

# VMAX Plugin for VMware vRealize Orchestrator

User Guide  
Version: 2.0

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## Version History

Version	Date	Comment	Author/Editor
0.1	January 2018	Initial Version	Haleupparahalli, Anvekar, Ravoor
1.0	April 2008	Updates for publication	Tonnesen
2.0	September 2018	New plugin version	Tonnesen
2.1	October 2018	Added vRO/A 7.5 support	Tonnesen

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## Disclaimer

The VMAX Plugin and workflows are use at your own risk. This is not a product, and therefore is not supported. All content (e.g. words, scripts, code) that is available is for informational purposes only. The authors make no representations as to the accuracy or completeness of any information in this document or found on the GitHub <https://github.com/dtonnesen/vmaxvro> site. The authors will not be liable for any errors or omissions in this information nor for the availability of this information. We will not be liable for any losses, injuries, or damages from the display or use of this information. Content published on GitHub is not read or approved in advance by Dell EMC or VMware and does not necessarily reflect the views and opinions of Dell EMC or VMware; nor does it constitute any official communication of Dell EMC or VMware. Always check official documentation hosted by either company for support or verified technical information.

## About this document

This document is a quick-start guide to use the VMAX Plugin for the vRealize Orchestrator. The document provides a brief walkthrough of installing and configuring the VMAX Plugin for the vRealize Orchestrator, and provides a step-by-step walkthrough for a few sample workflows.

## vRealize Suite - Overview

VMware vRealize Suite, which includes the vRealize Orchestrator and the vRealize Automation servers, is a cloud management software for heterogeneous datacenter environments.

### vRealize Automation

VMware vRealize Automation provides a secure portal where authorized administrators, developers or business users can request new IT services and manage specific cloud and IT resources, while ensuring compliance with business policies. Requests for IT service, including infrastructure, applications, desktops, and many others, are processed through a common service catalog to provide a consistent user experience despite underlying heterogeneous infrastructure.

Find more details about vRealize Automation see the VMware documentation:

<https://docs.vmware.com/en/vRealize-Automation/index.html>

### vRealize Orchestrator

vRealize Orchestrator is a development and process-automation platform that provides an extensive library of workflows and a workflow engine. Workflows achieve step-by-step process automation for greater flexibility in automated server provisioning and operational tasks across VMware and third-party applications.

Find more details about vRealize Orchestrator see the VMware documentation:

<https://docs.vmware.com/en/vRealize-Orchestrator/index.html>

## Prerequisites

Software / Hardware	Version	Comments
VMware vRealize Orchestrator Server	7.2, 7.3, 7.4, or 7.5	

VMware vCenter server	6.0, 6.5, or 6.7	Configured to manage required ESXi hosts
VMAX	uCode 5977 or 5978	
Unisphere for VMAX	8.4 or 9.0	Configured for managing required VMAX arrays
VMware vRealize Automation server	7.2, 7.3, 7.4, or 7.5	End-user interface for cloud management – offers catalog based services. Needs to have the vRO server registered

The setup of the vRO and vRA servers are noted below. For many users, the embedded vRO will be used so separate installations of the servers are unnecessary.

### Setup VMware vRO server

Download and install the VMware vRO orchestrator server. Version 7.2 is used here as an example.

VMware vRO download link for version 7.2:

[https://my.vmware.com/web/vmware/details?downloadGroup=VROVA\\_720&productId=624&rPId=13827](https://my.vmware.com/web/vmware/details?downloadGroup=VROVA_720&productId=624&rPId=13827)

The install guide can be found here: <https://docs.vmware.com/en/vRealize-Orchestrator/7.2/vrealize-orchestrator-72-install-config-guide.pdf>

### Setup the VMware vRA server

Download and install the VMware vRA server.

VMware vRA download link:

<https://my.vmware.com/web/vmware/details?downloadGroup=VRA-720&productId=624&rPId=13826>

The install guide can be found here: <https://docs.vmware.com/en/vRealize-Automation/7.2/vrealize-automation-72-installation-and-configuration.pdf>

The instructions below use vRO 7.2.

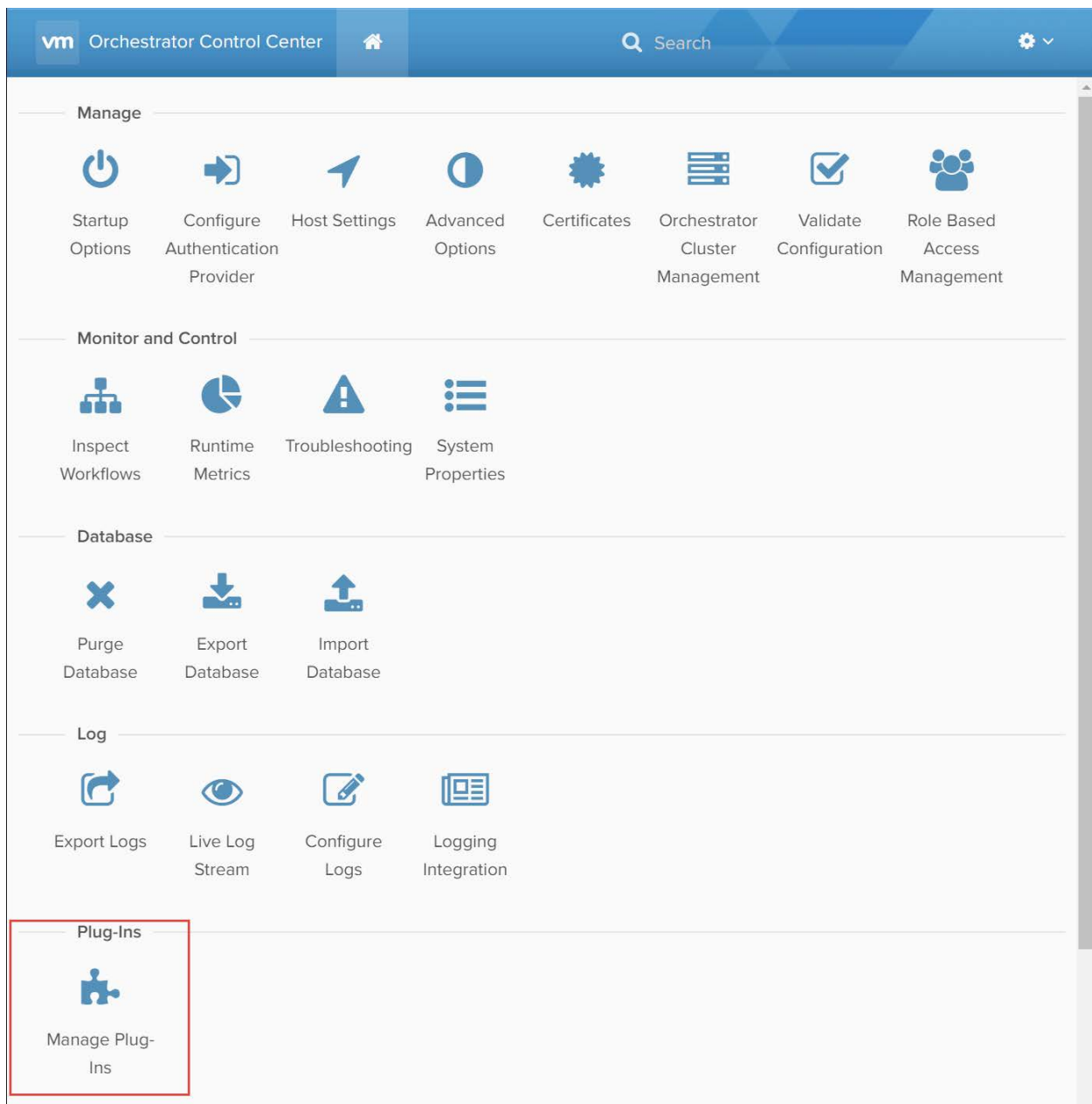
### Install VMAX Plugin for the vRO server

To install the VMAX plugin, the vRO Control Center must be running. By default, the service is stopped. Login to the vRO appliance (or vRA if using embedded), and run: **service vco-configurator start** before proceeding.

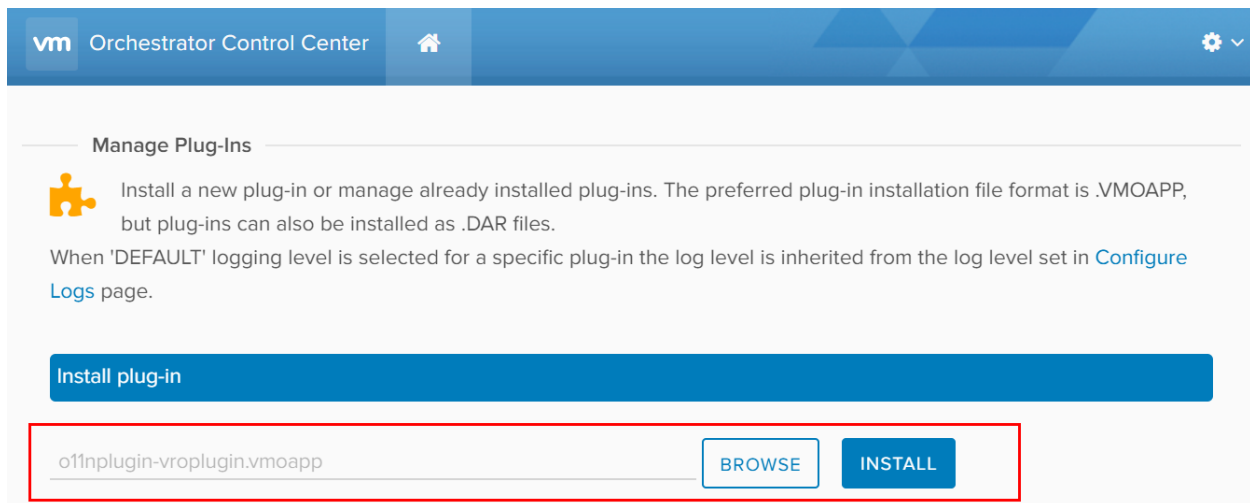
Log in to Control Center as **root**.

[https://<vRO\\_IP>:8283/vco-controlcenter/](https://<vRO_IP>:8283/vco-controlcenter/)

Go to the **Manage Plug-ins** page.




Locate the VMAX Plugin o11nplugin-vroplugin.vmoapp file in the repository.



vm Orchestrator Control Center

### Manage Plug-Ins

 Install a new plug-in or manage already installed plug-ins. The preferred plug-in installation file format is .VMOAPP, but plug-ins can also be installed as .DAR files.

When 'DEFAULT' logging level is selected for a specific plug-in the log level is inherited from the log level set in [Configure Logs](#) page.

Install plug-in

o1fnplugin-vroplugin.vmoapp

Click **Install**.

Read and accept the EULA license.

Install the Plugin.

Restart the Orchestrator server service from the **Startup Options** page in Control Center.

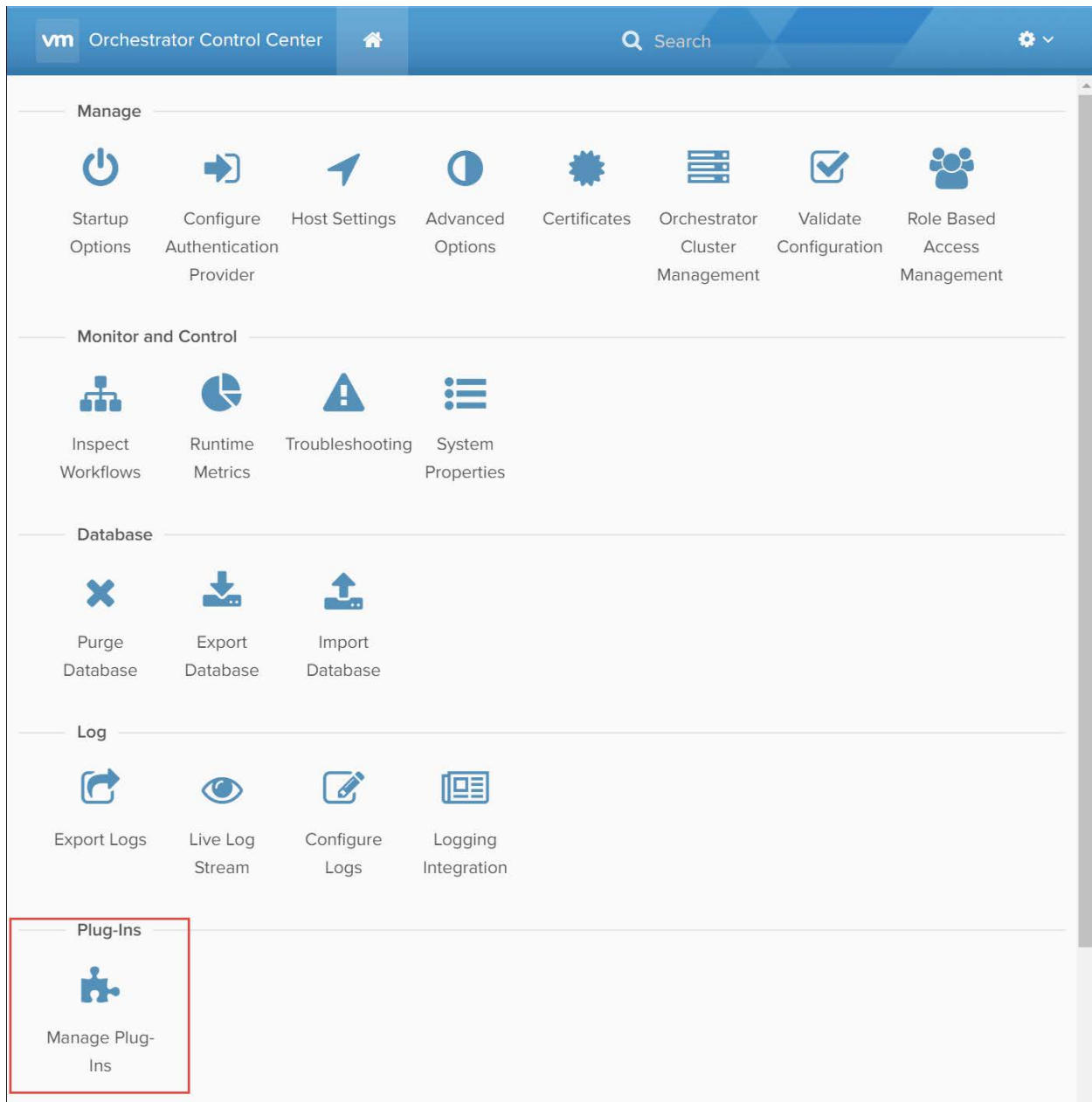
## Upgrade VMAX Plugin for the vRO server

To upgrade the VMAX plugin, the vRO Control Center must be running. By default, the service is stopped. Login to the vRO appliance (or vRA if using embedded), and run: **service vco-configurator start** before proceeding.

Log in to Control Center as **root**.

[https://<vRO\\_IP>:8283/vco-controlcenter/](https://<vRO_IP>:8283/vco-controlcenter/)

Go to the **Manage Plug-ins** page.



Locate the existing VMAX Plugin to be sure it is installed. Then locate the VMAX Plugin o11nplugin-vroplugin.dar file in the repository.



vm Orchestrator Control Center

### Manage Plug-Ins

Install a new plug-in or manage already installed plug-ins. The preferred plug-in installation file format is .VMOAPP, but plug-ins can also be installed as .DAR files. When 'DEFAULT' logging level is selected for a specific plug-in the log level is inherited from the log level set in [Configure Logs](#) page.

Install plug-in

Plug-in	Logging level	Enable plug-in
AD 3.0.7.7624613 Active Directory	DEFAULT	<input checked="" type="checkbox"/>
VCACDevopsREngine plug-in for vCenter Orchestrator	DEFAULT	<input checked="" type="checkbox"/>
VCO 7.3.1.7852116 vRealize Orchestrator Multi-Node Plug-In	DEFAULT	<input checked="" type="checkbox"/>
VMAXPlugin 1.0.0.1 VMAX Plugin for vRealize Orchestrator	DEFAULT	<input checked="" type="checkbox"/>
VRAServer 7.3.1-SNAPSHOT.7927085 vRealize Automation plug-in for vRealize Orchestrator	DEFAULT	<input checked="" type="checkbox"/>

Click **Install**.

Take the following two steps shown below.

vm Orchestrator Control Center

### Manage Plug-Ins

Install a new plug-in or manage already installed plug-ins. The preferred plug-in installation file format is .VMOAPP, but plug-ins can also be installed as .DAR files. When 'DEFAULT' logging level is selected for a specific plug-in the log level is inherited from the log level set in [Configure Logs](#) page.

Install plug-in

VMAXPlugin 1.0.0.12  
PowerMax Plugin for vRealize Orchestrator

vm Orchestrator Control Center

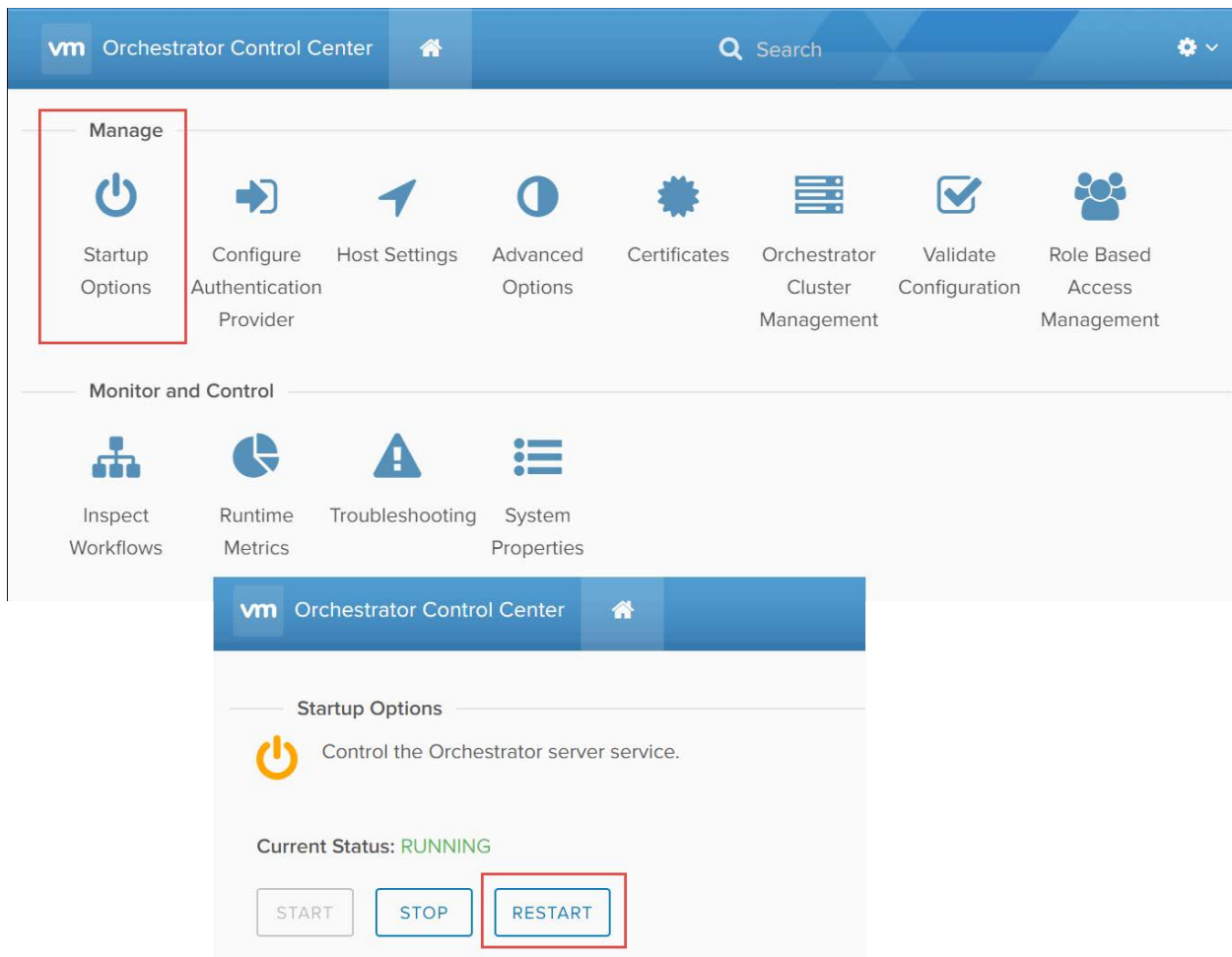
### Manage Plug-Ins

Plug-in(s) installed:  
Plug-in 'VMAXPlugin' (1.0.0 build 12) has overwritten existing plugin with version (1.0.0 build 1).

Install plug-in

Plugin file (\*.dar or \*.vmoapp)

Restart the Orchestrator server service from the **Startup Options** page in Control Center.



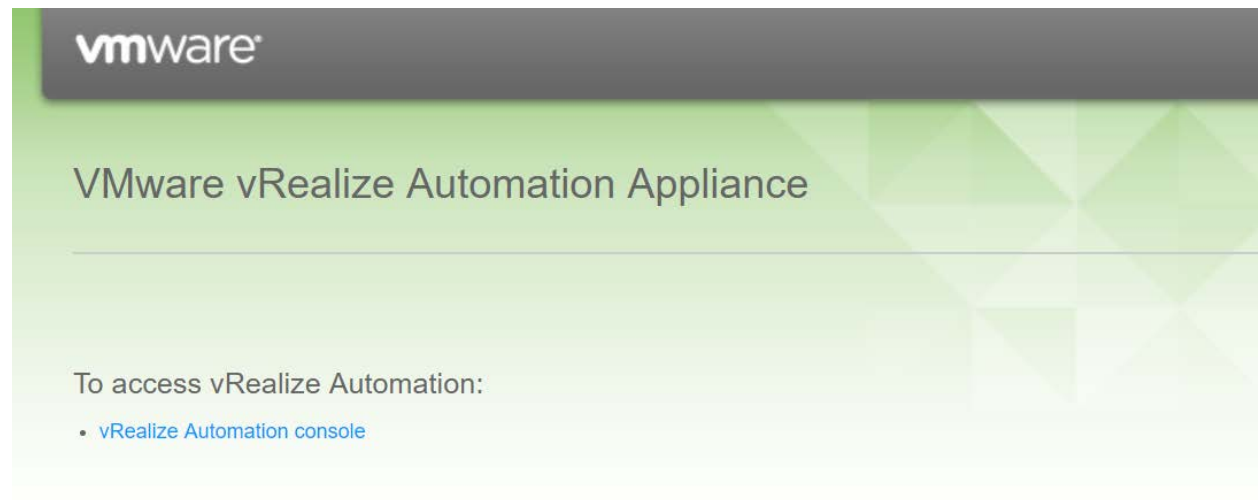
Log in to the Orchestrator client.

[https://<vRO\\_IP>:8281/vco](https://<vRO_IP>:8281/vco)

You can start the vRO client directly from the Web Page (requires Java), or download the thick client and start the local client.



For embedded vRO:



To access vRealize Automation:

- [vRealize Automation console](#)

To manage this appliance:

- [VMware vRealize Automation Appliance management](#)

To install vRealize Automation components (IaaS, Guest and Software Agents, Tools):

- [vRealize Automation component installation page](#)
- [Guest and software agents page](#)

To connect to the built-in vRealize Orchestrator Server:

- [vRealize Orchestrator Client](#)
- [vRealize Orchestrator Control Center](#) (the service is stopped by default)

To see vRealize Automation API documentation:

- [vRealize Automation API documentation](#)

Click **Help > Installed plug-ins...**

Verify that the VMAX plug-in is available in the **Plug-ins installed in the server** list.

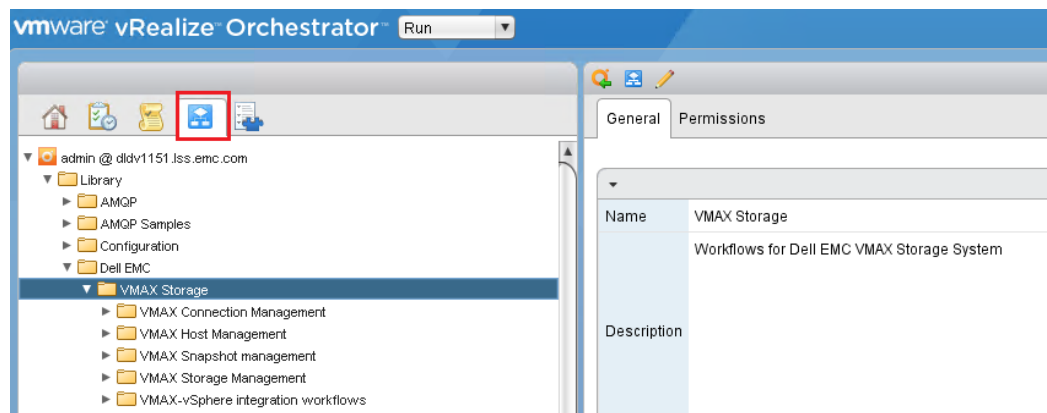
Plug-ins installed in the server		
Plug-in Name	Version	Description
SNMP	1.0.3	Simple Network Management Protoc...
PowerShell	1.0.11	Power Shell Plug-in
Net	7.0.1	Wrapper to Jakarta Apache Common...
VMAXPlugin	1.0.0	VMAX Plugin for vRealize Orchestrator
AMQP	1.0.4	AMQP Plug-in
TeamFoundationServer	7.3.0-SNAPSHOT	Team Foundation Server plug-in for v...
VRAServer	7.3.0-SNAPSHOT	vRealize Automation plug-in for vRea...
XML	7.0.1	XML Plug-in
GEF	2.0.0	vCAC Generic Endpoint Framework ...
vCAC	7.3.0	vRealize Automation Center Infrastru...
Enums	7.0.1	Common enumerated types
VAPI	7.4.0	vAPI plug-in for vRealize Orchestrator
VCACDevopsRPEngine	7.3.0-SNAPSHOT	VCACDevopsRPEngine plug-in for v...
SOAP	2.0.0	SOAP plug-in for vRealize Orchestrator
vCACCAFE	7.3.0	vRealize Automation plug-in for vRea...

Switch to the “Design” view, and the package for the VMAX Plugin would be visible.

The screenshot shows the VMware vRealize Orchestrator interface. At the top, a dropdown menu is set to 'Design'. On the left, a list of plug-ins is displayed, with 'com.dellemc.storage.vmax' selected and highlighted with a red box. On the right, the details for this plug-in are shown in a table-like format:

Name	com.dellemc.storage.vmax
Legal owner	Dell EMC
Global tags	
User tags	
Description	Workflow package for the Dell EMC VMAX vRO Plugin

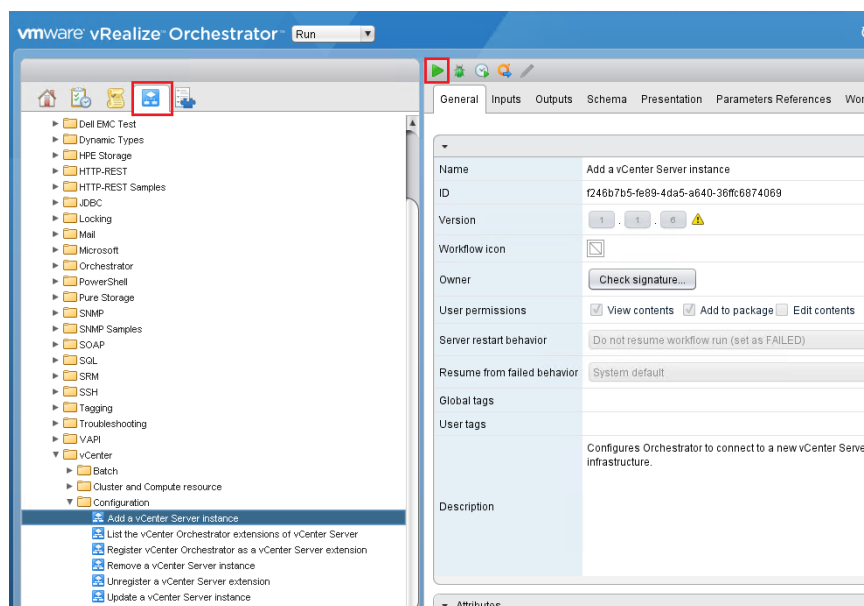
Additionally, you can view the list of workflows installed by navigating to the “Workflows” section.



## Configuring the vCenter Plugin

Some of the workflows offered by the VMAX Plugin will function only if one or more vCenter instances are registered with the vRO server. As part of a typical vRA/vRO implementation, a vCenter is normally available, however the steps below can be used to add the first or an additional one.

1. Navigate to the “Workflows” section.
2. Select “Add vCenter server instance” under the “Configuration” folder of the “vCenter” package.



3. Click on “Run”, which launches a form. Enter the details for the vCenter server to be registered.

Start Workflow : Add a vCenter Server instance

1 Set the vCenter Server i...  
2 Set the connection prope...

IP or host name of the vCenter Server instance to add  
dldv1183.lss.emc.com

\* HTTPS port of the vCenter Server instance  
443

\* Location of the SDK that you use to connect to the vCenter Server instance  
/sdk

Will you orchestrate this instance?  
☒ Yes ☐ No

Do you want to ignore certificate warnings? If you select Yes, the vCenter Server instance certificate is accepted silently and the certificate is added to the trusted store  
☒ Yes ☐ No

Cancel Back Next Submit

Start Workflow : Add a vCenter Server instance

✓ 1 Set the vCenter Server i...  
2 Set the connection prope...

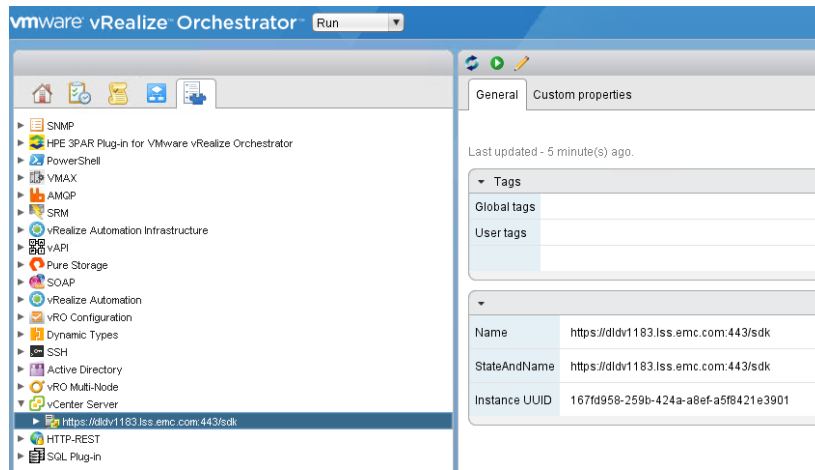
Do you want to use a session per user method to manage user access to the vCenter Server system? If you select No, Orchestrator will create only one connection to vCenter Server (the method is share a unique session).  
☐ Yes ☒ No

\* User name of the user that Orchestrator will use to connect to the vCenter Server instance.  
administrator@vsphere.local

\* Password of the user that Orchestrator will use to connect to the vCenter Server instance.  
\*\*\*\*\*

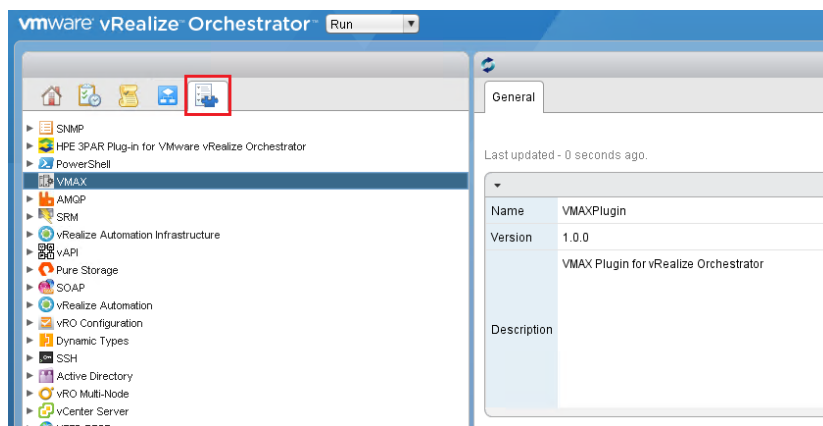
Cancel Back Next Submit

4. Click Submit to launch the workflow.
5. Once the workflow has completed successfully, the vCenter server instance can be viewed from the inventory under the “vCenter” object.

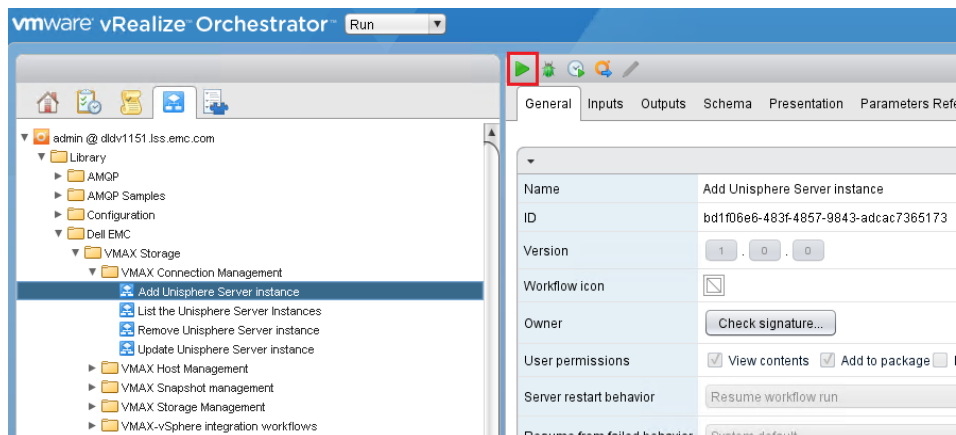


## Configuring VMAX Plugin

1. The VMAX Plugin is listed in the inventory of the vRO server. Initially, there are no connections.



2. Navigate to the "Workflows" section, and select "Add Unisphere Server Instance" under the "VMAX Connection Management" folder.
  - a. Click on "Run".



3. Enter the details of the Unisphere Server instance, and click "Submit".

Start Workflow : Add Unisphere Server instance

**Enter Unisphere credentials**

\* Name of the connection  
Unisphere\_Durham

\* FQDN or IP address of the Unisphere server instance  
dldv1153.lss.emc.com

\* HTTPS Port number of the Unisphere server  
8443

Do you want to ignore certificate warnings? If you select Yes, the Unisphere Server instance certificate is accepted silently and the certificate is added to the trusted store  
☒ Yes ☐ No

\* User name of the Unisphere server instance  
smc

\* Password for the Unisphere server instance  
xxx

Cancel Submit

4. If the details entered are correct, the workflow will succeed, indicated by the green coloration of the end workflow symbol.



5. The newly added Unisphere instance should be visible from the inventory under “VMAX”.
  - a. Manually reload the VMAX object by right-clicking on it, and selecting “Reload”.
  - b. Expanding the Unisphere will display the list of VMAX that are currently managed by it.

vmware vRealize Orchestrator - Run

General Custom properties

Last updated - 10 seconds ago.

Tags

Global tags

User tags

user smc

server dldv1153.lss.emc.com

name Unisphere\_Durham

displayName Unisphere\_Durham [dldv1153.lss.emc.com]

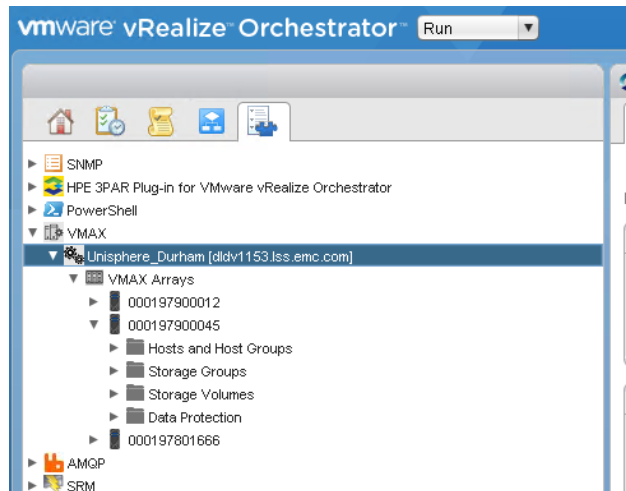
port 8443

Inventory:

- SNMP
- HPE 3PAR Plug-in for VMware vRealize Orchestrator
- PowerShell
- VMAX
  - Unisphere\_Durham [dldv1153.lss.emc.com]
    - VMAX Arrays
      - 000197900012
      - 000197900045
      - 000197801666
- AMQP
- SRM
- vRealize Automation Infrastructure
- VAPI
- Pure Storage
- SOAP
- vRealize Automation
- vRO Configuration
- Dynamic Types
- SSH
- Active Directory
- vRO Multi-Node
- vCenter Server



- The inventory is used to view storage objects related to the VMAX instance, such as Storage Groups, Hosts, Host Groups and Storage Volumes.

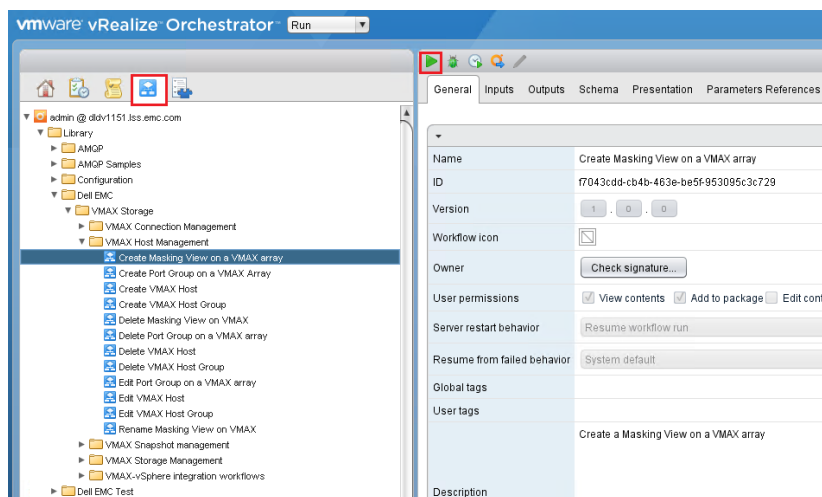


## Sample Workflow Runs

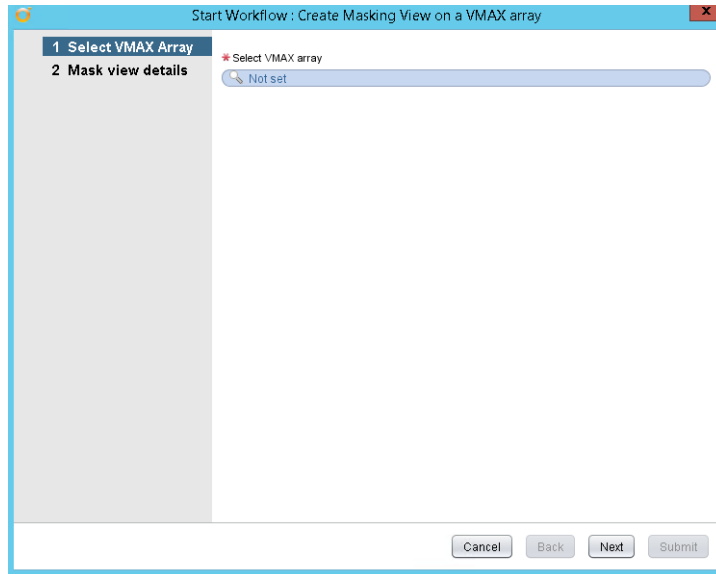
Once the vCenter and Unisphere instances are configured on the vRO server, any of the VMAX Plugin workflows can be invoked. A few examples are shown below.

### Creating Masking View on a VMAX Array

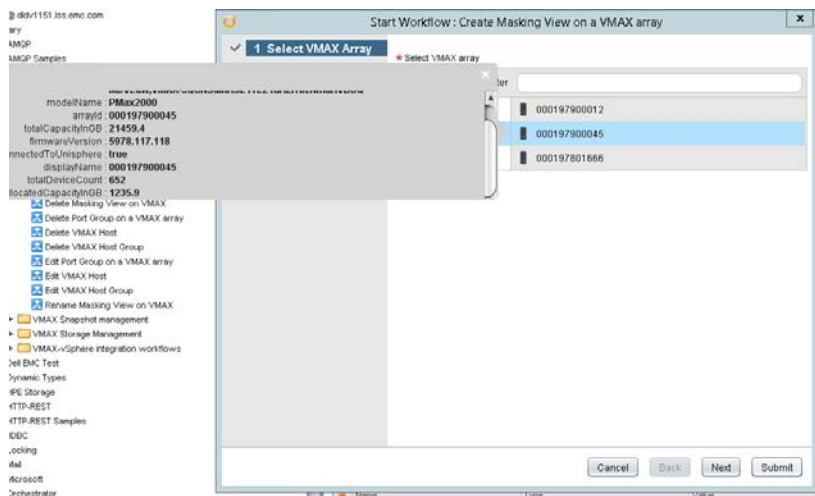
- Select the “Creating a Masking View on a VMAX Array” workflow under the “VMAX Host Management” folder, and click “Run”.



- In the wizard, select the VMAX array on which the masking view is to be created.

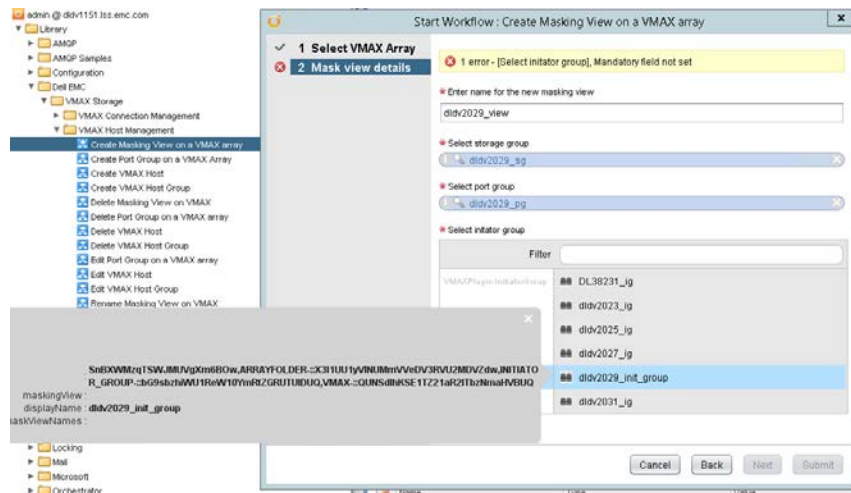


3. The details of each VMAX can be viewed by clicking on one of the entries returned in the list.

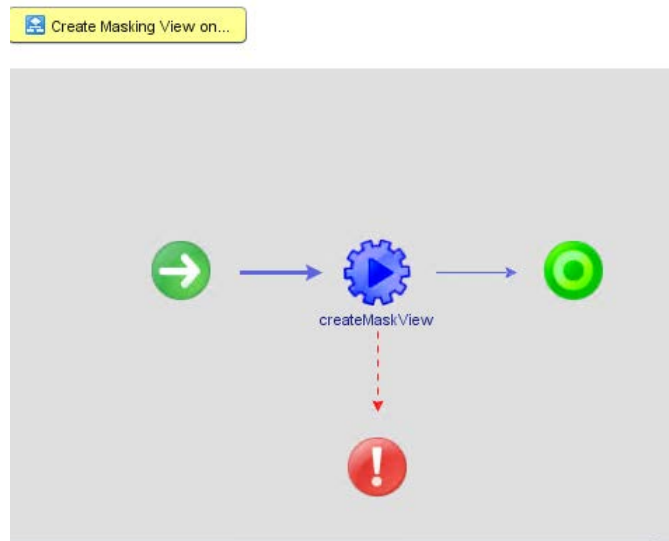


Note: After selecting one of the VMAX arrays, there may be a slight delay before the UI responds. This is due to some data pre-fetching that takes place in the background.

4. In the next screen, enter the name for the view, select the port group, initiator group, and the storage group for the masking view to be created.
  - a. Details of each of the PG, IG or the SG can be viewed by clicking on the objects in the list.



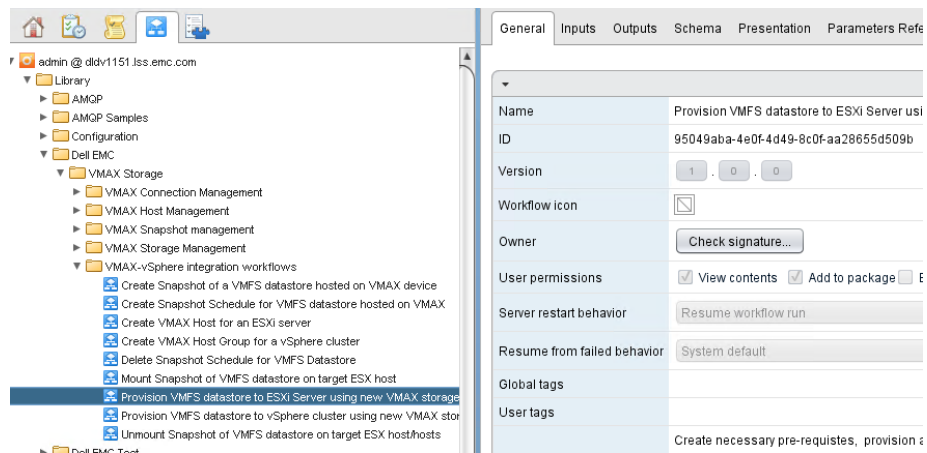
5. Click "Submit".
6. The workflow completion is indicated through the schema.



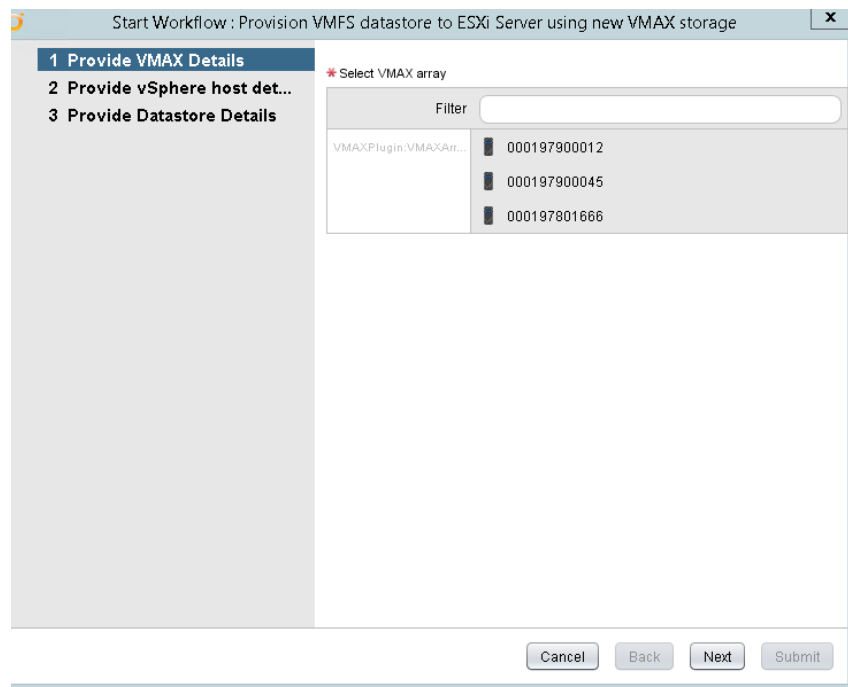
## Provision VMFS datastore to ESXi Server using new VMAX storage

The workflows under the "VMAX-vSphere integration workflows" cover those workflows which interact with the VMware environment as well as the VMAX (U4V) environment.

1. Select the "Provision VMFS datastore to ESXi Server using new VMAX storage" workflow under "VMAX-vSphere integration workflows" folder, and select "Run".



2. The wizard opens. Select the VMAX array that the storage is to be provisioned from.



3. Select the ESX server to which the datastore is to be mounted.

Start Workflow: Provision VMFS datastore to ESXi Server using new VMAX storage

- ✓ 1 Provide VMAX Details
- 2 Provide vSphere host details
- 3 Provide Datastore Details

\* Select ESXi Server

Filter

VC: HostSystem

- dldv2027.lss.emc.com
- dldv2029.lss.emc.com
- dldv2023.lss.emc.com

Cancel Back Next Submit

a.

- Enter the particulars for the Datastore – name, size and version.

Start Workflow: Provision VMFS datastore to ESXi Server using new VMAX storage

- ✓ 1 Provide VMAX Details
- ✓ 2 Provide vSphere host details
- 3 Provide Datastore Details

\* Enter Datastore name

VMFS\_DS\_045\_vRO

\* Enter Datastore size in GB

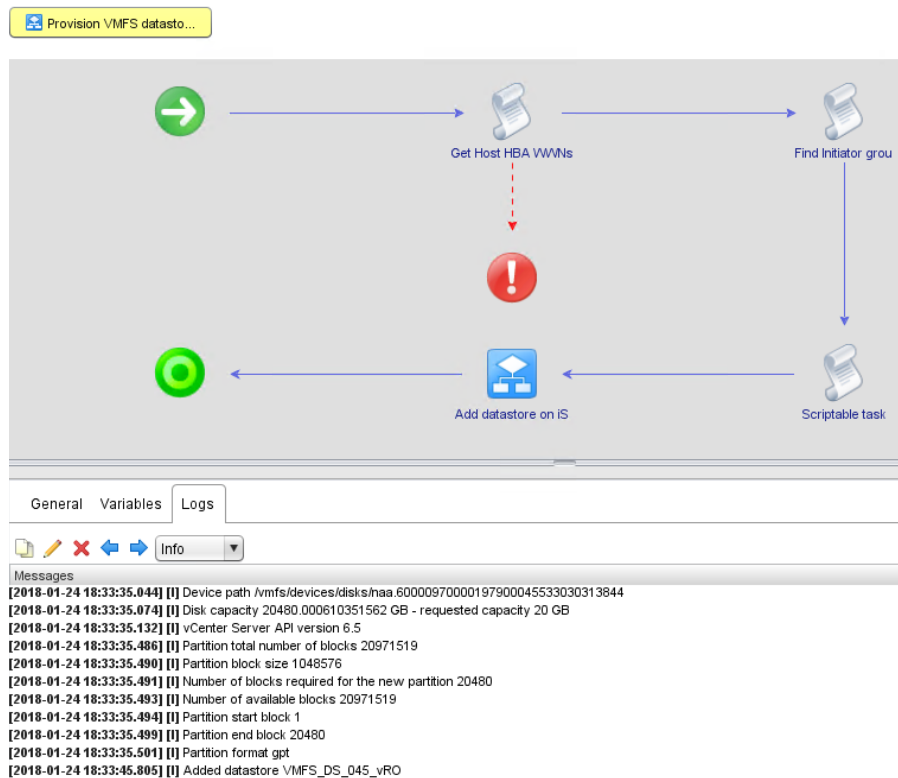
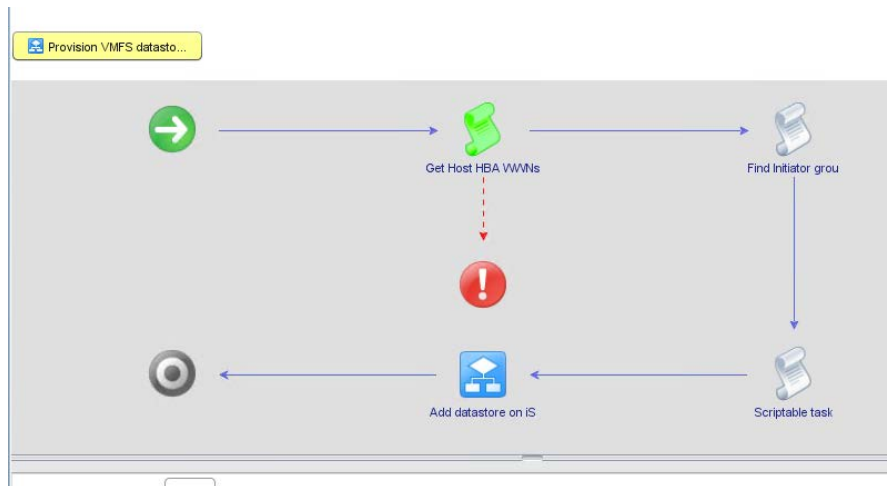
20

Select VMFS major version

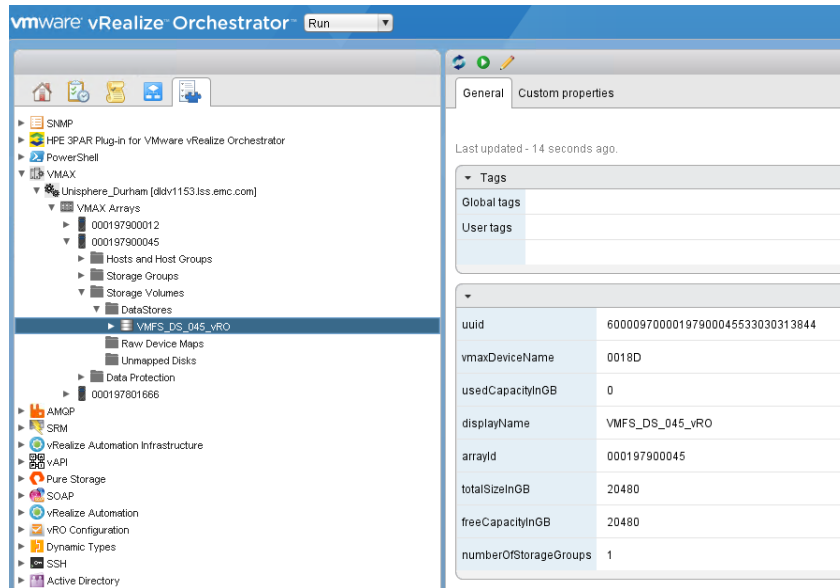
5

Cancel Back Next Submit

- Click on “Submit” to start the workflow.
- The workflow now creates a storage device on the VMAX of the requested size, adds the device to the masking view of the ESX server, and then creates a VMFS datastore on the device.



- The datastore created can be viewed from the inventory under the “StorageVolumes->Datastores” folder.



## List of Workflows

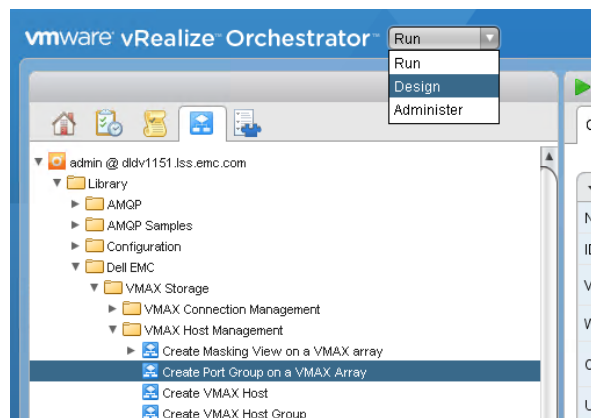
All the workflows offered by the VMAX plugin are located under the “VMAX Storage” folder under “Dell EMC”.

All the workflows, their descriptions, inputs and outputs are captured in the `VMAXPlugin_Workflows_Documentation.pdf` file.

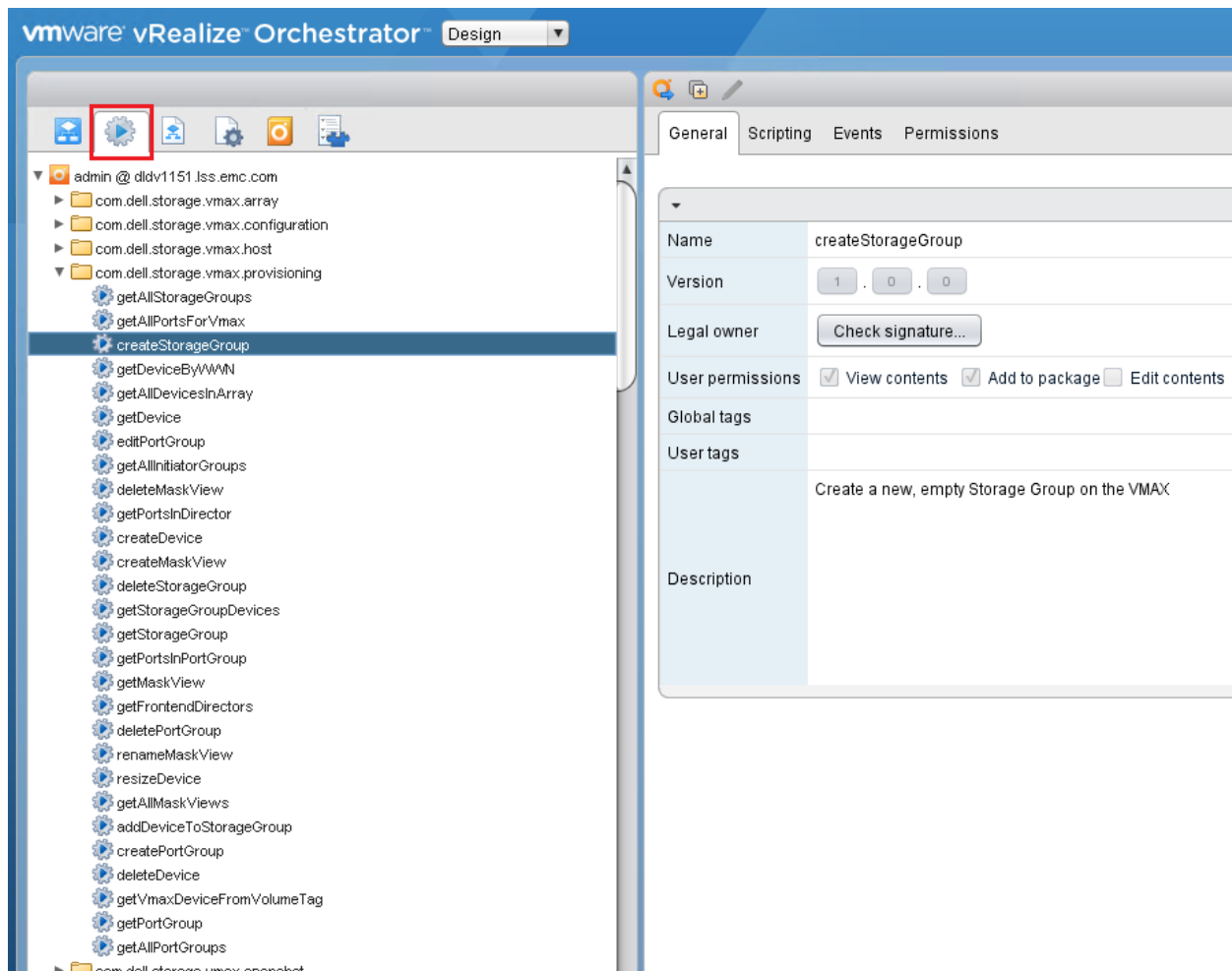
## VMAX Plugin Actions

The VMAX Plugin exposes a set of actions that can be used independently in custom workflows created by the end user. These are used as is, without duplicating or modifying them in any way (unlike the workflows, which can be duplicated).

The list of actions offered by the VMAX plugin can be seen by switching to the “Design” view in the vRO client.

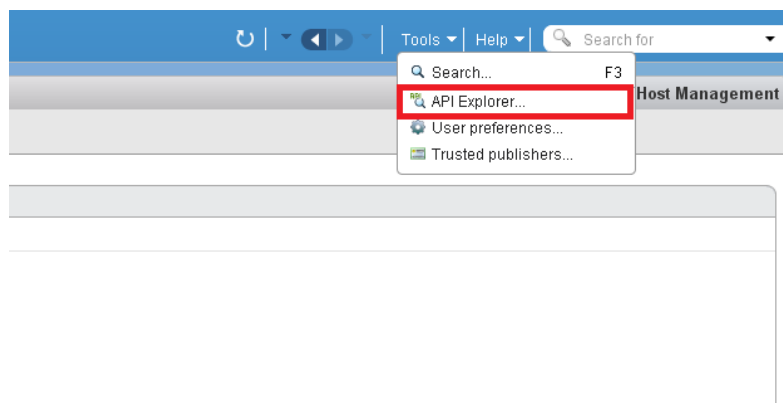


View the actions by navigating to the “Actions” section. Several actions are offered, and all of them are under the prefix: “com.dell.storage.vmax”.



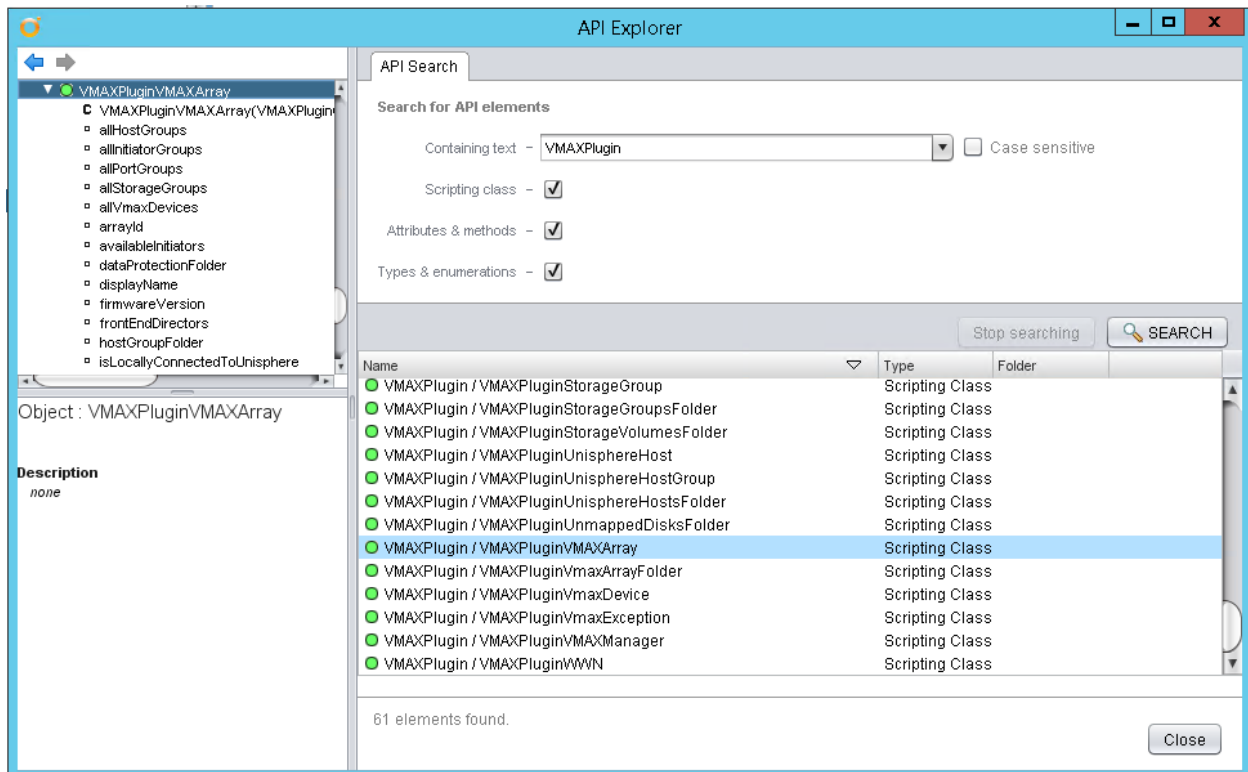
## Scripting Objects

The VMAX plugin exposes a set of scripting objects (JavaScript) which can be used to create custom scriptable tasks. The scripting objects can be viewed with the help of the API explorer under the “Tools” menu on the top right corner of the client.





The prefix for the APIs exposed by the VMAX plugin is “VMAXPlugin”. Selecting an object displays all the properties and methods on the object. These methods / properties can be used to create custom scripts and implement workflows which are not already offered by the VMAX Plugin.



The Javadoc for the various classes are found in the repository under the name VMAXPlugin\_Scripting\_Objects\_Javadoc.zip. The class names would appear the same as in the Javadoc, but with the additional prefix “VMAXPlugin”.

## Summary

Users may use the workflows or actions as-is, or create their own custom workflows using the provided scripting objects. The VMAX plugin may be revised and updated in the future. Be sure to read the README.rst in the repository which will contain information on any changes to the initial build.