:

The compute resources consumed by each VM are shown as a percentage of total host resources (not as percentage of resources allocated to the VM).

If you run the Ops Mgr console remotely, allow remote connections to Hyper-V hosts from the console. Otherwise, the Task Manager will not be able to connect to remote hosts and display performance statistics. For details, see Required Permissions.
Alerts and Knowledge Base

The Alert views reveal current issues in your Hyper-V environment.

Veeam Hyper-V MP includes _All Active Alerts_ view under the Veeam for Hyper-V folder, showing all alerts generated by the Veeam MP for Hyper-V.

For each alert, you can view a knowledge base article that provides detailed information about the issue, possible cause description, resolution steps and links to external resources.
Veeam Hyper-V MP Reports

Veeam Hyper-V MP includes a comprehensive set of proprietary reports with rich functionality. There are 2 report packs included in the Veeam Hyper-V MP:

- **Veeam Hyper-V Analysis Reports**
- **Veeam Hyper-V Capacity Planning Reports**

This guide describes report sample usage only. For detailed report knowledge, see Veeam MP Report Knowledge.

There are also several common Veeam MP reports that work both for the Hyper-V and VMware infrastructure. This guide does not describe reports included in the Veeam Report Library and Veeam Capacity Planning for Hybrid Clouds pack. For details on these reports, see Veeam MP Report Knowledge.

## Veeam Hyper-V Analysis Reports

This report pack contains valuable reports for analyzing and optimizing your Hyper-V environment, for example right-sizing VMs, finding Idle VMs, finding mis-used and over-provisioned storage.

**NOTE:**

The report pack includes a list of generic and linked reports and can be used only if you have the Veeam Report Library installed.

The report pack includes the following reports:

- **Hyper-V Overprovisioned Storage**
- **Virtual Machines. Checkpoint Summary**
- **Virtual Machines. Guest OS Summary**
- **Infrastructure Summary**
- **Stressed Hosts**
- **Virtual Machines. Uptime Statistics**
- **Top Noisy Hyper-V objects**
- **Configuration Tracking and Alert Correlation**
- **Hyper-V Storage Performance Profile Analysis**
- **Virtual Machines. Idle VMs**
- **Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU**
- **Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU**
Hyper-V Overprovisioned Storage

Dynamic disk technology allows administrators to allocate for virtual machines more storage space than there is real physical capacity. The **Hyper-V Overprovisioned Storage** report helps you reveal excessive storage overprovisioning in your virtual environment.

**Sample Usage**

This section provides step-by-step instructions that will help you understand how to create the Hyper-V Overprovisioned Storage report. Consider the following example:

*You need to report on disks with the largest amount of provisioned storage space. Use statistics for the previous month as a ground for the report analysis.*

**Step 1. Open the Hyper-V Overprovisioned Storage Report**

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Hyper-V Overprovisioned Storage report. Alternatively, right-click the Hyper-V Overprovisioned Storage report in the Reporting Pane and choose Open.

**Step 2. Define Time Intervals**

Choose the time range for the report.

1. From the **From** list, choose *Previous month > First day*.
2. From the **To** list, choose *Previous month > Last day*.
Step 3. Choose Sorting Options

Use the **Show details** list to define how data will be sorted in the report tables. To follow this example, choose **Highest Disk Pressure**.

Step 4. Choose Aggregation Type

Define whether the data in the report will be aggregated to **Hourly** or **Daily** values.

Step 5. Choose Report Scope

To follow this example, leave the **Scope** section without changes.

Step 6. Run the Report

When finished, click **Run** to view the report.
Report Output

The **TOP 5 Over-provisioned Datastores (GB)** chart will show 5 most over-provisioned storage objects, and graphically display the difference between capacity, provisioned and used space. The **TOP 10 Over-allocated by Storage VMs** chart will show 10 VMs with excessive amount of allocated space, and graphically display the difference between allocated used and unused space.

In this example, the report shows that the most over-provisioned storage of the previous month was *smb-v2*, while the *vm_share_v4* VM had the greatest amount of unused allocated space.
For each storage object, details tables will provide information on the number of VMs residing on disk, free and provisioned space, capacity, disk pressure and the percentage of provisioned space that is actually used.

### CSV Storage

<table>
<thead>
<tr>
<th>Storage</th>
<th>Cluster</th>
<th>VMs</th>
<th>Free Space (GB)</th>
<th>Capacity (GB)</th>
<th>Provisioned (GB)</th>
<th>Disk Pressure (%)</th>
<th>Provisioned Space Usage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume-smb2</td>
<td>sv1</td>
<td>1</td>
<td>3</td>
<td>8</td>
<td>7</td>
<td>87.5</td>
<td>73.86</td>
</tr>
<tr>
<td>smb-v3</td>
<td>sv1</td>
<td>2</td>
<td>8</td>
<td>20</td>
<td>12</td>
<td>60</td>
<td>100.01</td>
</tr>
<tr>
<td>small offline</td>
<td>sv1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>33.33</td>
<td>99</td>
</tr>
</tbody>
</table>

You can click a number in the **VMs** column of a details table to drill down to performance charts and statistics on storage space usage.

### SMB Storage

<table>
<thead>
<tr>
<th>Share</th>
<th>SMB Server</th>
<th>VMs</th>
<th>Free Space (GB)</th>
<th>Capacity (GB)</th>
<th>Provisioned (GB)</th>
<th>Disk Pressure (%)</th>
<th>Provisioned Space Usage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>sv1</td>
<td>sv1</td>
<td>1</td>
<td>3.15</td>
<td>8</td>
<td>1</td>
<td>12.5</td>
<td>463.11</td>
</tr>
<tr>
<td>lw2</td>
<td>lw2</td>
<td>1</td>
<td>14.24</td>
<td>35</td>
<td>1</td>
<td>6.67</td>
<td>72.75</td>
</tr>
<tr>
<td>lw3</td>
<td>lw2</td>
<td>1</td>
<td>40.39</td>
<td>80</td>
<td>1</td>
<td>1.25</td>
<td>3531.94</td>
</tr>
<tr>
<td>lw2</td>
<td>sv2</td>
<td>1</td>
<td>42.89</td>
<td>50</td>
<td>1</td>
<td>1.25</td>
<td>2592</td>
</tr>
<tr>
<td>sv1</td>
<td>sv1</td>
<td>1</td>
<td>1.74</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Local Storage

<table>
<thead>
<tr>
<th>Storage</th>
<th>Host</th>
<th>VMs</th>
<th>Free Space (GB)</th>
<th>Capacity (GB)</th>
<th>Provisioned (GB)</th>
<th>Disk Pressure (%)</th>
<th>Provisioned Space Usage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1</td>
<td>HV1-g816-vm</td>
<td>1</td>
<td>6</td>
<td>8</td>
<td>1</td>
<td>12.5</td>
<td>203</td>
</tr>
<tr>
<td>C1</td>
<td>HV1-g816-vm</td>
<td>1</td>
<td>29</td>
<td>80</td>
<td>2</td>
<td>2.5</td>
<td>2560.1</td>
</tr>
<tr>
<td>C1</td>
<td>HV2-g816-vm</td>
<td>2</td>
<td>44.97</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>C1</td>
<td>HV2-g816-vm</td>
<td>2</td>
<td>14</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Virtual Machines. Checkpoint Summary

Outdated checkpoints consume valuable storage resources and grow at a higher than standard disk rate. In addition, removing or merging checkpoints may cause VM downtimes, since Hyper-V generates additional storage traffic while performing these tasks. That is why best practices for checkpoints recommend that you delete checkpoints older than 3 days, since they no longer reflect recent VM changes.

The **Virtual Machines. Checkpoint Summary** report helps you detect outdated checkpoints and better address the problem of wasted storage space.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the **Virtual Machines. Checkpoint Summary** report. Consider the following example:

> You need to report on existing VM checkpoints and display checkpoint size and age statistics for this month.

### Step 1. Open the Virtual Machines. Checkpoint Summary Report

Open the Reporting Pane, select **Veeam Hyper-V Analysis Reports** and double-click the **Virtual Machines. Checkpoint Summary** report. Alternatively, right-click the **Virtual Machines. Checkpoint Summary** report in the Reporting Pane and choose **Open**.

### Step 2. Define Time Intervals

This parameter does not influence the **Virtual Machines. Checkpoint Summary** report output. It applies only to the drill-down **Performance Details Report** that is launched when you click a VM name in the **Virtual Machine** column of the output table.

For more information on the **Performance Details Report**, see Veeam Report Library Help.
Step 3. Choose Report Scope

To follow this example, leave the Scope section without changes.

Step 4. Run the Report

When finished, click Run to view the report.

Report Output

The report will provide the list of VMs with checkpoints. For each VM, the report will show the number of checkpoints, and the date and time when the oldest and the newest checkpoints were created. For each checkpoint, the report will detail its name, creation date, size and description.

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>Snapshot Name</th>
<th>Newest snapshot</th>
<th>Oldest snapshot</th>
<th>size (MB)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vm_test</td>
<td>2 Snapshots</td>
<td>6/1/2015 11:27:29 AM</td>
<td>5/31/2015 2:05:07 AM</td>
<td>0.183</td>
<td></td>
</tr>
<tr>
<td>vm_24</td>
<td>7 Snapshots</td>
<td>5/31/2015 7:22:17 PM</td>
<td>5/30/2015 2:20:16 AM</td>
<td>0.424</td>
<td></td>
</tr>
<tr>
<td>vm_hyper</td>
<td>7 Snapshots</td>
<td>5/24/2015 11:05:04 PM</td>
<td>5/24/2015 5:05:03 AM</td>
<td>0.230</td>
<td></td>
</tr>
<tr>
<td>vm_test22</td>
<td>6 Snapshots</td>
<td>5/30/2015 10:10:02 PM</td>
<td>5/30/2015 2:05:28 AM</td>
<td>0.197</td>
<td></td>
</tr>
<tr>
<td>vm1</td>
<td>6 Snapshots</td>
<td>5/31/2015 1:00:29 PM</td>
<td>5/12/2015 12:04:16 PM</td>
<td>0.197</td>
<td></td>
</tr>
<tr>
<td>vm2</td>
<td>1 Snapshot</td>
<td>5/31/2015 7:44:53 AM</td>
<td>5/12/2015 7:44:53 AM</td>
<td>0.014</td>
<td></td>
</tr>
<tr>
<td>vm_test2</td>
<td>1 Snapshot</td>
<td>5/29/2015 6:40:22 AM</td>
<td>5/29/2015 6:40:22 AM</td>
<td>0.035</td>
<td></td>
</tr>
</tbody>
</table>
Click a VM name in the **Virtual Machine** column of the output table to drill down to the Veeam Performance Details Report and review how the *CheckpointsSize* and *CheckpointsAge* VM performance metric values have been changing during this month.

### Performance Details

#### Report description:

#### Report parameters:

---

**Rule: Veeam Hyper-V VM Checkpoint Age**

---

**Rule: Hyper-V VM Checkpoints(Age Hours) (Veeam Hyper-V VM Checkpoint Age)**

**Included Objects**

<table>
<thead>
<tr>
<th>Interval</th>
<th>Sample Count</th>
<th>Min Value</th>
<th>Max Value</th>
<th>Average Value</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>505</td>
<td>11,197.34</td>
<td>11,360.26</td>
<td>11,278.52</td>
<td>6.80</td>
</tr>
</tbody>
</table>
Virtual Machines. Guest OS Summary

The Virtual Machines. Guest OS Summary report analyzes virtual infrastructure configuration to show all types of guest OSes installed on VMs, and the number of VMs that run OS of a specific type.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Virtual Machines. Guest OS Summary report. Consider the following example:

You need to report on top 10 most commonly used VM guest OSes in your environment. Use statistics for the previous two months as a ground for the report analysis.

Step 1. Open the Virtual Machines. Guest OS Summary Report

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Virtual Machines. Guest OS Summary report. Alternatively, right-click the Virtual Machines. Guest OS Summary report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

Choose the time range for the report.

1. From the From list, choose This month > First day.
2. From the To list, choose Today.
Step 3. Choose How to Display Report Output

Use the **Merge Editions** and **Merge Bits** lists to define whether data in the report output will be broken down by OS editions and by OS bit count. If you choose to merge editions, different editions of the same OS will be shown as one record in the report output. If you choose to merge bits, 32-bit and 64-bit versions of the same OS will be shown as one record in the report output.

![Virtual Machines: Guest OS Summary - Operations Manager - Report - win2012r2](image)

Step 4. Choose Number of Guest OSes to Display

To follow this example, type *10* in the **Count** field.

![Virtual Machines: Guest OS Summary - Operations Manager - Report - win2012r2](image)

Step 5. Choose Report Scope

To follow this example, leave the **Scope** section without changes.

Step 6. Run the Report

When finished, click **Run** to view the report.
Report Output

The report will show a top-10 list of guest operating systems installed on VMs in your environment. For each guest OS, the report will display a number of VMs which run the OS.

Virtual Machines. Guest OS Summary

- Report description

- Report parameters

<table>
<thead>
<tr>
<th>Virtual Infrastructure by Guest Operating System</th>
<th>Guest OS</th>
<th>Number of VMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Microsoft Windows Server 2008 R2 (64-bit)</td>
<td>491</td>
</tr>
<tr>
<td>2</td>
<td>Microsoft Windows Server 2012 (64-bit)</td>
<td>301</td>
</tr>
<tr>
<td>3</td>
<td>Other Linux (64-bit)</td>
<td>218</td>
</tr>
<tr>
<td>4</td>
<td>Microsoft Windows Server 2003 (32-bit)</td>
<td>121</td>
</tr>
<tr>
<td>5</td>
<td>Microsoft Windows 7 (32-bit)</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>Other Linux (32-bit)</td>
<td>79</td>
</tr>
<tr>
<td>7</td>
<td>Microsoft Windows Server 2003 (64-bit)</td>
<td>55</td>
</tr>
<tr>
<td>8</td>
<td>WindowsHyperVGuest</td>
<td>31</td>
</tr>
<tr>
<td>9</td>
<td>NOT AVAILABLE</td>
<td>24</td>
</tr>
<tr>
<td>10</td>
<td>Other (64-bit)</td>
<td>22</td>
</tr>
</tbody>
</table>
Infrastructure Summary

The **Infrastructure Summary** report reveals the necessary Hyper-V inventory configuration specifics and allows you to evaluate current resource utilization in your Hyper-V infrastructure.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the **Infrastructure Summary** report. Consider the following example:

> You need to collect data on resource usage and configuration of your virtual environment for the previous month.

Step 1. Open the Infrastructure Summary Report

Open the Reporting Pane, select **Veeam Hyper-V Analysis Reports** and double-click the **Infrastructure Summary** report. Alternatively, right-click the **Infrastructure Summary** report in the Reporting Pane and choose **Open**.

Step 2. Define Time Intervals

Choose the time range for the report.

1. From the **From** list, choose *Previous month > First day*.
2. From the **To** list, choose *Previous month > Last day*.
Step 3. Choose How to Display Report Charts

Use the Show details list to define whether you want the report to show expanded or collapsed charts.

Step 4. Choose Aggregation Type

Define whether the data in the report will be aggregated to Hourly or Daily values.
Step 5. Choose VM States and Specify Service Level Objective

These parameters do not influence the **Infrastructure Summary** report output. They apply only to the drill-down **Veeam State Summary Report** that is launched when you click the **State History** link in the output table.

For more information on the **Veeam State Summary Report**, see Veeam Report Library Help.

![Image of Veeam State Summary Report]

Step 6. Choose Report Scope

To follow this example, leave the **Scope** section without changes.

Step 7. Run the Report

When finished, click **Run** to view the report.
Report Output

The report will provide summary information on the selected infrastructure scope: the total number of SCVMM Servers (if present), clusters, hosts, VMs, SMB shares and CSVs, as well as total CPU, memory and disk resources.

The Virtual Infrastructure Density table will show the following consolidation ratios:

- **Host : Cluster ratio** — the average number of hosts in a cluster;
- **VM : Host ratio** — the average number of VMs running on a host;
- **vCPU : CPU ratio** — the average number of vCPUs configured for a single physical processor;
- **VM : Storage device ratio** — the average number of VMs on a CSV or SMB share.

The **Top 10 Guest Operating Systems** table will show a list of guest operating systems installed on VMs in your environment.

---

### Infrastructure Summary

<table>
<thead>
<tr>
<th>Virtual Infrastructure Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMM Servers:</td>
</tr>
<tr>
<td>Clusters:</td>
</tr>
<tr>
<td>Hosts:</td>
</tr>
<tr>
<td>VMs:</td>
</tr>
<tr>
<td>CSVs:</td>
</tr>
<tr>
<td>SMB shares:</td>
</tr>
<tr>
<td>Total CPU (GHz)</td>
</tr>
<tr>
<td>Total Memory (GB)</td>
</tr>
<tr>
<td>Total Disk Capacity (TB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top 10 Guest Operating Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest OS</td>
</tr>
<tr>
<td>Number of VMs</td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 R2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Virtual Infrastructure Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host : Cluster ratio</td>
</tr>
<tr>
<td>VM : Host ratio</td>
</tr>
<tr>
<td>vCPU : CPU ratio</td>
</tr>
<tr>
<td>VM : Storage device ratio</td>
</tr>
</tbody>
</table>
Details tables will display configuration properties of SCVMM Servers, clusters, CSVs, SMB shares and host systems. For each CSV and SMB share, the report will also provide information on its capacity and the amount of provisioned, used and free space.

You can click the **State History** link in a details table to drill down to the Veeam State Summary Report and review uptime and downtime statistics for the infrastructure object.

### State Summary

**Report description:**

**Report parameters:**

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Object</th>
<th>1st Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-V Host (VMM MD)</td>
<td>6.18</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hyper-V Host (VMM MD)</td>
<td>10746.74</td>
<td>99.96%</td>
</tr>
</tbody>
</table>
You can click a number in the **CPU Usage %**, **Memory Pressure %**, **Memory Usage %**, **Pressure** or **VMs** column of a details table to drill down to performance details for the infrastructure object.

**Performance Details**

- **Report description:**
- **Report parameters:**

**Rule: Veeam Hyper-V VM Virtual Processor % Total Run Time**
Stressed Hosts

The **Stressed Hosts** report helps you to detect resource demanding virtual machines that fail to operate because the hosts where these VMs reside are not capable to sustain the workload.

The report analyzes historical performance, configured resource allocation and current workloads to provide recommendations for an optimized allocation of resources.

The report can be used in addition to the **Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU** and **Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU** reports to detect VMs not discovered by the right-sizing reports but still experiencing lack of available resources.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the **Stressed Hosts** report. Consider the following example:

You need to report on Hyper-V hosts in your infrastructure that have performance issues and display top 5 resource demanding VMs running on the hosts, assuming that the maximum CPU dispatch wait time has to be lower than 15%. Use performance statistics for the previous quarter as a ground for the report analysis; omit statistics collected on Saturdays and Sundays.

**Step 1. Open the Stressed Hosts Report**

Open the Reporting Pane, select **Veeam Hyper-V Analysis Reports** and double-click the **Stressed Hosts** report. Alternatively, right-click the **Stressed Hosts** report in the Reporting Pane and choose **Open**.

**Step 2. Define Time Intervals**

Choose the time range for the report.

1. From the **From** list, choose *Previous quarter > First day*.
2. From the **To** list, choose *Previous quarter > Last day*.
3. In the **Include week days** field, clear check boxes next to *Saturday* and *Sunday*.
Step 3. Choose How to Display Report Charts

Use the **Show details** list to define whether you want the report to show expanded or collapsed charts.

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Choose How to Display Report Charts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use the <strong>Show details</strong> list to define whether you want the report to show expanded or collapsed charts.</td>
</tr>
</tbody>
</table>

![Image of report chart settings]

**Step 4. Specify Threshold Value**

Specify the CPU dispatch wait time threshold. To follow this example, type **15** in the **Threshold: Dispatch (%)** field.

<table>
<thead>
<tr>
<th>Step 4</th>
<th>Specify Threshold Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specify the CPU dispatch wait time threshold. To follow this example, type <strong>15</strong> in the <strong>Threshold: Dispatch (%)</strong> field.</td>
</tr>
</tbody>
</table>

![Image of report chart settings]

**Step 5. Choose Report Scope**

To follow this example, leave the **Scope** section without changes.

<table>
<thead>
<tr>
<th>Step 5</th>
<th>Choose Report Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To follow this example, leave the <strong>Scope</strong> section without changes.</td>
</tr>
</tbody>
</table>
Step 6. Define Resource to be Analyzed

To follow this example, choose both **vRAM** and **vCPU** in the **Sections to show** section.

Step 7. Choose Number of VMs to Display

To follow this example, type **5** in the **Top N Count** field.
Step 8. Choose How to Assess VM Performance

Use the **Performance Modeling Based On** list to define whether the report will use maximum (peak) or average CPU historical values to assess VM performance.

Step 9. Run the Report

When finished, click **Run** to view the report.

Report Output

The report will display a list of hosts that are running low on CPU and memory resources. For each stressed host, the report will show current host CPU configuration and summary information on the amount of total and available memory resources.

**NOTE:**

All recommendations are based on the current configuration. So, if a virtual machine has no current configuration (is turned off or decommissioned), it will not be included in the report.

In the **Stressed Hosts: Memory** section, click the plus sign next to the name of a stressed host to see the list of stressed VMs, their current and recommended vRAM allocation, maximum memory pressure and maximum vRAM usage values.

You can click the plus sign next to the name of a stressed VM to analyze how the maximum memory pressure level and the amount of available memory resources have changed for the VM during the reporting interval.
Stressed Hosts

Report description

Report parameters

Stressed Hosts: Memory

<table>
<thead>
<tr>
<th>RAM analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VMs processed</td>
</tr>
<tr>
<td>Stressed VMs</td>
</tr>
<tr>
<td>VMs that cannot be analyzed (*)</td>
</tr>
</tbody>
</table>

(*) Analysis may fail and VM will be excluded from report if
** There is existing historical configuration or performance data in the data warehouse for that VM.
** VM has no current configuration.

(**) All recommendations are based on historical performance data. Please verify current VM configuration and workload before applying recommended changes.

These servers can not allocate enough memory for the following virtual machines.

<table>
<thead>
<tr>
<th>Server Name</th>
<th>Host Total Memory (GiB)</th>
<th>Host Available Memory (GiB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.00</td>
<td>1.23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>Current vRAM Allocation (GiB)</th>
<th>Maximum Pressure %</th>
<th>Maximum vRam Usage (GiB)</th>
<th>Recommended vRAM Allocation (GiB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>vm_br_vlad</td>
<td>9.60</td>
<td>33.00</td>
<td>0.50</td>
<td>0.21</td>
</tr>
</tbody>
</table>

In the Stressed Hosts: CPU section, click the plus sign next to the name of a stressed host to see the list of stressed VMs, their current vCPU allocation, maximum/average CPU dispatch wait time values and the percentage of physical processor time being consumed by these VMs.

You can click the plus sign next to the name of a stressed VM to analyze how the CPU dispatch wait time (maximum and average) values have changed for the VM during the reporting interval.
The RAM analysis and CPU analysis tables will show the total number of processed VMs, number of stressed VMs and VMs that cannot be analyzed.

You can click the name of a stressed VM in the Stressed Hosts: CPU or Stressed Hosts: Memory table, or the Stressed VMs link in the CPU analysis or RAM analysis table to drill down to performance details for these VMs.
You can click the *VMs that cannot be analyzed* link in the **RAM analysis** and **CPU analysis** tables to drill down to performance details for these VMs.

### Performance Details

**Report description:**

**Report parameters:**

**Rule: Veeam Hyper-V VM Memory Pressure %**

![Graph showing Veeam Hyper-V VM Memory Pressure % over time]

**Rule: Hyper-V Dynamic Memory VM% Memory Pressure (Veeam Hyper-V VM Memory Pressure %)**

#### Included Objects

<table>
<thead>
<tr>
<th>Interval</th>
<th>Sample Count</th>
<th>Min Value</th>
<th>Max Value</th>
<th>Average Value</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule values</td>
<td>7824</td>
<td>29.00</td>
<td>33.00</td>
<td>30.63</td>
<td>0.41</td>
</tr>
</tbody>
</table>
Virtual Machines. Uptime Statistics

This report is designed to track VM availability, by reporting on the Veeam HyperV: Virtual Machine Uptime monitor.

For VMs with Hyper-V Integration Services installed, the monitor will show true availability of the virtualized OS. If Hyper-V Integration Services are not installed, then the power state of the VM will be tracked.

The report can be used to track and confirm the uptime of virtualized workloads, for reporting in Service Level agreements, downtime and outage analysis and so on.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Virtual Machines. Uptime Statistics report. Consider the following example:

You need to identify VMs whose uptime was less than 85% during the previous week.

Step 1. Open the Virtual Machines. Uptime Statistics Report

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Virtual Machines. Uptime Statistics report. Alternatively, right-click the Virtual Machines. Uptime Statistics report in the Reporting Pane and choose Open.

Step 2. Choose Aggregation Type

Define whether the data in the report will be aggregated to Hourly or Daily values.
Step 3. Define Time Intervals

Choose the time range for the report.

1. From the From list, choose Previous week > Monday.
2. From the To list, choose Previous week > Friday.

Step 4. Choose Report Scope

To follow this example, leave the Scope section without changes.

Step 5. Choose VM States

Use the Show details list to choose VM states that you consider unhealthy (for example, Critical, Warning and Unmonitored).
Step 6. Specify Service Level Objective

To follow this example, type 85 in the SLO (%) field.

Step 7. Choose Sorting Options

Define whether data in the report will be sorted by Virtual Machine Name, Up Time or Down Time. Define also the sorting order for results in the report table (Ascending or Descending).

Step 8. Run the Report

When finished, click Run to view the report.
Report Output

The report output below shows Up/Down time in absolute values and percentage.

NOTE:
If you use daily aggregation, mind that with default data grooming and aggregation settings, the current date may not have a datapoint in the data warehouse. In this case, the object will be marked Unmonitored for the current day, which means the object will have downtime.

For more accurate reporting results, you can exclude the current day from the reporting period.

The green graph on the chart will represent healthy states, the red graph will represent unhealthy states. The SLO bar will be highlighted pink or grey, according to the following rule:

- Grey: The percentage of time when the VM was in a healthy state is above the SLO (%). That is, the VM was in a healthy state more than 85% of time during the reporting period.
- Pink: The percentage of time when the VM was in a healthy state is below the SLO (%). That is, the VM was in an unhealthy state less than 85% of time during the reporting period.

Virtual Machines. Uptime Statistics

Report parameters:

<table>
<thead>
<tr>
<th>Member Name</th>
<th>Object Description</th>
<th>Up Time</th>
<th>Up Time %</th>
<th>Down Time</th>
<th>Down Time %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam Hyper-V VM Uptime (Operation Monitor)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>79.45%</td>
<td>79.45%</td>
<td>20.55%</td>
<td>20.55%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Health (0.216)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>100.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Heartbeat (0.216)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>79.45%</td>
<td>79.45%</td>
<td>20.55%</td>
<td>20.55%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Power State (0.216)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>100.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Uptime (Operation Monitor)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>95.79%</td>
<td>95.79%</td>
<td>4.21%</td>
<td>4.21%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Uptime (Operation Monitor)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>100.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Uptime (Operation Monitor)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>95.79%</td>
<td>95.79%</td>
<td>4.21%</td>
<td>4.21%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Uptime (Operation Monitor)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
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<td>95.79%</td>
<td>4.21%</td>
<td>4.21%</td>
</tr>
<tr>
<td>Veeam Hyper-V VM Uptime (Operation Monitor)</td>
<td>Hyper-V Virtual Machine (Veeam Monitor)</td>
<td>95.79%</td>
<td>95.79%</td>
<td>4.21%</td>
<td>4.21%</td>
</tr>
</tbody>
</table>

You can click a SLO bar to drill down to uptime details for the VM for the week.
Top Noisy Hyper-V objects

This report analyzes alerting activity and provides information on virtual infrastructure objects that caused the greatest number of alerts across a time range.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Top Noisy Hyper-V objects report. Consider the following example:

You need to report on top 10 cluster disks in your virtual infrastructure that caused the greatest number of alerts during this week.

Step 1. Open the Top Noisy Hyper-V objects Report

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Top Noisy Hyper-V objects report. Alternatively, right-click the Top Noisy Hyper-V objects report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

Choose the time range for the report.

1. From the From list, choose This week > Monday.
2. From the To list, choose This week > Friday.
Step 3. Choose Report Scope

Choose the necessary cluster disks to include in the report.

1. Click **Add Object**. By default, the Filter Options are configured to include only Hyper-V infrastructure objects.

2. In the **Add Object** window, click **Options**.

3. In the **Options** window, click **Add**.

4. In the **Class Name** search box, type *cluster disk* and click **Search**. Select the *Hyper-V Cluster Disk (Veeam MP)* class in the list of search results, click **Add** and click **OK**.

5. In the **Options** windows, click **OK** to apply the filter.

6. In the **Add Object** window, click **Search**. The search will return a list of objects that belong to the *Hyper-V Cluster Disk (Veeam MP)* class. Select the necessary disks in the list, click **Add** and click **OK**.

![Image of the report interface]

Step 4. Choose Number of Disks to Display

To follow this example, type *10* in the **Top N Count** field.

Step 5. Run the Report

When finished, click **Run** to view the report.
Report Output

The report will show statistics for top 10 "noisy" Hyper-V cluster disks.

It can be seen from the report output below that the "Top Noisy" infrastructure object of the week was the Cluster Disk 4, since it caused:

- 6 alerts in total (that is, 13% of all alerts included in the report);
- 4 Veeam HyperV: Cluster Storage Status alerts triggered by the Veeam Hyper-V Monitoring management pack;
- 2 Veeam HyperV: Cluster Disk Latency Analysis alerts triggered by the Veeam Hyper-V Monitoring management pack.

### Top Noisy Hyper-V objects

<table>
<thead>
<tr>
<th>Management pack</th>
<th>Path</th>
<th>Source</th>
<th>Monitor/Rule</th>
<th>Alert</th>
<th>Count</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV Monitoring</td>
<td>Cluster Disk 4</td>
<td>Pri. Veeam HyperV: Cluster Storage Status</td>
<td>Veeam HyperV: Cluster Storage Status</td>
<td>4</td>
<td>66.67%</td>
<td></td>
</tr>
<tr>
<td>Veeam HyperV Monitoring</td>
<td>Cluster Disk 4</td>
<td>Pri. Veeam HyperV: Cluster Disk Latency Analysis</td>
<td>Veeam HyperV: Cluster Disk Latency Analysis</td>
<td>2</td>
<td>33.33%</td>
<td></td>
</tr>
</tbody>
</table>

You can click a number in the **Count** column of the output table to drill down to the Veeam Alert History Report from the Veeam Report Library.
Configuration Tracking and Alert Correlation

The Configuration Tracking and Alert Correlation report helps you keep an eye on configuration changes that were made in your virtual environment and to track alerting activity across a time range.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Configuration Tracking and Alert Correlation report. Consider the following example:

You need to track configuration changes concerning compute resources (CPU and memory) allocated to a group of virtual machines, and analyze how these changes influenced the number of alerts raised in your virtual environment during the previous month.

Step 1. Open the Configuration Tracking and Alert Correlation Report

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Configuration Tracking and Alert Correlation report. Alternatively, right-click the Configuration Tracking and Alert Correlation report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

Choose the time range for the report.

1. From the From list, choose Previous month > First day.
2. From the To list, choose Previous month > Last day.
Step 3. Choose Grouping Options

Define whether data in the report will be grouped by Date or Property.

Step 4. Choose Sorting Options

Define whether data in the report will be sorted by Name or Number of changes.

Step 5. Choose Report Scope

Select the necessary virtual machines to include in the report.

1. Click Add Object. By default, the Filter Options are configured to include only Hyper-V infrastructure objects.
2. In the Add Object window, click Options.
3. In the Options window, click Add. In the Class Name search box, type “virtual machine” and click Search.
4. Select the Hyper-V Virtual Machine (Veeam MP) class in the list of search results, click Add and click OK.
5. In the Options windows, click OK to apply the filter.
6. In the Add Object window, click Search. The search will return a list of objects that belong to the Hyper-V Virtual Machine (Veeam MP) class. Click the Class column header to sort the search results by class.
7. Select the necessary VMs in the list, click Add and click OK.
Step 6. Choose Configuration Properties

Define configuration properties for which the report will track changes. In this example, we will select properties related to CPU and memory only.

In the **Properties** field, select:

- **Hyper-V Virtual Machine (Veeam MP): CPU Count**
- **Hyper-V Virtual Machine (Veeam MP): CPU Priority**
- **Hyper-V Virtual Machine (Veeam MP): CPU Reservation MHz**
- **Hyper-V Virtual Machine (Veeam MP): Memory Buffer**
- **Hyper-V Virtual Machine (Veeam MP): Memory Dynamic**
- **Hyper-V Virtual Machine (Veeam MP): Memory Maximum MB**
- **Hyper-V Virtual Machine (Veeam MP): Memory Minimum MB**
- **Hyper-V Virtual Machine (Veeam MP): Memory Startup MB**
- **Hyper-V Virtual Machine (Veeam MP): Memory Weight**

Step 7. Run the Report

When finished, click **Run** to view the report.
Report Output

The report will analyze virtual infrastructure configuration changes and provide detailed information on changes performed within the reporting period. The report will also analyze the number of alerts triggered during the reporting period, so that you can see correlation between the performed configuration changes and triggered alerts.

In the **Summary** section, the report will display the following charts:

- The **Top 5 most changing properties** chart will show 5 most frequently changed properties.
- The **Number of changes and alerts by day** chart will show day-by-day of configuration changes performed and the number of alerts raised.

### Configuration Tracking and Alert Correlation

#### Report description:

#### Report parameters:

#### Summary

![Top 5 most changing properties chart](chart1.png)

**Top 5 most changing properties**

- Hyper-V Virtual Machine (Veeam MP): Memory Startup MB
- Hyper-V Virtual Machine (Veeam MP): Memory Minimum MB
- Hyper-V Virtual Machine (Veeam MP): Memory Maximum MB
- Hyper-V Virtual Machine (Veeam MP): Memory Dynamic
- Hyper-V Virtual Machine (Veeam MP): Memory Buffer

![Number of changes and alerts by day chart](chart2.png)

**Number of changes and alerts by day**

![Table: Number of changes by object type](table.png)

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Number of changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-V Virtual Machine (Veeam MP)</td>
<td>225</td>
</tr>
</tbody>
</table>
In this example, the report shows that during the previous month the most frequently changed properties were: *Hyper-V Virtual Machine: Memory Startup MB*, *Hyper-V Virtual Machine: Memory Minimum MB*, *Hyper-V Virtual Machine: Memory Maximum MB*, *Hyper-V Virtual Machine: Memory Dynamic* and *Hyper-V Virtual Machine: Memory Buffer*. The report tables will provide details for VMs whose memory configuration was changed within the reporting period. For each VM, the details table will include information for registered property changes: the date of change, old and new property values.

<table>
<thead>
<tr>
<th>Name: s-03-nv2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of changes: 50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Last value</th>
<th>Number of changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Count</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date changed</th>
<th>Old value</th>
<th>New value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/03/2014 11:13:23 AM</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7/03/2014 6:41:06 PM</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU Priority</th>
<th>100</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Reservation</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

| Memory Maximum MB | 1024 | 2 |
| Memory Minimum MB | 1024 | 2 |

<table>
<thead>
<tr>
<th>Date changed</th>
<th>Old value</th>
<th>New value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/03/2014 11:13:23 AM</td>
<td>2568</td>
<td>5120</td>
</tr>
<tr>
<td>7/03/2014 7:46:47 PM</td>
<td>2560</td>
<td>1624</td>
</tr>
</tbody>
</table>

| Memory Startup MB | 1024 | 2 |

<table>
<thead>
<tr>
<th>Date changed</th>
<th>Old value</th>
<th>New value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/03/2014 11:13:23 AM</td>
<td>2568</td>
<td>5120</td>
</tr>
<tr>
<td>7/03/2014 7:46:47 PM</td>
<td>2560</td>
<td>1624</td>
</tr>
</tbody>
</table>

| Memory Weight | 6250 | 1 |

<table>
<thead>
<tr>
<th>Date changed</th>
<th>Old value</th>
<th>New value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/03/2014 11:13:23 AM</td>
<td>2568</td>
<td>5120</td>
</tr>
<tr>
<td>7/03/2014 7:46:47 PM</td>
<td>2560</td>
<td>1624</td>
</tr>
</tbody>
</table>
Hyper-V Storage Performance Profile Analysis

The Hyper-V Storage Performance Profile Analysis report analyzes IOPS and latency statistics for cluster disks and Cluster Shared Volumes, shows correlation between the IOPS achieved at the highest latency, which allows you to understand the real world performance of your Hyper-V storage.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Hyper-V Storage Performance Profile Analysis report. Consider the following example:

You need to find the most loaded cluster shared disks and volumes, assuming that the maximum device latency has to be lower than 30ms. Use the historical performance data for this month.

Step 1. Open the Hyper-V Storage Performance Profile Analysis Report

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Hyper-V Storage Performance Profile Analysis report. Alternatively, right-click the Hyper-V Storage Performance Profile Analysis report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

Choose the time range for the report.

1. From the From list, choose This month > First day.
2. From the To list, choose This month > Last day.
Step 3. Choose Report Scope

To follow this example, leave the **Scope** section without changes.

Step 4. Choose Aggregation Type

Define whether the data in the report will be aggregated to *Hourly* or *Daily* values.

Step 5. Specify Threshold Value

Specify the maximum latency threshold.

To follow this example, type 30 in the **Threshold: Storage Max Device Latency (ms)** field.

Step 6. Run the Report

When finished, click **Run** to view the report.
Report Output

The **IOPS achieved at latency peak** chart will show 5 most loaded cluster disks and volumes. For each disk or volume, the chart shows the worst latency value reported within the selected period and the IOPS value that was achieved during this latency peak.

Hyper-V Storage Performance Profile Analysis

- **Report description**
- **Report parameters**

**Summary**

The details table will show the total number of VMs hosted on the cluster disk/volume, the maximum number of IOPS reported for the selected period and the highest latency value reported for the selected period.
The **Latency and IOPS statistics** section will provide day-by-day latency and IOPS values and show whether (and when) the defined latency threshold has been breached.

<table>
<thead>
<tr>
<th>Storage Name</th>
<th>Number of VMs on the Storage</th>
<th>Maximum IOPS</th>
<th>Worst Latency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster Disk 2</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Latency and IOPS statistics for Cluster Disk 2

![Graph showing latency and IOPS statistics](image)

<table>
<thead>
<tr>
<th>Details</th>
<th>Number of VMs on the Storage</th>
<th>Maximum IOPS</th>
<th>Worst Latency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster Disk 4</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Cluster Disk 5</td>
<td>1</td>
<td>0.97</td>
<td>0.01</td>
</tr>
<tr>
<td>ClusterSharedV</td>
<td>10</td>
<td>4.23</td>
<td>0.00</td>
</tr>
<tr>
<td>csv2</td>
<td>6</td>
<td>1.81</td>
<td>0.00</td>
</tr>
<tr>
<td>offline CSV</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>sub-vel3</td>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>sub-vel4</td>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Virtual Machines. Idle VMs

Idle VMs are virtual machines that remain running even though they are no longer used, for example the project or POC is complete — but the virtual machines were never decommissioned. These Idle (aka 'Zombie') VMs consume CPU, memory and storage resources that could be used by other active machines.

The Virtual Machines. Idle VMs report shows a list of idle VMs in terms of CPU, memory, disk and network utilization.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Virtual Machines. Idle VMs report. Consider the following example:

You need to report on virtual machines CPU and memory performance for this week to identify VMs that can be considered as candidates for powering off or decommissioning. Identify VMs that stayed idle longer than the half of the reporting period.

Step 1. Open the Virtual Machines. Idle VMs Report

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Virtual Machines. Idle VMs report. Alternatively, right-click the Virtual Machines. Idle VMs report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

Choose the time range for the report.

1. From the From list, choose This Week > Monday.
2. From the To list, choose This Week > Friday.
Step 3. Choose Report Scope

Select virtual machines to include in the report.

1. Select the default Veeam Hyper-V Virtual Machines Group and click Remove.
2. Click Add Object. In the Add Object window, click Options.
3. In the Options window, click Add.
4. In the Class Name search box, type "virtual machine" and click Search.
5. Select the Hyper-V Virtual Machine (Veeam MP) class in the list of search results, click Add and click OK.
6. In the Options windows, click OK to apply the filter.
7. In the Add Object window, click Search. The search will return a list of objects that belong to the Hyper-V Virtual Machine (Veeam MP) class.
8. Select the all virtual machines in the list, click Add and click OK.

Step 4. Specify Threshold Values

Specify CPU and memory usage thresholds.

To follow this example, type 1000 in the Max CPU Usage (MHz, use 0 to ignore this parameter) and Max Active Memory (MB, use 0 to ignore this parameter) fields. Do not change other threshold values.
Step 5. Choose Idle Ratio

Define the percentage of days in the reporting period when the maximum resource usage of the VM was below the selected thresholds.

To follow this example, type 50 in the **Idle Ratio (%)** field.

![Image of the Veeam MP for Microsoft Hyper-V interface showing the Idle Ratio section]

Step 6. Run the Report

When finished, click **Run** to view the report.
Report Output

The report will show the list of virtual machines that stayed idle longer than half of the reporting period. Particularly, these are VMs whose maximum CPU usage was reported below 1000 MHz, and maximum memory usage was reported below 1000 MB for at least 3 days of the week.

Virtual Machines. Idle VMs

- Report description

- Report parameters

Summary

<table>
<thead>
<tr>
<th>Number Of VMs (18)</th>
<th>CPU Usage (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle (7)</td>
<td>Idle (247.91)</td>
</tr>
<tr>
<td>Normal (1)</td>
<td>Normal (176.21)</td>
</tr>
<tr>
<td>Switched off (12)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory Usage (MB)</th>
<th>Network Usage (KB/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle (1472.11)</td>
<td>Idle (11.26)</td>
</tr>
<tr>
<td>Normal (167.15)</td>
<td>Normal (11.53)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disk Usage (KB/s)</th>
<th>Storage Consumption (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle (72.07)</td>
<td>Idle (7.85)</td>
</tr>
<tr>
<td>Normal (37.33)</td>
<td>Normal (6.78)</td>
</tr>
<tr>
<td></td>
<td>Switched off (0.15)</td>
</tr>
</tbody>
</table>
The **Summary** doughnut charts will show the following information:

- Total number of idle, switched-off and normal VMs ("normal" are VMs that are neither idle, nor switched-off): it can be seen from the output, that during the week there were only 7 idle VMs, 1 normal and 10 switched-off VMs.

- Total CPU, memory, network and disk usage for idle and normal VMs

- Total storage consumption for idle, normal and switched-off VMs: in this example, idle VMs consumed 17.05 GB, normal VMs — 6.78 GB, and switched-off VMs — 0.15 GB.

The **Top 10 storage devices by wasted space** chart will show 10 volumes with the highest amount of storage consumed by idle, switched-off and normal VMs.

![Top 10 storage devices by wasted space](image)

The details table will show the following information for idle VMs: CPU, disk and network usage, active memory, percentage of time when the VM was in the idle state (that is, idle ratio), percentage of time when the VM was in the **Critical state** (Critical state means that the VM was powered off or non-operating) and storage space allocated.

### Idle VMs (performance-based analysis)

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>CPU Usage (MHz, max)</th>
<th>Active Memory (MB, max)</th>
<th>Disk Usage (KB/s, max)</th>
<th>Network Usage (KB/s, max)</th>
<th>Days Analyzed</th>
<th>Idle Ratio (%)</th>
<th>Down Time (%)</th>
<th>Storage Space Used (GB, current)</th>
</tr>
</thead>
<tbody>
<tr>
<td>vm_csv22</td>
<td>55.67</td>
<td>80.00</td>
<td>0.00</td>
<td>9.00</td>
<td>4</td>
<td>100.00</td>
<td>99.34</td>
<td>0.66</td>
</tr>
<tr>
<td>vm_csv22</td>
<td>285.87</td>
<td>128.77</td>
<td>97.33</td>
<td>13.10</td>
<td>7</td>
<td>100.00</td>
<td>99.34</td>
<td>0.61</td>
</tr>
<tr>
<td>vm_disk</td>
<td>26.73</td>
<td>60.00</td>
<td>0.00</td>
<td>9.00</td>
<td>4</td>
<td>100.00</td>
<td>n/a</td>
<td>0.64</td>
</tr>
<tr>
<td>vm_fkd</td>
<td>42.65</td>
<td>60.00</td>
<td>0.00</td>
<td>9.00</td>
<td>4</td>
<td>100.00</td>
<td>99.34</td>
<td>0.65</td>
</tr>
<tr>
<td>vm_os_csvd</td>
<td>233.67</td>
<td>274.73</td>
<td>15.73</td>
<td>19.23</td>
<td>6</td>
<td>100.00</td>
<td>93.17</td>
<td>4.37</td>
</tr>
<tr>
<td>vm_net</td>
<td>46.00</td>
<td>60.00</td>
<td>0.00</td>
<td>9.00</td>
<td>3</td>
<td>100.00</td>
<td>99.34</td>
<td>0.66</td>
</tr>
<tr>
<td>vm2012</td>
<td>255.67</td>
<td>125.97</td>
<td>795.00</td>
<td>41.91</td>
<td>6</td>
<td>100.00</td>
<td>n/a</td>
<td>31.92</td>
</tr>
</tbody>
</table>

You can click a VM name in the report table to analyze how the amount of consumed CPU, memory, network and storage resources was changing for the VM during the week.

You can also click the link in the **Down Time (%)** column to drill down to uptime details for the VM for this week.
Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU

The Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU report helps you to detect virtual machines that have more allocated RAM or CPU resources than they require.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU report. Consider the following example:

You need to report on top 10 VMs that have more allocated CPU resources than they require. Use performance statistics for the previous quarter as a ground for the report analysis; omit statistics collected on Saturdays and Sundays.

Step 1. Open the Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU Report

Open the Reporting Pane, select Veeam Hyper-V Analysis Reports and double-click the Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU report. Alternatively, right-click the Virtual Machines. Right-sizing — VMs Oversized for Memory and CPU report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

Choose the time range for the report.

1. From the From list, choose Previous quarter > First day.
2. From the To list, choose Previous quarter > Last day.
3. In the Include week days field, clear check boxes next to Saturday and Sunday.
Step 3. Choose How to Display Report Charts

Use the **Show details** list to define whether you want the report to show expanded or collapsed charts.

Step 4. Choose How to Assess VM Performance

Use the **Performance Modeling Based On** list to define whether the report will use maximum (peak) or average CPU historical values to assess VM performance.

Step 5. Choose Report Scope

To follow this example, leave the **Scope** section without changes.
Step 6. Define Resource to be Analyzed

To follow this example, choose vCPU in the Sections to show section.

Step 7. Choose Number of VMs to Display

To follow this example, type 10 in the Top N Count field.

Step 8. Run the Report

When finished, click Run to view the report.
Report Output

The analysis table will summarize the total savings possible by reclaiming the resources found by the report.

**NOTE:**

All recommendations are based on the current configuration. So, if a virtual machine has no current configuration (is turned off or decommissioned), it will not be included in the report.

<table>
<thead>
<tr>
<th>CPU analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VMs processed</td>
</tr>
<tr>
<td>Oversized VMs</td>
</tr>
<tr>
<td>VMs that cannot be analyzed (**)</td>
</tr>
<tr>
<td>Total vCPU resources that can be reclaimed (***)</td>
</tr>
</tbody>
</table>

The details table will display information on top 10 VMs CPU consumption: currently allocated, recommended, maximum and average CPU usage values.

In this example, only one VM is considered to be oversized. Clicking on the plus sign next to the virtual machine name in the table opens the details for this virtual machine.

<table>
<thead>
<tr>
<th>Top 1 VMs are shown. VMs are ranked by reclaim value and name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Machine</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>s2012</td>
</tr>
</tbody>
</table>

You can click the name of an oversized VM or the **Oversized VMs** link in the **CPU analysis** table to drill down to performance details for these VMs.

You can click the **VMs that cannot be analyzed** link in the **CPU analysis** table to drill down to performance details for these VMs.
Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU

The **Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU** report helps you to detect virtual machines that have less allocated RAM or CPU resources than they require.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the **Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU** report. Consider the following example:

> You need to report on top 10 VMs that have less allocated memory than they require. Use performance statistics for the previous quarter as a ground for the report analysis; omit statistics collected on Saturdays and Sundays.

**Step 1. Open the Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU Report**

Open the Reporting Pane, select **Veeam Hyper-V Analysis Reports** and double-click the **Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU** report. Alternatively, right-click the **Virtual Machines. Right-sizing — VMs Undersized for Memory and CPU** report in the Reporting Pane and choose **Open**.

**Step 2. Define Time Intervals**

Choose the time range for the report.

1. From the **From** list, choose *Previous quarter > First day*.
2. From the **To** list, choose *Previous quarter > Last day*.
3. In the **Include week days** field, clear check boxes next to *Saturday* and *Sunday*.
Step 3. Choose How to Display Report Charts

Use the **Show details** list to define whether you want the report to show expanded or collapsed charts.

Step 4. Choose How to Assess VM Performance

Use the **Performance Modeling Based On** list to define whether the report will use maximum (peak) or average CPU historical values to assess VM performance.

Step 5. Choose Report Scope

To follow this example, leave the **Scope** section without changes.
Step 6. Define Resource to be Analyzed

To follow this example, choose vRAM in the Sections to show section.

Step 7. Choose Number of VMs to Display

To follow this example, type 10 in the Top N Count field.

Step 8. Run the Report

When finished, click Run to view the report.
Report Output

The analysis table will summarize the total savings possible by reclaiming the resources found by the report.

**NOTE:**

All recommendations are based on the current configuration. So, if a virtual machine has no current configuration (is turned off or decommissioned), it will not be included in the report.

<table>
<thead>
<tr>
<th>RAM analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VMs processed</td>
</tr>
<tr>
<td>Undersized VMs</td>
</tr>
<tr>
<td>VMs that cannot be analyzed(*)</td>
</tr>
</tbody>
</table>

The details table will display information on top 10 VMs memory consumption: currently allocated, recommended, maximum and average memory consumption values.

In this example, only one VM is considered to be undersized. Clicking on the plus sign next to the virtual machine name in the table opens the details for this virtual machine.

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>Memory Consumed (GB)</th>
<th>Current vRAM Allocation (GB)</th>
<th>Recommended vRAM Allocation (GB)</th>
<th>RAM to Add (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg</td>
<td>Max</td>
<td>Avg</td>
<td>Max</td>
</tr>
<tr>
<td>E43312</td>
<td>1.00</td>
<td>2.00</td>
<td>2.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>

You can click the name of an undersized VM or the *Undersized VMs* link in the *RAM analysis* table to drill down to performance details for these VMs.

You can click the *VMs that cannot be analyzed* link in the *RAM analysis* table to drill down to performance details for these VMs.
Veeam Hyper-V Capacity Planning Reports

This report pack includes reports that help you to analyze health and performance of virtual infrastructure objects, evaluate the efficiency of resource utilization and optimize VMs' resource provisioning.

The report pack includes the following reports:

- Host Failure Modelling
- Performance Forecast for Hyper-V Clusters
- Performance Forecast for Hyper-V Cluster Storage
- Performance Forecast for Hyper-V SMB Volumes
- What-If VM Deployment Planning (manual resource entry)
- What-If VM Deployment Planning (model existing VMs)

Host Failure Modelling

The Host Failure Modelling report allows you both to simulate host failure in your Hyper-V cluster, and to forecast CPU and memory usage after the failure.

The report evaluates total capacity of your infrastructure and forecasts how many days remain before the level of CPU and memory usage in a cluster with failed host(s) reaches the specified threshold values.

To calculate future cluster performance, the report analyzes historical performance data for the specified period in the past, calculates the performance utilization trend and applies this trend to the forecast horizon. For better forecast accuracy, along with the performance trend the report provides trend deviations that represent the best- and worst-case scenarios. This allows you to estimate various possible outcomes and helps you rationally plan your cluster capacities.

The report also provides recommendations on appropriate resource allocation to prevent possible CPU and memory resource shortfalls in future.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Host Failure Modelling report. Consider the following example:

You need to model the situation when one host in a cluster fails and forecast the number of days left before the level of CPU and memory usage on remaining hosts reaches 80%. Use the historical performance data for the previous month for report analysis.

Step 1. Open the Host Failure Modelling Report

Open the Reporting Pane, select Veeam Hyper-V Capacity Planning Reports and double-click the Host Failure Modelling report. Alternatively, right-click the Host Failure Modelling report in the Reporting Pane and choose Open.
Step 2. Define Time Intervals

The **Performance Data From** parameter defines a date in the past starting from which historical performance data will be used to calculate the performance trend. The report analyzes historical performance data starting from this date to the current date (data collection period).

**NOTE:**
To make a forecast, the report must use historical performance data for at least 72 hours.

To follow this example, choose *Previous month > First day* from the **Performance Data From** list.

The **Forecast Horizon** parameter defines the forecast period. The calculated performance utilization trend is applied to the time interval that starts from the current date to the forecast horizon date.

**NOTE:**
The date in the **Forecast Horizon** field must be a date in future.

To follow this example, choose a date in future (30 days from today) from the **Forecast Horizon** list.
Step 3. Choose Report Scope

Choose a Hyper-V cluster to include in the report.

1. In the **Scope** section, select *Veeam Hyper-V Clusters Group* and click **Remove**.

2. Click **Add Object**. In the **Add Object** window, click **Options**. In the **Options** window, click **Add**. In the **Class Name** search box, type ’cluster’ and click **Search**. Select the *Hyper-V Cluster (Veeam MP)* class in the list of search results, click **Add** and click **OK**. In the **Options** window, click **OK** to apply the filter. In the **Add Object** window, click **Search**. The search will return a list of objects that belong to the *Hyper-V Cluster (Veeam MP)* class. Select the necessary cluster in the list, click **Add** and click **OK**.

Step 4. Choose How to Display Report Charts

Use the **Show details** list to define whether you want the report to show expanded or collapsed charts.
Step 5. Choose How to Display Report Output

Define whether the report will display all results or problematic areas only (problematic areas are clusters for which resource utilization thresholds will be breached within the forecast period).

Step 6. Choose How to Assess VM Performance

Use the Performance Modeling Based On list to define whether the report will use maximum (peak) or average CPU historical values to assess cluster performance.

Step 7. Specify Threshold Values

To follow this example, type 80 in the **Threshold: CPU Utilization (%)** and **Threshold: Used Memory (%)** fields.
Step 8. Choose Number of Hosts

Define the number of hosts for which you want to simulate failure.

To follow this example, type \( I \) in the **Hosts to Fail** field.

Step 9. Run the Report

When finished, click **Run** to view the report.
Report Output

The **Virtual Infrastructure Described** table will provide an overview for a cluster included in the report scope: number of hosts, number of VMs (total, active, shutdown and suspended) and total CPU and memory usage values.

The **Performance Forecast Analysis and Recommendations** table will provide details and recommendations for the resource whose utilization threshold will be breached first within the forecast period.

The **Overall Recommendations** table will provide recommendations for the cluster included in the report scope.

### Host Failure Modelling

**Report description**

**Report parameters**

#### Summary

<table>
<thead>
<tr>
<th>Virtual Infrastructure Described</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clusters overview</strong></td>
</tr>
<tr>
<td><strong>Hosts</strong></td>
</tr>
<tr>
<td><strong>Total CPU Cores</strong></td>
</tr>
<tr>
<td><strong>Total CPU (GHz)</strong></td>
</tr>
<tr>
<td><strong>Total Memory (GB)</strong></td>
</tr>
<tr>
<td><strong>Total VMs</strong></td>
</tr>
<tr>
<td><strong>Active VMs</strong></td>
</tr>
<tr>
<td><strong>Shutdown VMs</strong></td>
</tr>
<tr>
<td><strong>Paused VMs</strong></td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

<table>
<thead>
<tr>
<th>Performance Forecast Analysis and Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
</tbody>
</table>
| FCL                                                | Failed              | Used Memory (GB)          | 0             | Follow these recommendations to maintain usage within desired threshold for specified forecast horizon:  
- Add 11.94 GHz of CPU  
- Add 44.4 GB of RAM |

(*) Recommendations are based on a worst-case scenario.

#### Overall recommendations

Follow these recommendations to support 1 Host failure:
- Add 11.94 GHz of CPU, review workload balance
- Add 44.4 GB of RAM, review workload balance

(*) Recommendations are based on a worst-case scenario.

In this example, the cluster is reported to run out of CPU and memory if one of the hosts fails. The number of **Days Left** shows 0, which means that the cluster will not be able to sustain the current workload. The **Recommendation** section provides practical recommendations for maintaining the resource usage within the desired threshold.
The doughnut charts will represent the number of removed and remaining hosts and amount of removed and remaining resources in the simulated scenario.

The **Performance Forecast** table reveals whether the specified thresholds will be breached and details the following forecasted values (all values are provided for both the best-case and the worst-case scenarios):

- **Days Left**: number of days after which CPU and memory utilization thresholds will be breached
- **Available resources**: amount of resources that will remain unused on the forecast horizon date (available resources, calculated as the difference between the threshold and the predicted resource usage)

In this example, the report provides the following forecasts:

- CPU utilization threshold will be breached within the reporting period.
- Memory usage threshold will be breached immediately after the host failure.
You can expand the table rows to open charts detailing actual CPU and memory utilization values, calculated utilization trend and its deviation, and the threshold.

### Performance Forecast

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Threshold</th>
<th>Prediction</th>
<th>Days Left</th>
<th>Avail. resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worst</td>
<td>Best</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU Utilization (GHz)</td>
<td>9.1</td>
<td>Threshold will be achieved within reporting interval</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

**CPU Utilization (GHz)**

![CPU Utilization Graph](image1.png)

**Used Memory (GB)**

![Used Memory Graph](image2.png)
Performance Forecast for Hyper-V Clusters

The **Performance Forecast for Hyper-V Clusters** report forecasts CPU and memory resource utilization for Hyper-V clusters.

The report forecasts how many days remain before the level of CPU and memory resource utilization reaches the specified threshold values.

To calculate future cluster performance, the report analyzes historical performance data for the specified period in the past, calculates the performance utilization trend and applies this trend to the forecast horizon. For better forecast accuracy, along with the performance trend the report provides trend's confidence interval that represents the best- and worst-case scenarios. This allows you to estimate various possible outcomes and helps you rationally plan your resources.

If one or more specified thresholds are breached within the forecast interval, the report marks the cluster as problematic and lists constraining resources for it. The report also provides recommendations on appropriate resource allocation to prevent possible CPU and memory resource shortfalls in future.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the **Performance Forecast for Hyper-V Clusters** report. Consider the following example:

You need to forecast the number of days left before the level of CPU and memory usage for the selected cluster reaches 90%. Make sure that this threshold will not be breached within the next 30 days. Use the historical performance data for the previous month to calculate utilization trend.

Step 1. Open the Performance Forecast for Hyper-V Clusters Report

Open the Reporting Pane, select **Veeam Hyper-V Capacity Planning Reports** and double-click the **Performance Forecast for Hyper-V Clusters** report. Alternatively, right-click the **Performance Forecast for Hyper-V Clusters** report in the Reporting Pane and choose **Open**.

Step 2. Define Time Intervals

The **Performance Data From** parameter defines a date in the past starting from which historical performance data will be used to calculate the performance trend. The report analyzes historical performance data starting from this date to the current date (data collection period).

**NOTE:**

To make a forecast, the report must use historical performance data for at least 72 hours.

To follow this example, choose **Previous month > First day** from the **Performance Data From** list.

The **Forecast Horizon** parameter defines the forecast period. The calculated performance utilization trend is applied to the time interval that starts from the current date to the forecast horizon date.
NOTE:
The date in the Forecast Horizon field must be a date in future.

To follow this example, choose a date in future (30 days from today) from the Forecast Horizon list.

Step 3. Choose Report Scope

Choose a Hyper-V cluster to include in the report.

1. In the Scope section, select Veeam Hyper-V Clusters Group and click Remove.
2. Click Add Group. In the Add Group window, click Options. In the Options window, click Add. In the Class Name search box, type “cluster” and click Search. Select the Hyper-V Cluster (Veeam MP) class in the list of search results, click Add and click OK. In the Options windows, click OK to apply the filter. In the Add Group window, click Search. The search will return a list of objects that belong to the Hyper-V Cluster (Veeam MP) class. Select the necessary cluster in the list, click Add and click OK.
Step 4. Define Resource to be Analyzed

Defines what types of metrics will be analyzed in the report.

To follow this example, select both Hyper-V Cluster (Veeam MP): CPU Utilization (GHz) and Hyper-V Cluster (Veeam MP): Used Memory (GB) aspects in the Aspects to be Analyzed field.

Step 5. Choose How to Display Report Charts

Use the Show details list to define whether you want the report to show expanded or collapsed charts.
Step 6. Choose How to Display Report Output

Define whether the report will display all results or problematic areas only (problematic areas are clusters for which resource utilization thresholds will be breached within the forecast period).

![Performance Forecast for Hyper-V Clusters - Operations Manager - Report - win2012r2](image)

Step 7. Specify Threshold Values

To follow this example, type 90 in the **Threshold: CPU Utilization (%)** and **Threshold: Used Memory (%)** fields.

![Performance Forecast for Hyper-V Clusters - Operations Manager - Report - win2012r2](image)

Step 8. Run the Report

When finished, click **Run** to view the report.
Report Output

The **Virtual Infrastructure Described** table will provide an overview for the cluster included in the report scope: number of hosts, number of VMs (total, active, shutdown and suspended) and total CPU and memory usage values.

The **Performance Forecast Analysis and Recommendations** table will provide details and recommendations for the resource which utilization threshold will be breached first within the forecast period.

Performance Forecast for Hyper-V Clusters

**Report description**

**Report parameters**

**Summary**

<table>
<thead>
<tr>
<th>Virtual Infrastructure Described</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clusters overview</strong></td>
<td></td>
</tr>
<tr>
<td>Hosts</td>
<td>2</td>
</tr>
<tr>
<td>Total CPU Core</td>
<td>8</td>
</tr>
<tr>
<td>Total CPU (GHz)</td>
<td>20.26</td>
</tr>
<tr>
<td>Total Memory (GB)</td>
<td>64</td>
</tr>
<tr>
<td>Total VMs</td>
<td>29</td>
</tr>
<tr>
<td>Active VMs</td>
<td>11</td>
</tr>
<tr>
<td>Shutdown VMs</td>
<td>10</td>
</tr>
<tr>
<td>Paused VMs</td>
<td>0</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

<table>
<thead>
<tr>
<th>Name</th>
<th>Analysis Result</th>
<th>Constraining Resource</th>
<th>Days Left</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-V Cluster (Veeam MP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| PCL | Failed | Used Memory (GB) | 16 | 21 | Follow these recommendations to maintain usage within desired threshold till specified forecast horizon:
- Add 1.81 GHz of CPU
- Add 16/40 GB of RAM

(**) Recommendations are based on a worst-case scenario.

In this example, only one cluster is reported to run out of CPU and memory within the forecast period. The number of **Days Left** shows 14-21, which means that the cluster will be able to sustain the current workload from 14 days (in the worst-case scenario) to 21 days (in the best-case scenario). The **Recommendation** section provides practical recommendations for maintaining the resource usage within the desired threshold.

The **Performance Forecast** section will show a chart and a details table for each analyzed cluster resource.

The performance forecast tables reveal whether the specified thresholds will be breached and detail the following forecasted values (all values are provided for both the best-case and the worst-case scenarios):

- **Days Left**: number of days after which CPU and memory utilization thresholds will be breached
- **Metric Forecast**: predicted metric value at the end of the forecast period
Available resources: amount of resources that will remain unused on the forecast horizon date (available resources, calculated as the difference between the threshold and the predicted resource usage)

### Hyper-V Cluster (Veeam MP): nCL

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Threshold</th>
<th>Prediction</th>
<th>Days Left</th>
<th>Metric Forecast</th>
<th>Available resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Utilization (GHz)</td>
<td>10.23</td>
<td>Threshold may be achieved within reporting interval</td>
<td>25</td>
<td>20.04</td>
<td>-1.01</td>
</tr>
<tr>
<td>Used Memory (GB)</td>
<td>57.69</td>
<td>Threshold will be achieved within reporting interval</td>
<td>14</td>
<td>74.03</td>
<td>-16.45</td>
</tr>
</tbody>
</table>

In this example, the cluster is forecasted to run low on memory resources and CPU resources in the worst-case scenario.

You can expand the table rows to open charts detailing actual CPU and memory utilization values, calculated utilization trend and its deviation, and the threshold.
Performance Forecast for Hyper-V Cluster Storage

The **Performance Forecast for Hyper-V Cluster Storage** report forecasts free space, used space, latency and IOPS resource utilization for Hyper-V storage objects: Cluster Disks and Cluster Shared Volumes (CSV).

The report forecasts how many days remain before the level of resource utilization reaches the specified threshold values. The report allows analyzing the following storage resource utilization parameters: free space, used space, maximum device latency and storage IOPS.

**IMPORTANT!**

The report treats the Cluster Disk and CSV as separate objects with independent parameters. To avoid misunderstanding in the report output, note the following:

- For the Hyper-V Cluster Disks, the report will show information on the latency and IOPS metrics. When running the report for cluster disks only, clear the **Hyper-V Cluster Shared Volume (Veeam MP): Free Space (GB)** and **Hyper-V Cluster Shared Volume (Veeam MP): Used Space (GB)** check boxes in the **Aspects to be Analyzed** field.

- For the Hyper-V Cluster Shared Volumes, the report will show information on space usage. When running the report for CSV objects only, clear the **Hyper-V Cluster Disk (Veeam MP): Max Device Latency (millisecond)** and **Hyper-V Cluster Disk (Veeam MP): IOPS** check boxes in the **Aspects to be Analyzed** field.

To calculate future storage performance, the report analyzes historical performance data for the specified period in the past, calculates the performance utilization trend and applies this trend to the forecast horizon. For better forecast accuracy, along with the performance trend the report provides trend's confidence interval that represents the best- and worst-case scenarios. This allows you to estimate various possible outcomes and helps you rationally plan your resources.

If one or more specified thresholds are breached within the forecast interval, the report marks the cluster disk or volume as problematic and lists constraining resources for it. The report also provides recommendations on appropriate resource allocation to prevent possible resource shortfalls in future.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the **Performance Forecast for Hyper-V Cluster Storage** report. Consider the following example:

You need to forecast the number of days left before the amount of storage free space reaches 30%. Make sure that this threshold will not be breached within the next 30 days. Use the historical performance data for the previous month to calculate the resource utilization trend.

Step 1. Open the Performance Forecast for Hyper-V Cluster Storage Report

Open the Reporting Pane, select **Veeam Hyper-V Capacity Planning Reports** and double-click the **Performance Forecast for Hyper-V Cluster Storage** report. Alternatively, right-click the **Performance Forecast for Hyper-V Cluster Storage** report in the Reporting Pane and choose **Open**.
Step 2. Define Time Intervals

The **Performance Data From** parameter defines a date in the past starting from which historical performance data will be used to calculate the performance trend. The report analyzes historical performance data starting from this date to the current date (data collection period).

**NOTE:**
To make a forecast, the report must use historical performance data for at least 72 hours.

To follow this example, choose *Previous month > First day* from the **Performance Data From** list.

The **Forecast Horizon** parameter defines the forecast period. The calculated performance utilization trend is applied to the time interval that starts from the current date to the forecast horizon date.

**NOTE:**
The date in the **Forecast Horizon** field must be a date in future.

To follow this example, choose a date in future (30 days from today) from the **Forecast Horizon** list.
Step 3. Choose Report Scope

Choose Cluster Shared Volumes to include in the report.

1. In the **Scope** section, select *Veeam Hyper-V Cluster Disks Group* and click **Remove**.

2. Click **Add Group**. In the **Add Group** window, click **Options**. In the **Options** window, click **Add**. In the **Class Name** search box, type “shared volume” and click **Search**. Select the *Hyper-V Cluster Shared Volume (Veeam MP)* class in the list of search results, click **Add** and click **OK**. In the **Options** windows, click **OK** to apply the filter. In the **Add Group** window, click **Search**. The search will return a list of objects that belong to the *Hyper-V Cluster Shared Volume (Veeam MP)* class. Select the necessary volumes in the list, click **Add** and click **OK**.

Step 4. Define Resource to be Analyzed

Defines what types of metrics will be analyzed in the report.

To follow this example, select only the *Hyper-V Cluster Shared Volume (Veeam MP): Free Space (GB)* aspect in the **Aspects to be Analyzed** field.
Step 5. Choose How to Display Report Charts

Use the **Show details** list to define whether you want the report to show expanded or collapsed charts.

![Image of report chart settings]

Step 6. Choose How to Display Report Output

Define whether the report will display all results or problematic areas only (problematic areas are cluster disks and CSVs for which resource utilization thresholds will be breached within the forecast period).

![Image of report output settings]

Step 7. Specify Threshold Values

To follow this example, type **30** in the **Threshold: Storage Volume Free Space (%)** field.

![Image of threshold settings]

Step 8. Run the Report

When finished, click **Run** to view the report.
Report Output

The **Virtual Infrastructure Described** table will provide an overview for the storage included in the report scope: total number of storage volumes and storage devices, total storage volume capacity and total storage device capacity (in GB).

The **Performance Forecast Analysis and Recommendations** table will provide details and recommendations for the resource which utilization threshold will be breached first within the forecast period.

---

Performance Forecast for Hyper-V Cluster Storage

Report description

Report parameters

---

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Virtual Infrastructure Described</strong></td>
</tr>
<tr>
<td><strong>Storage overview</strong></td>
</tr>
<tr>
<td>Storage volumes</td>
</tr>
<tr>
<td>Total storage volume capacity GB</td>
</tr>
<tr>
<td>Storage devices</td>
</tr>
<tr>
<td>Total storage device capacity GB</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

<p>| Performance Forecast Analysis and Recommendations | |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Analysis Result</th>
<th>Constraining Resource</th>
<th>Days Left</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-V Cluster Shared Volume (Veeam MP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V-Big</td>
<td>Passed</td>
<td>None</td>
<td>0</td>
<td>No need to add any resources</td>
</tr>
<tr>
<td>v-Cat</td>
<td>Passed</td>
<td>None</td>
<td>0</td>
<td>No need to add any resources</td>
</tr>
<tr>
<td>v-My</td>
<td>Passed</td>
<td>None</td>
<td>0</td>
<td>No need to add any resources</td>
</tr>
<tr>
<td>v-My2</td>
<td>Failed</td>
<td>Free Space (GB)</td>
<td>0</td>
<td>Follow these recommendations to maintain usage within desired threshold till specified forecast horizon</td>
</tr>
<tr>
<td>Increase free space by 2.07 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Recommendations are based on a worst-case scenario.

---

Overall recommendations

| Recommendations for all objects of type "Hyper-V Cluster Shared Volume (Veeam MP)" | |
| Increase free space by 2.07 GB |

(*) Recommendations are based on a worst-case scenario.

---

In this example, only one volume is reported to run out of free space. The number of **Days Left** shows 0, which means that the volume will not be able to sustain the current workload. The **Recommendation** section provides practical recommendations for maintaining the resource usage within the desired threshold.

The performance forecast tables reveal whether the specified threshold will be breached and detail the following forecasted values (all values are provided for both the best-case and the worst-case scenarios):

- **Days Left**: number of days after which the free space threshold will be breached
- **Metric Forecast**: predicted metric value at the end of the forecast period
- **Available resources**: amount of resources that will remain unused on the forecast horizon date (available resources, calculated as the difference between the threshold and the predicted resource usage)

You can expand the table rows to open charts detailing actual free space value, calculated utilization trend and its deviation, resource capacity and the threshold.

In this example, the *Newsmb* volume is forecasted to run low on free space. The number of **Days Left** shows 0, which means that the amount of free space is already less than the threshold of 30%.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Threshold</th>
<th>Prediction</th>
<th>Days Left</th>
<th>Metric Forecast</th>
<th>Avail. resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Space (GB)</td>
<td>6.00</td>
<td>Threshold is achieved</td>
<td>0</td>
<td>0</td>
<td>2.93</td>
</tr>
</tbody>
</table>

![Free Space (GB) chart](image)

![Trend and its deviation chart](image)
Performance Forecast for Hyper-V SMB Volumes

The Performance Forecast for Hyper-V SMB Volumes report forecasts space resource utilization for Hyper-V Server Message Block (SMB) volumes.

The report forecasts how many days remain before the level of resource utilization reaches the specified threshold values. The report allows analyzing the following resource utilization parameters: free space and used space.

To calculate future volume performance, the report analyzes historical performance data for the specified period in the past, calculates the performance utilization trend and applies this trend to the forecast horizon. For better forecast accuracy, along with the performance trend the report provides trend's confidence interval that represents the best- and worst-case scenarios. This allows you to estimate various possible outcomes and helps you rationally plan your resources.

If one or more specified thresholds are breached within the forecast interval, the report marks the volume as problematic and lists constraining resources for it. The report also provides recommendations on appropriate resource allocation to prevent possible resource shortfalls in future.

Sample Usage

This section provides step-by-step instructions that will help you understand how to create the Performance Forecast for Hyper-V SMB Volumes report. Consider the following example:

You need to forecast the number of days left before the amount of SMB free space reaches 30%. Make sure that this threshold will not be breached within the next 30 days. Use the historical performance data for the previous month to calculate the resource utilization trend.

Step 1. Open the Performance Forecast for Hyper-V SMB Volumes Report

Open the Reporting Pane, select Veeam Hyper-V Capacity Planning Reports and double-click the Performance Forecast for Hyper-V SMB Volumes report. Alternatively, right-click the Performance Forecast for Hyper-V SMB Volumes report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

The Performance Data From parameter defines a date in the past starting from which historical performance data will be used to calculate the performance trend. The report analyzes historical performance data starting from this date to the current date (data collection period).

**NOTE:**

To make a forecast, the report must use historical performance data for at least 72 hours.

To follow this example, choose Previous month > First day from the Performance Data From list.

The Forecast Horizon parameter defines the forecast period. The calculated performance utilization trend is applied to the time interval that starts from the current date to the forecast horizon date.
NOTE:
The date in the **Forecast Horizon** field must be a date in future.

To follow this example, choose a date in future (30 days from today) from the **Forecast Horizon** list.

---

**Step 3. Choose Report Scope**

Choose SMB volumes to include in the report. To include all available volumes, leave the **Scope** section without changes.

**Step 4. Define Resource to be Analyzed**

Defines what types of metrics will be analyzed in the report.

To follow this example, select the **Hyper-V SMB Volume (Veeam MP): Free Space (GB)** aspect in the **Aspects to be Analyzed** field.
Step 5. Choose How to Display Report Charts

Use the **Show details** list to define whether you want the report to show expanded or collapsed charts.

Step 6. Choose How to Display Report Output

Define whether the report will display all results or problematic areas only (problematic areas are SMB volumes for which resource utilization thresholds will be breached within the forecast period).

Step 7. Specify Threshold Values

To follow this example, type *30* in the **Threshold: Storage Volume Free Space (%)** field.

Step 8. Run the Report

When finished, click **Run** to view the report.
Report Output

The **Virtual Infrastructure Described** table will provide an overview for SMB volumes included in the report scope: total number of volumes and total volume capacity.

The **Performance Forecast Analysis and Recommendations** table will provide details and recommendations for the resource which utilization threshold will be breached first within the forecast period.

![Hyper-V Capacity Planning Reports](image)

Performance Forecast for Hyper-V SMB Volumes

**Report description**

**Report parameters**

**Summary**

<table>
<thead>
<tr>
<th>Virtual Infrastructure Described</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Storage overview</strong></td>
</tr>
<tr>
<td><strong>Storage volume</strong></td>
</tr>
<tr>
<td>Total storage volume capacity GB</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

<table>
<thead>
<tr>
<th>Performance Forecast Analysis and Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Hyper-V SMB Volume (Veeam MP)</td>
</tr>
<tr>
<td>York-hyper_smb</td>
</tr>
<tr>
<td>Yorksv-hyper_local_sv</td>
</tr>
<tr>
<td>Yorksv-hyper_sv</td>
</tr>
<tr>
<td>Hyper-V SMB Volume (Veeam MP)</td>
</tr>
<tr>
<td>York-hyper_smb</td>
</tr>
<tr>
<td>Yorksv-hyper_local_sv</td>
</tr>
<tr>
<td>Yorksv-hyper_sv</td>
</tr>
</tbody>
</table>

(*) Recommendations are based on a worst-case scenario.

In this example, none of the analyzed volumes is reported to run out of free space.

The performance forecast tables reveal whether the specified threshold will be breached and detail the following forecasted values (all values are provided for both the best-case and the worst-case scenarios):

- **Days Left**: number of days after which the free space threshold will be breached
- **Metric Forecast**: predicted metric value at the end of the forecast period
- **Available resources**: amount of resources that will remain unused on the forecast horizon date (available resources, calculated as the difference between the threshold and the predicted resource usage)
You can expand the table rows to open charts detailing actual free space value, calculated utilization trend and its deviation, resource capacity and the threshold.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Threshold</th>
<th>Prediction</th>
<th>Days Left</th>
<th>Metric Forecast</th>
<th>Avail. resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Space (GB)</td>
<td>15.00</td>
<td>Threshold will not be achieved within reporting interval</td>
<td>m</td>
<td>42.92 42.06</td>
<td>27.92 28.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Best</td>
<td>65.63% 66.12%</td>
<td>55.63% 56.12%</td>
</tr>
</tbody>
</table>

![Free Space (GB)](image_url)
What-If VM Deployment Planning (manual resource entry)

The What-If VM Deployment Planning for Hyper-V (manual resource entry) report evaluates total capacity of your infrastructure and provides estimation of how many sample VMs of a certain profile can be added without causing the specified resource utilization threshold to be breached. In this report, you can specify parameters for the VM profile manually.

**IMPORTANT!**

Objects of the Veeam Hyper-V Hosts Group and Veeam Hyper-V Cluster Disks Group are described with different related metrics. That is why, to evaluate your Hyper-V infrastructure properly, mind the following:

- The Veeam Hyper-V Cluster Disks Group includes not only storage disks, but also volumes. That is why, to evaluate storage free space and IOPS, select the Veeam Hyper-V Cluster Disks Group in the Scope section, and specify the Threshold: Storage Volume Free Space and Threshold: Storage IOPS thresholds.
- To evaluate memory and CPU utilization, select the Veeam Hyper-V Hosts Group in the Scope section, and specify the Threshold: CPU Utilization (%), Threshold: Used Memory (%) or Threshold: vCPUs per Core thresholds.

The report evaluates total capacity of your infrastructure and provides estimation of how many sample VMs of a certain profile can be added without causing the specified resource utilization threshold to be breached.

The report analyzes historical performance data for the specified period in the past, calculates the performance utilization trend and applies it to the forecast horizon. Calculation of additional VM sets is based on the predicted future performance of the sample VM(s) and the predicted virtual infrastructure capacities.

**Sample Usage**

This section provides step-by-step instructions that will help you understand how to create the What-If VM Deployment Planning (manual resource entry) report. Consider the following example:

*Specify the following VM profile: 2 VMs, 3 GHz CPU, 4 GB memory, 250 disk IOPS. Assume that resource usage for these VMs will not exceed 85%.*

*Forecast how many sets of VMs of the specified profile can be added to your cluster. Make sure that the free space threshold will not breach 20%, and CPU and memory resources will not breach 90% within the next 30 days. Use the historical performance data for the previous month for report analysis.*

**TIP:**

To identify the IOPS limit at which your storage device may experience abnormal latency, you can use the Hyper-V Storage Performance Profile Analysis report.
Step 1. Open the What-If VM Deployment Planning for Hyper-V (manual resource entry) Report

Open the Reporting Pane, select Veeam Hyper-V Capacity Planning Reports and double-click the What-If VM Deployment Planning for Hyper-V (manual resource entry) report. Alternatively, right-click the What-If VM Deployment Planning for Hyper-V (manual resource entry) report in the Reporting Pane and choose Open.

Step 2. Define Time Intervals

The Performance Data From parameter defines a date in the past starting from which historical performance data will be used to calculate the performance trend. The report analyzes historical performance data starting from this date to the current date (data collection period).

**NOTE:**
To make a forecast, the report must use historical performance data for at least 72 hours.

To follow this example, choose Previous month > First day from the Performance Data From list.

The Forecast Horizon parameter defines the forecast period. The calculated performance utilization trend is applied to the time interval that starts from the current date to the forecast horizon date.

**NOTE:**
The date in the Forecast Horizon field must be a date in future.

To follow this example, choose a date in future (30 days from today) from the Forecast Horizon list.
Step 3. Choose Report Scope

Leave the **Scope** section without changes.

Step 4. Specify Threshold Value

To follow this example, type 20 in the **Threshold: Storage Volume Free Space** field. Leave the CPU and memory utilization thresholds without changes.
Step 5. Specify Workload

To follow this example:

1. In the **VM COUNT** field, type 2.
2. In the **VM config - CPU GHz** field, type 3.
3. In the **VM config - Memory GB** field, type 4.
4. In the **VM config - IOPS** field, type 250.
5. In the **VM config - Resource usage %** field, type 85.

Step 6. Run the Report

When finished, click **Run** to view the report.
Report Output

The **Virtual Infrastructure Described** table will provide an overview for all clusters included in the report scope: number of hosts, amount of CPU and memory resources, number of VMs (total, active, shutdown and paused).

The **Sample Workload Described** table will provide an overview for the virtual machine used as a sample for calculating the number of VM sets: total number of VMs, total vCPUs, total CPU usage, memory usage and storage usage and number of IOPS.

---

**What-If VM Deployment Planning for Hyper-V (manual resource entry)**

- Report description

- Report parameters

---

**Summary**

<table>
<thead>
<tr>
<th>Virtual Infrastructure Described</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clusters overview</strong></td>
<td></td>
</tr>
<tr>
<td>Hosts</td>
<td>4</td>
</tr>
<tr>
<td>Total CPU Cores</td>
<td>36</td>
</tr>
<tr>
<td>Total CPU (GHz)</td>
<td>39.95</td>
</tr>
<tr>
<td>Total Memory (GB)</td>
<td>124</td>
</tr>
<tr>
<td>Total VMs</td>
<td>2</td>
</tr>
<tr>
<td>Active VMs</td>
<td>2</td>
</tr>
<tr>
<td>Shutdown VMs</td>
<td>0</td>
</tr>
<tr>
<td>Paused VMs</td>
<td>0</td>
</tr>
<tr>
<td><strong>Storage volumes overview</strong></td>
<td></td>
</tr>
<tr>
<td>Storage volumes</td>
<td>10</td>
</tr>
<tr>
<td>Total Storage Capacity (GB)</td>
<td>674</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

<table>
<thead>
<tr>
<th>Sample Workload Described</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of VMs</td>
<td>2</td>
</tr>
<tr>
<td>Total vCPUs</td>
<td>2</td>
</tr>
<tr>
<td>CPU Usage (GHz)</td>
<td>5.1</td>
</tr>
<tr>
<td>Physical Memory (GB)</td>
<td>6.9</td>
</tr>
<tr>
<td>IOPS</td>
<td>425</td>
</tr>
<tr>
<td>Storage Usage (GB)</td>
<td>279</td>
</tr>
</tbody>
</table>

The **Constraining Resource per Each Object** table will provide the resource for which the specified threshold will be breached first within the forecast period, and will show the number of VMs of the specified profile that your cluster will be able to support.
The **Hyper-V Cluster** table will show an overview of cluster compute resources, and the number of VMs within the cluster (total, active, shutdown, paused).

The **Performance Forecast** table reveals the predicted CPU and memory utilization and shows many VMs you can add in terms of compute resources, taking into account available resources in future.

### Hyper-V Cluster (Veeam MP): nQL

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Capacity</th>
<th>Threshold Calculation</th>
<th>Threshold</th>
<th>Predicted Usage Absolute Value</th>
<th>% of Total</th>
<th>VM Sets that Can Be Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max vCPUs</td>
<td>96</td>
<td>8 Core x 12 vCPU/Sec</td>
<td>80</td>
<td>64</td>
<td>55</td>
<td>18</td>
</tr>
<tr>
<td>CPU Utilization (%)</td>
<td>20.2%</td>
<td>99.9 % of 26.2% (26.2%)</td>
<td>20.3%</td>
<td>20.64</td>
<td>12.6%</td>
<td>0</td>
</tr>
<tr>
<td>Used Memory (GB)</td>
<td>64</td>
<td>36% of 64 GB</td>
<td>57.6 GB</td>
<td>73.81</td>
<td>112.02%</td>
<td>0</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

The **Performance Forecast** tables reveal the predicted free space usage and IOPS numbers and shows how many VMs you can add, taking into account available resources in future.

### Hyper-V Cluster Disk (Veeam MP): nLSCSI

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Capacity</th>
<th>Threshold Calculation</th>
<th>Threshold</th>
<th>Predicted Usage Absolute Value</th>
<th>% of Total</th>
<th>VM Sets that Can Be Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOPS</td>
<td>n/a</td>
<td>1000 IOPS</td>
<td>1000</td>
<td>0.0%</td>
<td>n/a</td>
<td>2</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

### Hyper-V Cluster Shared Volume (Veeam MP): nLSCSI

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Capacity</th>
<th>Threshold Calculation</th>
<th>Threshold</th>
<th>Predicted Usage Absolute Value</th>
<th>% of Total</th>
<th>VM Sets that Can Be Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>iDisk</td>
<td>103</td>
<td>20 % of 100 10%</td>
<td>20</td>
<td>102.05</td>
<td>102.85</td>
<td>6</td>
</tr>
</tbody>
</table>
What-If VM Deployment Planning (model existing VMs)

The **What-If VM Deployment Planning for Hyper-V (model existing VMs)** report evaluates total capacity of your infrastructure and provides estimation of how many sample VMs of a certain profile can be added without causing the specified resource utilization threshold to be breached. In this report, you can choose sample VMs from the existing environment.

**IMPORTANT!**

Objects of the Veeam Hyper-V Hosts Group and Veeam Hyper-V Cluster Disks Group are described with different related metrics. That is why, to evaluate your Hyper-V infrastructure properly, mind the following:

- The Veeam Hyper-V Cluster Disks Group includes not only storage disks, but also volumes. That is why, to evaluate storage free space and IOPS, select the Veeam Hyper-V Cluster Disks Group in the **Scope** section, and specify the **Threshold: Storage Volume Free Space** and **Threshold: Storage IOPS** thresholds.
- To evaluate memory and CPU utilization, select the Veeam Hyper-V Hosts Group in the **Scope** section, and specify the **Threshold: CPU Utilization (%)**, **Threshold: Used Memory (%)** or **Threshold: vCPUs per Core** thresholds.

The report evaluates total capacity of your infrastructure and provides estimation of how many sample VMs of a certain profile can be added without causing the specified resource utilization threshold to be breached.

The report analyzes historical performance data for the specified period in the past, calculates the performance utilization trend and applies it to the forecast horizon. Calculation of additional VM sets is based on the predicted future performance of the sample VM(s) and the predicted virtual infrastructure capacities.

**Sample Usage**

This section provides step-by-step instructions that will help you understand how to create the **What-If VM Deployment Planning (model existing VMs)** report. Consider the following example:

*You need to forecast how many VMs of the specified profile can be added to your cluster. Make sure that the free space threshold will not breach 20%, and CPU and memory thresholds will not breach 90% within the next 30 days. Use the historical performance data for the previous month for report analysis.*

**TIP:**

To identify the IOPS limit at which your storage device may experience abnormal latency, you can use the Hyper-V Storage Performance Profile Analysis report.

**Step 1. Open the What-If VM Deployment Planning (model existing VMs) Report**

Open the Reporting Pane, select Veeam Hyper-V Capacity Planning Reports and double-click the **What-If VM Deployment Planning for Hyper-V (model existing VMs)** report. Alternatively, right-click the **What-If VM Deployment Planning for Hyper-V (model existing VMs)** report in the Reporting Pane and choose **Open**.
Step 2. Define Time Intervals

The Performance Data From parameter defines a date in the past starting from which historical performance data will be used to calculate the performance trend. The report analyzes historical performance data starting from this date to the current date (data collection period).

**NOTE:**
To make a forecast, the report must use historical performance data for at least 72 hours.

To follow this example, choose Previous month > First day from the Performance Data From list.

The Forecast Horizon parameter defines the forecast period. The calculated performance utilization trend is applied to the time interval that starts from the current date to the forecast horizon date.

**NOTE:**
The date in the Forecast Horizon field must be a date in future.

To follow this example, choose a date in future (30 days from today) from the Forecast Horizon list.
Step 3. Choose Report Scope

Leave the **Scope** section without changes.

![Image of Report Scope](image1)

Step 4. Specify Workload

In the **Workload** section, search for the VMs that will be used as a sample.

1. Click **Add Object**.

2. In the **Add Object** window, click **Search**. The search will return a list of objects that belong to the **Hyper-V Virtual Machine (Veeam MP)** class. Select the necessary VM in the list, click **Add** and click **OK**.

![Image of Workload](image2)
Step 5. Specify Threshold Value

To follow this example, type 20 in the **Threshold: Storage Volume Free Space** field. Leave the CPU and memory utilization thresholds without changes.

![Threshold Setting Example](image)

Step 6. Run the Report

When finished, click **Run** to view the report.
Report Output

The **Virtual Infrastructure Described** table will provide an overview for all clusters included in the report scope: number of hosts, amount of CPU and memory resources, number of VMs (total, active, shutdown and paused).

The **Sample Workload Described** table will provide an overview for the virtual machines used as a sample for calculating the number of VM sets: total number of VMs, total vCPUs, total CPU usage, memory usage and storage usage and number of IOPS.

---

**What-If VM Deployment Planning for Hyper-V (model existing VMs)**

- **Report description**
- **Report parameters**

---

### Summary

<table>
<thead>
<tr>
<th>Virtual Infrastructure Described</th>
<th>Clusters overview</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hosts</td>
</tr>
<tr>
<td></td>
<td>Total CPU Cores</td>
</tr>
<tr>
<td></td>
<td>Total CPU (GHz)</td>
</tr>
<tr>
<td></td>
<td>Total Memory (GB)</td>
</tr>
<tr>
<td></td>
<td>Total VMs</td>
</tr>
<tr>
<td></td>
<td>Active VMs</td>
</tr>
<tr>
<td></td>
<td>Shutdown VMs</td>
</tr>
<tr>
<td></td>
<td>Paused VMs</td>
</tr>
</tbody>
</table>

- **Storage volumes overview**
  - Storage volumes: 80
  - Total Storage Capacity: 876

(*) Some numbers are based on recent hourly averaged measurements, so fractional numbers may appear even when only integers seem to be an appropriate value.

<table>
<thead>
<tr>
<th>Sample Workload Described</th>
<th>Number of VMs</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total vCPUs</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>CPU Usage (GHz)</td>
<td>5.42</td>
</tr>
<tr>
<td></td>
<td>IOPS</td>
<td>11.31</td>
</tr>
<tr>
<td></td>
<td>Storage Usage (GB)</td>
<td>117.21</td>
</tr>
<tr>
<td></td>
<td>Physical Memory (GB)</td>
<td>0.92</td>
</tr>
</tbody>
</table>

The **Constraining Resource per Each Object** table will provide the resource for which the specified threshold will be breached first within the forecast period, and will show the number of VMs of the specified profile that your cluster will be able to support.
The **Hyper-V Cluster** table will show an overview of cluster compute resources, and the number of VMs within the cluster (total, active, shutdown, paused).

The **Performance Forecast** table reveals the predicted CPU and memory utilization and shows many VMs you can add in terms of compute resources, taking into account available resources in future.

### Hyper-V Cluster (Veeam MP): nCL

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Capacity</th>
<th>Threshold Calculation</th>
<th>Threshold</th>
<th>Predicted Usage Absolute Value</th>
<th>% of Total</th>
<th>VM Sets that Can Be Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max vCPUs</td>
<td>8</td>
<td>x CPUs &gt; 10 vCPUs/CPU</td>
<td>90</td>
<td>64</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>CPU Utilization (GHz)</td>
<td>20.25</td>
<td>10% of 20 GHz</td>
<td>20.25</td>
<td>20.25</td>
<td>100.00</td>
<td>0</td>
</tr>
<tr>
<td>Used Memory (GB)</td>
<td>64</td>
<td>50% of 64 GB</td>
<td>57.6</td>
<td>75.01</td>
<td>115.26</td>
<td>0</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements; so fractional numbers may appear even when only integers seem to be an appropriate value.

### Hyper-V Cluster Disk (Veeam MP): nSCSI

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Capacity</th>
<th>Threshold Calculation</th>
<th>Threshold</th>
<th>Predicted Usage Absolute Value</th>
<th>% of Total</th>
<th>VM Sets that Can Be Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOPS</td>
<td>n/a</td>
<td>1000 IOPS</td>
<td>1000</td>
<td>0.02</td>
<td>n/a</td>
<td>8</td>
</tr>
</tbody>
</table>

(*) Some numbers are based on recent hourly averaged measurements; so fractional numbers may appear even when only integers seem to be an appropriate value.

### Hyper-V Cluster Shared Volume (Veeam MP): nSCSI

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Capacity</th>
<th>Threshold Calculation</th>
<th>Threshold</th>
<th>Predicted Usage Absolute Value</th>
<th>% of Total</th>
<th>VM Sets that Can Be Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>used/Storage</td>
<td>100</td>
<td>20% of 180.0 GB</td>
<td>20</td>
<td>100.00</td>
<td>100.00</td>
<td>0</td>
</tr>
</tbody>
</table>
Troubleshooting

Some specific troubleshooting scenarios are provided in this section.

Problems Accessing and Displaying Veeam UI

This section describes common problems with accessing the Veeam UI and provides guidance on how to fix these problems.

Access Denied

If you use the default Log in using Windows credentials checkbox when accessing the Veeam UI, the current user account must be a member of the Veeam Virtualization Extensions Users group.

If you run Mozilla Firefox and try to access the web console remotely using the Login using Windows credentials option, you will need to perform an additional configuration:

1. In the address bar, enter `about:config`.
2. In the list of configuration options, find `network.automatic-ntlm-auth.allow-non-fqdn`.
3. Set the `network.automatic-ntlm-auth.allow-non-fqdn` configuration option value to `true`.

To log in using different credentials of the Veeam Virtualization Extensions Users group member, clear the Log in using Windows credentials check box and enter the username and password for the account of the authorized user.

Login using Windows credentials checkbox not displayed

When a distributed Veeam installation is used, where the Veeam Virtualization Extensions Service is installed on a different server from the Veeam UI web site, the Login using Windows credentials check box will not be available as account delegation across servers is not supported.

Page does not display

Check your browser settings to ensure the web console site is included in the list of `Trusted sites` (in IE, go to Tools > Internet Options > Security). Alternatively, the Automatic logon with current user name and password option should be selected for the list of `Trusted sites` (in IE, go to Tools > Internet Options > Security > Custom Level and scroll down to the User Authentication options).

Veeam UI displayed incorrectly in IE with Compatibility View enabled

Veeam UI website does not support the IE “Compatibility View” feature. To turn it off, click Tools > Compatibility View settings and clear the Display intranet sites in Compatibility View checkbox.
Hyper-V Hosts not Discovered in Ops Mgr

Symptoms

No Hyper-V hosts appear in the Ops Mgr console.

Cause

Hyper-V hosts might not be visible in Ops Mgr due to discovery issues, SDK connection issues or problems with the Ops Mgr agent on Hyper-V hosts.

Solutions

Open the Veeam Web UI and check if hosts are displayed on the **Hyper-V Servers** tab. If no hosts are shown:

- Check whether there are enough licensed sockets remaining.

- Click the **Update monitored Hosts** link. This will force the Veeam Virtualization Extensions Service to update the list of recently discovered hosts.

- Click the **Test OM SDK Connection** link to check SDK connection between the Veeam Virtualization Extensions Service and Ops Mgr.

If the SDK connection is unavailable, check whether the System Center Data Access Service is running on the Management Server. Also, make sure that the account used to run the Virtualization Extensions Service has the **Operator** or **Author** role assigned in Ops Mgr.

- Check that Veeam Hyper-V MPs have been imported and discoveries are not disabled.

- Check that proxy settings are enabled for Ops Mgr agents on Hyper-V hosts. For details, see Step 2. **Configure Ops Mgr Agent Proxy Settings**.

- Restart Ops Mgr service **Microsoft Monitoring Agent** on Hyper-V hosts to force discovery:
  - In Ops Mgr 2012 R2, restart **Microsoft Monitoring Agent Service**
  - In Ops Mgr 2012 SP1, restart **System Center Management Service**
Veeam MP Dashboards/Views are Empty

Symptoms

- Veeam MP dashboards and views display no data
- Data in dashboards and views is not updated
- You get errors when trying to access dashboards and views
- Widget performance degraded drastically

Causes

1. Performance data has not been aggregated yet in the Data Warehouse.
   After installation (or discovery of new objects), you should normally wait several hours before data is collected and aggregated:
   - 4 hours for ‘Top N’ widgets
   - 72 hours for capacity planning widgets and reports
   - 24 hours for reports

2. The latest Ops Mgr updates for improved performance of visualization components (dashboards and widgets) have not been applied. The latest updates contain fixes for Ops Mgr console issues.

3. Console process thread is full with queue of data queries. This could also be an indication of poor performance of SQL server(s) hosting the Ops Mgr databases.

Solutions

1. Make sure that the latest Ops Mgr updates are installed. Keep in mind that when applying console updates, you must also:
   - Apply all necessary server updates and SQL scripts.
   - Import all updated management packs.

2. Wait until performance data is collected and aggregated. In Veeam MP performance views, check that sufficient data is available for the corresponding object.

3. Perform Clear Cache for the Ops Mgr console in order to correctly load all views. To do this, start the Operations console with the /clearcache (or /C) parameter.
   - For Operations Manager 2012 R2, run this command in the command prompt:
     "%ProgramFiles%\Microsoft System Center 2012 R2\Operations Manager\Console\Microsoft.EnterpriseManagement.Monitoring.Console.exe" /clearcache
   - For Operations Manager 2012 SP1, run this command in the command prompt:
     "%ProgramFiles%\System Center 2012\Operations Manager\Console\Microsoft.EnterpriseManagement.Monitoring.Console.exe" /clearcache

Ops Mgr Agent Restarts on Hyper-V Host

Symptoms

Ops Mgr agent on a Hyper-V host restarts with the message: 'Health Service exceeded Process\Handle Count or Private Bytes threshold.'

Cause

Ops Mgr agent processes a large number of workflows, which might cause high numbers of used handles and private bytes for the Monitoring Host process. When the handle or private bytes counters reach their thresholds, the Ops Mgr agent will be automatically restarted by a default Microsoft monitor.

Solution

If Ops Mgr agent restarts frequently (e.g., every couple of hours), increase threshold values for the System Center Management Health Service Performance monitors:

- Health Service Handle Count Threshold
- Health Service Private Bytes Threshold
- Monitoring Host Handle Count Threshold
- Monitoring Host Private Bytes Threshold

The handle count thresholds can be increased up to 40000 handles. The private bytes threshold can be increased to 1610612736 bytes (1.5 GB).
Performance Metric Overrides Cause Veeam MP Monitors to Work Incorrectly

If you set an override for a Veeam MP performance metric in a way that the specified data collection time interval exceeds the Ops Mgr time range configured to collect dependent metrics, the corresponding Veeam MP monitor will not be able to work correctly, and all dependent metrics will return zero values.

For example, if you override the Veeam Hyper-V Host CPU Usage MHz rule and set the Frequency parameter to a value that exceeds the Frequency value configured for the dependent aggregated Veeam Hyper-V Cluster CPU Used % rule, the Veeam HyperV: Cluster CPU Usage monitor will report zero metric values.

To avoid the issue, configure the performance metric override correctly taking into account the Ops Mgr data collection time range:

<table>
<thead>
<tr>
<th>Aggregated Performance Monitor on Management Server</th>
<th>Aggregated Performance Rule on Management Server</th>
<th>Performance Rule on Hyper-V Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Cluster CPU Usage</td>
<td>Veeam Hyper-V Cluster CPU Used %</td>
<td>Veeam Hyper-V Host CPU Usage MHz</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Memory Usage</td>
<td>Veeam Hyper-V Cluster Memory Used %</td>
<td>Veeam Hyper-V Host Memory Used MB</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Disk Latency Analysis</td>
<td>Veeam Hyper-V Cluster Disk Highest Latency</td>
<td>Veeam Hyper-V Disk Read Latency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Veeam Hyper-V Disk Write Latency</td>
</tr>
<tr>
<td></td>
<td>Veeam Hyper-V Cluster Disk IOPS</td>
<td>Veeam Hyper-V Disk IOPS</td>
</tr>
<tr>
<td></td>
<td>Veeam Hyper-V Cluster Disk Usage MB/s</td>
<td>Veeam Hyper-V Disk Usage MB/s</td>
</tr>
<tr>
<td></td>
<td>Veeam Hyper-V SMB Volume Free Space GB</td>
<td>Veeam Hyper-V Host SMB Volume Free Space GB</td>
</tr>
<tr>
<td>Veeam HyperV: SMB Volume Free Space Analysis</td>
<td>Veeam Hyper-V SMB Volume Free Space %</td>
<td>Veeam Hyper-V Host SMB Volume Free Space %</td>
</tr>
</tbody>
</table>
How to Open a Veeam Support Call

If none of the above steps resolve your issue, then you may open a support call with Veeam. Information for contacting Veeam Support and support policy guide are available at the Customer Center Portal at cp.veeam.com.

Note that you will need to produce a .zip file of diagnostic data to send to Veeam support:

1. Open the Veeam UI.
2. Click the Help button and select Export Logs from the list.
3. Attach this file to your support request with the problem description.

**NOTE:**

If the log files are too large to attach, email the support address, and an alternative delivery method will be agreed (such as FTP upload).
Appendices

This section includes appendices with Veeam MP for Hyper-V reference information.

Appendix A. Configuring Run As Account for SCVMM Discovery

NOTE:
SCVMM is optional in terms of Veeam MP functionality.

The Veeam Hyper-V MP SCVMM Connection Account (Read-only) account is required to allow Ops Mgr agent on the SCVMM Server to discover and insert SCVMM-specific topology objects into Ops Mgr. For the Ops Mgr agent action account requirements, see Required Permissions.

To discover relations between Hyper-V objects and SCVMM-specific topology objects, it is also required to connect SCVMM with Ops Mgr. To do that, follow the instructions provided in this Microsoft article.

To add a Run As account to the Veeam Hyper-V MP SCVMM Connection Account (Read-only) profile:

1. Open the Ops Mgr Console using the account with administrative rights.
2. Go to the Administration section.
3. Expand the Run As Configuration node and select Profiles.
4. In the list of profiles, double-click the inbuilt the Veeam Hyper-V MP SCVMM Connection Account (Read-only).
5. Click Next to begin the Run As Profile Wizard.
6. At the Add Run As Accounts step, click Add.
7. In the Add a Run As Account window, click New and follow the Create Run As Account Wizard to create a new Run As account.
   a. At the Credentials step, specify user name and password that will be used for SCVMM discovery.
   b. At the Distribution Security step, choose the necessary distribution security level. If you choose the More secure level, you will need to manually distribute the account credentials to the machine where the Virtual Machine Manager runs.
   c. Click Create to save the account.
8. Select All targeted objects to be managed by the Run As account. Alternatively, you can select A selected class, group, or object and choose the following classes of Hyper-V objects:
   - Hyper-V SCVMM Server (from the Veeam Hyper-V Base Discovery MP)
   - Hyper-V SCVMM Storage Container (from the Veeam Hyper-V Library MP)
   - Veeam Virtualization Extensions Service (from the Veeam Base Discovery MP)
9. Click Save to save the profile.
NOTE:
When you configure a Run As Account, it is included into the *Microsoft.SystemCenter.SecureReferenceOverride* Management Pack that is automatically created by the Ops Mgr.

Due to the dependencies with the Microsoft.SystemCenter.SecureReferenceOverride MP, deleting the Veeam Hyper-V MP may result in conflicts. For details, see [Uninstalling Veeam Hyper-V MP](#).

### Appendix B. Discovered Object Classes and Frequency

Veeam Hyper-V MP discoveries are based on Microsoft best practice intervals. Discovery rule details are provided in the following table.

<table>
<thead>
<tr>
<th>Discovery Rule</th>
<th>Frequency, sec</th>
<th>Target</th>
<th>Discovered Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam Stage 1 - Hyper-V Initial Virtual Machine discovery</td>
<td>900</td>
<td>Hyper-V Host</td>
<td>Hyper-V Virtual Machine</td>
</tr>
<tr>
<td>Veeam Hyper-V Cluster Shared Volume discovery</td>
<td>3600</td>
<td>Hyper-V Host Cluster Physical Disk</td>
<td>Hyper-V Cluster Disk Hyper-V Cluster Shared Volume</td>
</tr>
<tr>
<td>Veeam Hyper-V Discovery Target Object Initial Discovery</td>
<td>3600</td>
<td>Windows Computer</td>
<td>Windows Computer Veeam Hyper-V Managed Host</td>
</tr>
<tr>
<td>Veeam Hyper-V Virtual Machine discovery</td>
<td>3600</td>
<td>Hyper-V Host Virtual Machines Container</td>
<td>Hyper-V Virtual Machine</td>
</tr>
<tr>
<td>Veeam Hyper-V Server Role discovery</td>
<td>3600</td>
<td>Veeam Hyper-V Managed Host</td>
<td>Hyper-V Host Virtual Machines Container Hyper-V Cluster Hyper-V Host</td>
</tr>
<tr>
<td>Veeam Hyper-V SCVMM properties and relations discovery</td>
<td>3600</td>
<td>Hyper-V SCVMM Server</td>
<td>Hyper-V SCVMM Storage Container Hyper-V Host Hyper-V Cluster Hyper-V SCVMM Server Hyper-V Discovery Target</td>
</tr>
<tr>
<td>Veeam Hyper-V Storage discovery</td>
<td>14400</td>
<td>Hyper-V Host</td>
<td>Hyper-V Host Cluster Physical Disk Hyper-V Cluster Disk Hyper-V Clustered Shared Volume Hyper-V SMB Volume</td>
</tr>
<tr>
<td>Veeam Hyper-V Host Network Adapter discovery</td>
<td>3600</td>
<td>Hyper-V Host</td>
<td>Hyper-V Host Virtual Network Adapter Hyper-V Virtual Switch Hyper-V Host Physical Network Adapter Hyper-V Host Teamed Physical Network Adapter</td>
</tr>
<tr>
<td>Discovery Rule</td>
<td>Frequency, sec</td>
<td>Target</td>
<td>Discovered Classes</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>Veeam Hyper-V SCVMM Virtual Machine discovery</td>
<td>3600</td>
<td>Hyper-V SCVMM Server</td>
<td>Hyper-V SCVMM Logical Network</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hyper-V Virtual Machine</td>
</tr>
<tr>
<td>Veeam Hyper-V Base SCVMM Server discovery</td>
<td>3600</td>
<td>Windows Computer</td>
<td>Hyper-V SCVMM Server</td>
</tr>
<tr>
<td>Create relationship between Hyper-V virtual</td>
<td>86400</td>
<td>Root Management Server Emulator</td>
<td>Hyper-V Virtual Machine</td>
</tr>
<tr>
<td>machine and Ops Mgr Agent in VM</td>
<td></td>
<td></td>
<td>Hyper-V Virtualization Extensions Object</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows Computer</td>
</tr>
<tr>
<td>Veeam Hyper-V Virtual Machine properties</td>
<td>3600</td>
<td>Hyper-V Host Virtual Machines Container</td>
<td>Hyper-V Virtual Machine</td>
</tr>
<tr>
<td>discovery</td>
<td></td>
<td></td>
<td>Hyper-V Virtual Switch</td>
</tr>
<tr>
<td>Veeam Hyper-V vSwitch properties discovery</td>
<td>3600</td>
<td>Hyper-V Host</td>
<td>Hyper-V Virtual Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hyper-V Host Network Container</td>
</tr>
</tbody>
</table>
Appendix C. Veeam Hyper-V MP Rules and Monitors

This section lists Veeam Hyper-V MP monitors, event rules and performance collection rules.

Event Rules

<table>
<thead>
<tr>
<th>Rule/Alert Name</th>
<th>Target</th>
<th>Event ID</th>
<th>Log Name</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: VM Backup Error</td>
<td>HOST VM Container</td>
<td>Any</td>
<td>Microsoft-Windows-Hyper-V-VMMS-Admin</td>
<td>Critical -OR- Warning</td>
<td>This rule tracks events about failed virtual machine backup operations reported by the Hyper-V host.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Guest OS Error</td>
<td>HOST VM Container</td>
<td>18590</td>
<td>Microsoft-Windows-Hyper-V-Worker-Admin</td>
<td>Critical -OR- Warning</td>
<td>This rule tracks fatal errors reported by the Guest OS running inside a Hyper-V VM and captured by the Hypervisor.</td>
</tr>
<tr>
<td>Veeam HyperV: VM NUMA Error</td>
<td>HOST VM Container</td>
<td>Any</td>
<td>Microsoft-Windows-Hyper-V-Worker-Admin</td>
<td>Critical -OR- Warning</td>
<td>This rule tracks errors reported by the Hyper-V host about inefficient or unsupported VM configuration caused by a specific NUMA topology.</td>
</tr>
<tr>
<td>Veeam HyperV: VM RemoteFX Error</td>
<td>HOST VM Container</td>
<td>Any</td>
<td>Microsoft-Windows-Hyper-V-Worker-Admin</td>
<td>Critical -OR- Warning</td>
<td>This rule tracks errors reported by the Hyper-V host about inefficient or unsupported RemoteFX or Synthetic 3D Display Controller configuration.</td>
</tr>
</tbody>
</table>

Monitors

Veeam Hyper-V SCVMM Service Monitor

<table>
<thead>
<tr>
<th>Monitor/Alert Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Trigger/Threshold</th>
<th>Description</th>
</tr>
</thead>
</table>
| Veeam HyperV: System Center Virtual Machine Manager Service Status | SCVMM  | Availability   | RED Status: SCVMM service is not running and configured to be running automatically | System Center Virtual Machine Management Service is down. Management and automation of SCVMM-managed Hyper-V host may not work with stopped VMM service.
When service is unavailable Veeam MP will not be able to discover properties of objects specified via VMM, |
| Veeam HyperV: System Center Virtual Machine Manager Service Status | SCVMM  | Availability   | GREEN (clear) Status: SCVMM service is running or stopped as it should be | System Center Virtual Machine Management Service is down. Management and automation of SCVMM-managed Hyper-V host may not work with stopped VMM service.
When service is unavailable Veeam MP will not be able to discover properties of objects specified via VMM, |
### Managed Host Proxy Monitor

<table>
<thead>
<tr>
<th>Monitor/Alert Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Trigger/Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Ops Mgr Agent proxy status</td>
<td>Managed Hyper-v host (VES watcher)</td>
<td>Availability</td>
<td><strong>RED Status:</strong> Proxy for the corresponding Agent is not enabled AND host is monitored with Veeam MP&lt;br&gt;<strong>GREEN (clear) Status:</strong> Proxy for the corresponding Agent is enabled OR managed host is not monitored</td>
<td>Hyper-V Host [Host name] is enabled for monitoring in Veeam Virtualization Extensions [URL], but agent settings do not allow Veeam Management Packs to create Hyper-V topology. Please enable proxy on agent or disable Veeam Hyper-V monitoring for the host.</td>
</tr>
</tbody>
</table>

### Health Service Configuration Monitor

<table>
<thead>
<tr>
<th>Monitor/Alert Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Trigger/Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Health Service recommended configuration monitor</td>
<td>Managed Hyper-V host (stub object)</td>
<td>Configuration</td>
<td><strong>RED Status:</strong> None&lt;br&gt;<strong>YELLOW Status:</strong> Registry settings are lower than recommended&lt;br&gt;<strong>GREEN (clear) Status:</strong> Registry settings are higher or same as recommended</td>
<td>The Ops Mgr Health Service on this Veeam MP managed Hyper-V server is not optimally configured for best monitoring performance and scalability. For Ops Mgr Agent, a Recovery Action will automatically correct this configuration and restart the Agent. Once corrected this Alert will close.&lt;br&gt;For Ops Mgr Management Server, the 'Configure Health Service' Task should be run manually. Note that this will restart the Health Service on the Management Server.</td>
</tr>
</tbody>
</table>
### State Monitors

<table>
<thead>
<tr>
<th>Monitor/Alert Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Trigger/Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: VM Uptime</td>
<td>Hyper-V VM</td>
<td>Availability</td>
<td>Aggregated Monitor, the worst of: Heartbeat Monitor, Power state Monitor, Health Monitor</td>
<td>[Alerting is disabled by default] The Virtual Machine is in downtime, one or more VM health monitors are in the critical state</td>
</tr>
<tr>
<td>Veeam HyperV: SMB Share Availability</td>
<td>Hyper-V SMB Share mount point (host stub object)</td>
<td>Availability</td>
<td>RED Status: SMB is unresponsive  GREEN (clear) Status: SMB share can be contacted</td>
<td>The SMB share [share name] connected to the Hyper-V host [host name] is unavailable. The following VMs are affected: [List of VMs and VHD files]</td>
</tr>
</tbody>
</table>

### Hyper-V Cluster Storage Monitors

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Cluster Storage Status</td>
<td>Hyper-V Cluster Disk</td>
<td>Availability</td>
<td>RED Status: Storage Failed</td>
<td>Clustered Storage Disk [Disk Name] is [offline/failed/other status]. The following clustered role resources depend on this storage: [clustered role name 1] and Disk(VHD)/Snapshot/Config information [clustered role name 2] and Disk(VHD)/Snapshot/Config information ... [clustered role name N] and Disk(VHD)/Snapshot/Config information</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>YELLOW Status: Storage Offline (or other status = not Available)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>GREEN (clear) Status: Storage Available</td>
<td></td>
</tr>
<tr>
<td>Veeam HyperV: Host Cluster Disk Status</td>
<td>Hyper-V Host Cluster Physical Disk (Veeam MP)</td>
<td>Availability</td>
<td>RED Status: Disk Failed</td>
<td>Host Cluster Disk is Offline. Critical state of this monitor means that the cluster disk is in the Failed state. Warning state means that the cluster disk went Offline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>YELLOW Status: Disk Offline (or other status = not Available)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>GREEN (clear) Status: Disk Online</td>
<td></td>
</tr>
</tbody>
</table>
### Hyper-V Host Network Container Monitors

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Network Adapter Status</td>
<td>Hyper-V Host Physical Network Adapter</td>
<td>Availability</td>
<td><strong>RED Status:</strong> On or more pNICs are down  <strong>YELLOW Status:</strong> None  <strong>GREEN (clear) Status:</strong> All NICs are UP</td>
<td>The Hyper-V Host physical NIC [NIC Name] is down.</td>
</tr>
<tr>
<td>Veeam HyperV: Network Adapter Team Status</td>
<td>Hyper-V Host Teamed Physical Network Adapter (Veeam MP)</td>
<td>Availability</td>
<td><strong>RED Status:</strong> StateError  <strong>YELLOW Status:</strong> StateWarning  <strong>GREEN (clear) Status:</strong> StateOK</td>
<td>This monitor tracks the internal state of the host teamed network adapter.</td>
</tr>
<tr>
<td>Veeam HyperV: Host Network connectivity problem</td>
<td>Hyper-V Host Network Container (Veeam MP)</td>
<td>Availability</td>
<td><strong>RED Status:</strong> StateError  <strong>GREEN (clear) Status:</strong> StateOK</td>
<td>The network adapter status changed to 'Disabled'.</td>
</tr>
</tbody>
</table>

### Hyper-V Host Virtual Switch Monitors

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Network connectivity problem on Host Virtual Switch</td>
<td>Hyper-V Virtual Switch</td>
<td>Availability</td>
<td><strong>RED Status:</strong> All NICs in the TEAM are down  <strong>YELLOW Status:</strong> Some NICs in the TEAM are down  <strong>GREEN (clear) Status:</strong> All vSwitch NICs are healthy</td>
<td>Network connectivity problem has been detected on host [Host Name] with vswitch [vswitch name]. The following VMs and Host vNICs are affected: VMs: [VM name] <a href="IP">vNIC</a></td>
</tr>
</tbody>
</table>
## VM Status Monitors

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: VM Health</td>
<td>Hyper-V VM</td>
<td>Availability</td>
<td><strong>RED Status:</strong> HealthState = Critical OR Major Failure (20) OR Critical Failure (25) OR OperationalStatus = 3 (Degraded) <strong>YELLOW Status:</strong> HealthState = Disabled OR OperationalStatus = 5 (Predictive Failure) <strong>GREEN (clear) Status:</strong> HealthState = OK AND OperationalStatus = 2 (OK)</td>
<td>The Health of VM [VM Name] is not healthy.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Heartbeat</td>
<td>Hyper-V VM</td>
<td>Availability</td>
<td><strong>RED Status:</strong> None <strong>YELLOW Status:</strong> Heartbeat = 13 (Lost Communication) OR 6 (Error) OR 12 (No Contact) <strong>GREEN (clear) Status:</strong> Heartbeat = 2 (OK)</td>
<td>The Heartbeat Status of VM [VM Name] is reported as [Heartbeat].</td>
</tr>
<tr>
<td>Veeam HyperV: VM Power State</td>
<td>Hyper-V VM</td>
<td>Availability</td>
<td><strong>RED Status:</strong> EnabledState &lt;&gt; 2 (Running) <strong>YELLOW Status:</strong> None <strong>GREEN (clear) Status:</strong> EnabledState = 2 (Running)</td>
<td>VM [VM Name] is not Running. The status is reported as [EnabledState].</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Resource Status</td>
<td>Hyper-V VM (as a Cluster Resource)</td>
<td>Availability</td>
<td><strong>RED Status:</strong> Failed, Offline <strong>YELLOW Status:</strong> None <strong>GREEN (clear) Status:</strong> On, Off, Saved</td>
<td>VM [VM Name] cluster resource is in failed state. The status is reported as [VM_state].</td>
</tr>
</tbody>
</table>
## Hyper-V Integration Services Monitors

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: VM Integration Services Status</td>
<td>Hyper-V VM</td>
<td>Availability</td>
<td><strong>RED Status:</strong> Service(s) is not running</td>
<td>The following Hyper-V Integration Service(s) are not running or not responding in the guest OS: [Service Name] [Service Name] .... [Service Name]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>YELLOW Status:</strong> None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>GREEN (clear) Status:</strong> All Services are running</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Event(s)</th>
<th>Generates Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam Hyper-V: Heartbeat Integration Service Status</td>
<td>“Ops Mgr Agent in VM” object (Hyper-V)</td>
<td>Availability</td>
<td>Check status of Hyper-V Heartbeat integration service in guest OS</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>RED Status:</strong> Service is not running</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>YELLOW Status:</strong> None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>GREEN (clear) Status:</strong> Service is running</td>
<td></td>
</tr>
</tbody>
</table>

## Self-Monitoring

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: SCVMM Connection Account (Read-only) configuration state</td>
<td>Veeam Virtualization Extensions Service</td>
<td>Configuration</td>
<td><strong>RED Status:</strong> None</td>
<td>RunAs profile ‘Veeam Hyper-V MP SCVMM Connection Account (Read-only)’ is not configured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>YELLOW Status:</strong> SCVMM Run-as profile is empty</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>GREEN (clear) Status:</strong> SCVMM Run-as profile is not empty</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitor Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV: Licensed socket count exceeded</td>
<td>Veeam Virtualization Extensions Service</td>
<td>Availability</td>
<td><strong>RED Status:</strong> Event ID 1106 raised</td>
<td>The number of Hyper-V CPU sockets in the license was exceeded. More Hyper-V hosts are selected for monitoring in the Veeam UI than it is allowed by the license.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>GREEN (clear) Status:</strong> Event ID 1105 raised</td>
<td></td>
</tr>
</tbody>
</table>
## Performance Monitors

<table>
<thead>
<tr>
<th>Monitor/Alert Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Trigger/Default Threshold</th>
<th>Description</th>
</tr>
</thead>
</table>
| Veeam HyperV: VM CPU Scheduling Analysis | Hyper-V VM     | Performance    | **Red**: % Avg Dispatch Wait Time > 10% (overridable)  
**Yellow**: % Avg Dispatch Wait Time > 8% (overridable)  
**Green**: % Avg Dispatch Wait Time < thresholds  
Consecutive Samples = 3  
Collection interval = 5 minutes | Hyper-V Virtual Machine [VM Name] on Host [host name] has high CPU Dispatch Wait time of [%Avg Dispatch Wait Time] over [num samples] samples. With maximum wait time across all vCPUs [%Max Dispatch Wait Time]%  
The latest values for VM vCPU load is: [table with per-core usage from WMI]  
These are the most recent real-time sample values.  
Use in-context Dashboard VM Compute Analysis to review VM resource consumption and in-guest performance metrics. |
| Veeam HyperV: Host CPU Scheduling Analysis | Hyper-V Host   | Performance    | **Red**: % Avg Dispatch Wait Time > 10% (overridable)  
**Yellow**: % Avg Dispatch Wait Time > 8% (overridable)  
**Green**: % Avg Dispatch Wait Time < thresholds  
Consecutive Samples = 3  
Collection interval = 5 minutes | Hyper-V Host [host name] has high overall CPU Dispatch wait time of [%Avg Dispatch Wait Time]% over [num samples] samples. With maximum wait time across all cores [%Max Dispatch Wait Time]%  
The latest values for VM CPU load is: [table with per-VM usage from WMI]  
These are the most recent real-time sample values.  
Use in-context Dashboard Host Compute Analysis to review VM resource consumption on this Host. |
<table>
<thead>
<tr>
<th>Monitor/Alert Name</th>
<th>Target</th>
<th>Parent Monitor</th>
<th>Trigger/Default Threshold</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam HyperV:</td>
<td>SMB share</td>
<td>Availability</td>
<td>Free Space % &lt;10 (Warn)</td>
<td>Hyper-V SMB share [Share Name] is low on free space with only [Free Space %] % space remaining. Use the SMB Space Usage Analysis Dashboard to see which VMs are using this storage; in particular, check for powered-off VMs that may be moved or deleted to free up space.</td>
</tr>
<tr>
<td>SMB Share Free</td>
<td></td>
<td></td>
<td>Free Space % &lt;5 (Critical)</td>
<td></td>
</tr>
<tr>
<td>Space</td>
<td></td>
<td></td>
<td>Consecutive Samples = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td>Veeam HyperV:</td>
<td>Hyper-V VM</td>
<td>Performance</td>
<td>Hyper-V Virtual Storage Device / Error Count &gt; 0 (Warning)</td>
<td>Hyper-V Virtual Machine [VM Name] on Host [host name] has logged [Error count] total storage errors over [num samples] samples.</td>
</tr>
<tr>
<td>VM Storage Errors</td>
<td></td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td>Veeam HyperV:</td>
<td>Hyper-V VM</td>
<td>Performance</td>
<td>Hyper-V Hypervisor Virtual Processor / % Guest Run Time &gt; 80 (Warning)</td>
<td>Hyper-V Virtual Machine [VM Name] on Host [host name] has high CPU usage of [% Guest Run Time]% over [num samples] samples.</td>
</tr>
<tr>
<td>VM CPU Usage</td>
<td></td>
<td></td>
<td>Hyper-V Hypervisor Virtual Processor / % Guest Run Time &gt; 95 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td>Monitor/Alert Name</td>
<td>Target</td>
<td>Parent Monitor</td>
<td>Trigger/Default Threshold</td>
<td>Description</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Veeam HyperV: VM Memory Pressure Analysis</td>
<td>Hyper-V VM</td>
<td>Performance</td>
<td>Hyper-V Dynamic Memory VM / % Memory Pressure &gt; 100 (Warning)</td>
<td>Hyper-V Virtual Machine [VM Name] on Host [host name] has high memory pressure of [Memory Pressure]% over [num samples] samples. Any value &gt;100% for memory pressure means that the VM is demanding memory from the Host, but cannot receive it. This can be due to either misconfigured Maximum Memory Limit for the VM, or to Host memory resource exhaustion. The VM is currently using (VM Physical Memory \ VM Maximum Memory Limit * 100) % of its allocated limit ( [Physical Memory] MB of limit [Maximum Memory] MB). <em>Plus dynamically-generated troubleshooting recommendation text.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hyper-V Dynamic Memory VM / % Memory Pressure &gt; 120 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
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<td></td>
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<td></td>
<td>Collection interval = 5 minutes</td>
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</tr>
<tr>
<td></td>
<td>Hyper-V VM</td>
<td>Configuration</td>
<td>Checkpoint AgeHours &gt; 48</td>
<td>The virtual machine [vm name] running on Host [hostname] is using Checkpoints.</td>
</tr>
<tr>
<td>Veeam HyperV: VM Checkpoint Analysis</td>
<td></td>
<td></td>
<td>Checkpoints SizeMB &gt; 2048</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>State always = Warning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Priority always = Low (overridable)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host</td>
<td>Performance</td>
<td>Hyper-V Hypervisor Logical Processor / % Total Run Time &gt; 80 (Warning)</td>
<td>This Hyper-V Host has high CPU usage of [% Total Run Time]% over [num samples] samples. Use in-context Dashboard Host Compute Analysis to review VM resource consumption on this Host.</td>
</tr>
<tr>
<td>Veeam HyperV: Host CPU Usage Analysis</td>
<td></td>
<td></td>
<td>Hyper-V Hypervisor Virtual Processor / % Total Run Time &gt; 90 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host</td>
<td>Performance</td>
<td>% Memory Used &gt; 90 (Warning)</td>
<td>This Hyper-V Host is using [Memory Used]% memory over [num samples] samples. Usage is [memory used MB]MB from total available of [memory GB] GB. Use in-context Dashboard Host Compute Analysis to review VM resource consumption on this Host.</td>
</tr>
<tr>
<td>Veeam HyperV: Host Memory Usage Analysis</td>
<td></td>
<td></td>
<td>% Memory Used &gt; 95 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor/Alert Name</td>
<td>Target</td>
<td>Parent Monitor</td>
<td>Trigger/Default Threshold</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------</td>
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<td>------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Veeam HyperV: Host Memory Pages/sec</td>
<td>Hyper-V Host</td>
<td>Performance</td>
<td>Memory Pages/sec &gt; 800 (Warning)</td>
<td>This Hyper-V Host Memory Pages/sec counter is [Memory Pages/sec] over [num samples] samples. Use in-context Dashboard Host Compute Analysis to review VM resource consumption on this Host.</td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host</td>
<td></td>
<td>Memory Pages/sec &gt; 1000 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host</td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host</td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td>Veeam HyperV: Host Network Queue Length</td>
<td>Hyper-V Host Physical Network Adapter</td>
<td></td>
<td>Network Interface/Output Queue Length = 2 (Warning)</td>
<td>This monitor tracks threshold breaches for the following metric: Hyper-V Physical Network Adapter\Output queue length - the number of threads waiting on the network adapter.</td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host NIC</td>
<td>Performance</td>
<td>Network Interface/Output Queue Length &gt; 2 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host NIC</td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Host NIC</td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td>Veeam HyperV: Cluster CPU Usage</td>
<td>Hyper-V Cluster</td>
<td>Performance</td>
<td>Hyper-V Cluster/ % CPU Used &gt; 80 (Warning)</td>
<td>This Hyper-V Cluster has high CPU usage of [% cpu used]% over [num samples] samples. Use in-context Dashboards for Cluster Compute Analysis and VM Compute Heatmap to review Host &amp; VM resource consumption in this Cluster.</td>
</tr>
<tr>
<td></td>
<td>Hyper-V Cluster</td>
<td></td>
<td>Hyper-V Cluster/ % CPU Used &gt; 90 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Cluster</td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Cluster</td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Memory Usage</td>
<td>Hyper-V Cluster</td>
<td>Performance</td>
<td>Hyper-V Cluster/ % Memory Used &gt; 80 (Warning)</td>
<td>This Hyper-V Cluster has high Memory usage of [% memory used]% over [num samples] samples. Use in-context Dashboards for Cluster Compute Analysis and VM Compute Heatmap to review Host &amp; VM resource consumption in this Cluster.</td>
</tr>
<tr>
<td></td>
<td>Hyper-V Cluster</td>
<td></td>
<td>Hyper-V Cluster/ % Memory Used &gt; 90 (Critical)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Cluster</td>
<td></td>
<td>Consecutive Samples = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyper-V Cluster</td>
<td></td>
<td>Collection interval = 5 minutes</td>
<td></td>
</tr>
<tr>
<td>Monitor/Alert Name</td>
<td>Target</td>
<td>Parent Monitor</td>
<td>Trigger/Default Threshold</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
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<td>----------------</td>
<td>---------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Disk Latency Analysis</td>
<td>Hyper-V Cluster Disk</td>
<td>Performance</td>
<td>Highest Latency &gt; 40 (Warning)</td>
<td>Hyper-V Cluster Disk [Disk Name] exhibited highest max latency of [Highest Latency _Total] ms, over [NumSamples] samples. Use the Disk Performance Analysis Dashboard to review VM I/O to this storage. Launch a Performance View to see the latency reported per-Host.</td>
</tr>
<tr>
<td>Veeam HyperV: Cluster Volume Free Space</td>
<td>Hyper-V Cluster Shared Volume</td>
<td>Availability</td>
<td>% Free Space &lt; 10 (Warning)</td>
<td>Hyper-V Cluster Shared Volume [CSVName] is low on free space with only [% Free Space] % space remaining. Use the CSV Space Usage Analysis Dashboard to see which VMs are using this storage; in particular, check for powered-off VMs that may be moved or deleted to free up space. Use the VM Checkpoint Analysis Dashboard to find VMs that have large checkpoint files that can be committed or deleted to free up space.</td>
</tr>
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## Performance Collection Rules

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Appendix D. Creating Veeam Dashboard Widgets

The Veeam Hyper-V MP offers customizable dashboard widgets to help you plan and optimize any resources in your infrastructure. These dashboard widgets can display data about any items in Ops Mgr – not just Veeam MP objects.

The Veeam Hyper-V MP contains the following widgets that you can include in dashboards.

- Morning Coffee Widget
- Heatmap Widget
- Traffic Light Widget
- Capacity Planning Widget

For details on creating dashboard views, see Microsoft technical documentation.

Morning Coffee Widget

This widget allows you to track the health state and overall resource utilization for the selected infrastructure objects.

Sample Usage

This section provides step-by-step instructions that will help you understand how to use the Morning Coffee widget. Consider the following example:

You have a very large infrastructure with lots of clusters, which makes it difficult to monitor data in the default Morning Coffee Dashboard. You need to narrow the monitoring scope and create a separate Morning Coffee widget for a specific cluster.

In a dashboard, click to add a new widget and follow the next steps:

1. At the Template step, choose Veeam > Veeam Infrastructure Summary Widget.
2. At the General Properties step, specify widget display name and description.
3. At the Management Pack step, choose Hyper-V.
4. At the Scope step, click Add to choose what infrastructure objects will be included in the widget scope.

NOTE:

Keep in mind that the Veeam Hyper-V MP comes with separate Topology – Compute and Topology – Storage topologies which have different root objects. If you add a compute topology container, the Morning Coffee Dashboard will not automatically add storage objects from that container and will not display storage information. For this reason, if you need to add a compute topology object, you will also need to add a corresponding storage topology object.
The **Add Groups or Objects** window will open. To follow this example:

a. Select the *Show all objects and groups* option.

b. In the search field, enter the name of the required cluster.

c. From the list of available items, select the *Hyper-V Cluster (Veeam MP)* object along with the corresponding *Hyper-V Cluster Disk Container (Veeam MP)* object, and click **Add**.

d. Click **OK**.

5. At the **Summary** step, review configuration information and click **Create**.

6. Click **Close**.

As a result, the widget will show the state of SCVMMs (if present), physical hosts, VMs, storage and resource utilization for the cluster.
Heatmap Widget

This widget allows you to compare performance metric or property values for several objects. Objects in the heatmap are represented with tiles, the size and color of the tiles reflects the value of performance counters.

Sample Usage

This section provides step-by-step instructions that will help you understand how to use the Heatmap widget. Consider the following example:

You need to analyze the amount of available and free space for host local volumes and make sure that there is at least 10% of free space left on the volumes.

In a dashboard, click to add a new widget and follow the next steps:

1. At the Template step, choose Veeam > Veeam Heatmap Widget.
2. At the General Properties step, specify widget display name and description.
3. At the Scope step, choose what infrastructure objects will be included in the widget scope:
   - In the Select a scope to contain all objects used in the heatmap box, add the Veeam Hyper-V Clusters Group.
   - In the Select a class to Group the tiles on the heatmap field, choose Hyper-V Host Disks Container.
   - In the Select a class to be used for each Tile on the heatmap field, choose Hyper-V Host Local Volume.

   NOTE:
   The Heatmap widget has a known limitation for the list of groups and objects selected as a scope.
   If you add several groups and objects in the widget scope, make sure they include containers and tile object classes. Otherwise, the widget may start working incorrectly.

   At the Set tile size step, choose a counter that will define the size of tiles on the heatmap.
   To follow this example, choose Total Storage Capacity GB.

4. At the Set tile color step, specify color settings for the heatmap:
   - In the Select counter or property to control Tile color field, select % Free Space.
   - In the Select method to control color range section, clear the Automatic (the maximum value will be used for Red) check box.
   - In the Minimum field, specify 100, in the Maximum field, specify 10.

5. At the Time Interval step, leave the default interval settings.
6. Click Create.
As a result, the widget will show host local volumes as tiles for each host:

- The tile size will represent the total amount of volume space.
- The tile color will represent the amount of free space left on the volume; volumes that have less than 10% free space left will be colored red.

Veeam MP for Hyper-V also includes default dashboards with the preconfigured Heatmap widgets. For details, see Heatmap Dashboards.

Traffic Light Widget

This widget shows top or bottom infrastructure objects for the selected performance metric.

Sample Usage

This section provides step-by-step instructions that will help you understand how to use the Traffic Light widget. Consider the following example:

You need to analyze the number of running VMs on hosts and make sure this number does not exceed 15.

In a dashboard, click to add a new widget and follow the next steps:

1. At the Template step, choose Veeam > Veeam Traffic Light Widget.
2. At the General Properties step, specify widget display name and description.
3. At the Scope and Counters step, choose what infrastructure objects will be included in the widget scope and what counter should be analyzed:
   - In the Select a group or object field, choose the Veeam Hyper-V Hosts Group.
   - In the Select a performance counter (Object/ Counter/ Instance) field, choose Hyper-V Hypervisor / VM Running / _Total.
4. At the Time Range and Results step, leave the default interval settings.
5. At the Display step, specify traffic lights color settings.
   - Select the Use warning (yellow) and critical (red) thresholds for the bar color check box. In the Warning field, enter 10; in the Critical field, enter 15.
6. Click Create.
As a result, the widget will show hosts sorted by running VMs:

- Hosts with more than 15 VMs will be highlighted red
- Hosts with 10 to 15 running VMs will be highlighted yellow
- Hosts with less than 10 running VMs will be highlighted green

Veeam MP for Hyper-V also allows you to configure the thresholds for predefined Top dashboards. For details, see Top Dashboards.

Capacity Planning Widget

This widget forecasts how many days remain before the level of resource utilization reaches the specified threshold.

Sample Usage

This section provides step-by-step instructions that will help you understand how to use the Capacity Planning widget. Consider the following example:

You need to analyze memory usage on hosts and make sure that the usage level will not exceed 75% within the next 30 days.

In a dashboard, click to add a new widget and follow the next steps:

1. At the Template step, choose Veeam > Veeam Capacity Planning Widget.
2. At the General Properties step, specify widget display name and description.
3. At the Scope step, choose what infrastructure objects will be included in the widget scope:
   - In the Specify a scope by selecting a group of objects or object container box, add the Veeam Hyper-V Clusters Group.
   - In the Select a class of objects to calculate capacity prediction field, choose Hyper-V Host (Veeam MP).
4. At the **Specify forecast horizon** step, specify the data collection period and forecast horizon:
   - In the **Make a forecast based on the performance data from the last** field, enter 30 days.
   - In the **Specify horizon** field, enter 30 days.

5. At the **Resources** step, specify the expression that will be used for capacity planning. In the **Specify a resource 1** row, enter the following expression:
   - **Metric**: % Memory Used
   - **Operator**: greater than
   - **Threshold**: 75%

6. Click **Create**.

   The widget will analyze host memory utilization statistics for the previous 30 days and will calculate the number of days after which the memory utilization threshold will be breached.

   For each host, the widget will show a color bar:
   - Days remaining before the threshold breach will be highlighted in **Green**
   - Days after the threshold breach will be highlighted in **Red**.

   Hosts for which the threshold has already been breached, will be represented with the red bar.

   ![Capacity Planning Widgets](image)

   **NOTE:**
   To make a forecast, historical performance data for at least 72 hours is required.

   The widget uses historical data for the period specified in the **Make a forecast based on the performance data from the last** field. If there is not enough historical data within this period (for example, there were gaps and interruptions in data collection), the widget will show the warning icon next to the object name.

   Veeam MP for Hyper-V also includes default dashboards with the preconfigured Capacity Planning widgets. For details, see **Capacity Planning Dashboards**.
Appendix E. Uninstalling Veeam Management Pack for System Center

To uninstall the Veeam Management Pack for System Center, follow these steps:

1. **Uninstall Veeam Virtualization Extensions Service and UI.**
2. **Delete Veeam Hyper-V management packs.**
3. **Finalize uninstall.**

**Step 1. Uninstall Veeam Virtualization Extensions Service and UI**

To uninstall Veeam Virtualization Extensions Service and UI, do the following:

1. Log on as **Administrator** to the server where the Veeam Virtualization Extensions Service and UI components are installed.
2. Open **Programs and Features** and select **Veeam Management Pack for System Center**.
3. Select the Veeam Virtualization Extensions components and click **Uninstall**.

![Uninstall Veeam Virtualization Extensions Service and UI](image)
Step 2. Delete Veeam Management Packs

Delete Veeam management packs in the following order.

Deleting Microsoft.SystemCenter.SecureReferenceOverride MP

If you have SCVMM in your environment and if you have configured the Veeam Hyper-V MP SCVMM Connection Account (Read-only) Run As account in System Center, then Ops Mgr will have the Microsoft.SystemCenter.SecureReferenceOverride created or modified.

To delete Veeam MPs, it will first be required to clean the dependency created to the Secure Reference MP. You can do it either manually, or using the Remove_Veeam_SecureReference.ps1 script included in the Veeam MP Resource Kit. For more information on removing dependencies with the Veeam Secure Reference PS Script, see the Veeam MP Resource Kit Guide.

NOTE:

If you use other third-party MPs that store Run As accounts in the Microsoft.SystemCenter.SecureReferenceOverride MP, you might need to manually clean Veeam MP dependencies from the Microsoft.SystemCenter.SecureReferenceOverride MP.

To learn how to clean dependencies, see www.veeam.com/kb1898.

Deleting Veeam Management Packs

To delete the imported Veeam management packs, use the Ops Mgr console Administration section.

NOTES:

1. As with any MP, you must delete the overrides (or the unsealed MP which contains the overrides) before you can delete Veeam MPs.

2. If you have created a dashboard in the Default Management Pack using any of the Veeam MP customizable widgets, you will need to delete the Default Management Pack before you can delete Veeam MPs. For more information on working with Veeam dashboard widgets, see section Creating Veeam Dashboard Widgets.

First, delete the report management packs:

- Veeam Hyper-V Analysis Reports
- Veeam Hyper-V Capacity Planning Reports
- Veeam Backup and Replication Reports
- Veeam Report Library

1. Next, delete the discovery, monitoring and views management packs:

- Veeam Hyper-V Views
- Veeam Task Manager for Hyper-V
- Veeam Hyper-V Monitoring
- Veeam Hyper-V Discovery
- Veeam Hyper-V Library
• Veeam Backup Views
• Veeam Backup Monitoring
• Veeam Backup Discovery
• Veeam Backup Library
• Veeam Backup Base Discovery
• Veeam Base Discovery
• Veeam Widget Library

Alternatively, you can use the following PowerShell command to remove all Veeam MPs:

```
Get-SCOMmanagementpack | where{$_.displayname -like '*Veeam*'} | Remove-SCOMManagementPack
```

**Step 3. Finalize Uninstall**

To make sure all Veeam Hyper-V MP components are removed:

• Restart Ops Mgr agents on Hyper-V hosts
• Restart Ops Mgr console
Appendix F. Importing Veeam MP in System Center Service Manager

When importing Veeam MP libraries into System Center 2016 Service Manager or System Center 2012 R2 Service Manager (SCSM), in order to configure SCSM – Ops Mgr synchronization, you should import the following Veeam Library MPs:

- Veeam.Virt.Extensions.VMware.BaseDiscovery.mpb
- Veeam.Virt.Extensions.VMware.Library.mp
- Veeam.Virt.Extensions.HyperV.Library.mp

All above MPs can be found in the Veeam MP ISO, in the \SCOM 2012 MPs folder.

Additionally, the following two Microsoft MPs are a required dependency — these MPs can be found on the Operations Manager 2012 R2 DVD, in the \Management Packs folder:

- Microsoft.SystemCenter.2007.mp
- Microsoft.SystemCenter.DataWarehouse.Library.mp

Note that import of the Veeam MPs using the SCSM console import GUI may fail with an error concerning dependencies. There is no known workaround for this. In this case, use Service Manager Shell powershell interface and the Import-SCSMManagementPack cmdlet as follows:

```powershell
```