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Lab Overview - HOL-1806-01-CMP - vRealize Suite - Getting Started
Lab Guidance

Note: It will take more than 90 minutes to complete this lab. You should expect to only finish 2-3 of the modules during your time. The modules are independent of each other so you can start at the beginning of any module and proceed from there. You can use the Table of Contents to access any module of your choosing.

The Table of Contents can be accessed in the upper right-hand corner of the Lab Manual.

This lab walks you through integration points of vRealize Operations Manager, vRealize Automation, vRealize Business for Cloud, and vRealize Log Insight, which can be applied to virtual, physical and hybrid cloud environments. You will better understand how these individual components work better together and find infrastructure management, monitoring and governance can be achieved with less time, cost, and effort.

Lab Module List:

- **Module 1 - vRealize Automation & vRealize Operations Integration** (45 minutes) (Intermediate) See the power of vRealize Automation and vRealize Operations integrated together to provide Intelligent Workload Placement by using analytics-based initial placement policies to recommend the optimal Compute Cluster and Datastore for a workload.

- **Module 2 - vRealize Log Insight & vRealize Operations Integration** (30 minutes) (Intermediate) Enhanced troubleshooting capabilities make everyone’s lives easier. See how the integration between vRealize Operations and vRealize Log Insight enables quick correlation of logs and metrics in context for any monitored object right from the vRealize Operations interface.

- **Module 3 - vRealize Business for Cloud & vRealize Automation Integration** (30 minutes) (Intermediate) Chargeback/Showback is a challenge for many organizations. See the integration of vRealize Business for Cloud with vRealize Automation to show the cost for the infrastructure when someone makes a request as well as updated pricing when post-provisioning actions such as reconfiguring a machine or scaling in or out occur.

- **Module 4 - vRealize Code Stream Management Pack for IT DevOps** (45 minutes) (Intermediate) Explore how vRealize Code Stream Management Pack for IT DevOps allows organizations to treat assets such as vRealize Automation Blueprints, vRealize Operations reports and other objects as pieces of code that can be lifecycle managed.

Lab Captains:

- **Module 1 - Kerry Holton, Staff Systems Engineer, USA**
- **Module 2 - Kerry Holton, Staff Systems Engineer, USA**
- **Module 3 - Kerry Holton, Staff Systems Engineer, USA**
• Module 4 - Kerry Holton, Staff Systems Engineer, USA

This lab manual can be downloaded from the Hands-on Labs Document site found here:

http://docs.hol.vmware.com

This lab may be available in other languages. To set your language preference and have a localized manual deployed with your lab, you may utilize this document to help guide you through the process:


Location of the Main Console

1. The area in the RED box contains the Main Console. The Lab Manual is on the tab to the Right of the Main Console.
2. A particular lab may have additional consoles found on separate tabs in the upper left. You will be directed to open another specific console if needed.
3. Your lab starts with 90 minutes on the timer. The lab can not be saved. All your work must be done during the lab session. But you can click the EXTEND to increase your time. If you are at a VMware event, you can extend your lab time twice, for up to 30 minutes. Each click gives you an additional 15 minutes. Outside of VMware events, you can extend your lab time up to 9 hours and 30 minutes. Each click gives you an additional hour.
Alternate Methods of Keyboard Data Entry

During this module, you will input text into the Main Console. Besides directly typing it in, there are two very helpful methods of entering data which make it easier to enter complex data.

Click and Drag Lab Manual Content Into Console Active Window

You can also click and drag text and Command Line Interface (CLI) commands directly from the Lab Manual into the active window in the Main Console.

Accessing the Online International Keyboard

You can also use the Online International Keyboard found in the Main Console.

1. Click on the Keyboard Icon found on the Windows Quick Launch Task Bar.
Click Once in the Active Console Window

In this example, you will use the Online Keyboard to enter the "@" sign used in email addresses. The "@" sign is Shift-2 on US keyboard layouts.

1. Click once in the active console window.
2. Click on the Shift key.

Click on the @ Key

1. Click on the "@" key.

Notice the @ sign entered in the active console window.
Activation Prompt or Watermark

When you first start your lab, you may notice a watermark on the desktop indicating that Windows is not activated.

One of the major benefits of virtualization is that virtual machines can be moved and run on any platform. The Hands-on Labs utilizes this benefit and we are able to run the labs out of multiple datacenters. However, these datacenters may not have identical processors, which triggers a Microsoft activation check through the Internet.

Rest assured, VMware and the Hands-on Labs are in full compliance with Microsoft licensing requirements. The lab that you are using is a self-contained pod and does not have full access to the Internet, which is required for Windows to verify the activation. Without full access to the Internet, this automated process fails and you see this watermark.

This cosmetic issue has no effect on your lab.

Look at the Lower Right Portion of the Screen
Please check to see that your lab is finished all the startup routines and is ready for you to start. If you see anything other than "Ready", please wait a few minutes. If after 5 minutes your lab has not changed to "Ready", consider restarting the lab.
Module 1 - vRealize Automation & vRealize Operations Integration (45 minutes)
Introduction

In this module, we will walk through the integration between vRealize Automation and vRealize Operations, and we will see how the two solutions integrated together provide intelligent workload placement by using analytics-based initial placement policies to recommend the optimal compute cluster and datastore for a workload.
vRealize Automation - Review and Test Integration

In this lesson we will access the configuration and test where vRealize Automation integrates with vRealize Operations Manager. We will achieve this by verifying that vRealize Automation points towards the active vRealize Operations Manager as the metrics provider, and then test our configuration to ensure connectivity.

The integration between vRealize Automation and vRealize Operations has been completed already, so this is a walk-thru of what setting up the integration looks like.

Launch Browser and Adjust Zoom

We will begin by launching our browser

1. Click the Google Chrome icon on the taskbar

As the Hands On Labs default resolution is relatively low, if the zoom is not already set to 90%, we will need to adjust this setting in the browser to make sure all necessary areas are visible and accessible.

1. Click the menu icon on the top right corner of the browser window
2. Click the "-" symbol to decrease the zoom to 90%
3. Press the "ESC" key on your keyboard
Navigate to vRealize Automation

1. Click the vRealize Automation bookmark

Log In to vRealize Automation

We will log in as the "cloudadmin" user. This user is designated as a tenant administrator in vRealize Automation which is the role that is necessary to configure integrations.

Once the vRealize Automation login screen appears:

1. Type **cloudadmin** in the user input field
2. Type **VMware1!** in the password input field
3. Click **Sign In**

**Navigate to the Administration Tab**

![Administration Tab Image]

In this step, we will need to access the area where the metrics provider is defined, configured and tested.

We'll begin by accessing the Administration section:

1. Click the **Administration** tab
2. Click **Reclamation**
Verify vRealize Operations as the Metrics Provider

In a new deployment of vRealize Automation, the default Metrics Provider is set to the vRealize Automation metrics provider option. For this lab, we want to ensure vRealize Operations is identified as the endpoint that provides metric data to vRealize Automation since it will be the Metrics Provider for this lab. After this is done, we need to test connectivity to make sure there isn’t anything blocking the traffic.

To do this, you would perform the following steps which have already been completed for this lab:

1. Click **Metrics Provider**
2. Type **https://vrops-01a/suite-api**
3. Type **admin** in the Username input field
4. Type **VMware1!** in the Password input field
5. Click Test Connection - a success message will appear
6. Click Save

**Note:** you won't see any changes after clicking **Save**.
Trust the Certificate

You may receive a message asking if you want to trust this certificate after clicking Save.

1. Click **OK** - a success message will appear

Log Out of vRealize Automation

1. Click **Logout** to log out of vRealize Automation

Next, we will take a look at how the integration is set up in vRealize Operations Manager.
vRealize Operations - Configure and Review Integration

vRealize Operations is a powerful and user-friendly solution for environment management and monitoring. When integrating and extending its reach with VMware and third party management packs and plug-ins, users have the ability to intimately understand the operational efficiency of their environments and seamlessly adjust and correlate visibility of their metrics and trends.

In this module we will access the configuration and test vRealize Operations integration with vRealize Automation through its Management Pack. Afterward, we will review the changes and access made available to additional components in vRealize Automation.

The integration between vRealize Operations and vRealize Automation has been completed already, so this is a walk-thru of what setting up the integration looks like.

Navigate to vRealize Operations

1. In your open browser, click the vRealize Operations Manager bookmark or navigate to https://vrops-01a.corp.local
Log In to vRealize Operations Manager

The integration with VMware Identity Manager has been set up, so we will redirect the login.

1. Select vIDM from the dropdown listbox
2. Click REDIRECT
Log In to vRealize Operations Manager

To configure integrations and management packs, we will log into vRealize Operations Manager as an administrator

1. Enter **cloudadmin** in the username field
2. Enter **VMware1!** in the password field
3. Click **Sign In**
Navigate to Administration

Management Packs are accessed through the Administration section, so we'll navigate there

1. Click Administration

Navigate to the vRealize Automation Management Pack

Here we can see all of the Solutions and Management Packs currently installed and made available to the vRealize Operations Manager instance.

1. Click Solutions
2. Expand the Name column
3. Scroll down the list until you see **VMware vRealize Automation**
4. Select the **VMware vRealize Automation** solution
5. Observe that the management pack is already configured
6. Click on the **gear icon** to view the configuration

**View the vRealize Automation Adapter Instance Settings**

![Instance Settings](image)

The vRealize Automation Management Pack has already been configured, so we'll view the settings. Ensuring connectivity for the collection of information is vital to the accuracy of data provided by vRealize Operations Manager. This is where **Collection State** and **Collection Status** are most relevant.

Under Basic Settings:

1. Note the URL for the vRealize Automation Appliance URL of **https://vra-01a.corp.local**
2. Leave the **Credentials-vRA-Adapter** credential selected
3. Click **Test Connection**
Acknowledgment Test Success

An informational prompt of the successful test result will appear.

1. Click **OK**

**View the vRealize Automation Adapter Advanced Settings**

vRealize Automation (version 7.3) and vRealize Operations (version 6.6) come together to provide analytics-based initial placement policies for vSphere machines. vRealize Automation will use analytics data in vRealize Operations to optimize the placement of workloads.
1. Click On the Down Arrow on **Advanced Settings**
2. Note that **vRA Enabled Intelligent Placement** is set to **ON** - this allows vRealize Operations Manager to manage the placement of VMs that are part of clusters managed by vRealize Automation. This mode is always ON and used for work-load placement (WLP)

**Close the vRealize Automation Adapter Instance Settings**

1. Click on **Advanced Settings** to collapse it
2. Click on **Close** (note - you may need to adjust the dialog box to see the close button)
Configure the integration of vRealize Automation with vRealize Operations provides
tenant-aware visibility of the infrastructure. With this extended visibility, operational
management extends to vRealize Automation cloud objects such as Tenants, Business
Groups, Reservations and Reservation Policies. We will access this visibility through
out-of-the-box Dashboards and Views.

1. Click **Home**
Dashboards Overview

After configuring the integration between vRealize Automation and vRealize Operations Manager, additional out-of-the-box Dashboards are made available.

Maximize the viewable screen area by toggling the side bar

1. Click the **side bar toggle**
Navigate to Dashboards

1. Click on **Dashboards**

Navigate to the vRealize Automation Dashboards
We will take a look at the out-of-the-box vRealize Automation Environment Overview dashboard

1. Click on the **down arrow** next to All Dashboards
2. Click on the **arrow** next to vRealize Automation
3. Click on vRealize Automation Env Overview

### View the vRealize Automation Environment Overview Dashboard

![vRealize Automation Environment Overview Dashboard](image)

Windows have been re-sized to show a more complete view. You will need to scroll down to see some of the information shown in the screenshot.

With the vRealize Automation Environment Overview dashboard, we can view information about Tenants, Business Groups, Reservations, Blueprints and related alerts. We can also view the health, risk and efficiency of resources for a given object from the managed inventory.

As this lab has been designed and built to operate at a very lean capacity, this lesson simply outlines the out-of-the-box visibility and functionality made available by the vRealize Automation Management Pack for vRealize Operations Manager. In larger and more complex production and lab environments, much more information would typically be shown.

We will select a tenant to view more detail

1. In the Tenant List widget, click **vsphere.local**
Observe and review the updated information now populated in the other widgets. Multiple widgets are visible in this dashboard - below are brief descriptions of some of them:

**Tenant List:** Lists the tenant objects available in the environment. You can see a data grid with a list of objects in the inventory on which you can sort and search.

**Business Group List:** Lists the business group objects available in the environment. You can see a data grid with a list of objects in the inventory on which you can sort and search.

**Environment Overview:** The widget is configured to show the health of the tenants, business groups, virtual machines and the relationships between these objects. You can view detailed information for the object by double-clicking on it.

**Blueprint List:** Lists the blueprints that are available for the selected tenant and business group.

**Top Alerts:** Shows alerts with the greatest significance on the selected objects it is configured to monitor. The top alerts include a short description of alerts configured for the widget. The alert name opens a secondary window from which you can link to the alert details. In the alert details, you can begin resolving the alerts.

**Navigate to the vRealize Automation Top-N Dashboard**

![Dashboard Screenshot](image)

We will now take a look at the out-of-the-box vRealize Automation Top-N Dashboard

1. Click on the **down arrow** next to **All Dashboards**
2. Click on the **arrow** next to **vRealize Automation**
3. Click on **vRealize Automation Top-N Dashboard**
View the vRealize Automation Top-N Dashboard

You can use the widgets in the vRealize Automation Top-N dashboard to view the top results from analysis of blueprints and business groups that you select.

You can use the vRealize Automation Top-N dashboard widgets to perform the following tasks:

- **Business Groups with most Critical Alerts:** Use this widget to view the business groups that have the most critical alerts.
- **Most Popular Deployed Blueprints:** Use this widget to view the top five most popular deployed blueprints in the environment.
- **Most Popular Deployed Blueprints (7 day trend):** Use this widget to view graphical trends that contain metrics for the virtual machine count that has been deployed the most for the blueprint over a seven-day period. You can create one or more graphs that contain metrics for the object you select.
Log Out of vRealize Operations Manager

1. Click the down arrow next to the user icon
2. Click **Log Out**
Intelligent Workload Placement Engine

Policy-Based Optimization of Virtual Machine Placement

vRealize Automation and vRealize Operations come together to provide analytics-based initial placement policies for vSphere machines. vRealize Automation uses analytics data in vRealize Operations to optimize the placement of workloads according to performance goals. These capabilities enable organizations to:

- Maximize your infrastructure investment by optimizing placement
- Combine vRealize Automation governance with performance based insight to optimize placement
- Place virtual machines according to performance goals, using multiple algorithms including balance for maintaining maximum headroom in case of spikes and consolidate to leave space for large workloads

The integration between vRealize Automation and vRealize Operations helps to optimize the placement of workloads and ensure each workload meets its SLA and performance requirements. You will be able to define monitoring and placement policies in vRealize Operations Manager per type of workload that vRealize Automation 7.3 can use to ensure the best possible placement for a workload.

When you use workload placement to provision blueprints, the provisioning workflow uses the reservations in vRealize Automation, and the placement optimization from vRealize Operations Manager

- vRealize Automation provides the governance rules to allow placement destinations
- vRealize Operations Manager provides placement optimization recommendations for compute cluster and datastore according to analytics data
- vRealize Automation continues the provisioning process according to the placement recommendations from vRealize Operations Manager
- Requires vRealize Operations Manager 6.6 or higher

If vRealize Operations Manager cannot provide a recommendation, or the recommendation cannot be used, then vRealize Automation falls back to its default placement logic.
Flowchart for Configuring Intelligent Workload Placement
Does an endpoint exist for the vRealize Operations Manager instance?

Yes

Does an endpoint exist for the vCenter Server in the vRealize Automation instance used for workload placement?

Yes

Add reservations to the vCenter Server endpoint. Infrastructure > Reservations > Reservations

Yes

Is Workload Placement enabled?

Yes

Is vRealize Operations Manager monitoring the vCenter Server instance?

Yes

vRealize Automation uses the vRealize Operations Manager workload placement analytics to deploy new blueprints.

No

Enable Placement. Infrastructure > Reservations > Placement Policy > Use vRealize Operations Manager for placement recommendations

No

Create a vRealize Operations Manager endpoint. Infrastructure > Endpoints > Endpoints

No

Create a vSphere endpoint. Infrastructure > Endpoints > Endpoints

Go to vRealize Operations Manager, and configure workload placement to use the vCenter Server instance. See Configuring vRealize Operations Manager for Workload Placement in vRealize Automation.
To use workload placement analytics to place machines when you deploy new blueprints, you must prepare the vRealize Automation instance.

Before the placement policy can suggest placement destinations for blueprints, you must perform several steps as shown in the flowchart and outlined in Configuring Workload Placement.

In this lesson, we will walk thru the configuration between vRealize Automation and vRealize Operations to provide intelligent workload placement.

**Navigate to vRealize Automation**

1. Click the vRealize Automation bookmark on your open browser's toolbar

**Log In to vRealize Automation**
To create a vRealize Operations Manager endpoint, we will log in as the IaaS administrator.

1. Type **cloudadmin** into the username field
2. Type **VMware1!** into the password field
3. Click **Sign In**

**Navigate to Endpoints Configuration**

To use the placement policy to place machines when you deploy new blueprints, we'll take a look at how to configure vRealize Automation to use the analytics that vRealize Operations Manager provides. We will also look at how to configure vRealize Operations Manager to apply a policy to consolidate and balance workloads to our cluster compute resources.

1. Click the **Infrastructure** tab
2. Click **Endpoints** >
Navigate to Endpoints Configuration Continued

1. Click **Endpoints**

**View vRealize Operations Manager Endpoint**

In our vRealize Automation instance, we have already added an endpoint for the vRealize Operations Manager instance to enable placement recommendations based on analytics data, so we'll take a look at that endpoint

1. Click the configured **vRealize_Operations** endpoint
View the vRealize Operations Manager Endpoint Configuration & Test Connection

The endpoint has already been configured for us, so we'll note the fields that have been set, and we'll test the connection to our vRealize Operations endpoint.

1. Click **Test Connection**
Accept the Security Alert

1. Click **OK**

Note: You will see a "The test connection was successful" message.
Cancel the Editing of the vRealize Operations Manager Endpoint

Since we haven't made any changes to the endpoint, we'll cancel out of the edit

1. Click **Cancel**
Navigate to the Main Infrastructure Tab

1. Click on **Infrastructure** from the menu on the left

Navigate to Reservations

1. Click on **Reservations** >
We can use the placement policy to have vRealize Automation determine where to place machines when we deploy new blueprints. The placement policy uses the analytics of vRealize Operations Manager to identify workloads on our clusters so that it can suggest placement destinations.

1. Click on **Placement Policy**

Note that there is already a vSphere endpoint with the name vCenter created. A vSphere endpoint must be created to allow vRealize Automation to communicate with the vSphere environment and discover compute resources, collect data, and provision machines.
Enable vRealize Operations Placement Recommendations

When a blueprint is deployed, workload placement uses collected data to recommend where to deploy the blueprint based on available resources. vRealize Automation and vRealize Operations Manager work together to provide placement recommendations for workloads in the deployment of new blueprints. While vRealize Automation manages organizational policies, such as business groups, reservations, and quotas, it integrates with the capacity analytics of vRealize Operations Manager to place machines. Note that workload placement is only available for vSphere endpoints.

1. Turn on the checkbox to enable "Use vRealize Operations Manager for placement recommendations"
2. Click Apply
3. Click Yes to the "Are you sure?" confirmation (not shown)

Note: You will see a "Placement settings were successfully applied" message.
Log Out of vRealize Automation

1. Click **Logout**

Navigate to vRealize Operations

To provide workload placement analytics to vRealize Automation to place machines when we deploy new blueprints, we must also prepare the vRealize Operations Manager instance. To this point, we have configured vRealize Automation to use workload placement analytics. Earlier in this module, we also verified that the vRealize Automation Solution is installed and configured in the vRealize Operations Manager instance that is being used for workload placement. For vRealize Operations Manager to provide analytics to vRealize Automation, we will now look at configuring a policy and applying the policy to our cluster compute resources.

1. Click the **vRealize Operations** bookmark on your browser toolbar
Log In to vRealize Operations Manager

1. Click REDIRECT
Log In to vRealize Operations Manager

1. Type `cloudadmin` into the username field
2. Type `VMware1!` into the password field
3. Click `Sign In`
Navigate to Administration

1. Click on Administration

Navigate to Policies

1. Click on Policies - we see that the HOL Policy is the active policy
Navigate to the Policy Library

1. Click on Policy Library

Edit the Active Policy

1. Click on the HOL Policy which is our active policy
2. Click on the Pencil icon to edit
Policies in vRealize Operations Manager are configured to establish the settings for consolidation, balance, fill, CPU, memory, and disk space.
1. Click on **Workload Automation**

**Update Workload Automation Policy Settings**

We can modify the setting named Consolidate Workloads to determine the best placement for new managed workloads based on the cluster status and capacity. We can also modify the threshold setting for Balance Workloads to the level of aggressiveness required to place workloads. We can configure one or more policies and apply them to our cluster compute resources.

1. Click on the lock next to **Consolidate Workloads** to override the parent policy settings
2. Adjust the slider for Consolidate Workloads to the **middle** of **None** and **Maximum**
3. Click on the lock next to **Balance Workloads** to override the parent policy settings
4. Adjust the slider for Balance Workloads to **Aggressive**
5. Click on the lock next to **Cluster Headroom** to override the parent policy settings
6. Leave the slider as is

When Consolidate Workloads is set to none, workload placement balances the workload across all the clusters to which the policy is applied. When Consolidate Workloads is set to a value other than none, workload placement fills the busiest cluster first.
Cluster Headroom is the buffer space reserved in a cluster, as a percentage of the total capacity. For example, if we set the cluster headroom to 20%, that buffer might prevent workload placement from placing virtual machines on that cluster. The reason it prevents the placement is because the cluster has 20% less of the free capacity for CPU, memory, or disk space.

**Consolidate Workloads:** *More consolidation* will put workloads into as few clusters as possible to reduce licensing and power costs, but allows for less responsive capacity, and is good for populations with steady demand. *Less consolidation* uses all available clusters which leaves more room for demand spikes but can run up licensing and power costs and is good for populations with erratic demand.

**Balance Workloads:** *Aggressive* minimizes contention but moves workloads more which can cause disruption and is good for more stable populations. *Conservative* exposes potential contention but moves workloads less and is good for dynamic populations.

**Cluster Headroom:** Headroom provides a buffer of space for the cluster which may cause a rebalance to occur earlier than it would otherwise.

**Exit Changes to the Active Policy**

We configured vRealize Operations Manager so that vRealize Automation uses the workload placement analytics to suggest placement destinations of machines when
users deploy blueprints. Once vRealize Automation and vRealize Operations Manager have collected data from the endpoints and objects in the environment, when we deploy new blueprints, vRealize Automation will display the workload placement recommendations, destination candidates, and selected placement for confirmation.

This lesson was to show how to change the Workload Automation settings for the Default Policy, but we won't save them for this lab.

1. Click **Cancel**

**Log Out of vRealize Operations Manager**

1. Click the down arrow next to the user icon
2. Click **Log Out**

**Close the Browser**

1. Click the X to close the browser
Conclusion

Congratulations on completing Module 1!

As we have seen, integration is key to a holistic yet simple-to-access view of the environment and to the depth and granularity that a broad range of users require.

In this module we took some time to see that integration can be powerful and does not necessarily need to be complex or lengthy. We identified where and how vRealize Automation works with vRealize Operations Manager as the primary metrics provider of vSphere metrics, while reciprocal integration offers additional quick and easy access to vital operational environment information without the need to access additional user interfaces or portals.

We also learned about the new powerful integration between vRealize Automation and vRealize Operations Manager to provide intelligent workload placement for vSphere machines.

In the next Module, we will take a closer look into integration between vRealize Log Insight with vRealize Operations. You may to proceed to the next lesson, or you can select any module below which interests you most.

Module 2 - vRealize Log Insight & vRealize Operations Integration (30 minutes, Intermediate) This module will walk you through the integration between vRealize Log Insight and vRealize Operations, and will look at how vRealize Operations and vRealize Log Insight work together to provide a 360-degree troubleshooting view.

Module 3 - vRealize Business & vRealize Automation Integration (30 minutes, Intermediate) This module will take you through the integration between vRealize Business for Cloud and vRealize Automation and show you how to include cost information on blueprints and machines.

Module 4 - vRealize Code Stream Management Pack for IT DevOps (45 minutes, Intermediate) This module will walk you through how you can use the vRealize Code Stream Management Pack for IT DevOps to take vRealize assets such as dashboards, reports and blueprints and treat them as code that can be lifecycle managed.
Module 2 - vRealize Log Insight & vRealize Operations Integration (30 minutes)
Introduction

Enhanced troubleshooting capabilities make everyone’s lives easier. In this module we will see how the integration between vRealize Operations and vRealize Log Insight enables quick correlation of logs and metrics in context for any monitored object right from the vRealize Operations interface.
vRealize Log Insight and vRealize Operations Integration

The integration of vRealize Log Insight with vRealize Operations delivers on the complete "Intelligent Operations" use case. With these integrated solutions, we can troubleshoot smarter with 360-degree troubleshooting using metrics and logs side-by-side and in context. Integration of vRealize Operations and vRealize Log Insight brings structured data (such as metrics and key performance indicators) and unstructured data (such as log files) together, for faster root-cause analysis. The integration saves time and improves return on investment by using a central log management solution to analyze data across the IT environment, including virtual, physical and cloud environments.

The integration with Log Insight provides full integration in-context within vRealize Operations for faster troubleshooting with capabilities to:

- Direct launch into the Log insight Dashboard
- Direct launch into the Log Insight Interactive Analytics mode
- Object auto-initiated log management
- vRealize Operations alerts auto-initiated log management

We will take a look at the integration between these two solutions to provide 360-degree troubleshooting.

Open Chrome Browser

1. Click on the Google Chrome icon on the Windows taskbar
Adjust Browser Zoom Level

As the Hands On Labs default resolution is relatively low, if the zoom is not already set to 90%, we will need to adjust this setting in the browser to make sure all necessary areas are visible and accessible.

1. Click the menu icon on the top right corner of the browser window.
2. Click the "-" symbol to decrease the zoom to 90%.
3. Press the "ESC" key on your keyboard.

Navigate to vRealize Operations Manager

1. Click on the vRealize Operations bookmark on the browser toolbar
Log In to vRealize Operations Manager

The integration with VMware Identity Manager has been set up, so we will redirect the login.

1. Select **vIDM** from the dropdown listbox
2. Click **REDIRECT**
Log In to vRealize Operations Manager

We will log into vRealize Operations as an administrator. Administrator privileges are required to set up the integration between vRealize Operations Manager and vRealize Log Insight, but this integration has already been set up for this lab, so we will look at what the integration provides.

1. Type `cloudadmin` in the username field
2. Type `VMware1!` in the Password field
3. Click `Sign In`
Access Log Insight Directly from vRealize Operations Manager

With the integration between vRealize Operations Manager and vRealize Log Insight, you can access Log Insight directly from within the vRealize Operations Manager interface eliminating the need to open up a second user interface or log into a different solution.

1. From the Home screen, click on Log Insight
Log In to vRealize Log Insight

Since we are integrated with VMware Identity Manager, we can log in to vRealize Log Insight via SSO

1. Click **LOGIN VIA SSO**
Collapse the Navigation Pane

To be able to see more of the Log Insight interface, collapse the navigation pane

1. Click on the **double-arrow** in the navigation pane
View the Log Insight Interface Directly from vRealize Operations Manager

There are two views within vRealize Log Insight - the Dashboards view and Interactive Analytics view, and we will take a look at both of these views.

For more in-depth lab covering vRealize Operations and vRealize Log Insight, take lab HOL-1801-03-CMP - vRealize Suite Standard: Application-aware software-defined data center (SDDC) and multi-cloud management
Dashboards Overview

We will start by taking a look at the Dashboards section of Log Insight

1. If the Dashboards view is not selected, click on Dashboards
2. If it is not already selected, click on the General>Overview dashboard
3. Disregard the "Evaluation License" message - this can be ignored since there are no features and functionality restrictions when running an evaluation license key.

Scroll around the General Overview dashboard to view the information that is provided.

Think of the Dashboards page as an overview section. Dashboards provide the ability to quickly visualize log data and determine potential issues within an environment. vRealize Log Insight provides two different types of widgets inside a dashboard: charts and queries. Charts are a visual representation of data and the most commonly used widget. Queries are saved pieces of information that provide both a visual and textual representation of data on the Interactive Analytics page, but they are listed only by a defined name on the dashboards page. Query widgets are typically used when a chart widget does not provide enough useful information.
Interactive Analytics Overview

Now we will look at how Interactive Analytics allows administrators and engineers to perform searches using plain language or REGEX strings and view log message detail to determine problem areas and perform root cause analysis.

1. Click **Interactive Analytics**

Interactive Analytics Screen

The following describes the different sections of the Interactive Analytics Screen:
1. This area shows the graphical representation of the current query. Because we have not yet specified a query or filter, all events are being displayed.
2. The Filter field is used to search for data within the logs, for example, host name, error message or error number.
3. vRealize Log Insight auto-correlates all log data. In this field we can specify a specific time range we would like to search for log entries. By default, the time range field is set to the last 5 minutes of data. Be advised that large date ranges will take a longer time to return the complete set of data, but that data will stream in as the query result is returned. In this lab, we have only just connected to the vCenter and therefore we have a limited time range where data is available.
4. Events are the log entries which match the query and will be displayed here. The key words (Fields) contained in each of the log messages will be called out in blue below the log message. By default vRealize Log Insight understands all the Syslog-defined fields. As as part of vRealize Log Insight Content Packs, which can be downloaded from VMware's Solution Exchange, fields are added which are specific to their domain. In our case, all of the vSphere and Syslog Fields are available.

For more in-depth lab covering vRealize Operations and vRealize Log Insight, take lab HOL-1801-03-CMP - vRealize Suite Standard: Application-aware software-defined data center (SDDC) and multi-cloud management

Launch vRealize Log Insight In Context of a Selected Object

Not only can we view the Log Insight user interface directly from within vRealize Operations Manager, but we can launch the Interactive Analytics screen in context for a selected object.

1. Click on the main Search icon on the top menu bar
Launch vRealize Log Insight In Context of a Selected Object

In the Search bar, we will type the beginning of the string we want to search for

1. Type `esx` to get a list of all of the datastores and host systems in the environment
2. Click on `esx-03a.corp.local`

In the Search bar, we will type the beginning of the string we want to search for

1. Type `esx` to get a list of all of the datastores and host systems in the environment
2. Click on `esx-03a.corp.local`
View the Logs for the Selected Host

The vRealize Operations Manager Summary screen for the esx-03a.corp.local host is displayed. From here, we can click on Logs to see Log Insight in the context of this selected host.

1. Click **Logs**
View the Interactive Analytics Screen for the Selected Host

Because we viewed the logs in the context of the esx-o3a.corp.local host, a filter has been set, and we will only see log information for that host

1. If Events is not already selected, click on **Events**
2. Note that all events are in relation to esx-03a.corp.local (note that you will have to scroll down to see the events)

View Logs in the Context of a vRealize Operations Manager Alert
We can also view logs in the context of a vRealize Operations Manager Alert. Since there is an alert on this host, we'll take a look at it.

1. Click on **Alerts** for the **esx-03a.corp.local** host

### Select the Maintenance Mode Alert

![Select the Maintenance Mode Alert](image)

There is an alert on this host because it has been in maintenance mode for at least 1 hour. Having this host in maintenance mode for a long period of time could cause issues in the environment, so we want to find out who put the host into maintenance mode and why - previously, we would have to do this using the command-line interface.

1. Click on the dropdown listbox next to **Group By** and select **None**
2. Click on the **Host is in maintenance mode for at least 1 hours** alert
View the Logs Associated with the Alert

We can take a look at the logs in the context of the alert

1. Click on **View Logs** under Need more information?
View the Interactive Analytics Screen for the Object with the Alert

Here we see all of the events on our esx-03a.corp.local host that were raised during that alert and they are grouped by Event Types
Find Maintenance Mode Events

We will filter the event types to show us those events with the phrase "maintenance mode" in them

1. Type **maintenance mode** into the search box
2. Note that a **custom time range** has been set to pull events from the time of this alert
3. Click the **magnifying glass** icon to search
Identify User Who Put Host Into Maintenance Mode

We'll look thru the event types until we find the event type that provides us with the user that placed this host into maintenance mode.

1. Scroll down the list of Event Types
2. Stop scrolling when you find the event that includes the phrase "has started to enter maintenance mode"
3. We can quickly see that the user that put this host into maintenance mode was the CORP\Administrator user

Log Out of vRealize Operations

1. Click on the down arrow next to the user icon
2. Click Log Out
Close the Browser

1. Click on the X to close the browser
Conclusion

Congratulations on completing Module 2!

As we have seen, the integration between vRealize Operations Manager and vRealize Log Insight delivers on the complete "Intelligent Operations" use case and provides 360-degree troubleshooting so you can look at metrics and logs side-by-side and in context.

In the next Module, we will take a closer look into integration between vRealize Business for Cloud with vRealize Automation. You may proceed to the next lesson, or you can select any module below which interests you most.

Module 1 - vRealize Automation & vRealize Operations Integration (45 minutes, Intermediate) This module will walks you through the integration between vRealize Automation and vRealize Operations, and will look at intelligent workload placement for vSphere virtual machines.

Module 3 - vRealize Business & vRealize Automation Integration (30 minutes, Intermediate) This module will take you through the integration between vRealize Business for Cloud and vRealize Automation and show you how to include cost information on blueprints and machines.

Module 4 - vRealize Code Stream Management Pack for IT DevOps (45 minutes, Intermediate) This module will walk you through how you can use the vRealize Code Stream Management Pack for IT DevOps to take vRealize assets such as dashboards, reports and blueprints and treat them as code that can be lifecycle managed.
Module 3 - vRealize Business for Cloud & vRealize Automation Integration (30 minutes)
Introduction

Chargeback/Showback is a challenge for many organizations. In this module, we will see the integration of vRealize Business for Cloud with vRealize Automation to show the cost for the infrastructure when someone makes a request. We will also see how we can get updated pricing when post-provisioning actions such as reconfiguring a machine or scaling in or out occur.
Overview of Integration Between vRealize Business for Cloud and vRealize Automation

Many organizations struggle with Chargeback/Showback to development teams and business units. The integration between vRealize Automation and vRealize Business for Cloud provides the capability to show how much infrastructure will cost as the request for that infrastructure is being made. Since these environments can be dynamic, a requester can see updated costs should they make changes to the requested infrastructure after it has been provisioned.

The enhanced vRealize Business for Cloud Integration with vRealize Automation provides:

- Consistent terminology across vRealize Automation and vRealize Business for Cloud
- No derived costing in vRealize Automation - vRealize Business for Cloud is the single source of truth for all pricing information
- Pricing based on Blueprint, Reservation or Reservation Policy
- Accurate pricing for fault-tolerant enabled machines
- Pricing updated after post-provisioning actions including; reconfigure machine, scale out/in and import machine

The configuration between vRealize Business for Cloud and vRealize Automation has already been set up in this lab, and the purpose of this lab is to show the benefits of using the two solutions together.

This lab covers the integration between vRealize Automation and vRealize Business for Cloud. If you would like to learn more about vRealize Business for Cloud, take HOL-1806-03-CMP - vRealize Business for Cloud - Getting Started and to learn more about vRealize Automation, take HOL-1821-01-CMP - vRealize Automation 7 - Getting Started.
Showback at Request Time

We will start by taking a look at how the cost for infrastructure can be set by an administrator and shown when a user makes a request for infrastructure through the self-service portal.

Open Chrome Browser

1. Click on the **Google Chrome** icon on the Windows taskbar

Adjust Browser Zoom Level

As the Hands On Labs default resolution is relatively low, if the zoom is not already set to 80%, we will need to adjust this setting in the browser to make sure all necessary areas are visible and accessible.

1. Click the menu icon on the top right corner of the browser window
2. Click the "-" symbol to decrease the zoom to 80%
3. Press the "ESC" key on your keyboard

Navigate to vRealize Automation
We will begin by clicking on the Chrome icon on the desktop to launch the browser and navigate to vRealize Automation

1. Click on the vRealize Automation bookmark from the browser toolbar

**Log In to vRealize Automation**

Log in to vRealize Automation as the IaaS administrator

1. Type **cloudadmin** in the User Name field
2. Type **VMware1!** in the Password field
3. Click **Sign In**
Navigate to the Business Management Tab

The Business Management tab is where you go to access vRealize Business for Cloud from vRealize Automation

1. Click on the Business Management tab

Business Management Tab

With vRealize Business for Cloud, directors of cloud operations can monitor their expenditures and design more price-efficient cloud services.
vRealize Business for Cloud provides the following benefits:

- Drives accountability by providing visibility into the price of virtual infrastructure and public cloud providers and by providing daily price and month-to-date expense updates in vRealize Automation
- Promotes efficiencies in the virtual infrastructure by making it possible to compare the prices, efficiency and availability of their private cloud with public cloud providers and industry benchmark data
- Optimizes decisions about placement for virtual workloads and tradeoffs between buying new hardware and using public cloud providers

We will set up a pricing policy for the Development Business Group so costs are associated with infrastructure that they request and deploy from the self-service portal in vRealize Automation

1. Click on **Consumption**

To learn more about vRealize Business for Cloud, please visit the [documentation center](#) or take HOL-1806-03-CMP - vRealize Business for Cloud - Getting Started.

**Edit the Pricing Policy**

![Diagram showing steps to edit the pricing policy](image)
Navigate to edit the pricing policy

1. Click on **Pricing and Charges**
2. Click on **Pricing**
3. Click on **Edit**
4. Click on **Edit Pricing**

**Open the vRealize Automation Policy**

1. Click on **Private Cloud (vSphere)** if it is not already selected to see the list of pricing policies
2. Click on the **vRealize Automation** policy
Navigate to the Development Reservation Policy

Notice that the Grouping Strategy for this policy is reservation, and we see a Development Reservation policy. Any user in the Development Business Group who requests IaaS thru vRealize Automation will have this pricing policy applied to that request.

1. Note that there are costs already associated with the vCPU and RAM
2. Click on Development Reservation
Modify the Development Reservation Policy

We will modify the Development Reservation and increase the costs for CPU, memory and storage. Wait until the fields are populated with their current values, and then enter the new values:

1. Enter 2 next to **per vCPU daily**
2. Enter 3 next to **per GB RAM daily**
3. Enter 1 next to **per GB daily**
4. Click **Save** (note that you may need to scroll down to see the Save button, and it may take a few seconds for the new values to be shown)
Costs Updated for the Development Reservation Policy

1. Note the updated costs for **vCPU daily** price and **GB RAM daily price**

**Log Out of vRealize Automation**

We will now log out of vRealize Automation as the cloud administrator so we can log in as a developer

1. Click **Logout**

**Navigate to Login Page**
1. Click **Go back to login page**

**Log In as a Developer**

We will log back into vRealize Automation as a development user

1. Type **devuser** in the User Name field
2. Type **VMware1!** in the Password field
3. Click **Sign In**
Navigte to Catalog to Request a Blueprint

As a development user, we will request infrastructure be provisioned thru our self-service catalog

1. Click Catalog

Request a Blueprint

Request a blueprint to see the cost associated with the infrastructure deployed for that blueprint

1. Click Request on the Windows Server 2012 blueprint
Get the Total Price for Deploying the Blueprint

We'll get the pricing for deploying this blueprint with the default configured CPU, memory and storage

1. Click on the **Windows2012** machine
2. Note the default CPU, memory and storage
3. Click **Update** to get the total price

View the Updated Price

1. Notice that the **Total price** now has a cost of **$25.11**
2. Click on **View Price Details**
Here we can see the costs that have been associated with the amount of CPUs, memory and storage that we have selected for this virtual machine:

1. Note the costs for **CPUs, Memory** and **Storage** which are based on the costs we set up earlier for our Development Reservation policy
2. There is an additional cost associated with this policy of $0.11 making our total cost $25.11
3. Click **Close**
Change the Amount of Memory for the Requested Virtual Machine

Let's change the amount of memory we're going to request for this virtual machine

1. Change the amount of memory to **2048**
2. Click **Update** to get updated pricing information
1. Notice that the **Total price** has been updated to **$28.11** because of the additional memory that we're requesting and each GB of memory costs $3.

2. Click **Cancel** - Instead of submitting this request and waiting for the VM to be provisioned, we'll cancel out of this request. In the next lesson we will use an existing VM from a previous request to look at pricing updates for Day 2 activities.
Post-Provisioning Cost

Now that we have seen the cost associated with a request for infrastructure at the request time, we will take a look at how those costs are updated to reflect day-two operations such as scaling out the infrastructure.

Navigate to the Items Tab and Select the Windows Deployment

Navigate to the Items tab to view the deployments for the development user

1. Click on Items
2. If it is not already selected, click on Deployments
3. Click on the CentOS deployment

Scale Out the CentOS VM
The integration between vRealize Automation and vRealize Business for Cloud provides updated pricing information when Day 2 actions such as scaling out or scaling in occur on a virtual machine that's been deployed from the self-service portal.

1. Click on **Scale Out**

**Scale Out the CentOS VM and View the Updated Cost**

1. Click on the **CentOS** virtual machine
2. Increase the **Scale out** to number to **2**
3. Click on **Update** to view the updated price for this blueprint deployment
View the Updated Price Details

Because we are scaling up this deployment to have two virtual machines, the cost for the deployment is doubled. Let's view the pricing details.

1. Note the **Total price** says **$30.22**
2. Click on **View Price Details**
3. Note the **Quantity** says **2**
4. Note the **Daily Price** which is for a single machine and is **$15.11** and the **Total Estimated Price** of **$30.22** for the two virtual machines
5. Click **Close**
Cancel the Scale Out Change

We have seen how pricing is updated for Day 2 actions against provisioned infrastructure, but we will cancel this change and not submit the request.

1. Click on **Cancel**

Close the Browser

1. Click on the **X** to close the browser
**Conclusion**

Congratulations on completing Module 3!

As we have seen, the integration between vRealize Business for Cloud and vRealize Automation allows you to begin to chargeback/showback the costs of provisioning infrastructure thru the self-service portal in vRealize Automation. You can also see updated pricing for Day 2 actions that are taken on virtual machines.

In the next Module, we will take a closer look into the vRealize Code Stream Management Pack for IT DevOps. You may proceed to the next lesson, or you can select any module below which interests you most.

**Module 1 - vRealize Automation & vRealize Operations Integration** (45 minutes, Intermediate) This module will walk you through the integration between vRealize Automation and vRealize Operations, and will look at intelligent workload placement for vSphere virtual machines.

**Module 2 - vRealize Log Insight & vRealize Operations Integration** (30 minutes, Intermediate) This module will walk you through the integration between vRealize Log Insight and vRealize Operations, and will look at how vRealize Operations and vRealize Log Insight work together to provide a 360-degree troubleshooting view.

**Module 4 - vRealize Code Stream Management Pack for IT DevOps** (45 minutes, Intermediate) This module will walk you through how you can use the vRealize Code Stream Management Pack for IT DevOps to take vRealize assets such as dashboards, reports and blueprints and treat them as code that can be lifecycle managed.
Module 4 - vRealize Code Stream Management Pack for IT DevOps (45 Minutes)
Introduction

In this module, we will explore how vRealize Code Stream Management Pack for IT DevOps allows organizations to treat assets such as vRealize Automation Blueprints, vRealize Operations reports and other objects as pieces of code that can be versioned and promoted between environments.
Prepare the Environment

In order to prepare the lab environment for these exercises, it is necessary to log in to vRealize Orchestrator and run a specific workflow.

Open the vRealize Orchestrator Client

To log in to vRealize Orchestrator, click on the vRealize Orchestrator Client shortcut on the desktop

1. Double-click on the icon named vRO Workflow Designer
Log In to vRealize Orchestrator

1. Log in to vRealize Orchestrator as administrator@vsphere.local (this is the default value)
2. Enter VMware1! in the Password field
3. Click Login
Locate the Workflow

Navigate to the vRealize Orchestrator workflow that we need to run

1. Select the **Workflows** tab
2. Navigate to **Library -> Content Management -> Configuration -> Helpers**
Run the Workflow

1. Scroll down to locate the **Reset Queue Schedule Policy** workflow
2. Select the **Reset Queue Schedule Policy** workflow
3. Click the **Start workflow...** icon to run the workflow
Log Out of vRealize Orchestrator

1. Verify successful completion of the Reset Queue Schedule Policy workflow. The most recent run will show a green checkmark indicating success.
2. Log out of vRealize Orchestrator by clicking the X to close the window, and click **Exit** in the confirmation window (not shown)
vRealize Code Stream Management Pack for IT DevOps

While the SDDC automation challenges are formidable, they can be solved using the same DevOps principles that are taking hold in the world of application development. Tools like source control systems, automated testing, repository management, and release pipeline automation can all be combined for automating SDDC content lifecycle management. VMware’s vRealize Code Stream provides a way to model and automate the software release process. It also embeds a new VMware Xenon based repository on the Primary Content Server that can be used to store code (such as vRealize Automation Composite Blueprints) or binary objects (such as VM templates). As an example, the Management Pack will speedily deploy vRealize Automation content across multiple tenants on a single instance or across multiple instances of vRealize Automation and vRealize Orchestrator. These multiple instances can be across Dev, Test, Production or even in multiple data center locations. In essence, the management pack enables “DevOps for Infrastructure”.

The SDDC Object Lifecycle

Within the Software Defined Data Center, or SDDC, all things are naturally becoming software defined. This includes not just our virtualized infrastructure, but all of the policy-based management and automation tools that are used to enable a hybrid cloud.
Each of these tools have their own configurations which help to define and manage your SDDC. Those configurations, which essentially define the SDDC, have their own lifecycle as well. This begs the question, what’s the most effective way to manage the lifecycle of these SDDC objects?

If you’ve deployed tools like vSphere, vRealize Operations, vRealize Automation, vRealize Code Stream, vRealize Orchestrator, and so on, then you likely understand the importance of the objects that you manage within these tools. Dashboards, Reports, Blueprints, Templates, Properties, Pipelines, Workflows – each of them is extremely important in defining how you manage your SDDC, however, each one of these objects requires its own level of management. Initially, one can easily create something and begin getting value out of the automation and abstraction that it provides. Over time as the number of objects increases, the need to maintain a common library of these objects and configurations becomes critical.

In addition, when managing multiple environments and/or multiple tenants, a lot of manual effort can be required in order to ensure the objects within these environments are consistent, while preserving a single source of truth. Over time, it also becomes very important to preserve a historical record of all of the changes and updates made to these various objects and configurations.

With the vRealize Code Stream Management Pack for IT DevOps, performing all of these tasks becomes trivial.

**What the vRealize Code Stream Management Pack for IT DevOps Does**

First, it provides the ability to capture and maintain a centralized repository of every single supported object and configuration. They can then be compared, rolled back, and deployed to other environments and tenants.

Secondly, it provides a mechanism for having a centralized “gold” configuration or environment, which in turn can be used to synchronize other tenants and/or environments. What previously would have involved significant manual effort can now be performed in only a few clicks. Plus, deployments can be automatically tested prior to being deployed onto production environments, and easily rolled back if necessary.

And finally, all of this is done while leveraging existing vRealize tools. Because of this, we can leverage the same approvals engine, workflows, pipelines, and overall infrastructure that is overseeing the SDDC.

Kick-start "DevOps for IT" with the vRealize Code Stream Management Pack

The vRealize Code Stream Management Pack for IT DevOps provides the following capabilities:

- Automated capture of content from multiple environments in a consistent format
- Check content in to a common repository thereby having one source of truth
- Automate progressions between environments
- Run automated tests before allowing progression
- Optionally approve before releasing to production environments
- Automated Rollback

You can now use your vRealize Automation license to enable vRealize Code Stream for your vRealize Automation environments allowing customers to lifecycle manage SDDC assets without having to license the full Code Stream product. The vRealize Automation license allows you to unlock vRealize Code Stream so that you can use it with the vRealize Code Stream Management Pack for IT DevOps. For more information regarding licensing, visit the Licensing section in the vRealize Code Stream 2.3 Release Notes.

Types of SDDC Assets for Lifecycle Management

You can lifecycle manage several types of SDDC assets with the vRealize Code Stream Management Pack for IT DevOps enabling the move to Infrastructure as code.

- **vRealize Automation**: blueprints, software, build profiles, property definitions, groups and actions
- **vRealize Operations**: alerts, dashboards, reports, views, etc.
- **vRealize Orchestrator**: workflows, actions, configuration elements and packages
- **vRealize Code Stream**: pipeline templates
- **vSphere**: templates and custom specifications
- **Files**: Linux

Open up Chrome

1. Click on the **Google Chrome** shortcut on the Windows Toolbar
Adjust the Browser Zoom Level

As the Hands On Labs default resolution is relatively low, if the zoom is not already set to 90%, we will need to adjust this setting in the browser to make sure all necessary areas are visible and accessible.

1. Click the menu icon on the top right corner of the browser window
2. Click the "-" symbol to decrease the zoom to 90%
3. Press the "ESC" key on your keyboard

Navigate to vRealize Automation

- Click on the vRealize Automation bookmark on the browser toolbar
Log in as Cloud Administrator

1. Type **cloudadmin** in username field
2. Type **VMware1!** in the password field
3. Click **Sign In**
We'll begin by taking a look at the endpoints that have already been configured in this lab environment.

1. Click **Items**
2. Click **Dynamic Types** (not shown) and then click **Endpoint** - Note the three endpoints for vRealize Automation, vRealize Operations and vRealize Orchestrator, that we have already configured.
3. Click on **vrops**
View the vRealize Operations Configured Endpoint

Each endpoint points to a specific instance of a VMware solution, so we could have multiple endpoints in the same category. For instance, in a real-world deployment, we may have a vROps-Test instance and a vROps-Prod instance, so that we could do all development and testing of vRealize Operations dashboards, reports, views, alerts, etc. in the vROps-Test instance and move them to vROps-Prod when they are ready for release. The same could be done for vRealize Automation, vRealize Orchestrator, vSphere, and Code Stream content. For this vRealize Operations endpoint, the following settings for capture, test and release have been configured:

1. **Supports Capture** is set to true which means that you can capture content from this endpoint
2. **Supports Release** is set to true which means that you can release content to this endpoint
3. **Supports Test** is set to true which means that testing is allowed on this endpoint
4. Click Close
We will open vRealize Operations and identify a report we want to capture

1. Open a **new tab** and click on the **vRealize Operations** bookmark
2. Select **vIDM** from the dropdown listbox
3. Click on **REDIRECT**
1. From the main menu, click on **Dashboard**

**Navigate to vRealize Operations Reports**

1. Click on **Reports**
Clone an Existing Report Template

Instead of making changes to an out-of-the box report template, we'll clone a report template

1. Select the **Cluster Capacity Risk Forecast Report**
2. Click on the **Clone Template** icon
Save Clone of Existing Report

We will go ahead and rename our cloned report template to something that will make it easy to find and at the top of the list

1. Rename the beginning of the report from "Copy of" to "Awesome"
2. Click Save
New Report Displayed

1. Our new **Awesome Cluster Capacity Risk Forecast Report** template shows up at the top of our report list

Navigate to vRealize Automation

1. Click on the **vRealize Automation** tab in your browser to navigate back to vRealize Automation
So far, we have taken a look at our vRealize Operations endpoint that we can capture content from, and we have gone into vRealize Operations and cloned an existing report. We will now capture that cloned report into the content repository. We will also make a change to the report and capture that content again, and then we will view the differences between the versions of the content we’ve captured. We will also take a look at the out-of-the-box Code Stream pipelines that are installed when the Management Pack is installed.

We’ll begin by requesting an out-of-the box package to capture our vRealize Operations report

1. Click on the Catalog tab
2. Click on Packages

There are five different package types that get installed with the vRealize Code Stream Management Pack. Below are descriptions of each of these different package types:

• **Delete Packages** - Delete packages from the repository and catalog items view
• **Group Package Request** - Capture, test and release a group of content packages
• **Single Package Request** - Capture, test and release a single content package
• **Group Management** - Add or remove captured packages to an existing or a new group
• **Re-Submit Package Requests** - Provide a previous request number to re-submit the same request without filling in the forms. Single and Group Package Requests are supported.

**Make a Single Package Request**

We will make a **Single Package Request** which will allow us to work with a single content package, such as a single vRealize Operations report or a single vRealize Automation blueprint. If we wanted to lifecycle manage more than one content package at a time, we can use the Group Package Request.

1. Click on **Request** under **Single Package Request**

**What is a Content Package?**

A content package is a file that contains specifications for software-defined services, such as vRealize Automation Blueprints, vSphere Templates, vRealize Orchestrator Workflows, vRealize Operations Manager Reports, etc.
View Information About a Single Package Request

When we request a package, the first screen that appears provides information about the request. Scroll thru the Information tab to see all of the detail about what is needed in a request.

1. Click on the scroll bar and read thru information
2. Click Next

So what does the management pack actually do?

The vRealize Code Stream Management Pack for IT DevOps allows vRA administrators to:

- Select the appropriate content (e.g. blueprint, workflow, etc.) from an environment (e.g. a "Development" tenant) and publish it to a destination environment (e.g. a "Production" tenant on the same or a different vRA instance).
- The solution automatically identifies all related dependencies (e.g. build profiles, custom icons, forms, etc.) for that content, packages it, versions it, and stores it in a repository.
- It then exports that package to the destination environment(s), testing it along the way if requested by the administrator.
• It then imports, unpacks and deploys that content to the destination environment(s), including all associated dependencies.
• The operation is logged, along with all relevant details.

Choose Actions to be Taken for the Request

The vRealize Code Stream Management Pack for IT DevOps provides:

• Automated capture of infrastructure content, in text or binary formats
• Storage and versioning of the captured content in a wide range of supported repository management solutions
• Automated rollout or rollback of content from multiple environments, including cross cloud and hybrid infrastructures

Based on our lifecycle management goals for the content, we can choose which actions we would like to take for the request. Because we are working in a lab environment with a single vRealize Operations instance, for this request, we are going to choose to only capture content from an endpoint to capture the vRealize Operations report.

1. Turn ON the checkbox next to **Capture content from endpoint**
2. Click **Next**

The vRealize Code Stream Management Pack for IT DevOps was built using generally available VMware products, including:
vRealize Code Stream as the core pipeline engine that codifies and automates the software development lifecycle for vRealize Automation, vRealize Orchestrator, vRealize Operations Manager and vSphere content

vRealize Automation Advanced Service Designer as the front-end UI that allows administrators to select the content to package, version, test (optionally) and move across vRealize Automation/vRealize Orchestrator/vCenter/vRealize Operations Manager/vRealize Code Stream instances.

vRealize Orchestrator for various parts of the business logic, particularly determining content dependencies (e.g. vRealize Orchestrator workflows associated with a vRealize Automation blueprint)

A VMware Xenon-based repository to store and version content packages.

CloudClient as the communication interface between the Advanced Service Designer and Code Stream

**Enter Details for the Content**

Here we can select the type of content we would like to lifecycle manage. We will take our new report and we are going to capture that content so that we have an initial version of it stored in our content repository.

1. Under **Select package type** scroll down and choose **Operations-Report** - note all of the different types of content you can capture, test and release
2. Under **Select source endpoint** choose **vrops**
3. Under **Select content package** choose **Awesome Cluster Capacity Risk Forecast Report**
4. Click **Next**
Note - Because some content could have dependent objects, for example, a vRealize Automation blueprint may call a vRealize Orchestrator workflow, depending on the content you are capturing, you will have the option to also capture the versions of the dependent objects to be stored along with the selected content package.

Provide Additional Details for the Request

We will enter a version comment for this request. We will not mark this new version as release because we are not done with the changes, and therefore, it is not ready to be deployed to other environments at this time.

1. Enter Initial capture of my report into the Enter a version comment field
2. Click Submit

Request Submitted
1. Click **OK**

**Navigate to the Code Stream Pipeline Executions**

In order to watch the execution of our request to capture content for the vRealize Operations report, we'll go to the Pipeline Executions tab for Code Stream. Note - It may take a few seconds for the execution to show up in the list.

1. Click on the **Code Stream** tab
2. Click on the **Pipeline Executions** tab
View the Status of Our Requested Pipeline

In the Pipeline Executions tab, we can see that our request is IN_PROGRESS. Let's drill down into the pipeline execution to see the stages in the pipeline and the execution status for each stage.

1. Click on the arrow next to our pipeline execution (note that it may take a few seconds for our pipeline execution to show up in the list)
View the Pipeline Executions Details

Here we can see all of the states that are part of this Code Stream Pipeline that is part of the Management Pack. We'll take a look at the pipeline in more detail next, but here we can see the status of the workflows in each stage.

1. Note the Initialize Version task which runs a vRealize Orchestrator workflow is green and the Initialize stage is green showing that both the Initialize Version task and the Initialize stage have completed
2. Note the Capture Content task and the Capture stage are blue which denotes that it is executing now
3. Any of the tasks or stages that are gray have not yet begun execution
4. Click on the arrow next to the pipeline execution to collapse it

Note that the pipeline may execute multiple stages before we drill down on it, so the screen may look different as some stages may have completed already.
vRealize Code Stream Management Pack Installed Pipelines

Let's take a look at the vRealize Code Stream Pipelines that get installed with the vRealize Code Stream Management Pack:

1. Click on the **Code Stream** tab
2. Click on the **Pipelines** tab
3. Select the pipeline named **Content_Pipeline**
4. Click on the **Edit** button
Navigate to the Stages for the Pipeline

On the Edit Pipeline tab you can see some details about the pipeline, but let's take a look at the stages that have been defined for this pipeline

1. Click on Stages
View the Stages for the Selected Pipeline

For the pipeline that we selected, Content_Pipeline, we can see each of the different stages that have been defined for this pipeline that got installed as part of the vRealize Code Stream Management Pack for IT DevOps.

As a reminder, when we selected the Single Package Request, we were presented with three options: Capture content from endpoint, Deploy to test and/or run tests and Release Content to production. Scroll thru the stages in the pipeline to see that there is a stage for each of those options called Capture, Test and Release. When we made our request, we only chose the Capture content from endpoint option, so in that case, the Capture stage would have run, but the Test and Release stages would be skipped.

1. Click on the **scroll bar** to scroll over to see all of the stages for this out-of-the-box pipeline
View the Configuration for a vRealize Orchestrator Task

In each of the stages we can see that vRealize Orchestrator workflows are being called. Let's take a look at one of the tasks in the Capture stage

1. Click on the **Capture Content** vRealize Orchestrator task
In the task configuration dialog box, we can see that the vRealize Orchestrator workflow titled "RP Capture Content" is called. This workflow was installed as part of the management pack and can be viewed inside of vRealize Orchestrator. We also see that a condition was set on this task so that this task only runs if the "Capture content from endpoint" checkbox was turned on during the package request.

1. Click **Cancel**
vRealize Code Stream pipelines also include the ability to add gating rules between each stage. These gating rules enable the ability to do things such as control the execution of a pipeline and require approval to move to the next stages. We will take a look at the gating rule configuration for the gating rule set between the Capture and Test stages.

1. Click on the **Gating Rule** between Capture and Test
Gating Rule Configuration

Here we can see that the pipeline only continues to the next stage if the previous stage is successful.

1. Click **Cancel**

If you would like to learn more about vRealize Code Stream, vRealize Automation or vRealize Orchestrator, take labs HOL-1821-04-CMP - vRealize Code Stream - DevOps Solutions, HOL-1821-01-CMP - vRealize Automation 7 - Getting Started and HOL-1821-05-CMP - vRealize Orchestrator - Getting Started.
Exit the Pipeline Editor

1. Click Close to exit the Pipeline Editor

View the Item Created from Running the Content_Pipeline

Now that we've submitted a package request to capture the vRealize Operations report template, and we've taken a look at what the out-of-the-box pipeline to capture content looks like, we will take a look at what the result of our request to capture that report template looks like.

1. Click on the Items tab
2. Click on Package
3. Click on the Awesome Cluster Capacity vRealize Operations report template which is the capture of the report that we ran
Here we can see all of the details about the vRealize Operations report that we captured.

There are also several actions that can be taken on this captured blueprint:

- **Delete Package** will delete a content package with all versions and history.
- **Delete Version** will delete a selected content package version from the repository.
- **Package Audit Log** displays a detailed list of all versions.
- **Recapture Package** recaptures the package and its content.
- **Release Package** releases the package to different vRealize Automation, vRealize Orchestrator, vRealize Operations Manager or vSphere endpoints.
- **Rollback Version** rolls back the package to a previous version, and the current version is incremented.
- **Show Version Diff** shows the differences between package versions.
- **Test Package** allows you to run unit tests and to deploy the content to the test environment if it has not already been deployed there.
- **Update Version Status** changes the release or test status of a content package version.
Close the Item Details Window

1. If necessary, click the **scroll bar** to see the Close button
2. Click the **Close** button
Navigate Back to vRealize Operations

1. Click on your open vRealize Operations browser tab
2. Click on the Awesome Cluster Capacity Risk Forecast Report
3. Click on the Pencil icon to edit the report

If you closed vRealize Operations or you have been logged out, click on the vRealize Operations bookmark and log in to vRealize Operations with user cloudadmin and password VMware1!
Make a Change to the vRealize Operations Report

We will modify our report by adding an existing View to it:

1. Click on the **Capacity Utilization Trend-CPU** View under Views and Dashboards.
2. Drag the **Capacity Utilization Trend-CPU** View to the report area.
3. Click **Save**.

Navigate Back to vRealize Automation
Now we will navigate back to vRealize Automation and recapture the content for our report since we've made a change to it

1. Click on the open vRealize Automation tab in your browser
2. Click on the Awesome Cluster Capacity Risk Forecast Report

If you closed your browser or you have been logged out of vRealize Automation, log back in as the user cloudadmin and password VMware1!

Recapture the vRealize Operations Report Template

Because we have already captured this vRealize Operations report template content, we can simply choose to recapture the package from the item details which saves us the time from navigating back the Catalog and requesting a package.

1. Click on Recapture Package
Provide Information for the Recapture Package Request

We will go ahead and recapture the Awesome Cluster Capacity Risk Forecast Report and mark it as a new version since we are done with our changes to it.

1. Click on vrops for Select source endpoint
2. Enter Added view for the version comment
3. Turn ON the checkbox for Mark new version as release (optional) - this time, we will mark this content as a new release because we're ready to deploy it to other environments
4. Click Submit

Acknowledge Request Submission

1. Click OK to acknowledge the request submission
Watch Status of the Pipeline Execution

Since we've submitted another request to capture content, we can navigate to the Pipeline Executions page to watch for our request to finish

1. Click on the Code Stream tab
2. Click on Pipeline Executions
3. Watch for the status of the request to change to Execution finished successfully

Navigate Back to the Captured vRealize Operations Report

We'll navigate back to the captured vRealize Operations report template package and take a look at some of the things we can do with this captured content

1. Click on the Items tab
2. Click on Package
3. Click on the Awesome Cluster Capacity report package
Request to Show The Differences Between Versions

One of the things we can do is look at the differences between the versions of the report we've captured

1. Click on the **Show Version Diff** action

Submit the Request to See the Version Differences

We'll select the two versions that we want to compare. Note that the version numbers may be different than what is shown on the screenshot if multiple requests have been run.
1. Select the version prior to the most recent version for the **Select First Version** field - in this case it is 1.
2. Select the most recent version that has been captured for the **Select Second Version** field - in this case it is 2.
3. Click on the box in the bottom right corner of the **Version Diff** text box to expand it and view the differences. If we want to submit this to keep track of the run of the version differences in our repository, we can submit the request, but since we just wanted to see the differences, we'll cancel this.
4. Click **Cancel**

**Rollback to a Previous Version**

1. Click on the **Awesome Cluster Capacity** report package

**Rollback to a Previous Version**

If we didn't like the changes we made to the report, and we wanted to roll back to a previous version, we can do that too.

1. Click on **Rollback Version**
Rollback to a Previous Version

We can roll back to a previous version of the report that we marked as a release, or we can roll back to any version. Since we didn't mark our first capture as a release, we need to roll back to a version not marked as a release.

1. Turn OFF the **Release versions** only checkbox
2. Click on the dropdown next to **Rollback to version** to see version 1 listed - had we captured additional versions, they would be listed here too
3. We won't submit this request, so click **Cancel**
Navigate Back to vRealize Operations

We will navigate back to vRealize Operations and delete the report that we created

1. Click on the open vRealize Operations tab in your browser

If you are prompted with the Login screen, click Redirect and log in as user cloudadmin password VMware1!

Delete the New Report Template

We will delete the report template that we created so that we can use the Code Stream Management Pack for IT DevOps to recover it
1. Select the **Awesome Cluster Capacity Risk Forecast Report**
2. Click on the X icon to delete the report

**Confirm the Deletion**

![Delete Template](image)

Click **Yes** to confirm the delete

**The Report Template is Deleted**

![Report Templates](image)

Note that the **Awesome Cluster Capacity Risk Forecast Report** is deleted and no longer shows in our list of report templates
Navigate Back to vRealize Automation

We'll navigate back to vRealize Automation and use our captured content to recover our report back in to vRealize Operations

1. Click on your open **vRealize Automation** browser tab
2. Click on the **Awesome Cluster Capacity Risk Forecast Report**

Release the Captured Package to vRealize Operations

Normally, had a vRealize Operations report been deleted, we would have to recreate it. Because we're using the vRealize Code Stream Management Pack for IT DevOps to treat all of our content as Infrastructure as Code, we can simply release the report we've already captured back to our vRealize Operations instance.

1. Click on **Release Package**
Specify Release Parameters

We will specify the parameters to release this captured content for our vRealize Operations report template

1. Next to Select release endpoints in order, click on the top double arrow to move it to the right list box
2. Select 2 from the Version dropdown list box (note, this number may be different in your lab environment)
3. Type Recover deleted report into the Enter a release comment text box
4. Click Submit

Acknowledge the Request

1. Click OK
Monitor Successful Completion of Request

Watch for the request to release the package content to finish successfully

1. Click on the **Code Stream** tab
2. Click on the **Pipeline Executions** tab
3. Watch for the **detailed status** to change to **Execution finished successfully**

Navigate Back to vRealize Operations and See Recovered Report

We'll navigate back to vRealize Operations and refresh our screen so we can see that our vRealize Operations report template has been recovered

1. Click on your open **vRealize Operations** browser tab
2. Click on the refresh icon
3. Note that the Awesome Cluster Capacity Risk Forecast Report is back in your vRealize Operations instance

Close the Browser

1. Click on the X to close the browser
Conclusion

Congratulations on completing Module 4!

In this module, we have seen that the vRealize Code Stream Management Pack for IT DevOps allows an organization to automate the lifecycle of vRealize Automation, vRealize Orchestrator, vCenter Server, vRealize Operations and vRealize Code Stream content (i.e. blueprints, forms, workflows, templates, pipelines, etc.) and move them across various product instances or tenants as part of their development, test and production stages.

The primary reason organizations should make use of this management pack is because blueprints, workflows and other types of vRA "content" is essentially code and, like any other code, should follow development best practices to ensure that it does not break anything in production. These best practices include developing and testing that code in a segregated environment before deploying it to production. One challenge today is that moving vRealize Automation content from one environment to another is often a manual, complicated, time-consuming and error-prone process. The management pack includes pre-built pipeline templates that automate and thus simplify that process, and it provides a foundation for Infrastructure as Code initiatives.

This concludes this lab. You may exit the lab, or you can select any module below which interests you most.

Module 1 - **vRealize Automation & vRealize Operations Integration** (45 minutes, Intermediate) This module will walks you through the integration between vRealize Automation and vRealize Operations, and will look at intelligent workload placement for vSphere virtual machines.

Module 2 - **vRealize Log Insight & vRealize Operations Integration** (30 minutes, Intermediate) This module will walk you through the integration between vRealize Log Insight and vRealize Operations, and will look at how vRealize Operations and vRealize Log Insight work together to provide a 360-degree troubleshooting view.

Module 3 - **vRealize Business & vRealize Automation Integration** (30 minutes, Intermediate) This module will take you through the integration between vRealize Business for Cloud and vRealize Automation and show you how to include cost information on blueprints and machines.
Conclusion

Thank you for participating in the VMware Hands-on Labs. Be sure to visit http://hol.vmware.com/ to continue your lab experience online.

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