

Management Pack for vRealize Orchestrator v2.0 Guide

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vRealize Operations Manager 7.0



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The Management Pack for vRealize Orchestration Guide

The *Management Pack for vRealize Orchestrator™ Guide* describes the steps to run vRealize Orchestrator workflows from vRealize Operations Manager.

The *Management Pack for vRealize Orchestration Guide* describes the process of deploying, configuring and managing the Management Pack for vRealize Orchestrator in your vRealize Operations Manager environment.

Intended Audience

The information in this guide is intended for vRealize Operations Manager administrators.

VMware Technical Publications Glossary

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

Introduction to Management Pack for vRealize Orchestrator

1

This chapter includes the following topics:

- [Introduction to the Management Pack for vRealize Orchestrator](#)
- [Supported Configurations](#)
- [Overview of Tasks](#)

Introduction to the Management Pack for vRealize Orchestrator

You can run vRealize Orchestrator workflows from vRealize Operations Manager after you install and configure the Management Pack for vRealize Orchestrator. You can run workflows to remediate alerts in vRealize Operations Manager or automate tasks.

Management Pack for vRealize Orchestrator supports the following types of workflows:

- Custom vCenter package workflows.
- User defined vCenter workflows in vRealize Orchestrator
- Out of the box (OOTB) workflows which ship with the Management Pack for vRealize Orchestrator.

You can map these workflows as actions to alerts via recommendations. A **Run Action** button is displayed when vRealize Operations Manager displays the alerts. Using the **Run Action** button, you can execute the workflows.

You can map the user-defined workflows from vRealize Orchestrator after you discover them in vRealize Operations Manager. If you have user-defined workflow packages, you can discover the package in vRealize Operations Manager and map each workflow in the package to actions. You can also map custom vCenter workflows.

Management Pack for vRealize Orchestrator ships with five new out of the box workflows and 14 out of the box workflows in all. This does not include the python based actions. They are automatically mapped to the alerts via recommendations.

You can create a new policy or modify an existing policy for automated workflow execution when the vSphere objects governed by the policy receives alerts. The Reconnect Host workflow is an out of the box workflow which supports automated execution. To automate the workflow execution, you must apply the policy to a custom group called vRealize Orchestrator Adapter Managed Objects. This group contains the vSphere objects.

Automated workflow execution is possible on workflows which have only one input parameter. The input parameter is the object name itself. To automate workflows which have more than one input parameter, you can add the input parameter data inside the action script of the workflow because automated workflow execution supports only one input parameter.

Example: Using Management Pack for vRealize Orchestrator to Scale Up your Infrastructure

You can use Management Pack for vRealize Orchestrator workflows to scale up your infrastructure and quickly act upon capacity related alerts.

For example, your VI Admin receives an alert that a VM is low on memory. If the alert is mapped to the Custom Reconfigure VM workflow with predefined values to increase the RAM in the VM, you can configure the workflow to be automatically executed. When the alert is received, vRealize Operations Manager triggers the action to reconfigure the VM and the memory is scaled up in the VM against which the alert is received.

Supported Configurations

The Management Pack for vRealize Orchestrator supports workflows that are in an external instance of vRealize Orchestrator or an instance of vRealize Orchestrator which is embedded in an instance of vRealize Automation which is connected to vRealize Operations Manager.

The Management Pack for vRealize Orchestrator supports running of workflows on vCenter Server instances that are connected to vRealize Operations Manager. The instance of vRealize Orchestrator may be connected to more vCenter Server instances but you cannot execute workflows on those instances unless they are connected to vRealize Operations Manager.

The vRealize Operations Manager may be connected to an external vRealize Automation which has an embedded vRealize Orchestrator. You can execute Management Pack for vRealize Orchestrator workflows from this instance of vRealize Orchestrator as well.

Supported Versions

Management Pack for vRealize Orchestrator supports the following versions:

Table 1-1. Supported Versions

| Product | Version |
|-----------------------------|---|
| vRealize Orchestrator | version 7.4 and 7.5. Version 7.3 is supported but not tested. |
| vRealize Operations Manager | 7.0 |

To upgrade from an earlier version of the Management Pack for vRealize Orchestrator, first upgrade your installation of vRealize Operations Manager to version 7.0 and then update the Management Pack for vRealize Orchestrator to version 2.0. Management Pack for vRealize Orchestrator version 2.0 is not compatible with vRealize Operations Manager version 6.7.

Overview of Tasks

After you install the Management Pack for vRealize Orchestrator, you must perform the required tasks before you can run a workflow and remediate the alert.

| Task | Purpose |
|---|---|
| Configure Management Pack for vRealize Orchestrator | The workflows that help you remediate alerts are available in vRealize Orchestrator. You must configure the Management Pack for vRealize Orchestrator to connect to an external vRealize Orchestrator or an instance embedded in vRealize Automation. Using dynamic actions, Management Pack for vRealize Orchestrator automatically converts all the custom vCenter package workflows to alert actions. |
| Add a vCenter server instance to vRealize Orchestrator | You can optionally perform this task to add a vCenter server instance to vRealize Orchestrator from vRealize Operations Manager. |
| Discover additional vRealize Orchestrator packages. This task is optional. | After you configure the vRealize Orchestrator adapter, you can discover vCenter user-defined packages or workflows. |
| Map user defined workflows to resources as actions. | You can map user defined workflows to resources, or modify custom workflows that are already mapped to resources before you trigger them as actions. If the user defined workflows are part of a package, you cannot map the package directly. You can only map workflows in the package. |
| Map workflows to alerts. | Map the custom workflows, user defined workflows and out of the box workflows to alerts via recommendations to see the Run Action button in an alert. |
| Apply a new policy or modify an existing policy to automate execution of workflows. | Automate the execution of workflows that have predefined parameters by using a policy on the management groups that contain the vRealize Orchestrator Adapter Managed Objects. |
| Run a workflow | You can run a workflow from an alert via the Run Action button, from the inventory explorer, or from the dashboard. |

Installing and Configuring the Management Pack

2

You can download the Management Pack for vRealize Orchestrator from the VMware Solution Exchange website.

This chapter includes the following topics:

- [Install the Management Pack](#)
- [Configure the Management Pack for vRealize Orchestrator](#)
- [Add a vCenter Instance to vRealize Orchestrator](#)

Install the Management Pack

The Management Pack for vRealize Orchestrator consists of a PAK file that contains out of the box workflows from vRealize Orchestrator. You may install more than one Management Pack for vRealize Orchestrator .

Prerequisites

The solution that you downloaded includes a PAK file. Save that PAK file to a temporary folder on your local system.

Procedure

- 1 Log in to the vRealize Operations Manager user interface with admin privileges.
- 2 On the menu, click **Administration** and in the left pane click **Solutions**.
- 3 On the **Solutions** tab, click **Add**.
- 4 Browse to locate the temporary folder and select the PAK file.

For example, `vmware-MPforvRealizeOrchestrator-<version#-build#>.pak`.

5 Make the following choices:

- Select the checkbox against, **Install the PAK file even if it is already installed.**
- Select the checkbox against, **Reset Default Content, overwriting to a newer version provided by this update. User modifications to DEFAULT Alert Definitions, Symptoms, Recommendations, Policy Definitions, Views, Dashboards, Widgets and Reports will be overwritten. If you are installing a product software update, clone or backup the content before you proceed.**

Note Select these checkboxes if you are updating the Management Pack for vRealize Orchestrator from version 1.0 to version 2.0.

6 Click **Upload**.

The upload might take several minutes.

7 Read and accept the EULA, and click **Next**.

Installation details appear in the window during the process.

8 When the installation is finished, click **Finish**.

What to do next

Configure the Management Pack for vRealize Orchestrator to connect to an external vRealize Orchestrator or an instance embedded in vRealize Automation.

Configure the Management Pack for vRealize Orchestrator

After you install the management pack, add and configure an external vRealize Orchestrator or an instance embedded in vRealize Automation from which you run workflows.

Procedure

- 1 On the menu, click **Administration** and in the left pane click **Solutions**.
- 2 Select Management Pack for vRealize Orchestrator and click the **Configure** icon.
- 3 Configure the adapter instance.

| Option | Description |
|-----------------------------------|---|
| Display Name | The name for the adapter instance. |
| Description | (Optional) The description of the adapter instance. |
| vRealize Orchestrator Host | The URL of the vRealize Orchestrator or vRealize Automation instance from where you will run workflows. Specify the FQDN, or the IP address. If there is a load balancer for the CAFÉ appliances, the URL must have HostName or IP address of the load balancer in the format HostName or IP . |
| Port | Port number of the vRealize Orchestrator or vRealize Automation instance which has an embedded vRealize Orchestrator. The default port for vRealize Orchestrator is 8281. The default port for vRealize Automation is 443. |

| Option | Description |
|--|--|
| Auto Discovery | <p>Discover objects automatically.</p> <ul style="list-style-type: none"> ■ To set automatic discovery for objects, select True. ■ To set the automatic discovery off, select False. |
| Credential | <p>To add the credentials to access the vRealize Orchestrator or vRealize Automation environment , click the plus sign.</p> <ul style="list-style-type: none"> ■ Credential Kind. From the drop-down menu, select either vRealize Orchestrator Credential or vRealize Automation Credential. ■ Credential name. The name by which you are identifying the configured credentials. ■ vRealize Orchestrator or vRealize Automation Username. The user name of the vRealize Orchestrator or vRealize Automation instance. ■ vRealize Orchestrator or vRealize Automation Password. The password of the vRealize Orchestrator or vRealize Automation instance. |
| Collectors/Groups | <p>The collector on which the vRealize Automation Management Pack instance will run.</p> <ul style="list-style-type: none"> ■ For one collector instance, select default collector group. ■ For multiple collectors, to distribute the workload and optimize performance, select the collector to manage the adapter process for this instance. |
| Workflow Execution Metric Collection Time | <p>This value affects the Number of Success and Failed Executions widget in the vRealize Orchestrator Top-N Workflows dashboard. The value you specify here decides the rate/frequency at which the workflow execution success/failure metrics will be updated in vRealize Operations Manager. The default value is 720 minutes.</p> |

4 Click **Test Connection** to validate the connection.

5 Click **Save Settings**.

The adapter instance is added to the list.

What to do next

Verify that the vRealize Operations Manager management pack is fetching workflows.

- In the **Solutions** page, verify that the **Collection State** column and **Collection Status** are green under **Configured Adapter Instances**. The **Collection Status** displays **Data Receiving** after the first collection cycle. The default time for a collection cycle is five minutes.
- In the top pane of vRealize Operations Manager, click the **Administration** icon and click **Configuration**. Click **Inventory Explorer** and verify that the vRealize Operations Manager workflows are displayed on the table. Sort by the Adapter **Type** column or filter by name of the adapter instance if necessary.
- Optionally, discover additional packages to configure workflows.

Ensure that the instance of vRealize Operations Manager where you are configuring the Management Pack for vRealize Orchestrator has an instance of vCenter with vRealize Orchestrator configured. If this is not configured, an alert is displayed in vRealize Operations Manager. You can add a vCenter instance to vRealize Orchestrator to remediate this alert.

Add a vCenter Instance to vRealize Orchestrator

An instance of vCenter must be available in vRealize Orchestrator and the same instance must be configured in vRealize Operations Manager. If this is not available, you can add a vCenter Instance to vRealize Orchestrator from vRealize Operations Manager.

Prerequisites

Management Pack for vRealize Orchestrator must be configured.

Procedure

- 1 In the menu, select **Administration**, then click **Configuration > Inventory Explorer** in the left pane.
- 2 Select **Adapter Instances** and then **vRealize Orchestrator Adapter Instance** from the list of adapter instances.
- 3 Select the vRealize Orchestrator adapter instance.
A list of all the objects are displayed on the right pane.
- 4 From the right pane, select the vRealize Orchestrator to which you want to add a vCenter instance.
- 5 Click the **Action** icon and then **Add a vCenter Instance to vRealize Orchestrator**.
- 6 Configure the properties.
- 7 Click **Begin Action**.
A task is added to the task list.

Configuring vRealize Orchestrator Workflows

3

This chapter includes the following topics:

- [Package Discovery](#)
- [Mapping Workflows to Resources as Actions](#)
- [Mapping Actions to Alerts](#)
- [Viewing Workflows in Packages](#)
- [Configuring Automatic Remediation](#)
- [Import Remediation Package to vRealize Orchestrator](#)

Package Discovery

By default, Management Pack for vRealize Orchestrator discovers custom vCenter workflows and Management Pack for vRealize Orchestrator Out of the box (OOTB) workflows. You can extend the workflow capability of the Management Pack for vRealize Orchestrator by installing additional packages.

Install additional packages to support workflows related to different adapters.

Prerequisites

Install and configure the Management Pack for vRealize Orchestrator. The Management Pack for vRealize Orchestrator must connect to an external adapter before you install packages related to the adapter. In the **Solutions** page, verify that the **Collection State** column and **Collection Status** are green under **Configured Adapter Instances**. The **Collection Status** displays **Data Receiving** after the first collection cycle.

Procedure

- 1 On the menu, click **Environment** and under **Management Pack for vRealize Orchestrator**, select **vRO Packages and Workflows**.
vRealize Orchestrator displays a list of the configured vRealize Orchestrator adapter instances.
- 2 Select a vRealize Orchestrator adapter instance.
- 3 Next to the name of the vRealize Orchestrator adapter instance in the right pane, click **Configure Package Discovery** under **Actions**.

- 4 The **Configure Package Discovery** dialog box opens. Add a list of packages to be discovered in the following format: <packageName>
- 5 Click **Begin Action**.
- 6 The package discovery task starts. You can view the task ID in the **Configure Package Discovery** dialog box. Click **OK**.
- 7 To track the progress of the task, go to the **Recent Tasks** section under **History** in the **Administration** menu. Package discovery starts after the first content cycle.

Mapping Workflows to Resources as Actions

You can map custom and user-defined workflows to actions. Repeat the task to add one workflow to more than one resource. You can map a package to a resource to add workflows to a resource in bulk.

Prerequisites

You must discover user-defined workflows them before you can add them as an action to a resource.

Note You can only map workflows to the supported target resources.

Procedure

- 1 In the menu, select **Administration**, then click **Configuration > Inventory Explorer** in the left pane.
- 2 Select **Adapter Instances** and then **vRealize Orchestrator Adapter Instance** from the list of adapter instances.
- 3 Select the vRealize Orchestrator adapter instance that contains the workflow that you want to run.
A list of all the workflows are displayed on the right pane.

Note This action is present at Adapter instance level, package level and workflow level. Most recommended one is package level and workflow level.

- 4 From the right pane, select the workflow that you want to add to a resource.
- 5 Click the **Action** icon and then **Create/Modify Workflow Action on vCenter Resources**.
- 6 Configure the following properties

| Property | Option |
|----------------------------|---|
| Workflow | Select a workflow from the drop-down list. Note Do not modify out of the box workflows. |
| Available on Resource Type | If the workflow is already configured as an action in a resource type, it is displayed here. |
| Resource Type | Select a resource type from the drop-down list. |
| Operation | Choose to add or remove the workflow as an action. Options are Add and Remove . |

7 Click **Begin Action**.

A task is added to the task list.

You can verify that the action is available by clicking **vCenter Server** under **Adapter Instances**. Click the **Action** icon after you select the correct **Adapter Type** and **Object type** in the right pane. From the list displayed under the **Action** icon, verify that the workflow that you added to the resource is available as an action in the list. You must wait one collection cycle before you can verify. You can monitor the task list to see the status of the task.

Mapping Actions to Alerts

After you install and configure the Management Pack for vRealize Orchestrator, you can map custom and user defined workflows (actions) to alerts via recommendations. After you perform this mapping, you can execute the vRealize Orchestrator workflow to remediate issues when vRealize Operations Manager displays alerts. Out of the box workflows are automatically mapped to alerts.

Before you map alerts to workflows, review the out of the box workflows and corresponding recommendations and alerts. See [Out of the Box Workflows](#) in the *Appendix*.

Procedure

- 1 In the menu, click **Alerts** and then in the left pane, click **Alert Settings > Alert Definitions**.
- 2 Select an Alert that you want to modify, and click the **Edit** icon.
The **Alert Definition Workspace** dialog box opens.
- 3 Click the **Add Recommendations** row.
The recommendation already available is displayed.
- 4 Click the **Add** icon to add a new recommendation.
The **New Recommendation** dialog box opens.
- 5 Enter the description of what must be done to resolve the triggered alert.
- 6 Select an option from the drop-down list under **Adapter Type**.
- 7 From the drop down, select the action as a method to resolve a triggered symptom or a generated alert. Actions must already be configured in vRealize Operations Manager.
- 8 Click **Save**.
- 9 Drag the recommendation that you created to the **Recommendations** section in the right pane.
- 10 Click **Save** to save the new alert definition.

Viewing Workflows in Packages

View relationship between the vRealize Orchestrator and package to view the workflows. The **All Metrics** tab provides a map between the vRealize Orchestrator and the package.

Prerequisites

Install and configure the Management Pack for vRealize Orchestrator and install a package before viewing the workflows in the packages.

Procedure

- 1 On the menu, click **Environment** and then select **Management Pack for vRealize Orchestrator** in the left pane.
- 2 Select the instance of vRealize Orchestrator under **vRO Packages and Workflows**.
- 3 Click the **All Metrics** tab in the right pane.
- 4 Expand the **Show Object Relationship** section to view the relationship between the vRealize Orchestrator instance and packages.
- 5 Click a package to see a list of workflows in the package.

By default, Management Pack for vRealize Orchestrator displays the following packages:

Table 3-1. Default Management Pack for vRealize Orchestrator Packages

| Package Name | Workflows |
|------------------------------|---|
| com.vmware.library.vcenter | vCenter Workflows |
| com.vmware.vrops.oob_content | Default Management Pack for vRealize Orchestrator workflows |

Configuring Automatic Remediation

A policy is a set of rules that you define for vRealize Operations Manager to use to analyze and display information about the objects in your environment. You can modify an existing policy or create a new policy and configure it for automatic alert remediation. To automate the workflow execution, you must apply the policy to a custom group called vRealize Orchestrator Adapter Managed Objects. This group contains the vSphere objects.

Prerequisites

Ensure that the following prerequisites are met:

- You have mapped custom and user-defined workflows to resources as actions. Automated workflow execution is possible on workflows which have only one input parameter. To automate workflows which have more than one input parameter, you must create a user-defined workflow and predefine the input parameters in the workflow.
- You have mapped the action to an alert via a recommendation.

Procedure

- 1 In the menu, click **Administration**, and then on the left pane click **Policies** and then click the **Active Policies** tab. Note the name of the current default policy.
- 2 In the **Policy Library** tab, select the current default policy and click **Edit Selected Policy**.

- 3 In the Edit Monitoring Policy window, click the **Apply Policy to Groups** tab.
- 4 Select the checkbox next to **vRealize Orchestrator Adapter Managed Objects**.
- 5 In the Edit Monitoring Policy window, click the **Alert/Symptom Definitions** tab.
- 6 In the **Alert Definitions** pane, filter by the name of the alert to which you have mapped the action that you want to automate.
- 7 Select the alert from the filter results.
 - a In the **Automate** column, select **Local** from the drop-down menu.
 - b In the State column, select **Local** from the drop-down menu.
- 8 Click **Save**.

The default policy is modified to automatically run the configured action when mapped alerts are displayed.

Import Remediation Package to vRealize Orchestrator

After you install and configure the Management Pack for vRealize Orchestrator, vRealize Operations Manager automatically imports the remediation package to vRealize Orchestrator after the first collection cycle. If you delete the remediation package in vRealize Orchestrator, you see an alert in vRealize Operations Manager. You can then re-import the remediation package to vRealize Orchestrator.

Prerequisites

Verify that you have configured the Management Pack for vRealize Orchestrator

Procedure

- 1 On the menu, click **Environment** and under **Management Pack for vRealize Orchestrator**, select **vRO Packages and Workflows**.

vRealize Orchestrator displays a list of the configured vRealize Orchestrator adapter instances.
- 2 Select a vRealize Orchestrator adapter instance.
- 3 Next to the name of the vRealize Orchestrator adapter instance in the right pane, click **Import vRealize Operations Remediation Package to vRO** under **Actions**.
- 4 Choose to overwrite package if required.
- 5 Click **Begin Action**.

What to do next

Log on to vRealize Orchestrator to verify if the remediation package is available.

Executing vRealize Orchestrator Workflows

4

This chapter includes the following topics:

- [Running a Workflow from an Alert](#)
- [Running a Workflow from the Inventory Explorer](#)
- [Determine the Status of a Workflow After Execution](#)
- [Example: Configuring and Executing Auto Remediation](#)

Running a Workflow from an Alert

Run a vRealize Orchestrator workflow from an alert to resolve issues reported by vRealize Operations Manager.

You can execute a vRealize Orchestrator workflow from vRealize Operations Manager.

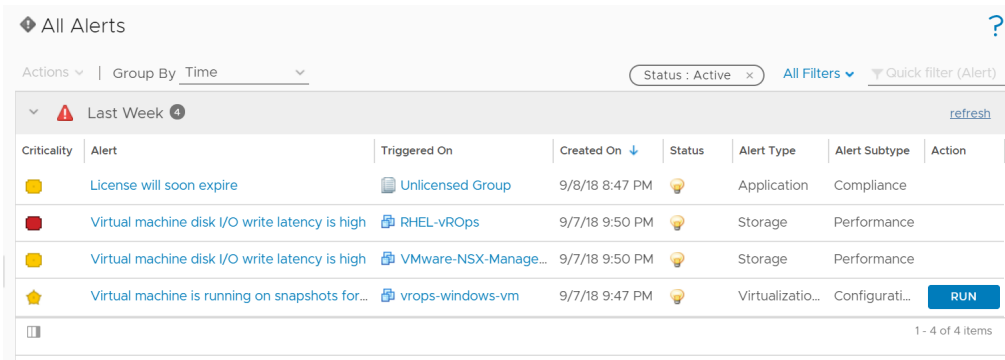
Prerequisites

Verify that you have configured the Management Pack for vRealize Orchestrator.

Procedure

- 1 In the menu, select **Alerts**, then click **All Alerts** in the left pane.
- 2 The are displayed on the right pane. They may be grouped either by Time, Criticality, Definition or Object Type.
- 3 Select an alert in the **All Alerts** page.
The alert details opens in the right pane.
- 4 Click the **Show Columns** icon on the bottom left. Select the **Action** checkbox. to show the actions column.

- If the alert recommendation has an associated action, click the **Run Action** button.



You can check if the task has been completed to verify if the workflow has executed. To check the status of the task, go to the **Recent Tasks** section under **History** in the **Administration** menu.

Running a Workflow from the Inventory Explorer

Run a vRealize Orchestrator workflow from the Inventory Explorer to perform common management tasks.

Prerequisites

Verify that you have configured the Management Pack for vRealize Orchestrator. You can run a workflow only on unique resource names. If two resources have the same name, the workflow may not run.

Procedure

- In the menu, select **Administration**, then click **Configuration > Inventory Explorer** in the left pane.
- Select **Adapter Instances** and then **vRealize Orchestrator Adapter Instance** from the list of adapter instances.
- Select the vRealize Orchestrator adapter instance that contains the workflow that you want to run. A list of all the workflows are displayed on the right pane.
- Click the **Action** icon and then **Execute Workflow Action** to run the workflow.

- 5 In the **Execute Workflow Action** dialog box, enter the input parameters to run the workflow. You must provide input parameters in the **Input parameter to run the Workflow** and **vCenter Server IP** columns.

◆ **Table 4-1. Input Format for the *Input parameter to run the Workflow* column**

| Workflow Data type | Format for Providing Input Values |
|--|--|
| String/Secure String/VC:XYZ (any String) | Resource name without single or double quotes |
| Number | Any numeric value. For example, you can provide the index number which corresponds to the VM's guest Operating System name for input parameter data type for the guest Operating System identifier. See Using the Input Parameter Data Type for Guest Operating System Identifier in the <i>Appendix</i> for more information. |
| Boolean | True or False |
| Array/XYZ (any string) | Input for the array in the following format: (input1, input2) or [input1, input2] or {input1, input2} |
| Optional inputs | If you do not wish to specify for any value for an optional input, you just need to provide a comma (,) in place of the value. |

Note : User input should be ordered with respect to the data type of the workflow input parameter.

- ◆ For the **vCenter Server IP** column, select the vCenter server IP from the dropdown. This is only required for the workflows that you run in the vCenter Server.

- 6 Click **Begin Action**.

What to do next

You can check if the task has been completed to verify if the workflow has executed.

Determine the Status of a Workflow After Execution

Recent Tasks provide the status of a workflow after you execute it. View the recent tasks to see if the workflow executed correctly. If any workflow is in the failed/unknown state, you will get a notification in the alerts window. If there are multiple failures, they are combined, and the alert is cleared in the next collection cycle.

Procedure

- 1 From the main menu of vRealize Operations Manager click **Administration**.
- 2 From the left pane, click **Recent Tasks** under **History**.
- 3 Select the workflow task from the list of recent tasks. You can view details of the selected task in the bottom pane.

Example: Configuring and Executing Auto Remediation

This example describes the steps to define a custom workflow in vRealize Orchestrator and configure auto-remediation of an alert using the custom workflow.

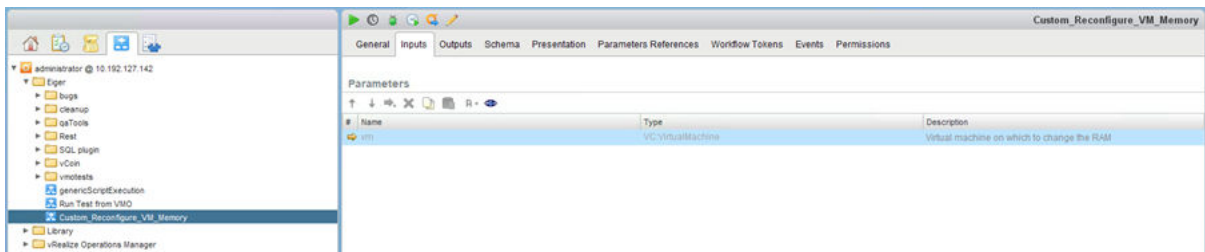
In this example, we will create a custom vRealize Orchestrator workflow where the input parameter name is **vm**.

Prerequisites

Automated workflow execution is possible on workflows which have only one input parameter. The input parameter should be of type VC: <VC datatype> in the vRealize Orchestrator workflows.

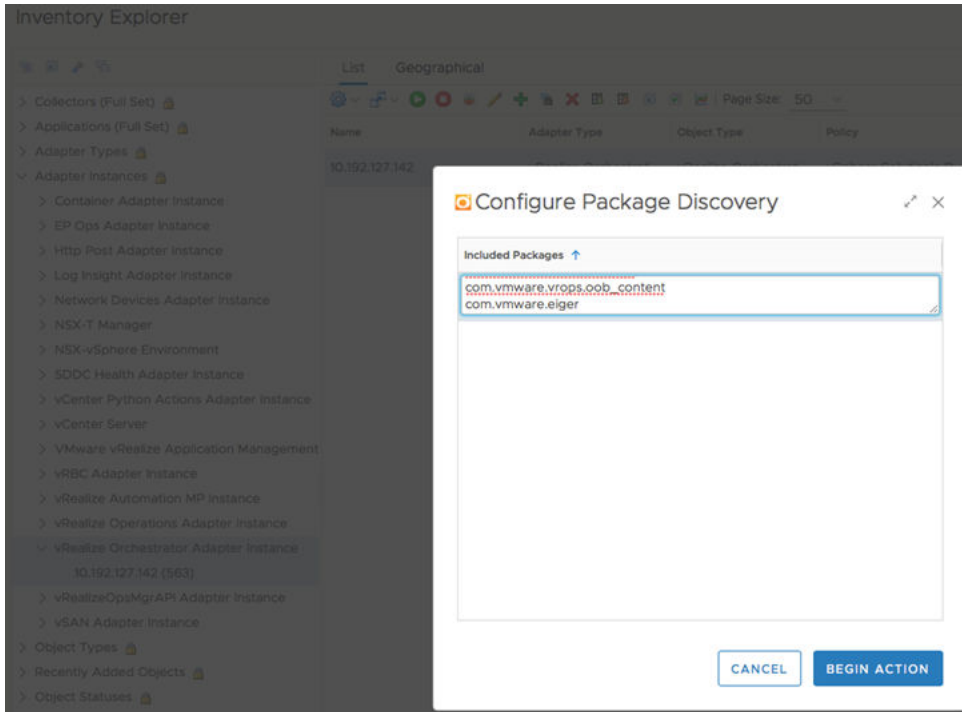
Procedure

- 1 Create a custom workflow in vRealize Orchestrator. The custom workflow should have one input parameter of type VC: <VC Datatype>. In our example, the workflow **Custom Reconfigure VM Memory**, has one input parameter of type VC:VirtualMachine, and the name of the input parameter is **vm**.



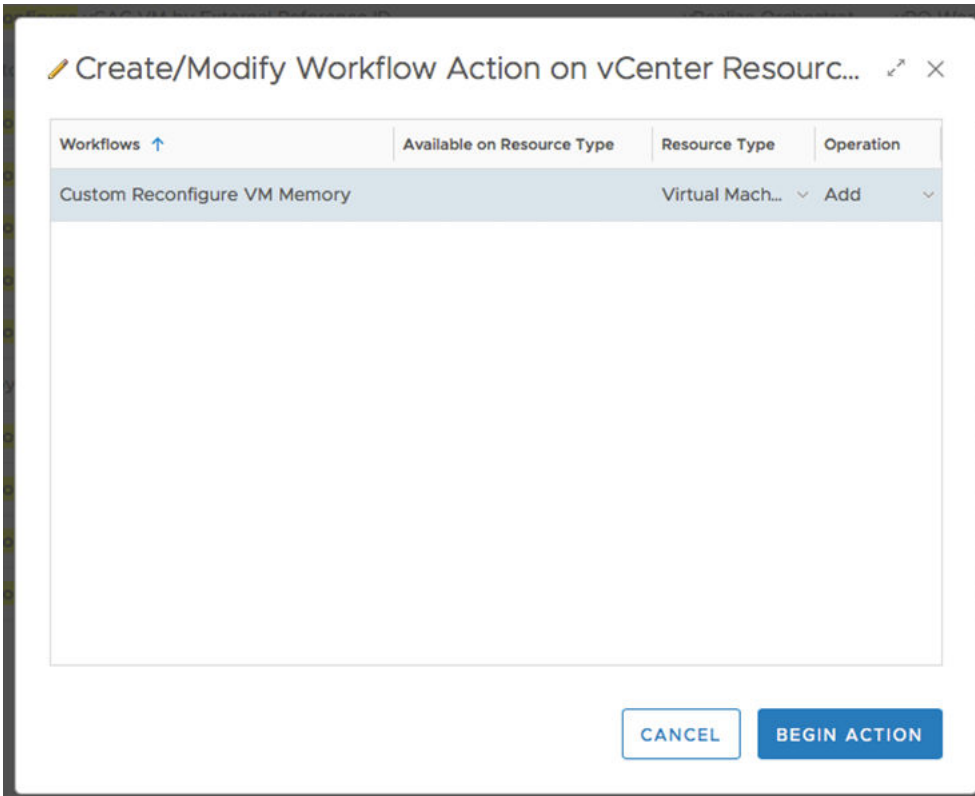
- 2 Import the custom workflow into vRealize Operations Manager.
 - a On the menu, click **Environment** and under **Management Pack for vRealize Orchestrator**, select **vRO Packages and Workflows**.
vRealize Orchestrator displays a list of the configured vRealize Orchestrator adapter instances.
 - b Select a vRealize Orchestrator adapter instance.

- c Next to the name of the vRealize Orchestrator adapter instance in the right pane, click **Configure Package Discovery** under **Actions**.
- d The **Configure Package Discovery** dialog box opens. Add a list of packages to be discovered in the following format: `<packageName>`

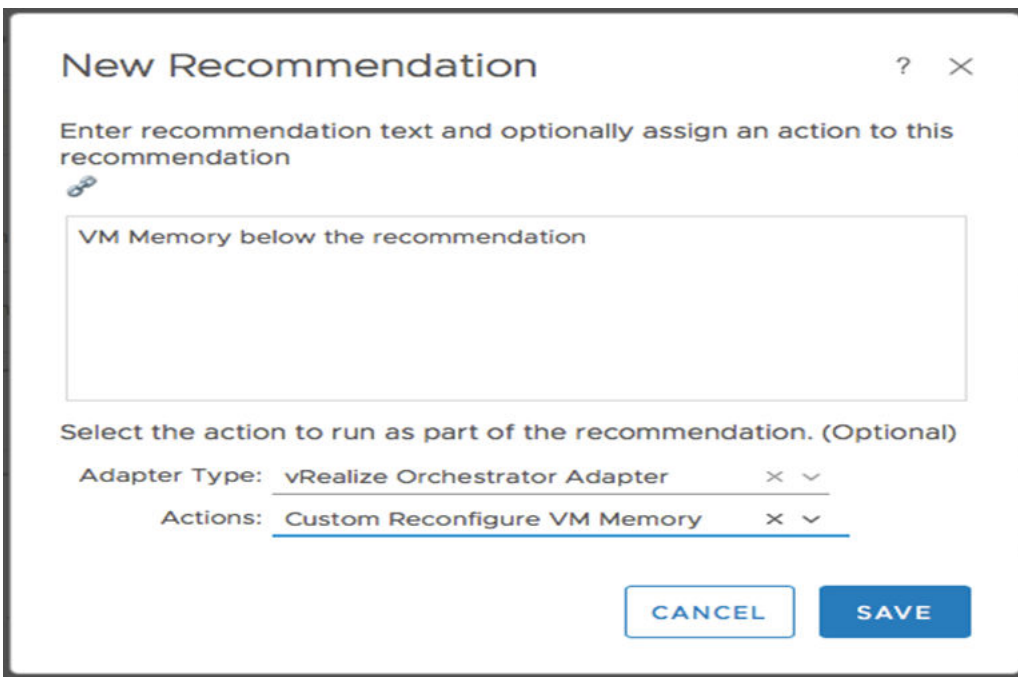


- 3 Map the custom workflow to a vCenter resource. Here the vCenter resource is of type **VC:VirtualMachine** which should match the vRealize Orchestrator workflow.
 - a In the menu, select **Administration**, then click **Configuration > Inventory Explorer** in the left pane.
 - b Select **Adapter Instances** and then **vRealize Orchestrator Adapter Instance** from the list of adapter instances.
 - c Select the vRealize Orchestrator adapter instance that contains the workflow that you want to run.

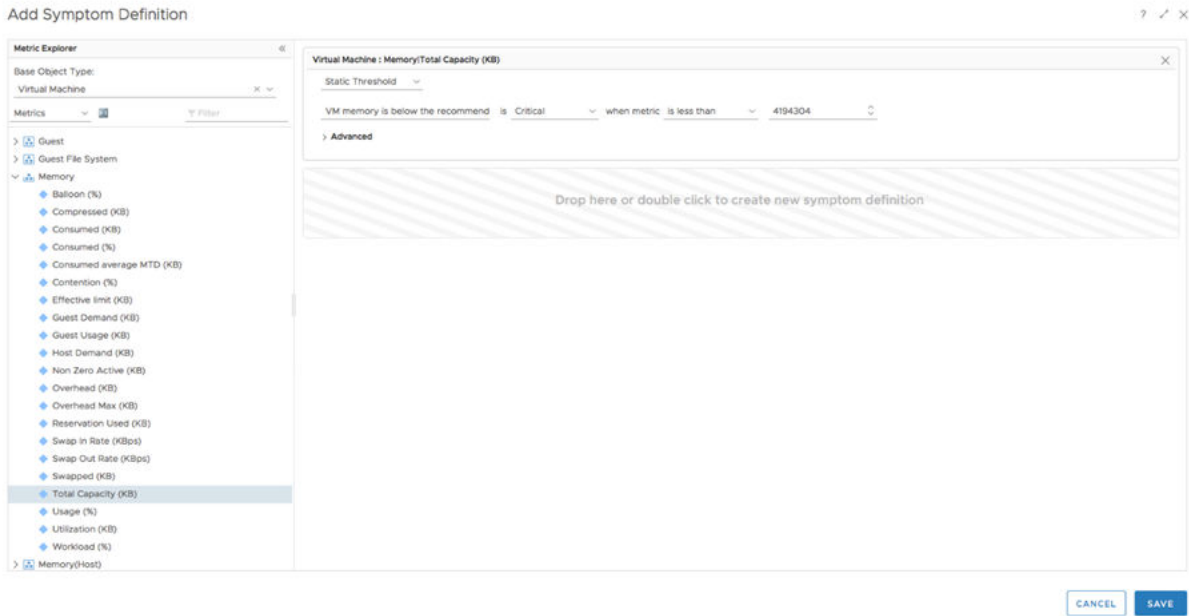
- d From the right pane, select the workflow that you want to add to a resource.
- e Click the **Action** icon and then **Create/Modify Workflow Action on vCenter Resources**.



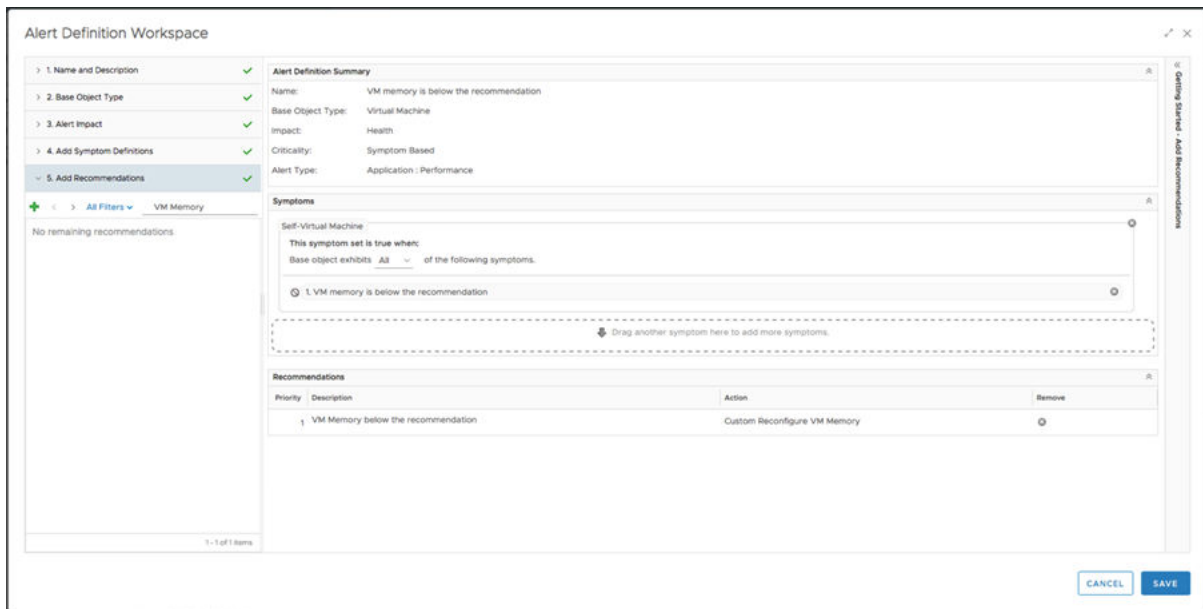
- 4 Create a custom recommendation. To define recommendations, in the menu, click **Alerts** and then in the left pane, click **Alert Settings > Recommendations**.



- 5 Create a symptom which looks for VMs that have memory below 64GB. In the menu, click **Alerts** and then in the left pane, click **Alert Settings > Symptom Definitions**.



- 6 Create a custom alert which will invoke the vRealize Orchestrator workflow/action automatically. Map the symptom and recommendation to the alert. To create or edit your alert definitions, in the menu, click **Alerts** and then in the left pane, click **Alert Settings > Alert Definitions**.



- 7 Create/Modify the policy and apply the vRealize Orchestrator Adapter group.
 - a In the menu, click **Administration**, and then in the left pane click **Policies**. Click the **Policy Library** tab, and click the **Edit Selected Policy** icon to edit a policy.
 - b In the **Automate** and **State** columns, change the setting to **Local**.

Edit Monitoring Policy

| | Name | Apply To Group |
|-------------------------------------|---|-------------------------------------|
| > 1. Getting Started | vSAN Datastores | <input type="checkbox"/> |
| > 2. Select Base Policy | Product Licensing | <input type="checkbox"/> |
| > 3. Analysis Settings | NSX-vSphere Primary Environments | <input type="checkbox"/> |
| > 4. Workload Automation | Unlicensed Group | <input type="checkbox"/> |
| > 5. Collect Metrics and Properties | Non vSAN Datastores | <input type="checkbox"/> |
| > 6. Alert / Symptom Definitions | vRealize Orchestrator Adapter Managed Objects | <input checked="" type="checkbox"/> |
| > 7. Apply Policy to Groups | SDDC Health Group | <input type="checkbox"/> |

Edit Monitoring Policy

Alert Definitions
Enable or disable Alert Definitions below. Enabled Alert Definitions will activate alerting for those conditions.

Actions | Impact | Criticality | State | Automate | Object Type: VM Memory | Page Size: 20

| Name | Symptom Definitions | Actionable Recommendations | Automate | Adapter Type | Object Type | State |
|---------------------------|---------------------|-----------------------------|----------|-----------------|-----------------|-------|
| VM memory is below the... | 1 | VM Memory below the reco... | Local | vCenter Adap... | Virtual Machine | Local |

1--1 of 1 items

Symptom Definitions
Enable or disable Symptom Definitions below. You can also override the thresholds for certain types of Symptom Definitions. Enabled Alert Definitions will automatically enable Symptom Definitions that they reference.

Actions | Type | State | Object Type: | Page Size: 20

| Name | Adapter Type | Object Type | Type | Trigger | State | Condition | Threshold |
|---------------------------|-----------------|-------------|-------------|---------------------|-----------|-----------|-----------|
| NET is unavailable | EP Ops Adapter | Dotnet | Metric HT | AVAILABILITYIR... | Inherited | Default | 15 |
| A duplicate IP addres... | vCenter Adapter | Host System | Fault Ev... | rsx.event.hosts... | Inherited | Default | Equals |
| A fatal memory error ... | vCenter Adapter | Host System | Fault Ev... | Memory device ... | Inherited | Default | Equals |
| A fatal PCIe error occ... | vCenter Adapter | Host System | Fault Ev... | PCI-E device err... | Inherited | Default | Equals |
| A path to storage dev... | vCenter Adapter | Host System | Message... | NOTIFICATION | Inherited | Default | null |

1-20 of 1217 items

After configuring the custom workflow, vRealize Operations Manager will look for VMs that have RAM less than 64GB and generate an alert.

All Alerts

Actions | Group By: Time | Status: Active | All Filters

Alert

- VM memory is below the recommendation
- Virtual machine disk I/O write latency is high
- Objects are not receiving data from adapter insta...
- Less than three controllers are deployed
- Adapter instance Object is down
- NSX Manager is down
- Virtual machine is running on snapshots for more...
- All Controller VMs are deployed on the same host
- Health of the children objects is degraded
- Health of the children objects is degraded

1 - 10 of 10 items

VM memory is below the recommendation

VM memory is below the recommendation, Execute auto reconfigure action on this VM.

Recommendations

VM Memory below the recommendation **RUN ACTION**

Need more information?

- View additional metrics
- View events

Symptoms

- VM-CLIENT has symptom VM memory is below the recommendation
 - Total Capacity (KB) 2097152.0 < Threshold (KB) 4194304.0

Notes

Leave a note...

Alert Information

- Triggered On: VM-CLIENT
- Start Time: 4:18 PM
- Update Time: 4:18 PM
- Status: Active
- Assigned To: -
- Alert Type: Application
- Alert Subtype: Performance

Based on the alert, Management Pack for vRealize Orchestrator invokes the custom workflow automatically. The alert remediated in next collection by executing the mapped recommendation. You can verify this in the **Recent Tasks**.

Recent Tasks

Status: All | All Filters | Filter (Object Name)

| Task | Status | Started Time | Completed Time | Automated | Object Name | Object Type | Event Source | Source Type | Submitted By | Task ID |
|---|-----------|--------------|----------------|-----------|---------------------|----------------------|---------------------|-------------|--------------|---------------------|
| Custom Reconfigure VM Memory | Completed | 4:48 PM | 4:48 PM | Yes | VM-CLIENT | Virtual Machine | Alert: VM memory... | LOCAL | admin | 46ef0133-23ee-49... |
| Create/Modify Workflow Action on vCe... | Completed | 3:52 PM | 3:52 PM | No | Custom Reconfigu... | vRO Workflow | | LOCAL | admin | 44c4984e-c3db-4... |
| Configure Package Discovery | Completed | 3:41 PM | 3:41 PM | No | 10.192.127.142 | vRealize Orchestr... | | LOCAL | admin | 70fa4c16-c6e6-49... |

1 - 3 of 3 items

Details of Task Selected

Associated Objects

| Object Name | Object Type | Status |
|-------------|-----------------|-----------|
| VM-CLIENT | Virtual Machine | Completed |

Messages Severity: All | Filter (Message)

| Severity | Time | Message |
|------------|--------------------------|--|
| Informa... | 2018-10-29 16:48:19.9... | Task id: [46ef0133-23ee-497a-833e-b75ea0fe63fe]. Starting the action |
| Informa... | 2018-10-29 16:48:20... | vCenter IP: 10.161.141.127 |
| Informa... | 2018-10-29 16:48:43... | Workflow Status: COMPLETED |
| Informa... | 2018-10-29 16:48:43... | Logs: |
| Informa... | 2018-10-29 16:48:43... | Workflow 'Custom Reconfigure VM Memory' has started |
| Informa... | 2018-10-29 16:48:43... | Modify Custom Reconfigure VM Memory has completed |

Management Pack for vRealize Orchestrator Dashboard

5

This chapter includes the following topics:

- [Access the Management Pack for vRealize Orchestrator Dashboard](#)
- [vRealize Orchestrator Workflows Overview Dashboard](#)

Access the Management Pack for vRealize Orchestrator Dashboard

The Management Pack for vRealize Orchestrator dashboard in the vRealize Operations Manager displays information that helps you monitor workflows.

Procedure

- 1 In the left pane of vRealize Operations Manager, click vRealize Orchestrator Workflows Overview.
- 2 The vRealize Orchestrator Workflows Overview dashboard displays the following widgets:
 - vRealize Orchestrator Adapter Instances
 - vRealize Orchestrator Instance Properties
 - vRO Health
 - Top-10 Workflows
 - Number of Successful and Failed Executions
 - Packages
 - Workflows
 - Number of Execution
 - Workflow Input Parameter
- 3 Click **Actions** > **Set as Home Page** to set this dashboard as one of the default dashboards in the **Quick Start** page.

vRealize Orchestrator Workflows Overview Dashboard

The vRealize Orchestrator Workflows Overview dashboard displays information about the vRealize Orchestrator adapter and workflows.

The vRealize Orchestrator Workflows Overview dashboard displays the following widgets by default.

vRealize Orchestrator Adapter Instances

You can view a list of vRealize Orchestrator adapters that you have configured in this widget. The widget displays the name of the adapter, adapter type, object type, policy applied, collection state, and collection status. Click on an adapter instance to view the properties of the adapter in the vRealize Orchestrator Instance Properties widget.

vRealize Orchestrator Instance Properties

Displays the properties of the vRealize Orchestrator adapter instances. You can view the adapter instance name and vRealize Orchestrator host settings.

vRO Health

Displays the status of the health-related alerts for the vRealize Orchestrator adapter instance. The state of the badge is based on your alert definitions. Click the badge to see the **Summary** tab for objects or groups configured in the widget. From the **Summary** tab you can begin determining what caused the current state. If the widget is configured for an object that has descendants, you should also check the state of descendants. Child objects might have alerts that do not impact the parent.

Top-10 Executed Workflows

Displays a count of the top 10 most frequently run workflows. This count includes workflows that have executed both successfully and unsuccessfully.

Number of Successful and Failed Executions

Displays the number of success and failed workflow executions.

Packages

Displays a data grid with objects in the inventory. The default configuration of the data grid appears in Object List Widget Options section. You can customize it by adding or removing default columns.

Workflows

Displays a data grid with list of vRealize Orchestrator workflows.

Number of Execution

Displays a metric chart of the workflow that you selected in the **Top-10 Executed Workflows** widget. You can use this information to monitor the workload of your workflows over time

Workflow Input Parameters

Displays the input parameters which was provided for executed workflows.

Appendix

This chapter includes the following topics:

- [Out of the Box vRealize Orchestrator Workflows](#)
- [Using the Input Parameter Data Type for Guest Operating System Identifier](#)
- [Location of Log Files](#)

Out of the Box vRealize Orchestrator Workflows

The Management Pack for vRealize Orchestrator ships with out of the box vRealize Orchestrator workflows. These workflows help you remediate alerts in vRealize Operations Manager. They are mapped to alerts from recommendations. When an object displays an alert given here, you can run the workflow from the alert.

Out of the Box Workflows for Custom Recommendations

Out of the box workflows for VM:

- VM Power Operations
- Reconfigure VM
- Move VM
- Manage Snapshots for VM
- Upgrade Guest Tools for VM
- Migrate Virtual Machine with vMotion
- Add a new vNIC to Virtual Machine
- Update CPU Reservation
- Update Memory Reservation
- Remove or Delete unused Template

Out of the box workflows for Host:

- Host Maintenance Mode

- Host Power Operations
- Decommission Host
- Reconnect Host. You can automate this workflow to run when an alert is displayed.

Out of the Box Workflows for Default Recommendations

You can map out of the box workflows to recommendations already in vRealize Operations Manager. The following table lists the default recommendations and the alerts for which these recommendations are applicable:

| Out of the Box Workflow/Action Name | Alert in vRealize Operations Manager | Recommendation in vRealize Operations Manager |
|--|--|--|
| Upgrade Guest Tools for VM | Virtual Machine has unsupported VMware Tools. | If the VMware tools version is too new, downgrade it to a supported version. Otherwise, upgrade VMware Tools to the latest version. Select this virtual machine in the vSphere Client or Web Client, then right-click and select "Upgrade VMware Tools". |
| VM Power Operation | vSphere HA failed to restart a network isolated virtual machine | Manually power on the virtual machine. |
| VM Power Operation | vSphere HA cannot perform a failover operation for the virtual machine | You can also try to power on the virtual machine and investigate any returned errors. |
| Reconnect Host | Host has lost connection to vCenter Server | Click "Open Host in vSphere Web Client" in the Actions menu at the top of Alert details page to connect to the vCenter managing this host and manually reconnect the host to vCenter Server. After the connection to the host is restored by vCenter Server, the alert will be canceled. |
| Set CPU Count for VM | Virtual Machine CPU usage is at 100% for an extended period of time. | Add more CPU capacity to this virtual machine. |
| Migrate Virtual Machine using vMotion. | Virtual Machine has CPU contention due to memory page swapping in the host | Use vMotion to migrate this virtual machine to a different host or cluster |
| Migrate Virtual Machine using vMotion. | Virtual machine has memory contention due to memory compression, ballooning, or swapping | Use vMotion to migrate this virtual machine to a different host or cluster. |
| Move VM | Virtual machine is demanding more CPU than its entitlement | Move this virtual machine to a different host or cluster |
| Move VM | Virtual machine in a DRS cluster is demanding more CPU than its entitlement | Move this virtual machine to a different host or cluster |
| Move VM | Virtual machine in a cluster is demanding more CPU than its entitlement | Move this virtual machine to a different host or cluster |

| Out of the Box Workflow/Action Name | Alert in vRealize Operations Manager | Recommendation in vRealize Operations Manager |
|-------------------------------------|--|--|
| Manage Snapshots for VM | Datastore is running out of disk space. | Delete unused snapshots for datastore |
| Manage Snapshots for VM | Virtual machine disk I/O read latency is high | If the virtual machine has multiple snapshots, delete unused snapshots for VM |
| Manage Snapshots for VM | Virtual machine disk I/O write latency is high | If the virtual machine has multiple snapshots, delete unused snapshots for VM |
| Manage Snapshots for VM | Virtual machine has disk I/O latency problem caused by snapshots | If the virtual machine has multiple snapshots, delete unused snapshots for VM |
| Manage Snapshots for VM | Virtual machine is running on snapshots for more than 2 days | If the virtual machine has multiple snapshots, delete unused snapshots for VM |
| Host Maintenance Mode | Host is in maintenance mode for at least 72 hours | If the time period of maintenance window is expected, you can cancel this alert. Otherwise, investigate further and take the host out of maintenance mode. |
| Host Power Operation | N/A | N/A |
| Decommission Host | N/A | N/A |
| Add a new vNIC to Virtual Machine | N/A | Add an additional NIC to the VM to spread the packet load more evenly |
| Update CPU Reservation | N/A | If the virtual machine CPU reservation is set, Decrease the CPU reservation configuration |
| Update Memory Reservation | N/A | If the virtual machine Memory reservation is set, Decrease the Memory reservation configuration |
| Remove or Delete unused Template | N/A | N/A |

Using the Input Parameter Data Type for Guest Operating System Identifier

When you use a workflow which as an input parameter data type

vc:VirtualMachineGuestOSIdentifier (VMGuestOS), you can provide the index number which corresponds to the VM's guest Operating System name. Use the index number from the table. For example, to execute the Create Custom Virtual Machine workflow to create a DOS Operating System, you provide the input parameter in the following format: **vc:VirtualMachineGuestOSIdentifier(1)**.

Index Numbers for Guest Operating System Identifier

| Index | Virtual Machine Guest Operating System Name |
|-------|---|
| 1 | dosGuest |
| 2 | win31Guest |
| 3 | win95Guest |
| 4 | win98Guest |
| 5 | winMeGuest |
| 6 | winNTGuest |
| 7 | win2000ProGuest |
| 8 | win2000ServGuest |
| 9 | win2000AdvServGuest |
| 10 | winXPHomeGuest |
| 11 | winXPProGuest |
| 12 | winXPPro64Guest |
| 13 | winNetWebGuest |
| 14 | winNetStandardGuest |
| 15 | winNetEnterpriseGuest |
| 16 | winNetDatacenterGuest |
| 17 | winNetBusinessGuest |
| 18 | winNetStandard64Guest |
| 19 | winNetEnterprise64Guest |
| 20 | winLonghornGuest |
| 21 | winLonghorn64Guest |
| 22 | winNetDatacenter64Guest |
| 23 | winVistaGuest |
| 24 | winVista64Guest |
| 25 | windows7Guest |
| 26 | windows7_64Guest |
| 27 | windows7Server64Guest |
| 28 | windows8Guest |
| 29 | windows8_64Guest |
| 30 | windows8Server64Guest |
| 31 | windows9Guest |
| 32 | windows9_64Guest |
| 33 | windows9Server64Guest |

| Index | Virtual Machine Guest Operating System Name |
|-------|---|
| 34 | windowsHyperVGuest |
| 35 | freebsdGuest |
| 36 | freebsd64Guest |
| 37 | redhatGuest |
| 38 | rhel2Guest |
| 39 | rhel3Guest |
| 40 | rhel3_64Guest |
| 41 | rhel4Guest |
| 42 | rhel4_64Guest |
| 43 | rhel5Guest |
| 44 | rhel5_64Guest |
| 45 | rhel6Guest |
| 46 | rhel6_64Guest |
| 47 | rhel7Guest |
| 48 | rhel7_64Guest |
| 49 | centosGuest |
| 50 | centos64Guest |
| 51 | centos6Guest |
| 52 | centos6_64Guest |
| 53 | centos7Guest |
| 54 | centos7_64Guest |
| 55 | oracleLinuxGuest |
| 56 | oracleLinux64Guest |
| 57 | oracleLinux6Guest |
| 58 | oracleLinux6_64Guest |
| 59 | oracleLinux7Guest |
| 60 | oracleLinux7_64Guest |
| 61 | suseGuest |
| 62 | suse64Guest |
| 63 | slesGuest |
| 64 | sles64Guest |
| 65 | sles10Guest |
| 66 | sles10_64Guest |
| 67 | sles11Guest |
| 68 | sles11_64Guest |

| Index | Virtual Machine Guest Operating System Name |
|-------|---|
| 69 | sles12Guest |
| 70 | sles12_64Guest |
| 71 | nld9Guest |
| 72 | oesGuest |
| 73 | sjdsGuest |
| 74 | mandrakeGuest |
| 75 | mandrivaGuest |
| 76 | mandriva64Guest |
| 77 | turboLinuxGuest |
| 78 | turboLinux64Guest |
| 79 | ubuntuGuest |
| 80 | ubuntu64Guest |
| 81 | debian4Guest |
| 82 | debian4_64Guest |
| 83 | debian5Guest |
| 84 | debian5_64Guest |
| 85 | debian6Guest |
| 86 | debian6_64Guest |
| 87 | debian7Guest |
| 88 | debian7_64Guest |
| 89 | debian8Guest |
| 90 | debian8_64Guest |
| 91 | debian9Guest |
| 92 | debian9_64Guest |
| 93 | debian10Guest |
| 94 | debian10_64Guest |
| 95 | asianux3Guest |
| 96 | asianux3_64Guest |
| 97 | asianux4Guest |
| 98 | asianux4_64Guest |
| 99 | asianux5_64Guest |
| 100 | asianux7_64Guest |
| 101 | opensuseGuest |
| 102 | opensuse64Guest |
| 103 | fedoraGuest |

| Index | Virtual Machine Guest Operating System Name |
|-------|---|
| 104 | fedora64Guest |
| 105 | coreos64Guest |
| 106 | vmwarePhoton64Guest |
| 107 | other24xLinuxGuest |
| 108 | other26xLinuxGuest |
| 109 | otherLinuxGuest |
| 110 | other3xLinuxGuest |
| 111 | genericLinuxGuest |
| 112 | other24xLinux64Guest |
| 113 | other26xLinux64Guest |
| 114 | other3xLinux64Guest |
| 115 | otherLinux64Guest |
| 116 | solaris6Guest |
| 117 | solaris7Guest |
| 118 | solaris8Guest |
| 119 | solaris9Guest |
| 120 | solaris10Guest |
| 121 | solaris10_64Guest |
| 122 | solaris11_64Guest |
| 123 | os2Guest |
| 124 | eComStationGuest |
| 125 | eComStation2Guest |
| 126 | netware4Guest |
| 127 | netware5Guest |
| 128 | netware6Guest |
| 129 | openServer5Guest |
| 130 | openServer6Guest |
| 131 | unixWare7Guest |
| 132 | darwinGuest |
| 133 | darwin64Guest |
| 134 | darwin10Guest |
| 135 | darwin10_64Guest |
| 136 | darwin11Guest |
| 137 | darwin11_64Guest |
| 138 | darwin12_64Guest |

| Index | Virtual Machine Guest Operating System Name |
|-------|---|
| 139 | darwin13_64Guest |
| 140 | darwin14_64Guest |
| 141 | darwin15_64Guest |
| 142 | darwin16_64Guest |
| 143 | vmkernelGuest |
| 144 | vmkernel5Guest |
| 145 | vmkernel6Guest |
| 146 | vmkernel65Guest |
| 147 | otherGuest |
| 148 | otherGuest64 |

Location of Log Files

Use the log files to view information about the vRealize Orchestrator adapter and workflows. You can access the log files from vRealize Operations Manager or by accessing the machine where you installed vRealize Operations Manager via SSH.

Access Log Files from vRealize Orchestrator

To access the log files for the collection cycle and status of the vRealize Orchestrator adapter, on the menu, click **Administration** and in the left pane click **Support > Logs**. Expand the node and the **COLLECTOR** folder. Expand the **adapters** folder and look for the vRealizeOrchestratorAdapter_number.log file in the **vRealizeOrchestratorAdapter** folder.

To access the log files for actions and workflows executed, open the vRealizeOrchestratorAdapter_0.log file.

Access Log Files via SSH

After you log in to the vRealize Operations Manager machine, access the log files in the following locations:

Table 6-1.

| File | Location |
|--|--|
| Log location folder for vRealize Orchestrator adapter | /storage/log/vcops/log/adapters/vRealizeOrchestratorAdapter |
| Log for collection cycle and status of vRealize Orchestrator adapter | /storage/log/vcops/log/adapters/vRealizeOrchestratorAdapter/vRealizeOrchestratorAdapter_Number.log |
| Log for vRealize Orchestrator adapter actions and workflows executed | /storage/log/vcops/log/adapters/vRealizeOrchestratorAdapter/vRealizeOrchestratorAdapter_0.log |