



# INTEGRATION MODULE FOR VMWARE VSPHERE

*For Keverion Runbook Studio and Azure Automation*

**User Guide**

Version 1.4



# Kelverion Integration Module for VMware vSphere

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Published: January 2023

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# Getting Started

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The following sections outline how to deploy and configure the Keverion Integration Module for VMware vSphere.

## System Requirements

The Integration Module for VMware vSphere requires the following software to be installed and configured prior to implementing the integration. For more information about installing and configuring VMware vSphere, refer to the respective product documentation.

- Keverion Runbook Studio 5.2
- Microsoft .NET Framework 4.7.2
- VMware vSphere vCenter 6.7, 7.0, 8.0 (On-premise)
- Windows Hybrid Runbook Worker

The Keverion Integration Module for VMware vSphere requires TLS 1.2 support to be enabled on your local computer or hybrid runbook worker. Please use [SystemDefaultTlsVersions](#) and [SCHANNEL\Protocols](#) in the Windows Registry to control the version of TLS in use.

## Deploying the Integration Module

The easiest way to install and deploy the Integration Module for VMware vSphere is from the PowerShell Gallery, but you can also download the module from Keverion and perform the steps manually.

You must install and deploy the integration module to each Azure Automation Account and Windows Hybrid Runbook Worker host system that you plan to use to run your runbooks. You must also install the Integration Module on any Runbook Studio host systems that you will be using to build and manage your runbooks.

## Using the PowerShell Gallery

Using the commands in the **PowerShellGet** module you can download the Keverion Integration Module for VMware vSphere from the PowerShell Gallery and install it on your local computer. You can also deploy the module directly from the PowerShell Gallery to any of your Azure Automation Accounts.

### *Install the Integration Module on your local computer or Hybrid Runbook Worker:*

1. Confirm that have the **PowerShellGet** module is installed.
2. Start a PowerShell window as Administrator and run the command:  
**Install-Module -Name Keverion.Vmware.Vsphere -Scope AllUsers**

### *Upload the Integration Module to an Azure Automation account:*

1. Go to the [PowerShell Gallery](#).
2. Click the **Azure Automation** tab.
3. Click **Deploy to Azure Automation**. You will be directed to Microsoft Azure.
4. Select the **Automation account** that you want to deploy the module to.
5. Click **OK**.

## Manual Installation

Alternatively, you can download the integration module package from Keverion and deploy it manually to your local computer, hybrid runbook workers and Automation Accounts.

The download package from Keverion includes a **.zip** file containing the integration module as well as the User Guide and Release Notes. The following instructions assume that you have unzipped the download package and have access to the **.zip** file containing the integration module.

### *Install the Integration Module on your local computer or Hybrid Runbook Worker:*

1. Copy the **Keverion.Vmware.Vsphere.zip** file to your local computer.
2. Right-click on the file and select **Properties**.
3. Click the **General** tab. If necessary, click **Unblock**, and then click **OK**.
4. Unzip the **Keverion.Vmware.Vsphere.zip** file.
5. Copy the **Keverion.Vmware.Vsphere** folder to a location in the %PsModulePath% path.

**Important:** When installing the integration module on a hybrid runbook worker, you must use a location that is accessible to all users of the computer.

### *Upload the integration module to an Azure Automation account:*

1. Sign into [Microsoft Azure](#).
2. Open the Automation account that you want to upload the module to.
3. Click **Modules** under Shared Resources. The list of installed modules is displayed.
4. Click **Add a module** at the top of the list.
5. In the **Upload File** box, select the **Keverion.Vmware.Vsphere.zip** file that you downloaded.
6. Click **OK**. Importing the module may take several minutes.

## Licensing the Integration Module

Licenses for Keverion integration modules are managed and deployed using the *Keverion Runbook Studio* and *Automation Connection Assets*.

*Register an integration module license with Runbook Studio:*

1. Open **Kelverion Runbook Studio**.
2. On the **File** tab, click **About**.
3. Click **License Information**.
4. Click the **Integration Modules** tab, and then click **Add License**.
5. Select the integration module license file (.kaml) and click **Open**.
6. You should see your entitlements displayed in the list.
7. Click **OK**.

**Important:** Entitlements will not display until after the integration module has been installed on the Runbook Studio computer.

*Create a Connection Asset with a license key and upload it to Azure:*

1. On the **Home** tab, click **Sign In**. The Sign In dialog appears.
2. Sign into your account.
3. In the **Active Azure Automation Account** box, select the account that you want to add the connection asset to.
4. Click **New Asset** and then click **Connection**. The New Connection dialog appears.
5. In the **Name** field, enter a name to identify the connection.
6. In the **Connection Type** field, select the desired connection type.
7. Enter the appropriate connection information in the provided fields.
8. Click **OK**.

*Update all Connection Asset license keys and upload them to Azure:*

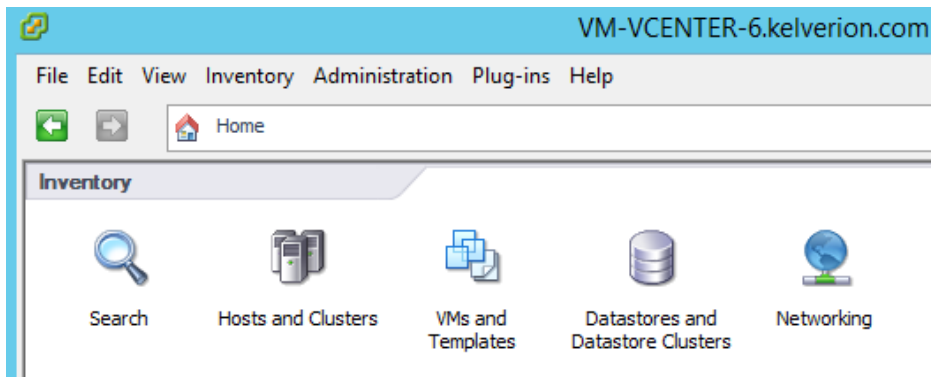
1. On the **Home** tab, click **Sign In**. The Sign In dialog appears.
2. Sign into your account.
3. In the Explorer panel, click the **Azure (Online)** group.
4. Right-click the Azure Automation Account that contains the connection assets you want to update, and then click **Update License Keys**. A summary is displayed.

## vSphere Inventory Structure

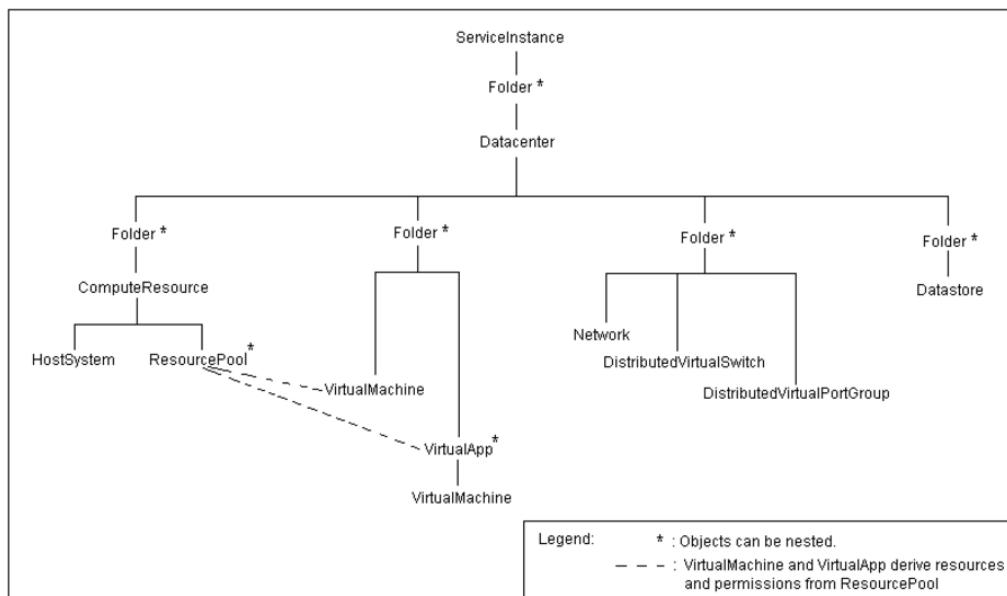
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The vSphere API organizes managed object entities (Datacenter, HostSystem, VirtualMachine, etc) in an inventory hierarchy.

Here are the main inventory groups as displayed in the VMware vSphere Client:



vCenter Server inventory hierarchy:



At top level in the hierarchy are Datacenter folders which can contain datacenters and other datacenter folders. Each datacenter contains the following sub-hierarchies:

- Compute Resource Hierarchy
- Virtual Machine Hierarchy
- Network Hierarchy
- Datastore Hierarchy

The **Compute Resource Hierarchy** consists of Compute Resource folders which can contain Compute Resources, Cluster Compute Resources, and other Compute Resource folders.

Each **Compute Resource** contains:



- One Host System
- Resource Pool Hierarchy. one or more resource pools which in turn can contain child resource pools.

Each **Cluster Compute Resource** contains:

- One or more Host System
- Resource Pool Hierarchy. one or more resource pools which in turn can contain child resource pools.

The **Virtual Machine Hierarchy** consists of Virtual Machine folders which can contain Virtual Machines, Virtual Apps and other Virtual machine folders. Virtual Apps can contain other Virtual Apps and Virtual Machines.

The **Network Hierarchy** consists of Network folders which can contain Networks, Distributed Virtual Switches and Distributed Virtual Port Groups.

The **Datastore Hierarchy** consists of Datastore folders which can contain Datastores.

When working with vSphere inventory objects it is important to remember the following:

- A non-template virtual machine must always be associated with a resource pool.
- A compute resource (or cluster compute resource) is the owner of any resource pool in the resource pool hierarchy it contains.
- Each vSphere managed object has a “parent” property:
  - The parent of a virtual machine can be a folder or a virtual app.
  - The parent of a host can be a compute resource or cluster compute resource.
  - The parent of a resource pool can be another resource pool or a compute resource or a cluster compute resource.
  - The parent of a datastore can be a folder.
  - The parent of a network can be a folder.
  - The parent of a folder can be another folder or a datacenter.
- For each datacenter, the server automatically creates the following hidden folders:
  - A VM folder for virtual machines, templates, and virtual apps
  - A “host” folder for Compute Resources and Cluster Compute Resources
  - A “network” folder
  - A “datastore” folder

These default folders are not visible in the vSphere Client and Web UI. For example, in the UI it looks like you can create a VM directly under a datacenter when in fact that VM is placed in the VM folder under that datacenter.

## Working With Activities in Runbook Studio

The following sections outline some of the common configuration options that are available to you when working with the activities in the Keverion Integration Module for VMware vSphere.

When designing runbooks in Keverion Runbook Studio, you will notice that the activities in the Keverion Integration Module for VMware vSphere include a **Discovery** panel instead of the **Parameter Sets** panel that is present for standard command activities. This is because the activities in the Keverion Integration Module for VMware vSphere support interactive discovery of server assets in your environment.

When connected to VMware vSphere, Runbook Studio will provide additional discovery options, such as Datacenters, Folders, Clusters, Hosts, Templates, Datastores, Resource Pools, Object Types, which can be used to navigate your vSphere object hierarchy and specify objects that are required for the activity. Once you have filled in the discovery options, Runbook Studio will provide additional parameters, and in some cases filters, which can be used to configure the activity.

*The Keverion Integration Module for VMware vSphere supports the following activities:*

<b>Add-VsphereVmDevice</b>	Adds a new device to an existing VM.
<b>Get-VsphereCustomAttribute</b>	Retrieves custom attributes for a VM or host and returns the results as a sequence of PSObject instances.
<b>Get-VsphereObject</b>	Retrieves vSphere objects of a specified type (VM, host, datastore, etc.) and returns the results as a sequence of PSObject instances.
<b>Get-VsphereVmDevice</b>	Retrieves VM device information for a specific VM and returns the results as a sequence of PSObject instances.
<b>Get-VsphereVmInfo</b>	Retrieves additional Guest OS or status information for a specific VM.
<b>Get-VsphereVmSnapshot</b>	Retrieves VM snapshots.
<b>Move-VsphereVm</b>	Moves a VM to another folder/datastore/resource pool.
<b>New-VsphereVm</b>	Creates a new VM based on a specified VM template.
<b>New-VsphereVmSnapshot</b>	Creates a new VM snapshot.
<b>Remove-VsphereVm</b>	Removes an existing VM from inventory or deletes it permanently.

<b>Remove-VsphereVmSnapshot</b>	Removes VM snapshots.
<b>Restart-VsphereVm</b>	Restarts a running VM.
<b>Set-VsphereCustomAttribute</b>	Sets a VM or host custom attribute.
<b>Set-VsphereVm</b>	Modifies the properties and/or devices of an existing VM.
<b>Start-VsphereVm</b>	Starts a VM.
<b>Stop-VsphereVm</b>	Stops a VM.
<b>Suspend-VsphereVm</b>	Suspends a VM.

**The advanced discovery capabilities provided by the activities in this integration module are only supported when authoring runbooks in Keverion Runbook Studio.**

When you publish your runbooks from Keverion Runbook Studio to Azure Automation or when you generate PowerShell code snippets for Service Management Automation, Runbook Studio will automatically convert the dynamically generated parameters and filters of Smart activities into the parameters provided by the underlying command activities.

## Smart Connections

In Keverion Runbook Studio you can configure one or more Smart Connections to establish reusable links between Runbook Studio and specific VMware vSphere instances. You can create as many Smart Connections as you require, specifying links to multiple servers. You can also create multiple Smart Connections to the same server to allow for differences in security privileges for different user accounts.

### *Adding a Smart Connection to Keverion Runbook Studio:*

1. On the **Home** tab, click **Smart Connections**. The Smart Connections dialog appears.
2. Click **Add a connection** at the top of the list.
3. In the **Name** box, enter a name for the connection.
4. In the **Connection Type** box, select *Keverion.VMware.Vsphere*
5. In the **ServerUrl** box, type the URL of the VMware vCenter server that you want to connect to. For example: `https://vcenter.keverion.com` or `https://192.168.1.1`
6. In the **User** and **Password** boxes, type the credentials used to connect to the VMware vCenter server.
7. In the **SkipCertificateValidation** box, specify if the Integration Module should validate the HTTPS server certificate, when connecting to the vCenter server. By default, certificate validation is not skipped.

8. Click **OK** to close the configuration dialog box, and then click **OK**.

## Global Connection Assets

The activities in the Kelverion Integration Module for VMware vSphere require connection information to connect to instances of VMware vSphere.

The recommended way to pass connection information to your activities in your runbooks is to use Global Connection Assets. Global connection assets let you securely define connection information in Azure which can then be retrieved on demand using either the *Get-AutomationConnection* cmdlet or Connection Asset Data Source.

### Add a global connection asset in Runbook Studio:

1. On the **Home** tab, click **Sign In**. The Sign in dialog appears.
2. Sign into your account.
3. In the **Active Azure Automation Account** box, select the account that you want to add the connection asset to.
4. Click **New Asset** and then click **Connection**. The New Connection dialog appears.
5. In the **Name** box, enter a name for the configuration.
6. In the **Connection Type** box, select *Kelverion.VMware.Vsphere*.
7. In the **ServerUrl** box, type the URL of the VMware vCenter server that you want to connect to. For example: <https://vcenter.kelverion.com> or <https://192.168.1.1>
8. In the **User** and **Password** boxes, type the credentials used to connect to the VMware vCenter server.
9. In the **SkipCertificateValidation** box, specify if the Integration Module should validate the HTTPS server certificate, when connecting to the vCenter server. By default, certificate validation is not skipped.
10. Click **OK**.

## Common Activity Properties

All activities in the Kelverion Integration Module for VMware vSphere have the following properties:

Property	Description
Label	A unique label that identifies the activity in the runbook. Runbook Studio will provide a default name for each activity, but you can provide your own labels to make their role in the runbook more obvious.
Description	An optional description of the activity. Providing a description is a great way to let everyone understand the function of the activity in the runbook.

Checkpoint	<p>Indicates whether or not a checkpoint is set in the runbook workflow after the activity runs. Checkpoints are only available for Graphical PowerShell Workflow runbooks.</p> <p>If the runbook uses Azure cmdlets you should follow best practices and follow a check-pointed activity with an <a href="#">Add-AzureRMAccount</a> in case the runbook is suspended and restarts from this checkpoint on a different worker.</p>
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## Smart Parameters

Unlike standard command activities whose parameters are determined by the Parameter Set that is selected, the parameters in the Keverion Integration Module for VMware vSphere are determined by the Discovery options that you specify.

For example, when using the **Add-VsphereVmDevice** activity, the Discovery panel will contain options for selecting the Device Type. Once you have selected a VM device type, Runbook Studio will provide you with additional discovery options and/or parameters that are specific for the selected Device Type. If you select another Device Type, Runbook Studio will provide you with a different set of parameters automatically.

**You must configure all mandatory parameters.** To view the optional parameters that are associated with an activity, click **Optional** at the top of the Parameters tab.

In addition, all activities in the Keverion Integration Module for VMware vSphere include a **Connection** parameter which is used to specify information that the activity will use to connect to VMware vSphere when it is executed as part of a runbook running on the Hybrid Runbook Worker. Typically, you will assign a Connection Asset data source to this parameter so that the activity can securely use connection information stored in Azure. The Connection parameter should not be confused with the similarly named Connection option on the Discovery panel which is used to specify how Runbook Studio connects to VMware vSphere to provide design-time configuration options.

Several factors determine the data sources that are available when configuring a parameter. They include: the parameter's data type, whether it is linked to another activity and whether the runbook has any input parameters.

**Runbook Studio supports the following data sources:**

Data Source	Description
Activity output	<p>Specify activity whose output will be assigned to the parameter. You may also provide an optional Path to select a specific property of the output objects that are generated by the activity.</p> <p>Available when the activity is linked to a source activity.</p>
Not configured	Clears any value that was previously configured. You must configure all

	mandatory parameters.
Certificate asset	<p>Specify the name of the global certificate asset that will be used to provide a value for the parameter.</p> <p>If you have connected to Azure and selected a Subscription and Automation Account on the toolbar, the data source will provide the names of the certificates that are available.</p>
Credential asset	<p>Specify the name of the global credential asset that will be used to provide a value for the parameter.</p> <p>If you have connected to Azure and selected a Subscription and Automation Account on the toolbar, the data source will provide the names of the credentials that are available.</p>
Constant	<p>Specify a constant value to assign to the parameter.</p> <p>Available for parameters that have the following data types:</p> <ul style="list-style-type: none"> <li>• String</li> <li>• DateTime</li> <li>• Boolean</li> <li>• Char</li> <li>• Byte</li> <li>• SByte</li> <li>• Int16</li> <li>• Int32</li> <li>• Int64</li> <li>• UInt16</li> <li>• UInt32</li> <li>• UInt64</li> <li>• Decimal</li> <li>• Double</li> <li>• Float</li> <li>• SwitchParameter</li> </ul> <p>When assigning a constant DateTime value, Runbook Studio assumes the value is in UTC.</p>
Connection asset	<p>Specify the name of the global connection asset that will be used to provide a value for the parameter.</p> <p>If you have connected to Azure and selected a Subscription and Automation Account on the toolbar, the data source will provide the names of the connections that are available.</p>
Empty string	An empty string will be assigned to the parameter. Available when the parameter is type <i>System.String</i>
Null	A null (\$null) value will be assigned to the parameter. Available when the parameter type is a reference type.
PowerShell expression	<p>Specify a <i>simple</i> PowerShell expression whose output will be assigned to the parameter.</p> <p>You can use variables in the expression to access the output of an activity or a runbook parameter.</p>
Runbook input	<p>Specify the name of the runbook input parameter whose value will be assigned to the parameter.</p> <p>Available when the runbook has one or more input parameters.</p>

Variable asset	<p>Specify the name of the global variable asset that will be used to provide a value for the parameter.</p> <p>If you have connected to Azure and selected a Subscription and Automation Account on the toolbar, the data source will provide the names of the variables that are available.</p>
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## Smart Filters

Some of the activities in the Keverion Integration Module for VMware vSphere include a Filters panel which lets you specify filters that can be used to retrieve a sub-set of vSphere objects.

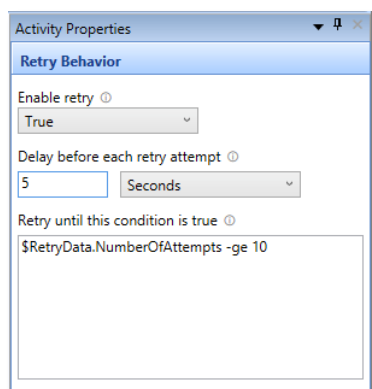
**If you do not provide any filters, then the activity will retrieve all objects for that activity.**

To add a filter to your activity, select the **Filters** panel and click **Add**. Filters have the following properties.

Property	Description
Filter	The name of the filter.
Operation	<p>The operation used to evaluate the filter. Different operators will be provided based on the filter that is selected. Possible filter operators include:</p> <ul style="list-style-type: none"> <li>Equals</li> <li>Does not equal</li> <li>Contains</li> <li>Does not contain</li> <li>Matches</li> <li>Starts with</li> <li>Ends with</li> </ul>
Value	<p>The data source used to retrieve the value used to evaluate the filter.</p> <p>The value used to evaluate the filter will be obtained. For more information on data sources, please refer to the Parameters section for more information on configuring data sources.</p>

## Retry Behavior

The activities in the Keverion Integration Module for VMware vSphere can be configured to run multiple times until a particular condition, which you specify, is satisfied. You can use the retry behavior options to configure activities that should run multiple times, that are error prone or may need more than one attempt for success.



When you enable retry for an activity, you can configure the runbook to wait a specified number of minutes or seconds before running the activity again. If no delay is specified the runbook will run the activity again, immediately after it completes.

The retry condition lets you specify a PowerShell expression that the runbook will evaluate after each time the activity runs. If the result of the expression is true the activity does not run again, and the runbook moves on to the next child activity in the runbook.

When defining the retry conditions for your activity you can take advantage of a global variable called **\$RetryData**. Specific information about the last time the activity ran can be accessed using the following properties.

Property	Description
NumberOfAttempts	Number of times that the activity has ran
Output	Output that was generated by the activity the last time that it ran
TotalDuration	Time elapsed since the activity was started
StartedAt	Time in UTC when the activity was first started

The following are some examples of activity retry conditions

```
# Run the activity exactly 5 times
$RetryData.NumberOfAttempts -eq 5

# Run the activity until it produces some output
$RetryData.Output.Count -ge 1

# Run the activity until at least 2 minutes has elapsed
$RetryData.TotalDuration.TotalMinutes -ge 2
```

## Additional Parameters

The activities in the Keverion Integration Module for VMware vSphere let you specify additional PowerShell parameters that you can use to control the behavior of the activity.

For example, to output detailed information about the operation performed by an activity you would specify **-Verbose:\$True**



# Add-VsphereVmDevice

The **Add-VsphereVmDevice** activity is used in a runbook to add new devices to an existing VM.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Device Type</b>	The type of device that is to be added to the VM.
<b>CD/DVD Drive Type</b>	<p>The type of CD/DVD drive that is to be added to the VM. This parameter is only available when Device Type is CD/DVD Drive.</p> <ul style="list-style-type: none"><li>• <b>Client Device.</b> connect the device to a physical CD/DVD device on the system from which you access the vSphere Client.</li><li>• <b>Host Device.</b> connect the device to a physical CD/DVD device on the host.</li><li>• <b>Datastore ISO File.</b> connect the device to an ISO file that is stored on a datastore accessible to the host.</li></ul>

## Required Parameters

You must configure the following parameters. You may have to configure additional parameters depending on the discovery options that you selected.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM</b>	ID (managed object reference) of the VM to which the device is to be added.

## CD/DVD Drive Required Parameters

You must configure the following parameters when you set **Device Type** to **CD/DVD Drive**.

<b>ISO File Path</b>	<p>Location of the datastore ISO file for the device. Available when <b>CD/DVD Drive Type</b> is set to <b>Datastore ISO File</b>.</p> <p><b>Tip:</b> Must be in the form [&lt;datastore name&gt;] &lt;ISO file Path&gt;</p> <p><b>Example:</b> [DS-DEV-01] ISO/windows/ windows_10_x64.iso</p>
<b>Host Device Path</b>	Location of host device. Available when <b>CD/DVD Drive Type</b> is set to <b>Host</b> .

### Hard Disk Required Parameters

You must configure the following parameters when you set **Device Type** to **Hard Disk**.

<b>Disk Provision</b>	Provision type for the new hard disk.
<b>Disk Size (MB)</b>	Size of the new hard disk, in MB.

### Network Adapter Required Parameters

You must configure the following parameters when you set **Device Type** to **Network Adapter**.

<b>Network Adapter Type</b>	The type of network adapter to be added. This should be one of the NICs available for the Compute Resource (or Cluster Compute Resource) owner of the Resource Pool of the VM, and it should be supported by the operating system of the VM.
<b>Network ID</b>	ID (managed object reference) of the network to be assigned to the new network adapter.

### Optional Parameters

This activity may provide optional properties, dependent on the discovery options that you selected, that you can configure, as necessary.

### CD/DVD Drive Optional Parameters

You can configure the following properties when you set **Device Type** to **CD/DVD Drive**.

<b>Connect at Power On</b>	Specifies if the drive should be connected when the VM powers on.
<b>ISO Datastore ID</b>	ID (managed object reference) of the datastore where the ISO file is stored. The datastore must correspond to the datastore specified in the ISO File Path. Available when <b>CD/DVD Drive Type</b> is set to <b>Datastore ISO File</b> .

### Network Adapter Optional Parameters

<b>Connect at Power On</b>	Specifies if the network adapter should be connected when the VM powers on.
----------------------------	---

### Outputs

This activity outputs objects with the following properties.

<b>Attribute Key</b>	Unique custom attribute identifier.
<b>Attribute Name</b>	Name of the custom attribute.
<b>Attribute Type</b>	Custom attribute type. <ul style="list-style-type: none"><li>Global attributes can be set for any object type.</li></ul>

- 
- |  |   |
|--|---|
|  | <ul style="list-style-type: none"><li>• Host attributes can be set for hosts.</li><li>• VM attributes can be set for VMs.</li></ul> |
|--|---|
-

# Get-VsphereCustomAttribute

---

The **Get-VsphereCustomAttribute** activity is used in a runbook to retrieve VM or host custom attribute values.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
-------------------	--

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>vSphere Object ID</b>	ID (managed object reference) of the VM or host for which custom attributes are to be retrieved.

## Outputs

This activity outputs an object that represents the custom attribute that was retrieved. This object has the following properties.

<b>Attribute Key</b>	Unique custom attribute identifier.
<b>Attribute Name</b>	Name of the custom attribute.
<b>Attribute Type</b>	Custom attribute type. <ul style="list-style-type: none"><li>• Global attributes can be set for any object type.</li><li>• Host attributes can be set for hosts.</li><li>• VM attributes can be set for VMs.</li></ul>
<b>Attribute Value</b>	Custom attribute value.

# Get-VsphereObject

---

The **Get-VsphereObject** activity is used in a runbook to retrieve vSphere objects. This activity lets you retrieve a specific object by its ID or a collection of objects that match one or more filters.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Object Type</b>	Specifies the type of objects that are to be retrieved.
<b>Search By</b>	Specifies how objects are to be retrieved. <ul style="list-style-type: none"><li>• <b>Object Filters.</b> You can specify object filters to narrow down the result set.</li><li>• <b>Object ID.</b> You can specify an object ID to retrieve a specific object.</li></ul>

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>Object ID</b>	Specifies an object ID (managed object reference) for the object to be retrieved. This parameter is only available when discovery parameter <b>Search By</b> is set to <b>Object ID</b> .

## Filters

This activity provides filters based on the **Object Type** that was selected.

### Cluster Filters

This activity provides the following filters when the **Object Type** option is set to **Cluster**.

<b>Cluster Name</b>	Filter by Cluster Name.
<b>Number of CPU Cores</b>	Filter by Number of CPU Cores.
<b>Number of CPU</b>	Filter by Number of CPU Threads.

<b>Threads</b>	
<b>Number of Effective Hosts</b>	Filter by Number of Effective Hosts.
<b>Number of Hosts</b>	Filter by Number of Hosts.
<b>Parent ID</b>	Filter by Parent ID.
<b>Resource Pool ID</b>	Filter by Resource Pool ID.
<b>Total CPU (MHz)</b>	Filter by Total CPU value.
<b>Total Memory (bytes)</b>	Filter by Total Memory value.

### *Compute Resource Filters*

This activity provides the following filters when the **Object Type** option is set to **Computer Resource**.

<b>Compute Resource Name</b>	Filter by Compute Resource Name.
<b>Number of CPU Cores</b>	Filter by Number of CPU Cores.
<b>Number of CPU Threads</b>	Filter by Number of CPU Threads.
<b>Number of Effective Hosts</b>	Filter by Number of Effective Hosts.
<b>Number of Hosts</b>	Filter by Number of Hosts.
<b>Parent ID</b>	Filter by Parent ID.
<b>Resource Pool ID</b>	Filter by Resource Pool ID.
<b>Total CPU (MHz)</b>	Filter by Total CPU value.
<b>Total Memory (bytes)</b>	Filter by Total Memory value.

### *Datacenter Filters*

This activity provides the following filters when the **Object Type** option is set to **Datacenter**.

<b>Datacenter Name</b>	Filter by Datacenter Name.
<b>Datastore Folder ID</b>	Filter by Datastore Folder ID.
<b>Host Folder ID</b>	Filter by Host Folder ID.
<b>Network Folder ID</b>	Filter by Network Folder ID.
<b>Parent ID</b>	Filter by Parent ID.

<b>VM Folder ID</b>	Filter by VM Folder ID.
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### *Datastore Filters*

This activity provides the following filters when the **Object Type** option is set to **Datastore**.

<b>Datastore Name</b>	Filter by Datastore Name.
<b>Is Accessible</b>	Filter by Is Accessible value.
<b>Maintenance Mode</b>	Filter by Maintenance Mode. Possible values are: <ul style="list-style-type: none"> <li>enteringMaintenance</li> <li>inMaintenance</li> <li>normal</li> </ul>
<b>Multiple Host Access</b>	Filter by Multiple Host Access.
<b>Parent ID</b>	Filter by Parent ID.
<b>Type</b>	Type. Possible values are: <ul style="list-style-type: none"> <li>CIFS</li> <li>NFS</li> <li>NFS41</li> <li>OTHER</li> <li>VFFS</li> <li>VMFS</li> <li>vsan</li> <li>VVOL</li> </ul>

### *Folder Filters*

This activity provides the following filters when the **Object Type** option is set to **Folder**.

<b>Folder Name</b>	Filter on the folder name
<b>Parent ID</b>	Filter on the ID of the parent folder

### *Host Filters*

This activity provides the following filters when the **Object Type** option is set to **Host**.

<b>Connection State</b>	Filter by Connection State. Possible values are: <ul style="list-style-type: none"> <li>connected</li> <li>disconnected</li> <li>notResponding</li> </ul>
<b>CPU Mhz</b>	The speed of the CPU cores. This is an average value if there are

	multiple speeds.
<b>Host Name</b>	Filter by Host Name.
<b>In Maintenance Mode</b>	Filter by In Maintenance Mode value.
<b>Memory Size (bytes)</b>	Filter by Memory Size value.
<b>Number of CPU Cores</b>	Filter by Number of CPU Cores.
<b>Number of CPU Threads</b>	Filter by Number of CPU Threads.
<b>Number of CPUs</b>	Filter by Number of CPUs.
<b>Number of Network Cards</b>	Filter by Number of Network Cards.
<b>Parent ID</b>	Filter by Parent ID.
<b>Power State</b>	Filter by Power State. Possible values are: <ul style="list-style-type: none"> <li>• poweredOn</li> <li>• poweredOff</li> <li>• standby</li> <li>• unknown</li> </ul>
<b>UUID</b>	Filter by UUID.

### *Network Filters*

This activity provides the following filters when the **Object Type** option is set to **Network**.

<b>IP Pool ID</b>	Filter by IP Pool ID.
<b>IP Pool Name</b>	Filter by IP Pool Name.
<b>Is Accessible</b>	Filter by Is Accessible value.
<b>Network Name</b>	Filter by Network Name.
<b>Parent ID</b>	Filter by Parent ID.

### *Resource Pool Filters*

This activity provides the following filters when the **Object Type** option is set to **Resource Pool**.

<b>Owner ID</b>	Filter by Owner ID.
<b>Parent ID</b>	Filter by Parent ID.
<b>Resource Pool Name</b>	Filter by Resource Pool Name.



## VM Filters

This activity provides the following filters when the **Object Type** option is set to **VM**.

<b>Guest OS ID</b>	Filter by Guest OS ID.
<b>Instance UUID</b>	Filter by Instance UUID.
<b>Is Template</b>	Filter by Is Template value.
<b>Parent ID</b>	Filter by Parent ID.
<b>Parent VApp ID</b>	Filter by Parent VApp ID.
<b>Resource Pool ID</b>	Filter by Resource Pool ID.
<b>UUID</b>	Filter by UUID.
<b>Version</b>	Filter by Version.
<b>VM Name</b>	Filter by VM Name.

## Outputs

This activity outputs objects that represent the **Object Type** that was selected. The following sections outline the properties for each object type that is supported.

### Cluster Outputs

When the **Object Type** option is set to **Cluster**, this activity outputs objects with the following properties.

<b>Cluster ID</b>	ID (managed object reference) for the cluster.
<b>Cluster Name</b>	Specifies the name of the cluster.
<b>Datastores</b>	Specifies the datastores available for the cluster. This value is a comma separated list of datastore IDs (managed object references).
<b>Effective CPU</b>	Effective CPU resources available to run VMs. This is the aggregated effective resource level from all running hosts. Hosts that are in maintenance mode or are unresponsive are not counted. Resources used by the VMware Service Console are not included in the aggregate. This value represents the number of resources available for the root resource pool for running virtual machines.
<b>Effective Memory</b>	Effective memory resources (in MB) available to run VMs. This is the aggregated effective resource level from all running hosts. Hosts that are in maintenance mode or are unresponsive are not counted. Resources used by the VMware Service Console are not included in the aggregate. This value represents the number of resources available for the root resource pool for running virtual machines.

<b>Hosts</b>	Hosts that are part of this compute resource. This value is a comma separated list of host IDs (managed object references).
<b>Networks</b>	Networks available for this compute resource. This value is a comma separated list of network IDs (managed object references).
<b>Number of CPU Cores</b>	Number of physical CPU cores.
<b>Number of CPU Threads</b>	Aggregated number of CPU threads.
<b>Number of Effective Hosts</b>	Total number of effective hosts.
<b>Number of Hosts</b>	Total number of hosts.
<b>Parent ID</b>	Specifies the ID (managed object reference) of the parent folder for this cluster.
<b>Resource Pool ID</b>	Managed object reference of the root resource pool for this cluster.
<b>Total CPU (MHz)</b>	Aggregated CPU resources of all hosts, in MHz.
<b>Total Memory (bytes)</b>	Aggregated memory resources of all hosts, in bytes.

### *Compute Resource Outputs*

When the **Object Type** option is set to **Computer Resource**, this activity outputs objects with the following properties.

<b>Compute Resource ID</b>	ID (managed object reference) for the compute resource.
<b>Compute Resource Name</b>	Specifies the name of the compute resource.
<b>Datastores</b>	Specifies the datastores available for the compute resource. This value is a comma separated list of datastore IDs (managed object references).
<b>Effective CPU</b>	Effective CPU resources available to run VMs. This is the aggregated effective resource level from all running hosts. Hosts that are in maintenance mode or are unresponsive are not counted. Resources used by the VMware Service Console are not included in the aggregate. This value represents the amount of resources available for the root resource pool for running virtual machines.
<b>Effective Memory</b>	Effective memory resources (in MB) available to run VMs. This is the aggregated effective resource level from all running hosts. Hosts that are in maintenance mode or are unresponsive are not counted. Resources used by

	the VMware Service Console are not included in the aggregate. This value represents the amount of resources available for the root resource pool for running virtual machines.
<b>Hosts</b>	Hosts that are part of this compute resource. This value is a comma separated list of host IDs (managed object references).
<b>Is Cluster</b>	Indicates if this compute resource is a cluster or not.
<b>Networks</b>	Networks available for this compute resource. This value is a comma separated list of network IDs (managed object references).
<b>Number of CPU Cores</b>	Number of physical CPU cores.
<b>Number of CPU Threads</b>	Aggregated number of CPU threads.
<b>Number of Effective Hosts</b>	Total number of effective hosts.
<b>Number of Hosts</b>	Total number of hosts.
<b>Parent ID</b>	Specifies the ID (managed object reference) of the parent folder for this cluster.
<b>Resource Pool ID</b>	Managed object reference of the root resource pool for this cluster.
<b>Total CPU (MHz)</b>	Aggregated CPU resources of all hosts, in MHz
<b>Total Memory (bytes)</b>	Aggregated memory resources of all hosts, in bytes.

### *Datacenter Outputs*

When the **Object Type** option is set to **Datacenter**, this activity outputs objects with the following properties.

<b>Datacenter ID</b>	ID (managed object reference) of the datacenter.
<b>Datacenter Name</b>	Datacenter name.
<b>Datastore Folder ID</b>	ID (managed object reference) of the main folder containing datastores for the datacenter.
<b>Datastores</b>	Datastores available in the datacenter. This value is a comma separated list of datastore IDs (managed object references).
<b>Host Folder ID</b>	ID (managed object reference) of the main folder containing hosts for this datacenter.

<b>Network Folder ID</b>	ID (managed object reference) of the main folder containing networks for this datacenter.
<b>Networks</b>	Networks available in the datacenter. This value is a comma separated list of datastore IDs (managed object references).
<b>Parent ID</b>	ID (managed object reference) of the parent folder for this datacenter.
<b>VM Folder ID</b>	ID (managed object reference) of the main folder containing VMs for this datacenter.

### *Datastore Outputs*

When the **Object Type** option is set to **Datastore**, this activity outputs objects with the following properties.

<b>Capacity (bytes)</b>	Maximum capacity of the datastore, in bytes. This property is guaranteed to be valid only if Is Accessible is True.
<b>Datastore ID</b>	ID (managed object reference) of the datastore.
<b>Datastore Name</b>	Datastore name.
<b>Free Space (bytes)</b>	Available space of the datastore, in bytes. This property is guaranteed to be valid only if Is Accessible is True.
<b>Hosts</b>	Hosts attached to the datastore. This value is a comma separated list of host IDs (managed object references).
<b>Is Accessible</b>	The connectivity status of this datastore. If this is False, some of the other published properties cannot be guaranteed to be accurate. For datastores accessed from multiple hosts, vCenter Server reports Accessible as an aggregated value.
<b>Maintenance Mode</b>	The current maintenance mode state of the datastore. Possible values are: <ul style="list-style-type: none"> <li>enteringMaintenance</li> <li>inMaintenance</li> <li>normal</li> </ul>
<b>Multiple Host Access</b>	Specifies if more than one host in the datacenter has been configured with access to the datastore.
<b>Parent ID</b>	ID (managed object reference) of the datastore parent folder.
<b>Type</b>	Type of file system volume. Possible values are: <ul style="list-style-type: none"> <li>CIFS</li> <li>NFS</li> <li>NFS41</li> <li>OTHER</li> </ul>

	<ul style="list-style-type: none"> <li>• VFFS</li> <li>• VMFS</li> <li>• vsan</li> <li>• VVOL</li> </ul>
<b>Uncommitted (bytes)</b>	Total additional storage space, in bytes, potentially used by all virtual machines on this datastore. This property is guaranteed to be valid only if Accessible is True.

### Folder Outputs

When the **Object Type** option is set to **Folder**, this activity outputs objects with the following properties.

<b>Datacenter ID</b>	ID (managed object reference) of datacenter under which this folder is located. This value is empty for datacenter folders.
<b>Datacenter Name</b>	Name of datacenter under which this folder is located. This value is empty for datacenter folders.
<b>Folder ID</b>	ID (managed object reference) of the folder.
<b>Folder Name</b>	Folder name.
<b>Parent ID</b>	ID (managed object reference) of parent folder.
<b>Path</b>	Folder path. For non-datacenter folders, the path includes the datacenter path under which the folder is located.
<b>Type</b>	<p>Comma separated list of child types that can exist under this folder. Possible values are:</p> <ul style="list-style-type: none"> <li>• ComputeResource</li> <li>• Datacenter</li> <li>• Datastore</li> <li>• DistributedSwitch</li> <li>• Folder</li> <li>• Network</li> <li>• StoragePod</li> <li>• VirtualApp</li> <li>• VirtualMachine</li> </ul>

### Host Outputs

When the **Object Type** option is set to **Host**, this activity outputs objects with the following properties.

<b>Connection State</b>	Host connection state. Possible values are:
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	<ul style="list-style-type: none"> <li>connected</li> <li>disconnected</li> <li>notResponding</li> </ul>
<b>CPU Mhz</b>	The speed of the CPU cores. This is an average value if there are multiple speeds.
<b>Datastores</b>	Datastores available on the host. This value is a comma separated list of datastore IDs (managed object references).
<b>Host ID</b>	ID (managed object reference) of the host.
<b>Host Name</b>	Host name.
<b>In Maintenance Mode</b>	Indicates whether the host is in maintenance mode or not.
<b>Management Server IP Address</b>	IP address of the Virtual Center server managing this host, if any.
<b>Memory Size (bytes)</b>	The physical memory size on the host, in bytes.
<b>Networks</b>	Networks available on the host. This value is a comma separated list of network IDs (managed object references).
<b>Number of CPU Cores</b>	Number of physical CPU cores on the host.
<b>Number of CPU Threads</b>	Number of physical CPU threads on the host.
<b>Number of CPUs</b>	Number of physical CPU packages on the host.
<b>Number of Network Cards</b>	The number of network adapters.
<b>Overall CPU Usage (MHz)</b>	Aggregated CPU usage across all cores on the host in MHz. This is only available if the host is connected.
<b>Overall Memory Usage (MB)</b>	Physical memory usage on the host in MB. This is only available if the host is connected.
<b>Parent ID</b>	Management object reference of the host parent folder.
<b>Power State</b>	<p>The host power state. Possible values are:</p> <ul style="list-style-type: none"> <li>poweredOff</li> <li>poweredOn</li> <li>standby</li> <li>unknown</li> </ul>

<b>Uptime</b>	The system uptime of the host in seconds.
<b>UUID</b>	The hardware BIOS identification.

### *Network Outputs*

When the **Object Type** option is set to **Network**, this activity outputs objects with the following properties.

<b>Hosts</b>	Hosts available for the network. This value is a list of comma-separated list of host IDs (managed object references).
<b>IP Pool ID</b>	Identifier of the associated IP pool. Zero if the network is not associated with an IP pool.
<b>IP Pool Name</b>	Name of the associated IP pool. Empty if the network is not associated with an IP pool.
<b>Is Accessible</b>	Indicates if at least one host is configured to provide this network.
<b>Network ID</b>	ID (managed object reference) of the network.
<b>Network Name</b>	Network name.
<b>Parent ID</b>	ID (managed object reference) of the network parent folder.

### *Resource Pool Outputs*

When the **Object Type** option is set to **Resource Pool**, this activity outputs objects with the following properties.

<b>Is Virtual App</b>	Indicates if the resource pool is a virtual app.
<b>Owner ID</b>	ID (managed object reference) of the resource pool owner.
<b>Owner Type</b>	Resource pool owner type. Possible values are: <ul style="list-style-type: none"> <li>• Compute Resource</li> <li>• Cluster Compute Resource</li> </ul>
<b>Parent ID</b>	ID (managed object reference) of the resource pool owner.
<b>Parent Type</b>	Resource pool parent type. Possible values are: <ul style="list-style-type: none"> <li>• Resource Pool</li> <li>• Compute Resource</li> <li>• Cluster Compute Resource</li> </ul>
<b>Resource Pool ID</b>	ID (managed object reference) of the resource pool.
<b>Resource Pool Name</b>	Resource pool name.

## VM Outputs

When the **Object Type** option is set to **VM**, this activity outputs objects with the following properties.

<b>Datastores</b>	Datastores used by the VM. This value is a comma separated list of datastore IDs (managed object references).
<b>Guest OS</b>	Name of guest OS used by the VM.
<b>Guest OS ID</b>	ID of the guest OS used by the VM.
<b>Instance UUID</b>	VirtualCenter-specific 128-bit UUID of a virtual machine, represented as a hexadecimal string. This identifier is used by VirtualCenter to uniquely identify all virtual machine instances, including those that may share the same SMBIOS UUID.
<b>Is Template</b>	Indicates if the is a VM template.
<b>Memory (MB)</b>	Amount of memory in MB assigned to the VM.
<b>Networks</b>	Networks used by the VM. This value is a comma separated list of networks IDs (managed object references).
<b>Number of Cores per Socket</b>	Number of CPU cores per socket on the VM.
<b>Number of CPUs</b>	Number of CPUs on the VM.
<b>Number of Network Cards</b>	Number of network adapters on the VM.
<b>Number of Virtual Disks</b>	Number of virtual hard disks on the VM.
<b>Parent ID</b>	ID (managed object reference) of the VM parent folder.
<b>Parent VApp ID</b>	Managed object reference of the VM parent VApp.
<b>Resource Pool ID</b>	Managed object reference of the resource pool associated with the VM.
<b>UUID</b>	Virtual machine BIOS identification.
<b>Version</b>	VM hardware virtualization version.
<b>VM ID</b>	ID (managed object reference) of the VM.
<b>VM Name</b>	Name of the VM.
<b>VMX Path</b>	Path of the VMX configuration file of the VM.



# Get-VsphereVmDevice

The **Get-VsphereVmDevice** activity is used in a runbook to retrieve devices for a specified VM.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Device Type</b>	Specifies the type of devices that are to be retrieved.

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM ID</b>	ID (managed object reference) of the VM for which devices are to be retrieved.

## Outputs

This activity outputs objects that represent the **Device Type** that was selected. The following sections outline the properties for the different device types that are supported.

### *Outputs for Devices Other than Hard Disks*

When the **Device Type** options is set to anything other than **Hard Disk** this activity outputs objects with the following properties.

<b>Allow Connect Guest Control</b>	Indicates whether the guest OS controls when the device is connected.
<b>Backing Type</b>	Device backing type. Device backing objects contain information about the backing of devices on a virtual machine. Not all devices are required to have backing information.
<b>Connected</b>	Indicates whether the device is currently connected. Valid only while the virtual machine is running.
<b>Connect Status</b>	The device connect status. <ul style="list-style-type: none"><li>• <b>ok.</b> The device is working correctly.</li></ul>

	<ul style="list-style-type: none"> <li>• <b>recoverableError</b>. The device has reported a recoverable error. For example, attempting to connect to floppy device that is being used by another virtual machine or some other program would result in this status.</li> <li>• <b>unrecoverableError</b>. The device cannot be used. For example, attempting to connect to a floppy device that does not exist would result in this status.</li> <li>• <b>untried</b>. The device status is unknown, or it has not been requested to connect when the VM is powered on.</li> </ul>
<b>Controller Key</b>	Key of the controller device for this device.
<b>Device Type</b>	Type of device.
<b>Key</b>	A unique key that distinguishes this device from other devices in the same virtual machine. Keys are immutable but may be recycled; that is, a key does not change if the device is associated with a particular virtual machine. However, once a device is removed, its key may be used when another device is added.
<b>Label</b>	Device display label.
<b>Start Connected</b>	Specifies whether to connect the device when the virtual machine starts.
<b>Summary</b>	Device summary description.
<b>Unit Number</b>	<p>The unit number of this device on its controller. This property is null if the device does not have a controller.</p> <p>Normally, two devices on the same controller may not be assigned the same unit number. If multiple devices could exist on a controller, then unit number must be specified to configure respective devices.</p>
<b>Label</b>	Device display label.
<b>Start Connected</b>	Specifies whether to connect the device when the virtual machine starts.
<b>Summary</b>	Device summary description.
<b>Unit Number</b>	<p>The unit number of this device on its controller. This property is null if the device does not have a controller.</p> <p>Normally, two devices on the same controller may not be assigned the same unit number. If multiple devices could exist on a controller, then unit number must be specified to configure respective devices.</p>

### *Outputs for Hard Disk Objects*

When the **Device Type** option is set to **Hard Disk**, this activity outputs objects that have the following properties.

<b>Allow Connect Guest Control</b>	Indicates whether the guest OS controls when the device is connected.
<b>Backing Device Name</b>	The name of the backing device on the host system. Applies to device backed virtual disk.
<b>Backing Object ID</b>	Backing object's durable and immutable identifier. Applies to file backed virtual disk.
<b>Backing Type</b>	Device backing type. Device backing objects contain information about the backing of devices on a virtual machine. Not all devices are required to have backing information.
<b>Capacity (Bytes)</b>	Capacity of virtual disk in bytes.
<b>Compatibility Mode</b>	<p>The compatibility mode of the raw disk mapping (RDM). Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>physicalMode.</b> A disk device backed by a physical compatibility mode raw disk mapping cannot use disk modes, and commands are passed straight through to the LUN indicated by the raw disk mapping.</li> <li>• <b>virtualMode.</b> A disk device backed by a virtual compatibility mode raw disk mapping can use disk modes.</li> </ul>
<b>Connected</b>	Indicates whether the device is currently connected. Valid only while the virtual machine is running.
<b>Connect Status</b>	<p>The device connect status.</p> <ul style="list-style-type: none"> <li>• <b>ok.</b> The device is working correctly.</li> <li>• <b>recoverableError.</b> The device has reported a recoverable error. For example, attempting to connect to floppy device that is being used by another virtual machine or some other program would result in this status.</li> <li>• <b>unrecoverableError.</b> The device cannot be used. For example, attempting to connect to a floppy device that does not exist would result in this status.</li> <li>• <b>untried.</b> The device status is unknown, or it has not been requested to connect when the VM is powered on.</li> </ul>
<b>Controller Key</b>	Key of the controller device for this device.
<b>Datastore ID</b>	Reference to the datastore object storing the disk file. Applies to file backed virtual disk.
<b>Device Type</b>	Type of device.
<b>Disk Mode</b>	<p>Virtual disk mode. Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>append.</b> changes are appended to the redo log; you revoke changes by removing the undo log.</li> <li>• <b>independent_nonpersistent.</b> Same as nonpersistent, but not</li> </ul>

	<p>affected by snapshots.</p> <ul style="list-style-type: none"> <li>• <b>independent_persistent.</b> Same as persistent, but not affected by snapshots.</li> <li>• <b>nonpersistent.</b> Changes to virtual disk are made to a redo log and discarded at power off.</li> <li>• <b>persistent.</b> Changes are immediately and permanently written to the virtual disk.</li> <li>• <b>undoable.</b> Changes are made to a redo log, but you are given the option to commit or undo.</li> </ul>
<b>Disk Object ID</b>	Virtual disk durable and immutable identifier.
<b>Disk Provision</b>	<p>Virtual disk provisioning. Applies to Flat Version 2 backed virtual disks: Possible values are:</p> <ul style="list-style-type: none"> <li>• Thin Provision</li> <li>• Thick Provision Lazy Zeroed</li> <li>• Thick Provision Eager Zeroed</li> </ul>
<b>Disk Type</b>	<p>Virtual disk type. Possible values are:</p> <ul style="list-style-type: none"> <li>• RawVirtual</li> <li>• RawPhysical</li> <li>• Flat</li> <li>• Unknown</li> </ul>
<b>File Name</b>	Virtual disk file name. Applies to file backed virtual disk.
<b>Key</b>	A unique key that distinguishes this device from other devices in the same virtual machine. Keys are immutable but may be recycled; that is, a key does not change if the device is associated with a particular virtual machine. However, once a device is removed, its key may be used when another device is added.
<b>Label</b>	Device display label.
<b>Start Connected</b>	Specifies whether to connect the device when the virtual machine starts.
<b>Summary</b>	Device summary description.
<b>Unit Number</b>	<p>The unit number of this device on its controller. This property is null if the device does not have a controller.</p> <p>Normally, two devices on the same controller may not be assigned the same unit number. If multiple devices could exist on a controller, then unit number must be specified to configure respective devices.</p>
<b>UUID</b>	Virtual disk unique identifier.

# Get-VsphereVmInfo

The **Get-VsphereVmInfo** activity is used in a runbook to retrieve additional VM details such as Guest OS info or VM state.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>VM Info Type</b>	Specifies the type of information to be retrieved.

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM ID</b>	ID (managed object reference) of the VM.

## Outputs

This activity outputs objects that represent the **VM Info Type** that was selected. The following sections online the properties for the different types of VM information that are supported.

### VM Guest Outputs

Then the **VM Info Type** option is set to **VM Guest** this activity outputs objects with the following properties.

<b>App Heartbeat Status</b>	Application heartbeat status. Possible values are: <ul style="list-style-type: none"><li>• <b>appStatusGray</b>. Heartbeat status is disabled.</li><li>• <b>appStatusGreen</b>. Heartbeat status is OK.</li><li>• <b>appStatusRed</b>. Heartbeat has stopped.</li></ul>
<b>Guest Family</b>	Guest OS family, if known.
<b>Guest Full Name</b>	Guest OS full name, if known.
<b>Guest ID</b>	Guest OS identifier, if known.
<b>Guest Kernel Crashed</b>	Indicates if guest OS kernel has crashed.

<b>Guest Operations Ready</b>	Indicates guest operations availability. When True, the VM is ready to process guest operations.
<b>Guest State</b>	<p>Operation mode of the guest operating system. Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>running</b>. Guest OS is running normally.</li> <li>• <b>shuttingdown</b>. Guest OS has a pending shutdown command.</li> <li>• <b>resetting</b>. Guest OS has a pending reset command.</li> <li>• <b>standby</b>. Guest OS has a pending standby command.</li> <li>• <b>notrunning</b>. Guest OS is not running.</li> <li>• <b>unknown</b>. Guest OS information is not available.</li> </ul>
<b>Guest State Change Supported</b>	Indicates if the VM is ready to process soft power operations.
<b>Host Name</b>	Host name of the guest OS, if known.
<b>Interactive Guest Operations Ready</b>	Indicates if the VM is ready to process guest operations as the user interacting with the guest desktop.
<b>IP Address</b>	Primary IP address assigned to the guest OS, if known.
<b>IPv4 Address</b>	IP v4 address.
<b>IPv6 Address</b>	IP v6 address.
<b>Tools Running Status</b>	<p>Current running status of VMware Tools in the guest operating system, if known. Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>guestToolsRunning</b>. Tools running.</li> <li>• <b>guestToolsNotRunning</b>. Tools not running.</li> <li>• <b>guestToolsExecutingScripts</b>. Tools starting.</li> </ul>
<b>Tools Version</b>	Current versions of VMware Tools, if known.
<b>Tools Version Status</b>	<ul style="list-style-type: none"> <li>• <b>guestToolsBlacklisted</b>. VMware Tools is installed, but the installed version is known to have a grave bug and should be immediately upgraded.</li> <li>• <b>guestToolsCurrent</b>. VMware Tools is installed, and the version is current.</li> <li>• <b>guestToolsNeedUpgrade</b>. VMware Tools is installed, but the version is not current.</li> <li>• <b>guestToolsNotInstalled</b>. VMware Tools has never been installed.</li> <li>• <b>guestToolsSupportedNew</b>. VMware Tools is installed, supported, and newer than the version available on the host.</li> <li>• <b>guestToolsSupportedOld</b>. VMware Tools is installed, supported, but a newer version is available.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>guestToolsTooNew.</b> VMware Tools is installed, and the version is known to be too new to work correctly with this virtual machine.</li> <li>• <b>guestToolsTooOld.</b> VMware Tools is installed, but the version is too old.</li> <li>• <b>guestToolsUnmanaged.</b> VMware Tools is installed, but it is not managed by VMware.</li> </ul>
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### *VM Status Outputs*

Then the **VM Info Type** option is set to **VM Status** this activity outputs objects with the following properties.

<b>VM Guest OS State</b>	<p>Operation mode of the guest operating system. Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>running.</b> Guest OS is running normally.</li> <li>• <b>shuttingdown.</b> Guest OS has a pending shutdown command.</li> <li>• <b>resetting.</b> Guest OS has a pending reset command.</li> <li>• <b>standby.</b> Guest OS has a pending standby command.</li> <li>• <b>notrunning.</b> Guest OS is not running.</li> <li>• <b>unknown.</b> Guest OS information is not available.</li> </ul>
<b>VM Power State</b>	<p>Current power state of the VM. Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>poweredOff.</b> VM is currently powered off.</li> <li>• <b>poweredOn.</b> VM is currently powered on.</li> <li>• <b>suspended.</b> VM is currently suspended.</li> </ul>
<b>VM Tools Running Status</b>	<p>Current running status of VMware Tools in the guest operating system, if known. Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>guestToolsRunning.</b> Tools running.</li> <li>• <b>guestToolsNotRunning.</b> Tools not running.</li> <li>• <b>guestToolsExecutingScripts.</b> Tools starting.</li> </ul>

# Get-VsphereVmSnapshot

The **Get-VsphereVmSnapshot** activity is used in a runbook to retrieve VM snapshots.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Search By</b>	Specifies how snapshots are to be retrieved. <ul style="list-style-type: none"><li>• <b>VM ID</b>. Retrieves all the snapshots for the specified VM.</li><li>• <b>Snapshot ID</b>. Retrieves the specified snapshot.</li></ul>

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM ID</b>	Specifies the ID (managed object reference) of the VM for which snapshots are to be retrieved. This parameter is only available when discovery parameter <b>Search By</b> is set to <b>VM ID</b> .
<b>Snapshot ID</b>	Specifies the ID (managed object reference) of the snapshot that is to be retrieved. This parameter is only available when discovery parameter <b>Search By</b> is set to <b>Snapshot ID</b> .

## Outputs

This activity outputs objects that represents the snapshots that were retrieved. This object has the following properties.

<b>Create Time</b>	Date and time when the snapshot was created, in local time.
<b>Create Time (UTC)</b>	Date and time when the snapshot was created, in UTC.
<b>Description</b>	Snapshot description.
<b>ID</b>	The unique identifier that distinguishes this snapshot from other snapshots of the virtual machine.
<b>Is Current</b>	Indicates whether this is the current snapshot of the virtual machine.



<b>Parent ID</b>	ID (managed object reference) of the parent snapshot, if any.
<b>Power State</b>	The power state of the virtual machine when the snapshot was taken.
<b>Quiesced Guest File System</b>	Flag to indicate whether or not the snapshot was created with the "Quiesce Guest File System" option, ensuring a consistent state of the file system.
<b>Snapshot ID</b>	ID (managed object reference) of the snapshot.
<b>Snapshot Name</b>	Name of the snapshot.
<b>VM ID</b>	ID (managed object reference) of the VM this snapshot belongs to.

## Move-VsphereVm

The **Move-VsphereVm** activity is used in a runbook to move an existing VM.

### Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run. You can use the discovery options to navigate the object hierarchy in your vSphere environment and select the specific VM you want to move. Alternatively, you can configure the activity to resolve the VM when the activity runs, using the **VM ID** parameter and an appropriate data source.

<b>Cluster</b>	Specifies the cluster where the VM is to be moved. The list of available clusters is based on the Datacenter selection. If you do not have any clusters in your environment, or if you want to specify a host which does not belong to a cluster, leave this selection empty.
<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Datacenter</b>	Specifies the datacenter where the VM is to be moved.
<b>Datastore</b>	Specifies the datastore where the VM is to be moved. The list of available datastores is based on the Cluster/Host selection.
<b>Folder</b>	Specifies the folder where the VM is to be moved. The list of available folders is based on the Datacenter selection.
<b>Host</b>	Specifies the host where the VM is to be moved. The list of available hosts is based on the Datacenter and/or Cluster selection.
<b>Resource Pool</b>	Specifies the resource pool where the VM is to be moved. The list of available resource pools is based on the Cluster/Host selection.

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM ID</b>	ID (managed object reference) of the VM that is to be moved.

## Optional Parameters

You can configure the following parameters, as required.

<b>Datastore ID</b>	<p>ID (managed object reference) of the datastore where the VM is to be moved. This parameter is only available when the Datastore optional discovery parameter is not specified.</p> <ul style="list-style-type: none"><li>• If not specified, the current VM datastore will be used.</li><li>• If not specified and the current VM datastore is not accessible, the activity will fail.</li><li>• Must be specified when moving the VM to another datacenter.</li><li>• Must be specified when moving the VM to another host that is not associated with the current VM datastore.</li></ul> <p>The specified datastore must be accessible for the specified resource pool.</p>
<b>Disk Drive Key</b>	Identifies the VM disk(s) for which Disk Provision is to be applied. If not specified, Disk Provision will be applied to all VM disks. To specify multiple disks, use a comma (,) separated list of drive keys.
<b>Disk Provision</b>	Specifies provisioning for the VM disk(s). If Disk Drive Key is not specified, the specified provisioning will be applied to all VM disks.
<b>Folder ID</b>	<p>ID (managed object reference) of the folder where the VM is to be moved. This parameter is only available when the Folder optional discovery parameter is not specified.</p> <p>When not specified:</p> <ul style="list-style-type: none"><li>• If moving within the same datacenter, the VM will keep the same folder.</li><li>• If moving to another datacenter, the root VM folder of the destination datacenter will be used.</li></ul>
<b>Host ID</b>	<p>ID (managed object reference) of the host where the VM is to be moved.</p> <p>If not specified:</p> <ul style="list-style-type: none"><li>• If the Resource Pool is not specified, the current VM host will be used.</li></ul>

<b>Resource Pool ID</b>	<ul style="list-style-type: none"> <li>• If the Resource Pool is specified, and it is associated with a stand-alone host, that host will be used.</li> <li>• If the Resource Pool is specified, and it is associated with a DRS enabled cluster, a host selected by DRS will be used.</li> </ul> <p>If this parameter is specified, the specified resource pool and datastore must be accessible from the specified host.</p> <p>Typically, this parameter is specified when moving the VM to another host in a cluster, where multiple hosts are associated with the same resource pool. When moving the VM to a stand-alone host, that host is implicitly specified by the resource pool and does not have to be specified.</p> <p>ID (managed object reference) of the resource pool where the VM is to be moved. This parameter is only available when the Resource Pool optional discovery parameter is not specified.</p> <ul style="list-style-type: none"> <li>• Must be specified when moving the VM to another datacenter.</li> <li>• Must be specified when moving the VM to another host that is not associated with the current VM resource pool.</li> </ul> <p>Specifying the resource pool also implicitly specifies the host (in the case of a stand-alone host), or the cluster.</p>
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## Output

This activity outputs the managed object reference (MOR) of the VM that was moved.

# New-VsphereVm

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The **New-VsphereVm** activity is used in a runbook to create a new VM based on a VM template.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run. You can use the discovery options to navigate the object hierarchy in your vSphere environment and select the specific objects required to create the new VM. Alternatively, you can configure the activity to resolve these objects when the activity runs, using the **Datastore ID**, **Folder ID**, **Resource Pool ID** and **template ID** parameters.

<b>Cluster</b>	Specifies the cluster where the new VM is to be created. The list of available clusters is based on the Datacenter selection. If you do not have any clusters in your environment or if you want to specify a host which does not belong to a cluster, leave this selection empty.
<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Datacenter</b>	Specifies the datacenter where the new VM is to be created.
<b>Datastore</b>	Specifies the datastore for the new VM. The list of available datastores is based on the Cluster/Host selection.
<b>Folder</b>	Specifies the folder for the new VM. The list of available folders is based on the Datacenter selection.
<b>Host</b>	Specifies the host where the new VM is to be created. The list of available hosts is based on the Datacenter and/or Cluster selection.
<b>Resource Pool</b>	Specifies the resource pool for the new VM. The list of available resource pools is based on the Cluster/Host selection.
<b>Template</b>	Specifies the template on which the new VM is to be based. The list of available templates is based on the Template Datacenter selection.
<b>Template Datacenter</b>	Specifies the datacenter where the VM template is located.

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
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<b>Datastore ID</b>	ID (managed object reference) of the datastore where the new VM is to be located. This parameter is only available when the Datastore optional discovery parameter is not specified. The specified datastore must be accessible for the specified resource pool.
<b>Folder ID</b>	ID (managed object reference) of the folder where the new VM is to be located. This parameter is only available when the Folder optional discovery parameter is not specified.
<b>Name</b>	The name for the new VM.
<b>Resource Pool ID</b>	ID (managed object reference) of the resource pool for the new VM. This parameter is only available when the Resource Pool optional discovery parameter is not specified. Specifying the resource pool also implicitly specifies the host (in the case of a stand-alone host) or the cluster.
<b>Template ID</b>	ID (managed object reference) of the template on which the new VM is based. This parameter is only available when the Template optional discovery parameter is not specified.

## Optional Parameters

You can configure the following parameters, as required.

<b>Customization Spec</b>	<p>The name of a Customization Spec which is to be applied to the new VM. You can use the vSphere <i>Customization Specifications Manager</i> (under Home/Management) to configure VM customization specs.</p> <p><b>Tip:</b> VMware Tools must be installed on the template source VM for a customization spec to be applied. Also, a customization spec is applied on a new VM after the VM is started the first time.</p>
<b>Disk Provision</b>	Provision type for the all the hard disks on the new VM. Use this parameter when you wish the new VM to have a different provision than the one specified in the VM template.
<b>Host ID</b>	<p>ID (managed object reference) of the host where the VM should be created.</p> <ul style="list-style-type: none"> <li>• This parameter is <b>optional</b> when creating a new VM under a stand-alone host since the host is implicitly specified by the specified resource pool.</li> <li>• This parameter is <b>optional</b> when creating a new VM under a DRS enabled Cluster, since the host is assigned automatically from the DRS Cluster implicitly specified by the specified resource pool.</li> <li>• This parameter is <b>required</b> when creating a VM under to a non-DRS Cluster.</li> </ul>

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	If this parameter is specified, the specified resource pool and datastore must be accessible from the specified host.
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## Output

This activity outputs the managed object reference (MOR) of the VM that was created.

# New-VsphereVmSnapshot

The **New-VsphereVmSnapshot** activity is used in a runbook to create a new VM snapshot.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
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## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>Name</b>	The name for the new snapshot. The name does not need to be unique for the VM.
<b>VM ID</b>	ID (managed object reference) of the VM for which the snapshot will be created.

## Optional Parameters

You can configure the following parameters, as required.

<b>Description</b>	Snapshot description. If not specified, a default description may be provided.
<b>Include VM Memory</b>	<p>Specifies if a memory dump of the internal state of the virtual machine is included in the snapshot. Memory snapshots consume time and resources, and thus take longer to create. When set to False, the power state of the snapshot is set to powered off.</p> <p>Default value is False.</p>
<b>Quiesce Guest File System</b>	<p>Specifies if VMware Tools is used to quiesce the file system in the virtual machine. This assures that a disk snapshot represents a consistent state of the guest file systems.</p> <p>If set to True, and the virtual machine is powered on when the snapshot is taken, VMware Tools is used to quiesce the file system. If the virtual machine is powered off or VMware Tools are not available, the quiesce</p>

	value is ignored. Default value is False.
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## Output

The activity returns the ID (managed object reference) of the new snapshot.

## Remove-VsphereVm

The **Remove-VsphereVm** activity is used in a runbook to remove a VM from inventory, or to delete it permanently from disk.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
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## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM ID</b>	ID (managed object reference) of the VM that is to be removed. After the VM is removed, this ID is no longer valid.

## Optional Parameters

You can configure the following parameters, as required.

<b>Delete from Disk</b>	Specifies that the VM will be permanently deleted from disk. If not specified, the VM will be un-registered from inventory. Un-registered VMs can be later be re-registered and become part of inventory again. For details, please consult VMware documentation.  <b>Tip:</b> A re-registered VM will have a different ID (managed object reference) than before it was un-registered.
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## Output

This activity outputs the managed object reference (MOR) of the VM that was removed. Note that this MOR is no longer valid, as the VM no longer exists.

## Remove-VsphereVmSnapshot

The **Remove-VsphereVmSnapshot** activity is used in a runbook to remove a VM snapshot.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
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## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>Snapshot ID</b>	ID (managed object reference) of the snapshot that is to be removed. After the snapshot is removed, this ID is no longer valid.

## Optional Parameters

You can configure the following parameters, as required.

<b>Consolidate</b>	Specifies if the virtual disk associated with this snapshot will be merged with other disk(s), if possible. Default value is True.
<b>Remove Children</b>	Specifies if the entire snapshot subtree will be removed. Default value is False.

## Output

This activity outputs the managed object reference (MOR) of the snapshot that was removed. Note that this MOR is no longer valid, as the snapshot no longer exists.

# Restart-VsphereVm

The **Restart-VsphereVm** activity is used in a runbook to restart a running VM.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
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## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>Reboot Guest OS</b>	<p>Specifies whether the VM Guest OS will be rebooted (soft restart) or if the VM power will be reset (hard restart).</p> <p><b>Tip:</b> The VM must have VMware Tools installed and running for the activity to reboot (soft restart) the VM.</p>
<b>VM ID</b>	ID (managed object reference) of the VM that is to be restarted.
<b>Wait for VM State</b>	<p>Specifies a VM state that the activity will be waiting for before completing. Possible values are:</p> <ul style="list-style-type: none"><li>• <b>VM Powered On.</b> activity waits until the VM is in <i>poweredOn</i> state.</li><li>• <b>VM Guest OS Running.</b> activity waits until VM Guest operating system is in <i>running</i> state.</li><li>• <b>VM Tools Running.</b> activity waits until VMware Tools are in <i>guestToolsRunning</i> running state.</li><li>• <b>Do Not Wait.</b> activity does not wait.</li></ul> <p><b>Tip:</b> When the activity is configured to wait for a state, the VM is first Shut Down or Powered Off (as specified by Reboot Guest OS) and then it is started again.</p>

## Optional Parameters

You can configure the following parameters, as required.

<b>Timeout (sec)</b>	Specifies the number of seconds before the activity times out, when Wait for VM State is configured to wait for a VM state.
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**Tip:** If this parameter is not specified and **Wait for VM State** is configured so that the activity waits, the activity will not time out, it will wait indefinitely until the specified state is reached.

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## Output

This activity outputs the managed object reference (MOR) of the VM that was restarted.

# Set-VsphereCustomAttribute

The **Set-VsphereCustomAttribute** activity is used in a runbook to set custom attribute values. If the activity specifies an attribute which does not exist, the default behavior is to create the attribute.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Attribute Type</b>	Custom attribute type. <ul style="list-style-type: none"><li>• Global attributes can be set for any object type.</li><li>• Host attributes can be set for hosts.</li><li>• VM attributes can be set for VMs.</li></ul>
<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>Attribute Name</b>	Specifies the name for the custom attribute that is to be set.
<b>Attribute Value</b>	Specifies the new value for the custom attribute.
<b>vSphere Object ID</b>	ID (managed object reference) of the VM or host for which custom attribute is to be set.

## Optional Parameters

You can configure the following parameters, as required.

<b>Don't Create If Doesn't Exist</b>	Specifies that the attribute should not be created if it does not exist. In this case, the activity will fail. By default, if an attribute does not exist, it will be created.
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## Output

This activity outputs the attribute key of the attribute that was set.

# Set-VsphereVm

The **Set-VsphereVm** activity is used in a runbook to modify properties and/or devices on an existing VM.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>CD/DVD Drive Type</b>	Specifies a new CD/DVD drive type when changing to a different drive type. Available when the <b>Set</b> option is set to <b>CD/DVD Drive</b> . Options include: <ul style="list-style-type: none"><li>• <b>Client Device.</b> connect the device to a physical CD/DVD device on the system from which you access the vSphere Client.</li><li>• <b>Host Device.</b> connect the device to a physical CD/DVD device on the host.</li><li>• <b>Datastore ISO File.</b> connect the device to an ISO file that is stored on a datastore accessible to the host.</li></ul>
<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Set</b>	Specifies which part of the VM is to be modified.

## Required Parameters

You must configure the following parameters. You may have to configure additional parameters depending on the discovery options that you selected.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM ID</b>	ID (managed object reference) of the VM which is to be modified.

## CD/DVD Drive Required Parameters

You must configure the following parameters when **Set** is set to **CD/DVD Drive**.

<b>ISO File Path</b>	Location of the datastore ISO file for the device. Available when the <b>CD/DVD Drive Type</b> option is set to <b>Datastore ISO File</b> . <i>Tip:</i> Must be in the form [<datastore name>] <ISO file Path> <i>Example:</i> [DS-DEV-01] ISO/windows/ windows_10_x64.iso
<b>Host Device Path</b>	Location of host device. Available when <b>CD/DVD Drive Type</b> option is

	set to <b>Host Device</b> .
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### *Network Adapter Required Parameters*

You must configure the following parameters when **Set** is set to **Network Adapter**.

<b>Network ID</b>	ID (managed object reference) of the network to be assigned to the network adapter.
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### *Optional Parameters*

This activity may provide optional properties, depending on the discovery options that you selected, and they can be configured, as necessary.

### *CD/DVD Drive Optional Parameters*

You can configure the following properties when you set **Device Type** to **CD/DVD Drive**.

<b>Device Key</b>	Specifies the device to be modified. Available when <b>CD/DVD Drive Type</b> is set to <b>Datastore ISO File</b> or <b>Host</b> .
<b>Connect at Power On</b>	Specifies if the drive should be connected when the VM powers on. Available when <b>CD/DVD Drive Type</b> is set to <b>Datastore ISO File</b> or <b>Host</b> .
<b>ISO Datastore ID</b>	ID (managed object reference) of the datastore where the ISO file is stored. The datastore must correspond to the datastore specified in the ISO File Path. Available when <b>CD/DVD Drive Type</b> is set to <b>Datastore ISO File</b> .

### *CPU Optional Parameters*

You can configure the following parameters when **Set** is set to **CPU**.

<b>Number of Cores per Socket</b>	Number of CPU cores per socket for the modified VM.
<b>Total Number of Cores</b>	Total number of CPU cores for the modified VM.

### *Hard Disk Optional Parameters*

You can configure the following parameters when **Set** is set to **Hard Disk**.

<b>Device Key</b>	Specifies the disk drive that is to be modified. When not specified, the activity updates the first disk drive device it finds, if any.
<b>Disk Size (MB)</b>	Specifies the new disk size, in MB.

### Memory Optional Parameters

You can configure the following parameters when **Set** is set to **Memory**.

<b>Memory (MB)</b>	Specifies the amount of memory, in MB, for the modified VM.
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### Network Adapter Optional Parameters

You can configure the following parameters when **Set** is set to **Network Adapter**.

<b>Connect At Power On</b>	Specifies if the network adapter should be connected when the VM powers on.
<b>Device Key</b>	Specifies the network adapter device to be modified. When not specified, the activity updates the first network adapter device it finds, if any.

### VM Optional Parameters

You can configure the following parameters when **Set** is set to **VM**.

<b>Description</b>	Specifies the description for the modified VM.
<b>Guest OS ID</b>	Specifies the Guest OS for the modified VM.
<b>VM Name</b>	Specifies a new name for the VM.

### Output

This activity outputs the managed object reference (MOR) of the VM that was updated.

# Start-VsphereVm

The **Start-VsphereVm** activity is used in a runbook to start a VM.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run. If the specific datacenter is not known when you are configuring the activity, you can configure it using the provided **Datacenter ID** parameter and an appropriate data source.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
<b>Datacenter</b>	Specifies the datacenter on which the VM should be started.

## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>Datacenter ID</b>	ID (managed object reference) of the datacenter on which the VM should be started. This parameter is only available when the Datacenter optional discovery parameter is not specified.
<b>VM ID</b>	ID (managed object reference) of the VM that is to be started.
<b>Wait for VM State</b>	Specifies a VM state that the activity will be waiting for before completing. Possible values are: <ul style="list-style-type: none"><li>• <b>VM Powered On.</b> activity waits until the VM is in <i>poweredOn</i> state.</li><li>• <b>VM Guest OS Running.</b> activity waits until VM Guest operating system is in <i>running</i> state.</li><li>• <b>VM Tools Running.</b> activity waits until VMware Tools are in <i>guestToolsRunning</i> running state.</li><li>• <b>Do Not Wait.</b> activity does not wait.</li></ul>

## Optional Parameters

You can configure the following parameters, as required.

<b>Override Automation Level</b>	<ul style="list-style-type: none"><li>• Override the DRS automation level. Possible values are:</li><li>• <b>fullyAutomated.</b> Specifies that VirtualCenter should automate both the migration of virtual machines and their placement with a host</li></ul>
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	<p>at power on.</p> <ul style="list-style-type: none"> <li>• <b>manual</b>. Specifies that VirtualCenter should generate recommendations for virtual machine migration and for placement with a host but should not implement the recommendations automatically.</li> <li>• <b>partiallyAutomated</b>. Specifies that VirtualCenter should generate recommendations for virtual machine migration and for placement with a host but should automatically implement only the placement at power on.</li> </ul>
<b>Reserve Resources</b>	<p>Reserve resources for the powering-on VMs throughout the power-on session.</p> <p><b>Tip:</b> When this option is set to true, the server will return at most one recommended host per manual VM, and the VM's reservations are held on the recommended host until the VM is powered on (either by applying the recommendation or by a power-on request on the VM), or until the recommendation is canceled, or until the recommendation expires.</p> <p><b>Tip:</b> The expiration time is currently set to 10 minutes. This option does not influence automatic VMs since their recommendations are executed immediately. This option is effective on DRS clusters only.</p>
<b>Timeout (sec)</b>	<p>Specifies the number of seconds before the activity times out, when <b>Wait for VM State</b> is configured to wait for a VM state.</p> <p><b>Tip:</b> If this parameter is not specified and <b>Wait for VM State</b> is configured so that the activity waits, the activity will not time out, it will wait indefinitely until the specified state is reached.</p>

## Output

This activity outputs the managed object reference (MOR) of the VM that was started.

# Stop-VsphereVm

The **Stop-VsphereVm** activity is used in a runbook to stop a running VM.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
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## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>Shutdown Guest OS</b>	Specifies whether the VM Guest OS will be shut down (soft stop) or if the VM will be powered off (hard stop). <i>Tip:</i> The VM must have VMware Tools installed and running for the activity to shut down (soft stop) the VM.
<b>VM ID</b>	ID (managed object reference) of the VM that is to be stopped.
<b>Wait for VM Powered Off</b>	Specifies whether the activity will be waiting for the VM to reach the <i>poweredOff</i> state before completing.

## Optional Parameters

You can configure the following parameters, as required.

<b>Timeout (sec)</b>	Specifies the number of seconds before the activity times out, when configured to wait. <i>Tip:</i> If this parameter is not specified and <b>Wait for VM Powered Off</b> is configured so that the activity waits, the activity will not time out, it will wait indefinitely until the powered off.
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## Output

This activity outputs the managed object reference (MOR) of the VM that was stopped.

# Suspend-VsphereVm

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The **Suspend-VsphereVm** activity is used in a runbook to suspend a running VM.

## Discovery Options

You can use the following options to connect to VMware vSphere and configure how you would like the activity to run.

<b>Connection</b>	The name of the Smart Connection used to connect Runbook Studio to the vSphere server.
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## Required Parameters

You must configure the following parameters.

<b>Connection</b>	A hashtable containing connection information. This is typically obtained using a Connection Asset data source or Get-AutomationConnection activity.
<b>VM ID</b>	ID (managed object reference) of the VM that is to be suspended.

## Output

This activity outputs the managed object reference (MOR) of the VM that was suspended.