



EMC[®] ViPR Controller Plug-in for VMware[®] vRealize Orchestrator

Version 3.5

Installation and Configuration Guide

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CHAPTER 1

EMC ViPR Controller Plug-in for vRealize Orchestrator Overview

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- [Multi-client integration](#)..... 11

ViPR Controller for vRealize Orchestrator

The EMC ViPR Controller plug-in for vRealize™ Orchestrator™ (ViPR Controller for vRO) provides an orchestration interface to the ViPR Controller software platform. The ViPR Controller plug-in has pre-packaged workflows used through the vRO Client as well as other clients that support ViPR Controller integration.

Note

VMware vRealize Orchestrator was formerly named VMware vCenter Orchestrator.

ViPR Controller plug-in for vRO workflows

There are three types of workflows pre-packaged with ViPR Controller.

- [Common ViPR Controller operations](#) on page 6
- [Single \("Building block\) ViPR Controller operations](#) on page 7
- [Multiple ViPR Controller operations.](#) on page 8

Note

You can access the ViPR Controller workflows from the vRO client or web client, **Workflows > Library** tree.

Workflows for common ViPR Controller operations

The workflows used to automate common ViPR Controller operations such as provisioning storage for an entire cluster.

Table 1 Common workflows

Workflow	Used to
In Workflow, Library > EMC ViPR > vCenter > Datastore	
Create EMC ViPR Volume Snapshot for VMFS Datastore	Creates a snapshot of a ViPR Controller block volume.
Delete Datastore and EMC ViPR Storage	Deletes the ViPR Controller storage, if there are no hosts associated, or snapshots associated with the storage. <ul style="list-style-type: none"> • If the storage is associated with hosts, there is an option to delete the storage and the host associations. • If the storage has snapshots there is an option to delete the storage and the associated snapshots.
Expand a Datastore with EMC ViPR Storage	Expands the ViPR Controller storage and then the datastore.
Share VMFS Datastore with Cluster	Shares the VMFS datastore and the ViPR Controller storage with the hosts in a cluster.
Share VMFS Datastore with Multiple Clusters	Shares a VMFS datastore with more than one cluster.
In Workflow, Library > EMC ViPR > vCenter > Hosts/cluster	

Table 1 Common workflows (continued)

Workflow	Used to
Delete Raw Disk (RDM) and EMC ViPR Storage	Deletes the Raw Disk, removes the storage from the hosts, then deletes the storage.
Provision NFS Datastore for Cluster with EMC ViPR Storage	Creates a ViPR Controller file system, and datastore, and associate them with the cluster.
Provision Raw Disk (RDM) with EMC ViPR Storage	Creates a ViPR Controller block storage volume, associates the volume with the hosts in a cluster, and creates a corresponding Raw Disk (RDM) for a virtual machine (VM).
Provision VMFS Datastore for Cluster with EMC ViPR Storage	Creates a ViPR Controller volume, and datastore, and associate them with the cluster.

Building block workflows

Building block workflows are individual operations used to construct the common, and multiple workflows. The building block workflows can also be used individually, to perform granular ViPR Controller operations such as creating a ViPR Controller volume.

Table 2 Building block workflows

Workflow	Used to
In Workflow, Library > EMC ViPR > General	
Create EMC ViPR File System	Creates a file system with ViPR Controller storage.
Create EMC ViPR Volume	Creates a block volume with ViPR Controller storage.
Create EMC ViPR Volume Snapshot	Creates a snapshot of the VMFS datastore.
Create Raw Disk (RDM)	Creates a SCSI controller and Raw Device Mapping (RDM) on the virtual machine (VM).
Delete EMC ViPR File System	<p>Deletes the ViPR Controller file system, if there are no hosts associated with the file system, and if no snapshots are associated with the file system.</p> <ul style="list-style-type: none"> • If the files system is associated with hosts, there is an option to delete the storage and the host associations. • If the file system has snapshots there is an option to delete the storage and the associated snapshots.
Delete EMC ViPR Volume	<p>Deletes the ViPR Controller block volume, if there are no hosts associated with the volume, and if no snapshots are associated with the volume.</p> <ul style="list-style-type: none"> • If the volume is associated with hosts, there is an option to delete the storage and the host associations. • If the volume has snapshots there is an option to delete the storage and the associated snapshots.

Table 2 Building block workflows (continued)

Workflow	Used to
Delete Raw Disk (RDM)	Deletes a Raw Disk Mapping (RDM) virtual disk on a virtual machine.
Expand EMC ViPR File System	Expands an ViPR Controller file system.
Expand EMC ViPR Volume	Expands the ViPR Controller block volume to the defined size.
Export EMC ViPR File System	Exports an ViPR Controller file system to a host or host cluster.
Export EMC ViPR Volume	Presents a ViPR Controller volume to a host or host cluster.
Get EMC ViPR File System Mount Path for Datastore	Gets the ViPR Controller file system mount path for a given datastore.
Get EMC ViPR Volume WWN for Datastore	Gets the ViPR Controller block volume World Wide Name (WWN) for a given datastore.
Provision for EMC ViPR Volume for Hosts	Creates a volume from ViPR Controller storage and presents it to the hosts.
Provision Raw Disk for VM name and UUID	This workflow is a non-interactive workflow designed specifically to work with the EMC ViPR Controller Enablement Kit for vRealize Automation Center (vRA). For details see <i>Create a VM and Provision an RDM with EMC ViPR Controller</i> which is available from the ViPR Controller Product Documentation Index .

Multiple workflows

Multiple workflows allow you to perform ViPR Controller operations on multiple ViPR Controller resources, as well as perform multiple ViPR Controller operations in a single workflow.

Table 3 Multiple workflows

Workflow	Used to
In Workflow, Library > EMC ViPR > Multiple	
Create EMC ViPR Volume - Multiple	Creates a user-defined number of block volumes with ViPR Controller storage, and allows users to chose from the available consistency groups from the ViPR Controller user-assigned project.
Create Raw Disk (RDM) - Multiple	Creates a user-defined number of SCSI controller and Raw Device Mapping (RDM) on the virtual machine (VM).
Delete EMC ViPR Volume - Multiple	Deletes the user-defined number of ViPR Controller block volumes. If there are no hosts associated with the volume, and if no snapshots are associated with the volume. <ul style="list-style-type: none"> If the volume is associated with hosts, there is an option to delete the storage and the host associations.

Table 3 Multiple workflows (continued)

Workflow	Used to
	<ul style="list-style-type: none"> If the volume has snapshots there is an option to delete the storage and the associated snapshots.
Delete Raw Disk (RDM) - Multiple	Allows users to select one or more Raw Disk Mapping (RDM) from a drop-down menu, to delete from the virtual machine.
Delete Raw Disk (RDM) and EMC ViPR Storage - Multiple	Allows users to select one or more Raw Disk Mapping (RDM) from a drop-down menu, to delete from the virtual machine, then removes the storage from the hosts, then deletes the storage. Additionally, it allows users to chose from the available consistency groups from the ViPR Controller user-assigned project.
Export EMC ViPR Volume - Multiple	Presents one or more ViPR Controller volumes to a host or host cluster. User can enter the volume World Wide Name for each volume being exported to hosts or clusters.
Provision for EMC ViPR Volume for Hosts/Clusters - Multiple	Creates a user-defined number of block volumes from ViPR Controller storage and presents them to the hosts, and allows users to chose from the available consistency groups from the ViPR Controller user-assigned project.
Provision Raw Disk (RDM) with EMC ViPR Storage - Multiple	Creates a user-defined number of ViPR Controller block storage volumes, associates the volumes with the hosts in a cluster, and creates a corresponding Raw Disk (RDM) for a virtual machine (VM). Additionally, it allows users to chose from the available consistency groups from the ViPR Controller user-assigned project.
Provision VMFS Datastore for Cluster with EMC ViPR Storage - Multiple	Creates a user-defined number of ViPR Controller volumes, and datastores, and associate them with the cluster.

Service Catalog workflows

Service Catalog workflows call the Service Catalog API in ViPR Controller, as opposed to the REST APIs, which are called in all other workflows. These workflows have been added to ensure that rollback is supported. The Service Catalog API calls support rollback, whereas REST API calls do not trigger rollback. There are three Service Catalog workflows and they call the corresponding workflow, which is also exposed in the ViPR Controller Service Catalog Portal.

Table 4 Service Catalog workflows

Workflow	Used to
In Workflow, Library > EMC ViPR > Service Catalog Workflows	
Block Services for VMware vCenter > Create Volume and Datastore	Calls the Create Volume and Datastore workflow in the ViPR Controller Service catalog API. Creates a user-defined number of ViPR Controller volumes and datastores and associates them with the cluster/host.

Table 4 Service Catalog workflows (continued)

Workflow	Used to
Block Storage Services > Create Block Volume	Calls the Create Block Volume workflow in the ViPR Controller Service catalog API. Creates a user-defined number of block volumes from ViPR Controller storage, and allows users to choose from the available consistency groups from the ViPR Controller user-assigned project.
Block Storage Services > Create Block Volume for a host	Calls the Create Block Volume for a Host workflow in the ViPR Controller Service catalog API. Creates a user-defined number of block volumes from ViPR Controller storage, exports them to the hosts, and allows users to choose from the available consistency groups from the ViPR Controller user-assigned project.

Deprecated workflows

The workflows listed below are deprecated and not recommended for usage. These workflows have not been updated after Plugin version 2.1. Instead, you should use the corresponding workflows (with the same name) from the Multiple category (**EMC ViPR > Multiple**), since those workflows have the enhancements made after Plugin version 2.1.

Note

The deprecated workflows are marked with a "Red Downward Arrow with exclamation point" in the Plugin icon. While these workflows can still be run, they are not recommended to be used as no updates have been made post Plugin version 2.1. For example, instead of using the "Create EMC ViPR Volume" workflow, use the "Create EMC ViPR Volume - Multiple" workflow from the **EMC ViPR > Multiple** category.

Deprecated Workflows list:

EMC ViPR > General:

- Create EMC ViPR Volume
- Create Raw Disk (RDM)
- Delete EMC ViPR File System
- Delete EMC ViPR Volume
- Delete Raw Disk (RDM)
- Export EMC ViPR Volume
- Provision EMC ViPR Volume for Hosts

EMC ViPR > vCenter > Hosts/Clusters:

- Delete Raw Disk (RDM) and EMC ViPR Storage
- Provision Raw Disk (RDM) with EMC ViPR Storage
- Provision VMFS Datastore for Cluster with EMC ViPR Storage

Multi-client integration

The EMC ViPR Controller plug-in for vRealize Orchestrator builds upon the vRealize Orchestrator integration functionality to provide EMC ViPR Controller workflow and resource management.

The multi-client support allows access either interactively or programmatically, with maximum flexibility to assemble any solution appropriate to your environment.

When used interactively, some workflow values are populated with values corresponding to the context from which they were launched. For example, if the workflow is executed from a vSphere Web Client within the context of a cluster, the host cluster values are entered into the workflow.

When used programmatically, the EMC ViPR Controller plug-in provides the capability to pass new workflow parameters, through an external application, as required.

The functionality provided with the EMC ViPR Controller plug-in for vRealize Orchestrator is supported by the following clients when vRealize Orchestrator is integrated with the application.

- vRealize Orchestrator REST API
- VMware vSphere, vCenter Server
- VMware vRealize Automation (earlier releases were referred to as VMware vCloud Automation Center)

Refer to [EMC ViPR Plug-in Integration with Additional VMware Applications on page 20](#) for client integration details.

CHAPTER 2

EMC ViPR Controller and vRealize Orchestrator Configuration Requirements

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EMC ViPR Controller configuration requirements

The EMC ViPR Controller environment must meet specific configuration requirements to support the ViPR plug-in for vRealize Orchestrator.

- Only a ViPR Controller Tenant Administrator or Project Administrator for the Project being configured, can run the workflows.

Note

ViPR Controller roles are configured by ViPR Controller Security Administrators from the ViPR Controller UI.

- A ViPR Controller System Administrator must configure the following, using the ViPR Controller UI, ViPR Controller API, or ViPR Controller CLI prior to running any of the workflows:
 - ViPR Controller virtual assets, such as virtual storage arrays (virtual arrays), and virtual storage pools (virtual pools) must have been created.
 - Hosts must have been added to the virtual array, networks.
 - The vCenter server must be added to ViPR Controller.
- Each instance of the ViPR Controller plug-in can be used to manage one instance of ViPR Controller . You cannot manage multiple instances of ViPR Controller with a single instance of the ViPR Controller plug-in for vRealize Orchestrator.

vRealize Orchestrator configuration requirements

vRealize Orchestrator must meet specific configuration requirements to support the EMC ViPR Controller plug-in for vRealize Orchestrator.

- To see a detailed list of the vRealize Orchestrator versions supported with this plug-in, refer to the [ViPR Controller Support Matrix](#).
- For EMC ViPR Controller Plug-in for vRealize Orchestrator, import the vCenter Certificate into the configurator and then add the vCenter server, that will be used for provisioning to the vRealize Orchestrator client. To add the vCenter server to the vRO client:
 - From the vRealize Orchestrator client, go to the **vCenter > Configuration**.
 - Run the **Add a vCenter** workflow.
 - Enable the **Share a unique session** mode for the vCenter Server plug-in for vRealize Orchestrator before invoking the EMC ViPR Controller workflows. Enable the **Share a unique session mode** through the vRealizeOrchestrator Configuration interface, **vCenter Server, New vCenter Server Host** tab.

Note

vRealize Orchestrator users must be part of the Orchestrator administrator group to install and configure plug-ins.

Refer to VMware vRealize Orchestrator documentation for specific configuration steps.

CHAPTER 3

EMC ViPR Controller Plug-in Installation and Configuration

This chapter contains the following topics:

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- [Configuring EMC ViPR Controller system settings](#)..... 16
- [Verifying the EMC ViPR Controller plug-in installation](#)..... 18
- [Generating EMC ViPR Controller workflow documentation](#).....18

Installing or upgrading the EMC ViPR Controller plug-in for vRealize Orchestrator

The EMC ViPR Controller plug-in, `EMC-ViPR-vRO-Plugin-3.5.x.x-xxxxxxxx.xxxxxx-x.dar`, is available from EMC Support Zone. Once downloaded, the plug-in is installed from the Orchestrator Configuration interface.

If upgrading:

- When you load the new plugin file into vRealize Orchestrator, and it will overwrite the old plugin version.
- After upgrading, run the new Configure EMC ViPR and Tenant workflow so that the tenant parameters are set.

Procedure

1. Download the `EMC-ViPR-vRO-Plugin-3.5.x.x-xxxxxxxx.xxxxxx-x.dar` file from EMC Support Zone.
2. Enter the vRealize Orchestrator server host name in a supported browser to access the vRealize Orchestrator Web view.

See VMware vRealize Orchestrator documentation for a list of supported Web browsers.

3. Click the vRealize Orchestrator **Orchestrator Configuration** link.
4. Click **Plug-ins**, and continue to follow the vRealize Orchestrator steps for installing plug-ins.
5. When prompted, point to the `EMC-ViPR-vRO-Plugin-3.5.x.x-xxxxxxxx.xxxxxx-x.dar` file on your local machine.

If the connection is valid the credential details will persist and project/virtual pool details will be automatically populated.

6. Once the plug-in is installed, restart the vRealize Orchestrator server host.
7. Restart both the vRealize Orchestrator and the Orchestrator Configuration server.

Note

The vRealize Orchestrator server host must be restarted before restarting the services.

Configuring EMC ViPR Controller system settings

Configuring the ViPR Controller system settings consists of assigning the ViPR Controller instance (hostname/IP address), ViPR Controller username and password, port, tenant, and project, and the workflow timeout period that will be the default ViPR Controller settings to be used by all EMC ViPR workflows.

Before you begin

The ViPR Controller settings are defined in the **EMC ViPR and Tenant** workflow, which is configured and run through the vRealize Orchestrator Client.

Review the following information prior to running the workflow.

- vRealize Orchestrator requires users to be part of the vRealize Orchestrator administrator group to use the Orchestrator Configuration interface.

- The ViPR Controller user must have been assigned a ViPR Controller Tenant Administrator role or a Project Administrator role for the tenant and the project being configured.

Note

ViPR Controller roles are configured by ViPR Controller Security Administrators from the ViPR Controller UI.

- When ViPR Controller workflows are invoked programmatically from external applications, the configured settings act as defaults and can be overridden through the external program.
- To configure ViPR Controller settings for all the workflows, the **EMC ViPR and Tenant** workflow must be configured and run prior to running the other workflows.

Procedure

1. Launch and login to the vRealize Orchestrator Configuration Client or Web Operator.
2. Go to the **Workflows**, and expand the **EMC ViPR > Configurations**, choose, and run the **Select EMC ViPR and Tenant** workflow.
3. If this is the first time you are configuring the workflow, continue to step 4.

If you are editing the workflow, select:

- **Yes**, after the **Do you want to Enter/Edit ViPR config details?** question.
- If you want to enable debug mode, select **Yes**, after **Enable debug?**

The interactive workflow window opens.

4. Enter the ViPR Controller host virtual IP address.
-

Note

The port number: 4443 is taken by default and does not need to be entered.

5. Enter the ViPR Controller user credentials.
6. Enter the Tenant and Project.
The virtual array options are populated based on the selected project.
7. Select the virtual array.

The ViPR Controller virtual array is a default setting, which may be automatically or manually set for each workflow. While executing the workflow, the target virtual array is computed when possible. For example, if the workflow is executed within the context of a vSphere cluster, the correct virtual array for the cluster is computed by the plug-in, and set in the drop-down menu. If the virtual array cannot be computed, the virtual array, defined as the default in the **Select EMC ViPR and Tenant** workflow is set as the first option in the drop-down menu, followed by a list of the other available ViPR Controller virtual arrays. You can change the computed or default virtual array setting when configuring the workflow.

8. Click **Submit**.

The settings are saved, and will be used during the execution of all the workflows.

9. If you want to change these settings for another workflow, you will need to repeat these steps, prior to running the workflows, each time you want to change the ViPR Controller settings for a given workflow.

Verifying the EMC ViPR Controller plug-in installation

To verify that the EMC ViPR Controller plug-in was correctly installed, locate the **EMC ViPR** folder **vRealize Orchestrator > Workflows > vCenter Administrator > Library** and review the list of workflows.

Procedure

1. Launch vRealize Orchestrator.
2. Log into the vRealize Orchestrator Client or Web Operator.
3. Go to **Workflows**, and expand the **vCenter Administrator > Library**.
4. Expand the **EMC ViPR** folder to ensure the EMC ViPR Controller workflow library is installed.

The expanded EMC ViPR Controller folder is demonstrated in the [EMC ViPR Workflow tree](#).

Generating EMC ViPR Controller workflow documentation

vRealize Orchestrator provides a feature for generating workflow documentation that describes the workflow inputs in detail.

Before you begin

- Adobe Reader is required to generate and view the workflow documentation.
- The generate documentation feature is only available from the vRealize Orchestrator installable client. Documentation cannot be generated from the vRealize Orchestrator Web Operator.

Procedure

1. From the vRealize Orchestrator Client **Workflows** tab, expand the **vCenter Administrator > Library**.
2. Right-click the **EMC ViPR** folder, and select **Generate Documentation** to generate an Adobe PDF document of all the EMC ViPR Controller workflows and their parameter descriptions.
3. Optionally, expand the **EMC ViPR** folder, right-click on a specific EMC ViPR Controller workflow, and click **Generate Documentation** to generate an Adobe PDF document of the selected workflow.

CHAPTER 4

EMC ViPR Controller Plug-in Integration with Additional VMware Applications

This chapter contains the following topics:

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- [VMware vRealize Orchestrator REST API integration](#) 20
- [VMware vSphere, vCenter Server integration](#) 20
- [VMware vRealize Automation Center](#) 21

EMC ViPR Controller workflow multi-client integration

The EMC ViPR Controller plug-in for vRealize Orchestrator integration functionality provides EMC ViPR Controller workflows and resource management through additional VMware clients.

VMware integration requirements and recommendations

The VMware environment must meet the criteria described in the following sections to support the EMC ViPR Controller plug-in for vRealize Orchestrator. Refer to VMware documentation for integration procedures and additional details.

VMware vRealize Orchestrator REST API integration

Access and run the ViPR Controller plug-in for vRO workflows from the vRealize Orchestrator REST API.

The default ViPR Controller host, user, project, virtual array, and virtual pool were defined while configuring ViPR Controller from the vRealize Orchestrator Configuration interface.

VMware vSphere, vCenter Server integration

Integrate the workflows installed with EMC ViPR Controller plug-in for vRealize Orchestrator with the vCenter Server. Once integrated, invoke and use the workflows through the vSphere Web Client.

VMware vSphere integration recommendations and requirements

- vSphere requires that a Single sign-on (SSO) is configured between vSphere and vRealize Orchestrator.
- Both the EMC ViPR Controller plug-in for vRealize Orchestrator and the vCenter Server plug-in for vRealize Orchestrator are installed on the same vRealize Orchestrator instance.
- Enable the **Share a unique session** mode for the vCenter Server plug-in for vRealize Orchestrator through the vRealize Orchestrator interface, before invoking the ViPR workflows through the vCenter Server.
- One instance of the vSphere vCenter Server can be used for one ViPR Controller instance. A single vCenter Server instance cannot be used to manage multiple instances of ViPR Controller.
- EMC ViPR Controller workflows can only be invoked from the vSphere Web Client. The workflows cannot be accessed from the locally installed vSphere Client.

EMC ViPR workflow settings

- The EMC ViPR Controller hostname, username, password, and project, which are configured through the **EMC ViPR Configurations > Select EMC ViPR and Tenant** workflow in the vRealize Orchestrator Client, can be reconfigured by re-running the same workflow in the vRealize Orchestrator Client.
- The EMC ViPR Controller virtual array may be set automatically or manually. While executing the workflow, the target virtual array is computed based on the context of the workflow when it is invoked. If not computed, the virtual array is automatically set to the virtual array configured for the workflows in vRealize Orchestrator. The virtual array however, can always be manually overridden when executing the workflows.

- If manually entering the virtual array, and the virtual pool, the virtual array and virtual pool names are not rendered in vSphere. The virtual array and virtual pool names must be manually typed into the fields.

VMware vRealize Automation Center

Invoke and use the ViPR Controller plug-in workflows from vRealize Automation Center.

vRealize Automation Center integration requirements and recommendations

A single instance of vRealize Automation Center (Formerly referred to as vCloud Automation Center) can be used to manage multiple instances of ViPR Controller for example, the ViPR Controller username and password can be passed in programmatically, allowing vRealize Automation Center to have multiple user mappings. This might be done in a multi-tenant environment or an enterprise, with self-service portals that may have different configurations for different departments.

EMC ViPR workflow settings

- All the EMC ViPR Controller workflow parameters can be passed programmatically through vRealize Automation Center.
- The ViPR Controller hostname, username, password, project, and virtual array that are configured through the **EMC ViPR Configurations > Select EMC ViPR and Tenant** workflow in the vRealize Orchestrator Client, can be reconfigured by re-running the same workflow in the vRealize Orchestrator Client.

