HP Operations Orchestration Software

Software Version: 7.60

Microsoft Hyper-V Integration Guide

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On the Web: Finding OO support and documentation

There are two Web sites where you can find support and documentation, including updates to OO Help systems, guides, and tutorials:

- The OO Support site
- BSA Essentials Network

Support

Documentation enhancements are a continual project at Hewlett-Packard Software. You can obtain or update the HP OO documentation set and tutorials at any time from the HP Software Product Manuals Web site. You will need an HP Passport to log in to the Web site.

To obtain HP OO documentation and tutorials

1. Go to the HP Software Product Manuals Web site (http://support.openview.hp.com/selfsolve/manuals).
2. Log in with your HP Passport user name and password.

   OR

   If you do not have an HP Passport, click **New users — please register** to create an HP Passport, then return to this page and log in.

   If you need help getting an HP Passport, see your HP OO contact.

3. In the **Product** list box, scroll down to and select **Operations Orchestration**.
4. In the **Product Version** list, click the version of the manuals that you're interested in.
5. In the **Operating System** list, click the relevant operating system.
6. Click the **Search** button.
7. In the **Results** list, click the link for the file that you want.

BSA Essentials Network

For support information, including patches, troubleshooting aids, support contract management, product manuals and more, visit the following site: http://www.hp.com/go/bsaessentialsnetwork

This is the **BSA Essentials Network** Web page. To sign in:

1. Click **Login Now**.
2. On the **HP Passport sign-in** page, enter your HP Passport user ID and password and then click **Sign-in**.
3. If you do not already have an HP Passport account, do the following:
   a. On the **HP Passport sign-in** page, click **New user registration**.
   b. On the **HP Passport new user registration** page, enter the required information and then click **Continue**.
   c. On the confirmation page that opens, check your information and then click **Register**.
   d. On the **Terms of Service** page, read the Terms of use and legal restrictions, select the **Agree** button, and then click **Submit**.
4. On the **BSA Essentials Network** page, click **Operations Orchestration Community.**

The Operations Orchestration Community page contains links to announcements, discussions, downloads, documentation, help, and support.

Note: Contact your OO contact if you have any difficulties with this process.

In OO: How to find Help, PDFs, and tutorials

The HP Operations Orchestration software (HP OO) documentation set is made up of the following:

- Help for Central

  Central Help provides information to the following:

  - Finding and running flows
  - For HP OO administrators, configuring the functioning of HP OO
  - Generating and viewing the information available from the outcomes of flow runs

  The Central Help system is also available as a PDF document in the HP OO home directory, in the \Central\docs subdirectory.

- Help for Studio

  Studio Help instructs flow authors at varying levels of programming ability.

  The Studio Help system is also available as a PDF document in the HP OO home directory, in the \Studio\docs subdirectory.

- Animated tutorials for Central and Studio

  HP OO tutorials can each be completed in less than half an hour and provide basic instruction on the following:

  - In Central, finding, running, and viewing information from flows
  - In Studio, modifying flows

  The tutorials are available in the Central and Studio subdirectories of the HP OO home directory.

- Self-documentation for operations and flows in the Accelerator Packs and ITIL folders

  Self-documentation is available in the descriptions of the operations and steps that are included in the flows.

Table of Contents

Overview

This integration will allow administrators to build HP Operations Orchestration (OO) flows that are integrated with the release version of Microsoft Hyper-V for Windows 2008.

This document will explain how this integration has been implemented and how the operations that are included for communicating back and forth between OO and Hyper-V work.

Use cases and scenarios

1. Control machine (VM) state–related operations.
   - Start
   - Stop
   - Suspend
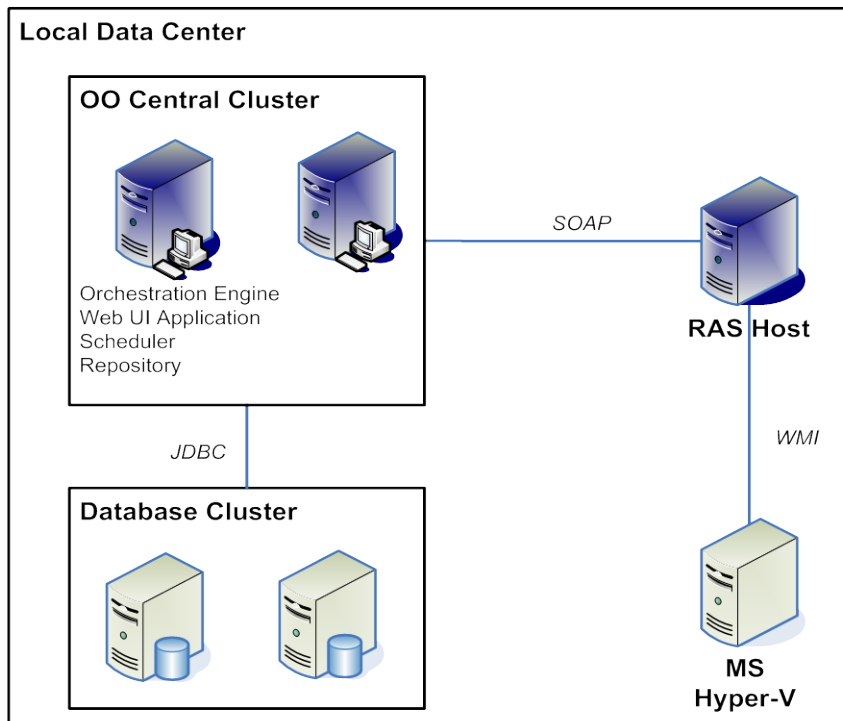   - Reset
2. Administer VM.

   This includes actions such as:

   - Resource control (including set or get number of processors, set or get memory size, set VM resources, change boot order)
   - Snapshot administration (including create, delete, apply)
   - Migration (import and export)
3. Administer virtual network devices.
   - Create NIC, set MAC for NIC, delete NIC, etc.
   - Create or remove private or internal virtual network
   - Attach VMs to a network on specific ports, detach VMs from a network
4. VM provisioning or de-provisioning.
   - Create a VM
   - Rename a VM
   - Manage storage devices or locations (including create VHD, validate VHD, compact VHD, expand VHD, convert VHD, attach VHD, remove VHD)
   - Delete a VM
5. Server or job status.
   - Get VMs
   - Get old or long-running VMs
   - Get a job state
   - Terminate a job

Versions and Components

Operations Orchestration Version	Microsoft Hyper-V Version
7.60	Windows 2008 release version

Architecture

Installation and configuration instructions

Install a Windows-based RAS that can connect to the Hyper-V server over WMI.

Operation specifics

The Hyper-V integration includes several operations for interacting with Hyper-V Virtualization Server and the guest VMs. These operations are located in OO studio in the \Library\Integrations\Microsoft\Hyper-V\ folder. All the operations have the following inputs:

- The name of the host for the Hyper-V Server
- A user and a password for connecting to the host

All other inputs needed by the operations are explained on the **Description** tabs of their **Properties** sheets in OO Studio.

The Hyper-V integration OO flows are grouped by subfolder within the \Library\Integrations\Microsoft\Hyper-V\ folder.

Server subfolder

Host Enumerate Virtual Machines

Returns a list of all the VMs available on the Hyper-V Virtualization Server.

List Long Running Virtual Machines

Returns a list of all the VMs which have been running for a longer time than the threshold given in milliseconds. If the given threshold is 0, all the running VMs are returned.

List Old Virtual Machines

Returns a list of all the VMs that were created before a given threshold. The threshold input should have the following format: dd/mm/yyyy hh:mm:ss.

Virtual Machine Actions subfolder

Create Blank Virtual Machine

Creates a blank VM with the indicated name, a default of 512 MB of RAM, and 1 CPU. All the others resources (such as VHDs and NICs) should be added later.

Delete Virtual Machine

Deletes a VM without deleting its corresponding VHD file.

Export Virtual Machine

Exports a VM and stores the files at the given path. This path should be a local path on the machine on which the Hyper-V Server is installed.

Get Virtual Machine State

Determines a VM's state (such as starting, running, stopped, or paused).

Import Virtual Machine

Imports a VM and stores the files at the given path. This path should be a local path on the machine on which the Hyper-V Server is installed.

Pause Virtual Machine

Pauses a VM. The machine should not be stopped. To resume, use the Start Virtual Machine operation.

Rename Virtual Machine

Renames a given VM.

Reset Virtual Machine

Resets a VM. The operation fails if the machine is stopped.

Save Virtual Machine

Saves the state of (Suspends) a VM. The operation fails if the machine is stopped. To resume, use the Start Virtual Machine operation.

Shutdown Virtual Machine

Shuts down a VM gracefully. The operation fails if the machine is already stopped. This requires Integrated Services installed.

Start Virtual Machine

Turns-on a VM. The operation fails if the machine is already started.

Stop Virtual Machine

Stops a VM, using turn-off. The operation fails if the machine is already stopped. This operation doesn't require that Integrated Services be installed.

Virtual Machine Configuration folder

Change Boot Order

Changes the boot order for a VM. The operation fails if the machine is not stopped.

Get Number Of Processors For Virtual Machine

Gets the number of processors for a given VM.

Get Virtual Machine Memory

Gets the quantity of memory (in MB) allocated to a VM.

Get Virtual Machine Operating System Name

Gets the version of the operating system installed on a VM. This operation requires that the Integration Services be installed on the VM.

Get Virtual Machine Processor Usage

Gets the processor usage for a VM.

Resource Control

Sets the following:

- The percent of the total resources that are reserved for the VM (that is, the maximum percent of the total resources which can be used by a VM).
- The relative weight of a machine (the machine's priority for access to physical resources, relative to other running virtual machines) when multiple machines are running.

Provisos for running this operation are that the machine should be stopped and the percent inputs should be between 0 and 100.

Set Memory Size

Sets the memory size (in MB) for a given VM. The value should be between 8 and 4096 MB. The operation fails if the machine is not stopped.

Set Number Of Processors

Sets the number of processors for a given VM. The value should be 1, 2, or 4. The operation fails if the machine is not stopped.

Snapshots subfolder

Apply Snapshot

Applies a snapshot to a given VM.

Create Snapshot

Takes a snapshot for a VM. The snapshot is given the indicated name.

Delete Snapshot

Deletes an existing snapshot for a given VM.

Delete Snapshot Tree

Deletes the entire snapshot tree, which has as root the indicated snapshot.

Enumerate Snapshots

Returns a list of all the snapshots available for a given VM.

Rename Snapshot

Renames a snapshot for a given VM.

Virtual Harddisk Operations subfolder

Attach Virtual Harddisk to Virtual Machine

Attaches a virtual hard disk from a given local path to the given machine, at the given controller and position. The machine should be stopped.

Compact Virtual Harddisk

Compacts the virtual disk image from the given local path. The ID of the job that has been launched is returned.

Convert Virtual Harddisk

Converts the type (from fixed to dynamic and vice versa) of an existing virtual disk image. The old and the new path should be local paths on the Hyper-V Server. The ID of the job that has been launched is returned.

Create Virtual Harddisk

Creates a virtual hard disk at the given path. The type (fixed or dynamic) and the size (in GB, between 1 and 2048) of hard-disk can be specified. The ID of the job that has been launched is returned.

Expand Virtual Harddisk

Expands an existing virtual hard disk file to the indicated size (in GB). The path should be a local one on the Hyper-V Server. The ID of the job that has been launched is returned.

Get Virtual Harddisk Information

Gets information about a virtual hard disk image at the given path. This should be a local path on the Hyper-V Server. The size of the virtual hard disk file on the physical disk (in bytes), the maximum size of the virtual hard disk as viewable by the VM (in bytes), and the type of virtual hard disk are returned.

Remove Device From IDE Controller

Removes a device attached to an IDE Controller of the given machine. The operation fails if the machine is not stopped.

Validate Virtual Harddisk

Validates whether the virtual disk image at the indicated local path can be opened in read-only mode.

Jobs subfolder

Get Job State

Gets the state of a job, as indicated by its ID. The results are the job state such as (running, starting, or completed), the percent of job completion, and, if an error occurs, the description of the error.

Terminate Job

Cleanly stops the job indicated by its ID, saving data, preserving the state, and shutting down all underlying processes in an orderly manner.

Virtual Networks subfolder

Attach Legacy NIC to Virtual Machine

Creates and attaches a virtual legacy NIC to the given machine. The MAC of the legacy NIC can be set either statically or dynamically. A legacy NIC is used when a network installation of the OS is to be done or when the Integration Services are not installed into the guest OS. The ID of the legacy NIC is returned.

Attach NIC to Virtual Machine

Creates and attaches a virtual NIC to the given machine. The MAC of the NIC can be set either statically or dynamically. A NIC's required drivers are installed when the Integrated Services are installed. The ID of the NIC is returned.

Attach VM To Network

Attaches a VM (through one of its NICs) to an internal or private virtual network on the given port.

Change MAC for Legacy NIC

Changes the MAC address of a virtual legacy NIC (indicated by its ID) from the given machine. The MAC address should be a valid one (12 hexadigits not separated by anything). If this is left empty, the MAC will be obtained dynamically. The machine should be stopped.

Change MAC for NIC

Changes the MAC address of a virtual NIC (indicated by its ID) from the given machine. The MAC address should be a valid one (12 hexadigits not separated by anything). If this is left empty, the MAC will be obtained dynamically. The machine should be stopped.

Create Internal Network

Creates an internal virtual network. Virtual machines connected to this network can communicate between themselves and the host system. There is no connectivity with the physical network.

Create Private Network

Creates a private virtual network. Virtual machines connected to this network can communicate between them. The host system has no connectivity with VMs.

Delete Network

Removes a virtual network (given by its name) from server.

Detach Virtual Machine From Network

Detaches a VM (actually one of its NICs) from an internal or private virtual network.

Get Legacy NICs for Virtual Machine

Returns data about virtual legacy NICs for the given machine. The data returned includes the IDs for the legacy NICs, the MAC addresses, whether it is statically or dynamically defined, and the ID of the network to which it is connected, if any.

Get NICs for VM

Returns data about virtual NICs for the given machine. The data returned includes the IDs for the NICs, the MAC addresses, whether it is statically or dynamically defined, and the ID of the network to which it is connected, if any.

List Virtual Machines Attached To Network

Lists all the VMs that are attached to an internal or private virtual network. The operation returns the names of all the VMs attached to the network.

Remove Legacy NIC by ID

Removes a virtual legacy NIC, specified by its ID, from the given machine.

Remove Legacy NIC by MAC

Removes a virtual legacy NIC, specified by its MAC, from the given machine. If there are multiple Legacy NICs with the same MAC, all of them are removed.

Remove NIC by ID

Removes a virtual NIC, specified by its ID, from the given machine.

Remove NIC by MAC

Removes a virtual NIC, specified by its MAC, from the given machine. If there are multiple NICs with the same MAC, all of them are removed.

Troubleshooting

Errors that the operations return

Some error messages are retrieved from the jobs started executing a certain operation and others are statically defined in the code. The most significant error messages that can be returned by the operations are the following:

The indicated VM doesn't exist on the given Hyper-V server.

The named VM doesn't exist on the Hyper-V Server.

A VM with the given name already exists on the given Hyper-V server.

A VM cannot be created if one with the same name already exists.

The indicated virtual machine is damaged and the operation can not succeed.

The VM may have been damaged during an inadequate operation (forced turn-off, for example). In this case, the user cannot interact with the machine from either the Hyper-V interface or from the operations of the Operations Orchestration Hyper-V Integration pack.

Access is denied.

The provided credentials are not valid, or the user is not entitled to do the operation.

A timeout occurred.

A timeout occurred during the run.

The system is in use.

The operation failed because the system is in use.

The system is out of memory.

The system does not have enough memory for this operation to succeed.

The VM is stopped or the operating system version is not a Hyper-V supported one.

The operating system can be retrieved only if it is supported by Hyper-V and the VM is running. Retrieving information about the processor usage also requires the machine to be started. Other operations (such as Start Virtual Machine) require the VM to be stopped.

The machine can not be shutdown. It may not have the integration services component installed.

Some operations, such as Shutdown, require that Integrated Services be installed.

The given virtual machine doesn't have the given snapshot.

The indicated snapshot doesn't exist for the VM.

The values for the boot devices should be mutually different.

For "Change the Boot Order" operation, any two of the inputs indicating from where to boot first, second, third, and fourth should be different.

The given path doesn't exist.

The operations with virtual harddisks (VHDs) have as input a local path to the physical place of the VHD files. If the location at the given path doesn't exist, the above error message is thrown.

The given job doesn't exist.

There is no job with the given ID.

The job is already stopped.

A job that is not started can not be stopped.

The value for the size should be an integer between 1 and 2048.

The size of the VHD is an integer between 1 and 2048 GB.

The file already exists.

A VHD cannot be created at a location that already exists, because it would overwrite an existing file.

The file doesn't represent a VHD.

The file at the indicated path is not a valid virtual hard disk.

GetVirtualHardDiskInfo returned an invalid CIM_XML instance.

Trying to retrieve data about a virtual hard disk resulted in a result that can not be parsed.

The file doesn't represent a dynamic VHD.

You cannot compact or expand a non-dynamic virtual hard disk.

The dynamic VHD is in use. Stop the VMs that use it.

Operations cannot be run against a virtual hard disk that is in use.

The indicated VHD is already connected to the virtual machine.

The same virtual hard disk cannot be connected twice at the same VM.

There is any device at the indicated position of the specified controller.

A device cannot be removed from a specified position of an IDE Controller to which the device is not attached.

Invalid MAC Address.

The MAC address should have 12 hexadigits, not separated by anything.

There is no NIC with the given ID/MAC attached at the given VM.

There is no NIC attached to the VM having the given ID/MAC.

The virtual network doesn't exist and the operation can not succeed.

The indicated virtual network (switch) doesn't exist.

The virtual port can not be created.

A virtual port on the virtual switch can not be created. Probably, the maximum number of ports was reached.

The value for the threshold in milliseconds is not valid.

The threshold input should be a positive integer, as it represents a number of milliseconds.

The given threshold doesn't have the requested format.

The threshold input should have the form dd/mm/yyyy hh:mm:ss

The value for the months is not valid.

The "months" values should be an integer between 1 and 12.

The value for the days is not valid.

The "days" values should be an integer higher than 0 and less than the number of days for the corresponding month.

The value for the hours is not valid.

The "hours" values should be an integer between 0 and 23.

The value for the minutes is not valid.

The "minutes" values should be an integer between 0 and 59.

The value for the seconds is not valid.

The "hours" values should be an integer between 0 and 59.

Customizing the integration

For each Hyper-V integration, create a new flow and add the corresponding inputs as written in the integrations' descriptions. They should run without any other supplemental configuration.

Security

The integrations use WMI for interacting with the Hyper-V Virtualization Server. All the remote operations are executed on the local system account. WMI uses the passed user credentials to authenticate the user, but does the actual operation using the local system account. As a result, UNC paths cannot be used with the WMI operations. For example, you can neither import nor export a VM from a UNC path.