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Lab Overview - HOL-1801-03-CMP - vRealize Suite Standard: Application-aware software-defined data center (SDDC) and multi-cloud management
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.

In this lab we will explore how to use vRealize Operations and vRealize Log Insight to troubleshoot issues, look for performance improvements, avoid disruption, and proactively manage the Software Defined Data Center (SDDC) with integrated performance and health monitoring across compute, network, storage and applications.

Lab Module List:

- **Module 1 - 360-degree troubleshooting with metrics and logs** (30 minutes) (Basic lab) This module will show the integration of vRealize Operations and vRealize Log Insight by troubleshooting a IIS service and reviewing the logs associated.
- **Module 2 - Health and performance monitoring** (30 minutes) (Basic lab) This module will examine objects in our lab environment that are experiencing performance issues due to CPU or Memory constraints.
- **Module 3 - Software defined data center and multi-cloud monitoring** (30 minutes) (Basic lab) This module will examine Health Monitoring and usage through dashboards.
- **Module 4 - Operating system and application monitoring** (30 minutes) (Basic lab) This module will examine the End Point Agent, Groups, Policies.
- **Module 5 - Extending monitoring through the stack - from physical to application** (30 minutes) (Basic lab) This module will examine the Blue Medora management packs and the mapping from virtual, physical to the applications.

Lab Captains:

- **Module 1 - Tony Welsh, Staff Systems Engineer, United States**
- **Module 2 - Tony Welsh, Staff Systems Engineer, United States**
- **Module 3 - Mark Plaza, Senior Systems Engineer, United States**
- **Module 4 - Mark Plaza, Senior Systems Engineer, United States**
- **Module 5 - Mark Plaza, Senior Systems Engineer, United States**

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

![Image of On-Screen Keyboard]

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

![Image of On-Screen Keyboard]

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 you lab has not changed to "Ready", please ask for assistance.
Module 1 - 360-degree troubleshooting with metrics and logs (30 minutes)
Introduction

In this module you will troubleshoot the performance issue of a web server. The IIS Server is experiencing high HTTP GET requests. Using vRealize Operations Alerts and Log Insight logs you will be able to review what is occurring and what type of information can be presented back to the other team members for their review.
Metrics and IIS example

This module uses the live version of vRealize Operations.

Open Firefox Browser from Windows Quick Launch Task Bar

Now let's start the lab module.

1. If Firefox is not currently open, click the Firefox icon on the Windows Quick Launch Task Bar.

Open vRealize Operations Manager Tab

1. Click the "vRealize Operations Manager - Live Instance"
Login to vRealize Operations Manager

vRealize Operations is integrated with VMware Identity Manager which we will use for this lab.

One of the major reasons for the change to vIDM is not only the reduced footprint and ability to easily scale, it’s also the added functionality. vIDM now brings a slew of new features, including:

- OTB 3rd party SAML Token Support
- OTB Smart Card Support
- Multi-factor authentication
- Login Auditing
- Major Scalability Improvements
- HA support (configured by wizard)

In addition, the vIDM identity stack supports many authentication protocols and methods (some of which were previously not supported):

- Username/password
- Kerberos
- SAML Authentication
- Smart Card / Certificate
- RSA SecurID
- RADIUS
- RSA Adaptive Authentication

1. Click the drop down and select "VMware Identity Manager"
2. Click "REDIRECT"
vIDM Login

The correct user and password will already be filled in.

1. Click "Sign in"

Live Instance of vRealize Operations

When you first log in to vRealize Operations you are presented with the dashboard showing the current Health of the 3 Hosts in our lab environment.
Set Browser Zoom Level

The lab environment has a default resolution of 1024x768. To minimize the need for extensive scrolling within the vRealize Operations user interface, please adjust the zoom level in Firefox.

1. Open the **Firefox Menu** drop down.
2. Set the desired zoom level. Typically 80-90% is sufficient to provide adequate screen space for vRealize Operations in the lab environment. Also making use of the full-screen option is recommended.

Search for IIS Server

1. Click on the "**magnifying glass**" in the upper right corner of vRealize Operations. This is the search icon as shown in the picture.
Search for IIS Server

1. Type **"IIS"** to begin the filtering items until the IIS WWW Service - web-02a.corp.local is visible.
2. Click **"IIS WWW Service - web-02a.corp.local"**

Summary Dashboard

1. Verify you are viewing the Summary page of the IIS WWW Service for web-02a.
2. If there were any alerts for the IIS service they would be listed in the highlighted area.
3. We need to create an alert for our web server so we receive notification when the HTTP Requests start. Click **"Alerts"**
Create Symptom Definition

First we need to define the Symptom definition. Symptoms are conditions that indicate problems in your environment. You create the symptom, then add that to alert definitions so you are notified of a problem when it occurs with your monitored objects.

1. Click the "v" to expand the Alert Settings menu.
2. Click "Symptom Definitions"
3. Click the "+" to create a new definition.

Base Object Type

![Diagram showing how to select a Base Object Type]
1. For the Base Object Type click the "v" to expand the adapter list.
2. Click the "v" for the EP Ops Adapter to expand the object types.
3. Scroll down until you find the WWW service and click "IIS WWW Service"

Configure WWW Symptom

1. Click the "v" to expand the UTILIZATION Metrics section.
2. Double-Click "Total Get Requests per Minute".
3. Type "WWW Service" for the Symptom Name.
4. Click the drop down menu and set to "Critical".
5. Type "100" as the threshold for the GET requests.
6. Click the "v" to expand the Advanced Section.
7. Change the Wait Cycle time to "1".
8. Change the Cancel Cycle time to "2".
9. Click "SAVE"
vRealize Operations has many predefined symptoms so let's filter to the one we created.

1. Type "www" in the filter field and then "Enter". The only item displayed should be the WWW Service definition we just created.

The next step is to create the alert definition.

Alert Definition

1. Click "Alert Definitions"
2. Click the "+" to create a new alert.
Alert Name

1. Type "**WWW Alert**" for the name of the new alert.

Base Object Type

Our Base object will be the virtual machine.

1. Click the "v" to expand the adapter list.
2. Click the "v" **vCenter Adapter** to expand the objects.
3. Scroll down and click "**Virtual Machine**".
Alert Impact

Verify the section 3. Alert Impact has the settings shown.
Alert Symptom

We want the alert to be triggered on the virtual machine when any of the descendant's have the symptom active. We do this by selecting the descendant as the object defined within the alert.

1. Click "v" and click "**Descendant**" to change the Defined On from Self to Descendant.
2. Click the "v" to list the available adapters.
3. Click the "v" **EP Ops Adapter** to expand the list of objects.
4. Scroll down and click "**IIS WWW Service**"

We want the alert to be triggered on the virtual machine when any of the descendant's have the symptom active. We do this by selecting the descendant as the object defined within the alert.

1. Click "v" and click "**Descendant**" to change the Defined On from Self to Descendant.
2. Click the "v" to list the available adapters.
3. Click the "v" **EP Ops Adapter** to expand the list of objects.
4. Scroll down and click "**IIS WWW Service**"
Alert Symptom

1. Click and drag the "WWW Service" Symptom to the right and drop into the Symptoms section of the workspace.
2. Click the "v" next to Count and change to "Any"
Alert Recommendation

Now you can create a new recommendation for the alert.

1. Click "v" to expand the Add Recommendation section.
2. Click the "+" to add a new recommendation.
New Recommendation

1. Type "Additional Web Servers are needed for High HTTP Requests"
2. Click "SAVE"

Drag Recommendation

1. Click and Drag the Recommendation to the alert definition section of the workspace.
2. Click "SAVE" to complete the Alert Definition.
URL Stress Program

Now that we have the Alert created, we start a tool called "URL Stress". It is a program used in this lab to send multiple HTTP Get requests to a web server which in this case is running on web-02a.corp.local. You will find URL Stress in a folder on the desktop called "HOL Files".

1. Double-Click on "HOL Files" to open the folder.

Start URL Stress Program

1. Double-Click "URLSTRESS.exe" to start the program.
URL Stress Parameters

Use the following parameters for URL Stress to send multiple HTTP GET requests to web-02a.corp.local.

1. Type "http://web-02a.corp.local" for the URL line.
2. Set the Threads to "100"
3. Set the Repeat Count to "10000"
4. Click "Run". You should then see the requests begin.

This will start generating a large number of HTTP GET requests to the IIS server. The next step is to create a chart to see the requests on a metric chart.
Reviewing Metric Chart History

There are many metrics available within vRealize Operations. We are expanding just a few of the categories such as AVAILABILITY, THROUGHPUT and UTILIZATION. For our example we are interested in the metric "Total Get Requests per Minute" which will graph the HTTP Get requests from the URL Stress tool.

1. Click the "All Metrics" tab.
2. Expand "All Metrics" by clicking the "v".
3. Expand "AVAILABILITY" by clicking the "v".
4. Expand "THROUGHPUT" by clicking the "v".
5. Expand "UTILIZATION" by clicking the "v".
6. Double-click on the metric "Total Get Requests per Minute". A graph will be created for that metric displaying the the last hour.
7. Select the symbol shown to expand the relationship window.

Note: The graph in your lab may look different that what is shown in this example.
Virtual Machine Graph

1. Click the "v" to expand the object types.
2. Scroll down
3. Click the "Virtual Machine" category.
4. Click "web-02a" The display will change to reflect the view of the virtual machine.
1. After a couple minutes the relationship chart should indicate a Health status of Red as shown above.
2. The chart will show a large number of Get requests per minute as shown in the highlighted area.
3. Let's see if an alert was triggered. Click the "Summary" tab.
Running the URLStress program created an alert. Let's review the details of the alert.

1. Click the "WWW Alert" link. This will take us to the alert where we can review the details.
Review the Web Server Issue

To review further details for this alert:

1. Click the "v" to expand the details on the descendants.
2. Click the "v" to expand the details of the service. Similar to the Metric chart you can see a time frame of how long the incident was occurring. Let's examine the logs collected with vRealize Log Insight.
3. Highlighted is the recommendation you created during the alert definition steps.
4. Click the link for "View Logs". Since vRealize Operations and Log Insight are integrated, the link will take you to the Log Insight product and display the logs that pertain to the IIS WWW Service.

Note: VMware Identity Manager may have logged you out depending on the amount of time which as passed, so may need to click "REDIRECT" to reautheticate. Click the “Login via SSO” button if it appears.
vRealize Log Insight - Interactive Analytics

The log entries for web-02a are displayed. In this example, there over 3,000,000 entries. Let's see how many of the entries are from the same source IP address.

1. Note: If you don't see log entries, click the drop-down arrow and change the time range to "Last hour of data"
2. Click the **Magifying Glass** to search.
Log Insight Events

1. Click "Event Types" to sort the entries according to the type of log entry.
2. Log Insight sorts the log entries into 7 event types as shown in yellow.
3. The top entry contains 2 million entries as shown in yellow. Notice the entry contains "GET" to port 80 indicating these are from the "URL Stress" program.
4. Click "Expand" to see the individual log entries.
1. Click "Field Table" to view the logs by the fields. You will notice that Log Insight creates a table of the main fields. Let's see if all these logs are IIS logs.
2. Click the "-" to expand the ms_product field.
3. Hover over the Blue Bar as shown. Notice the number of entries stays the same indicating they are all IIS logs.
Filter by Source

1. Click the "Source IP Address" on one of the entries. A dialog box appears.
2. Click 'Value is Not '192.168.120.40''

No Results

The last filter was to show entries that did NOT contain the IP addresses of '192.168.120.40' and as expected, there are none. This is because we started the URL Stress tool from the same IP address. This is simple demonstration of being able to filter in different ways. Lets delete the last filter to view all the entries again.

1. Click the "X" to clear the source filter.
2. Click the "Search" icon.
You should now have all of the entries visible again. Now we want to add this information to a dashboard which you can share with other team members so they can investigate further.

**Add Results to a Dashboard**

1. Click "Add to Dashboard" button.
2. Type a name such as "High HTTP Get Requests"
3. Click the Add button to add this chart to my dashboard.
4. Click the "Dashboards" icon as shown.

**Dashboards**
Once on the Dashboards screen, we need to expand "My Dashboards"

1. Click the "v" to expand My Dashboards.
2. Click "Dashboard 1" to display the contents we saved earlier. This provides a good view of the timeframe the GET requests occurred.
3. Click the time period to change to the "Last Hour of Data". Let's look at another Dashboard.
4. Click the "v" to expand the Microsoft IIS dashboards.

**IIS Dashboard**

1. Click the "General - Overview" for additional information with the IIS entries.

### Module Clean Up

To cleanup the environment for the next module, close the Firefox browser and URL Stress program.
Conclusion

In this module, we were able to troubleshoot the performance issue of a web server which was experiencing high IIS GET requests. With the integration of vRealize Operations and vRealize Log Insight there were several tools used to explore performance metrics and log data.

You've finished Module 1

Congratulations on completing Module 1.

Proceed to any module below which interests you most.

- **Module 1 - 360-degree troubleshooting with metrics and logs** (30 minutes) (Basic lab) This module will show the integration of vRealize Operations and vRealize Log Insight by troubleshooting a IIS service and reviewing the logs associated.
- **Module 2 - Health and performance monitoring** (30 minutes) (Basic lab) This module will examine objects in our lab environment that are experiencing performance issues such as CPU, Memory.
- **Module 3 - Software defined data center and multi-cloud monitoring** (30 minutes) (Basic lab) This module will examine Health Monitoring and usage through dashboards.
- **Module 4 - Operating system and application monitoring** (30 minutes) (Basic lab) This module will examine the End Point Agent, Groups, Policies.
- **Module 5 - Extending monitoring through the stack - from physical to application** (30 minutes) (Basic lab) This module will examine the Blue Medora management packs and the mapping from virtual, physical to the applications.

Evaluate vRealize Log Insight

Would you like to see how vRealize Log Insight could help better manager your applications and infrastructure? Request a free 60-day evaluation [here](#) to try it out in your own environment.

How to End Lab
1. If you do not want to continue with any other modules you can end this lab by clicking the **END** button.
Module 2 - Health and performance monitoring (30 minutes)
Introduction

The scenario for this lab is one that System Administrators encounter on a regular basis. The CPU usage on a Virtual Machine climbs above 90% causing the health to deteriorate. You will be introduced to vRealize Operations Health and Performance monitoring along with new troubleshooting workflows, alerts, custom grouping, custom dashboards/reports. Once you have reviewed the current situation of the high CPU usage you will change the number of CPU's to resolve the issue.
Health and performance monitoring with new troubleshooting workflows, alerts, custom grouping, custom dashboards/reports

In this module we will use the live version of vRealize Operations Manager to review alerts and proactively solve performance issues with guided remediation.

To get started, we need to open the live instance of vRealize Operations.

Open Firefox Browser from Windows Quick Launch Task Bar

1. Click the Firefox Icon on the Windows Quick Launch Task Bar.
Select vRealize Operations Manager - Live Instance

1. Select **vRealize Operations Manager - Live Instance** from the Lab Links menu.
Login to vRealize Operations with VMware Identity Manager (vIDM).

vRealize Operations is integrated with VMware Identity Manager which we will use for this lab.

One of the major reasons for the change to vIDM is not only the reduced footprint and ability to easily scale, it’s also the added functionality. vIDM now brings a slew of new features, including:

- OTB 3rd party SAML Token Support
- OTB Smart Card Support
- Multi-factor authentication
- Login Auditing
- Major Scalability Improvements
- HA support (configured by wizard)

In addition, the vIDM identity stack supports many authentication protocols and methods (some of which were previously not supported):

- Username/password
- Kerberos
- SAML Authentication
- Smart Card / Certificate
- RSA SecurID
• RADIUS
• RSA Adaptive Authentication

1. Click the Drop down and select "VMware Identity Manager" if this is not already set.
2. Click "REDIRECT"

**Sign in to Workspace One Domain**

1. The User and Password have already been entered in. Click "Sign In"
Home screen with Recommended Actions

As you can see our lab environment is a small environment but since it is a live environment we are able to make changes that are not possible in the historical instance. vRealize Operations now includes Dashboards to help you Get Started with Operations.

1. Click "Dashboards"

Set Browser Zoom Level

To minimize the need for extensive scrolling within the vRealize Operations user interface, please adjust the zoom level in Firefox.

1. Open the Firefox Menu drop down.
2. Set the desired zoom level. Typically 80-90% is sufficient to provide adequate screen space for vRealize Operations in the lab environment. Also making use of the full-screen option is recommended.
Getting Started

1. Welcome to Dashboards! The Getting Started page steps you through some useful categories of Dashboards and pages to help you start off. Highlighted are the Dashboards for the category "Operations".

   Click the following and you see other useful Dashboards for each category.

   2. Click "Capacity and Utilization"
   3. Click "Performance and Troubleshooting"
   4. Click "Workload Balance"
   5. Click "Configuration and Compliance"
Performance of Virtual Machine

We are going to focus on one VM called "Photon-OS-Container-Host" for this module. We will investigate the current state of the VM and the Parent Host. We will then create an alert and create a CPU load to trigger that alert to use actionable items to change the number of CPU's.

1. Click "Getting Started" to go back to the Dashboard categories.
2. Click "Capacity and Utilization" categories
3. Scroll down until you can select the "VM UTILIZATION" dashboard.
4. Click "VM UTILIZATION"

VM Utilization Dashboard

The VM Utilization Dashboard is displayed but probably isn't showing the VM we are interested in.
1. Click "Photon-OS-Container-Host". The dashboard should now show the results for the VM we are interested in.

2. **Scroll Down** to see the remaining chart graphs. Take note the first graph which is CPU/Demand and it is currently near zero. There may be some previous history from the VM being powered on earlier.

3. Click the link for "Photon-OS-Container-Host" to view more details about the VM.

**Details for Photon VM**

![Photon VM Details](image)

The Summary page is currently displayed and shows the overall health regarding the Photon-OS-Container-Host VM. Review the following areas.

1. This area shows the Health Status of the VM.
2. This area contains performance metrics similar to what we saw on the graphs.
3. This area will display any alerts that pertain to the VM.
4. **Scroll to the bottom** of the page to see additional details.
1. The bottom part of the dashboard shows additional information on the host running the Photon VM. In this case the VM is running on a host "esx-01a.corp.local" and its health is green, meaning good.
2. Let's review additional information about the Photon VM. Click "more" to expand the available tabs.
Analysis of VM

1. Click "Analysis" to see details about the CPU and Memory usage. Notice the CPU Demand and Usage are both at a minimal level.

For our example we want to be alerted of a high CPU condition so we will next create an alert when the condition occurs.
Symptom Definition

First we need to create Symptom Definitions. Symptom Definitions is the method to have vRealize Operations Manager identify problems on objects in your environment and then trigger alerts when conditions occur that qualify as problems. In our scenario the condition to monitor is the high CPU workload on the virtual machine "Photon-OS-Container-Host". Creating one or more of the symptoms can then be added to an alert definition. When a symptom is triggered, vRealize Operations will issue an alert.

1. Click the "Alerts" tab.
2. Click the "v" symbol as shown to expand the Alert Settings.
3. Click "Symptom Definitions"
4. Click "+" to create a new Symptom Definition.
Create New Symptom Definition

1. Click "v" to expand the adapter list.
2. Click "v" to expand the vCenter Adapter object types.
3. Scroll down and click Virtual Machine when listed.

CPU Usage definition

Configure the Symptom Definition with the following parameters.
1. Type a metric filter of "CPU|USAGE"
2. Click the "v" to expand the resulting metrics
3. Double-Click "Usage (%)"
4. Type "High CPU" for the symptom name.
5. Set the definition to "Critical"
6. Type "95" as the value the symptom has to exceed to be triggered.
7. Click "v" to expand the "Advanced section"
8. Modify the "Wait Cycle" to "1" The Wait Cycle field means that the trigger condition should remain true for this number of collection cycles before the symptom is triggered, which means that the symptom is triggered in the same collection cycle when the condition became true.
9. Modify the "Cancel Cycle" to "2" The Cancel Cycle field means that the symptom is canceled after the trigger condition is false for this number of collection cycles after which the symptom is cancelled, which means that the symptom is canceled in the same cycle when the condition becomes false.
10. Click "SAVE"

**Alert Definition**

Now to create the Alert definition. Alert definitions are a combination of symptoms and recommendations that you combine to identify problem areas in your environment and generate alerts.

1. Click "Alert Definitions"
2. Click "+" to create a new definition.
1. Type **"High CPU Alert"** for the alert name and description.
2. Click "->" to expand section "**2. Base Object Type**".

---

**Alert Name**

**Alert Definition Workspace**

1. **High CPU Alert**

2. **Base Object Type**

3. **Alert Impact**

4. **Add Symptom Definitions**

5. **Add Recommendations**
1. Click the "v" vCenter Adapter to expand the object list, scroll down and select "Virtual Machine" from the list.
2. Click the "v" to expand section "4. Add Symptom Definitions"
Alert Impact

These settings and their definitions are shown below. These settings determine how your alert will be classified and triggered.

Note: For our scenario we will use the defaults.

1. The Impact field will categorize the alert as health, risk or efficiency problem.
2. The Criticality field is how serious the problem is.

For criticality you can select one of the following values.

- Info. Informational purposes only. Does not affect badge colors
- Warning. Lowest level. Displays yellow.
- Immediate. Medium level. Displays orange.

3. The Alert Type and Subtype fields can be used to classify the alert. One example would be using these fields as information to route the alert to the appropriate personnel and department in your organization.
4. Finally choose settings for your cycle, which are data collection intervals. Wait cycle indicates how many cycles should pass where your symptoms exist before triggering the alert. Cancel Cycle indicates how many cycles without symptoms should pass before the alert is cancelled.
Add Symptom Definition

1. Type "**high cpu**" and press the "**Enter Key**" to filter the Symptom Definitions to what we just created in the previous step.
2. Drag "**High CPU**" to the Symptom Definition section on the workspace as shown.
3. Click "**v**" to expand section "5. Add Recommendations".

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Add Recommendation

Finish the definition by adding a recommendation which can be used to modify the number of CPU's required for the VM.

1. Type "cpu" and press the "Enter Key" to reduce the recommendations to CPU related.
2. Drag and Drop the "Add more CPU Capacity for this virtual machine" recommendation in the worksheet as shown.
3. Click "SAVE"

Alert List

Verify the Alert exists.

1. Type "High CPU" and press the "Enter Key" to reduce the alert definition list.
2. Click the "Magnifying Glass icon" which is the Search tool.
Search for VM

1. Type "photon" to search for objects beginning with photon
2. Click "Photon-OS-Container-Host" to go to the summary page of this VM.

All Metrics Graphs

Setup the CPU and Memory graphs by completing the following.

1. Click "All Metrics"
2. Click "v" to expand the CPU metric section.
3. Double-Click "CPU/Usage (%)" to create a chart.
4. Click "v" to expand the Memory metric section.
5. Double-Click "Memory/Usage (%)" to create a chart for memory usage.
6. Click the "^" symbol as shown to open the relationship window. This is helpful to see when an alert is triggered.
7. In our example the color of the VM Health badge changes from green to red. However the color can be green, yellow, orange or red depending on the severity of the alert.

**Putty icon**

![Putty Icon](image)

1. Click the "Putty" icon to start a putty session to the Photon-OS-Container-Host in order to start the CPU load condition.

**Putty to Photon-OS-Container-Host**

![PuTTY Configuration](image)

1. Click the saved session " photon-os-container-host.corp.local"
2. Click "Load"
3. Click "Open" to start the putty session.
Start CPU Load

1. Type "`cat /dev/zero > /dev/null`" and press the "Enter Key" to start the CPU load.

Refresh Metric Graphs

1. Click "Refresh Icon" after a couple minutes. The graph will start to show the increase in CPU Usage on the metric chart. Once CPU Usage is above 95% a alert should be generated.
2. Click "Refresh" to update the entire Operations screen.
3. Click "Summary" to move to the Summary page.
As shown, the Health status of the VM has changed to critical and a alert has triggered regarding the high CPU Usage.

Note: You may see additional alerts for this VM as there are other alerts active within our environment.

1. Click the link to "High CPU Alert" for more details about the alert.
Alert details

The alert details page is displayed and we can review further information about the symptoms.

1. Click the "v" to expand the Symptoms page. You can see the threshold highlighted in yellow was set was 95% and the usage was greater than 96%. Also the recommendation shown in yellow is to add more CPU capacity for this virtual machine.

2. Click "RUN ACTION" to change the CPU from 1 vCPU to 2.

The ability to run actions and make VM configuration changes within vRealize Operations can save time because it doesn't require logging into vCenter. This ability to execute the actions is controlled by permissions in vROps.
**Action**

Change the number of CPU's from 1 to 2 by making the following changes.

1. Type "2" for the New CPU count.
2. Check the box for "Power Off Allowed"
3. Click "BEGIN ACTION" to start the changes to the VM.

**Recent Tasks for CPU Count**
Once the Action is started, a dialog box is displayed to see the status of the task.

1. Click the link "34ac9996-da2a-468f-80e6-07cefacd14d2" as shown. Your lab environment may have a different task ID(s)

Recent Task List

1. Click the "Set CPU Count for VM" task. Additional details are displayed below regarding the operations that were completed.
2. Click the link for the VM "Photon-OS-Container-Host" to take you to the summary page of the VM.
Summary Screen

The Summary screen will automatically be updated after a few minutes showing the health is once again green and the alert has cleared.

Configuration Changes - 2 CPU's
1. To see the configuration changes, scroll down on the Summary page.
2. Notice the number of vCPU's is now set to 2.

**Module Clean Up.**

Before leaving this module let's reset the environment by closing the putty session and the Firefox browser.
Conclusion

For this module we introduced vRealize Operations Health and performance monitoring along with new troubleshooting workflows, alerts, custom grouping, custom dashboards/reports.

You’ve finished Module 2

Congratulations on completing Module 2.

Proceed to any module below which interests you most.

- **Module 1 - 360-degree troubleshooting with metrics and logs** (30 minutes) (Basic lab). This module will show the integration of vRealize Operations and vRealize Log Insight by troubleshooting a IIS service and reviewing the logs associated.
- **Module 3 - Software defined data center and multi-cloud monitoring** (30 minutes) (Basic lab) This module will examine Health Monitoring and usage through dashboards.
- **Module 4 - Operating system and application monitoring** (30 minutes) (Basic lab) This module will examine the End Point Agent, Groups, Policies.
- **Module 5 - Extending monitoring through the stack - from physical to application** (30 minutes) (Basic lab) This module will examine the Blue Medora management packs and the mapping from virtual, physical to the applications.

Evaluate vRealize Log Insight

Would you like to see how vRealize Suite Standard could help better manager your applications and infrastructure? Request a free 60-day evaluation [here](#) to try it out in your own environment.

How to End Lab

If you do not want to continue with the other modules, you can end your lab by clicking on the **END** button in the lab environment.
Module 3 - Software Defined Data Center and Multi-Cloud Monitoring (30 minutes)
Introduction to SDDC and Multi-Cloud Monitor (Hybrid Cloud)

VMware’s Cloud Management Platform delivers the most complete solution for managing a heterogeneous, hybrid cloud.

In this module, we will show you how vRealize Operations Manager (vROps) can monitor software defined datacenter (SDDC) technologies and multiple public clouds.

vRealize Operations brings together all management functions of performance management, capacity planning, topology analysis, and troubleshooting in one integrated, and extensible platform. Below are some of the popular ways to easily keep track of your entire infrastructure (on-prem and/or off-prem).

**Dashboards**

Dashboard are a feature within vRealize Operations that can provide a quick overview on the performance and condition of your infrastructure. The data and analysis are presented through customizable dashboards through a series of widgets.
Alerts and Reports

Alerts and Reports are other options that can help you monitor your environment regardless of location (on-prem vs off-prem).

- You can monitor your environment for generated **alerts** from a single view. The alerts are generated when the symptoms in the alert definition are triggered, letting you know when the objects in your environment are not operating within the parameters you defined as acceptable.
- A **report** is a scheduled snapshot of views and dashboards. You can create it to represent objects and metrics from your entire environment. This is another great way to understand how your environment is operating regardless of location.
Monitoring the Health of your SDDC and Multi-Cloud Environment

Let's dive deeper into some of the dashboards that are available to monitor your SDDC environment (on-prem).

The first one we will take a look at relates to how your Management environment is working (Monitor the Monitors). The second one will give you visibility into your entire environment allowing you to drill down where needed for the problem areas.

Launch the Live vRealize Operations Manager Console

Open Firefox Browser from Windows Quick Launch Task Bar

1. Click on the Firefox Icon on the Windows Quick Launch Task Bar.

Live vRealize Operations Manager Console

1. Select Live vRealize Operations Manager from the browser toolbar or from the shortcut in the browser
Log In Page

Authenticate via the VMware Identity Manager.

1. Choose **VMware Identity Manager** from the drop down if not already selected
2. Click on **Redirect**
1. Click Sign in
Set Browser Zoom Level

The lab environment has a default resolution of 1280x800. To minimize the need for extensive scrolling within the vRealize Operations user interface, please adjust the zoom level in Firefox.

1. Open the Firefox Menu drop down.
2. Set the desired zoom level. Typically 80-90% is sufficient to provide adequate screen space for your lab environment. Also making use of the full-screen option is recommended.

SDDC Management Health Dashboard

This dashboard is made available through a solution management pack. The solution bundles the capability of monitoring various application components of the SDDC management stack. The intent is to provide a Single Pane of Glass to isolate the health problems in the applications running on the SDDC management plane.

Includes the following:

- SDDC Health Management : Health Overview
- SDDC Health Management : Historical Trend
- SDDC Health Management Apps : Infrastructure View
- SDDC Health Management Apps : Service View
- Health based alerts
- Config based alerts
- Top Recommendations
Navigate to Dashboards

1. Click on the **Dashboards** button

Accessing the SDDC Management Health Dashboard

![Accessing the SDDC Management Health Dashboard](image-url)
1. Click on the **All Dashboards** drop-down.
2. Hover over **SDDC Health Dashboards**
3. Click **SDDC Management Health Overview** to open that dashboard

### Understanding the SDDH Health Overview Dashboard

1. The first widget pane explains the health status of your SDDC Environment through a series of indicators (Red, Yellow, Green). In this example you will see the vRealize Suite of products are performing as expected (vRealize Log Insight, vRealize Business for Cloud, vRealize Operations, vRealize Automation).
2. The second widget will show you how the infrastructure servers are performing.
3. The last widget will show you how the services are running on each node and the alerts associated with each one, if any.
4. If you had any objects that were performing poorly or had health related risks they would show up in the dashboard with a different color (yellow = warning, red = Critical).
1. Click on the All Dashboards drop-down.
2. Hover over Operations to see the Operations dashboards
3. Click Operations Overview to open that dashboard
Viewing the Operations Overview dashboard

1. The first widget pane shows you what you have and the quantity trends for each category. (Datacenters, Clusters, Hosts, Running VM's, etc.)
2. The next widget allows you to select a Datacenter so you can dive deeper into the associated clusters along with the alerts (yellow = warning, red = Critical). In our lab we have just a single Datacenter.
3. The vm information gives you a view on the top 15 vm’s and how they are performing. In this case we don't have high utilization indexes but in a production environment this would be a good way to identify problem areas.
Managing Public Clouds

One of the key facets of Intelligent Operations is the ability to manage your operations across multiple platforms, such as virtual and cloud infrastructure. As you move your environment to a Public or Hybrid cloud model you will still need the capability of managing your entire infrastructure in the same way you do today (external and internal). vRealize Operations allows you to do that from a centralized location while leveraging your existing investment and expertise.

It is quite possible a single application could span an organization’s internal vSphere private cloud with, for example, an instance of Amazon Web Services and you need to be able to maintain the appropriate levels of visibility and control.

In this module we look at how we connect to Amazon and monitor the public cloud resources with the "Management Pack for AWS" for vROPS.

The Management Pack Marketplace

Management Packs extend vRealize Operations to manage objects outside of traditional vSphere environments. Like most of the Management Packs they are very simple to install and configure. Note that management pack extensibility does require vRealize
Operations Advanced or Enterprise editions. See the VMware Solution Exchange website for more details.


Let’s take a look now at the Management Pack for AWS and how it can provide you greater visibility and control of the Public cloud environments. We will use the Blue Medora HVM instance of vRealize Operations in our lab since it is already configured with several management packs.

**Return to the Lab Start Page**

**Access the Blue Medora vRealize Operations Manager Historical View Mode UI**

1. Click the **HOL-1801 Lab Links** browser tab to return to the launch page
2. Click the **vRealize Operations Manager - Blue Medora Management Packs** link in the browser to open it in a new tab
Set Browser Zoom Level

The lab environment has a default resolution of 1280x800. To minimize the need for extensive scrolling within the vRealize Operations user interface, please adjust the zoom level in Firefox.

1. Open the Firefox Menu drop down.
2. Set the desired zoom level. Typically 80% is sufficient to provide adequate screen space for your lab environment. Also making use of the full-screen option is recommended.
Log In

1. Select **Local Users** from the drop down.

   ID = admin  
   Password = VMware1!

2. Click **LOG IN**
Review the Management Pack for AWS properties

For this module we will use a management pack that is already installed and configured in the Lab. If you have any question about how to install the management packs, please refer to the VMware vRealize Operations Manager Information Center web site and search for "Configuring Additional Solutions and Adapters in vRealize Operations Manager" for further details.

This step is provided to show how the AWS management pack is configured.

1. Navigate to Administration.
2. Click on Solutions.
3. Scroll to find the MP for AWS management pack.
4. Click the MP for AWS to select it.
5. Select the management pack and click on the Configure Icon.
Review the Management Pack for AWS settings

Manage Solution - MP for AWS

1. Click on the "Edit Credential" icon to review the AWS credentials that were used. Select Cancel. Do NOT Change this setting.
2. Click on Advance Settings to review AWS additional settings.
3. Click on Close button without changing anything.
The AWS Management Pack comes with seven dashboards to provide you with the additional visibility and control that you require.

To view the dashboards included with the AWS Management Pack:

1. Click on **Dashboards**
2. Click the **All Dashboards** drop-down
3. Hover over the **AWS** category
4. Click on **AWS Instance Utilization**
Exploring the AWS EC2 Instance Utilization

The VM Utilization Dashboard is made up of several widgets to display, at a glance, an ordered list of VMs in your cloud environment. This list includes metrics such as CPU Usage and Memory Usage that can be indicative of poor performance.
The vRealize Operations AWS Management Pack brings a lot of metrics per object type for each Public Cloud.

To see the CPU Utilization for an AWS EC2 instance

1. Select the top VM listed in the CPU Usage dashboard by double clicking the EC2 instance name

EC2 Instance - CPU Utilization Average ... continued.

Let's drill down deeper...
1. Click **All Metrics** to see the available metrics for the object
2. Double-click **CPU Utilization Average** to see the historical graph for that metric

Now, you are able to get more details on the metric and make an analysis on CPU utilization regardless of where the VM resides.

### Additional AWS Dashboards

Feel free to explore the other AWS dashboards that are included with the management pack. To view the other dashboards,

To view the other dashboards included with the AWS Management Pack,

1. Click on **Dashboards**
2. Click the **All Dashboards** drop-down
3. Hover over the **AWS** category
4. Click on any other dashboards to explore them

### Summary

In this module we explored the integration of vRealize Operations with AWS and the dashboards and metrics that come out of the box with the management packs for both on-premises vSphere and for AWS clouds.
Conclusion

You have completed **Module 3 - Software Defined Data Center and Multi-Cloud Monitoring**.

You should now have an understanding of:

- How to use vROPS to centrally manage your environment (on-prem and off-prem)
- Using Dashboards and how they play a role in monitoring your environment
- Using Alerts and Reports to identify issues with your environment

Feel free to proceed to any module below which interests you most:

**Module 4 - Operating system and application monitoring**

**Module 5 - Extending monitoring through the stack - from physical to application**

**Evaluate vRealize Log Insight**

Would you like to see how vRealize Suite Standard could help better manager your applications and infrastructure? Request a free 60-day evaluation [here](#) to try it out in your own environment.

**How to End Lab**

If you wish to conclude your lab at this time click on the **END** button. This will terminate your lab and all progress. Do this only if you wish to **NOT** proceed with the other modules.
Module 4 - Operating system and application monitoring (30 Minutes)
Introduction

In this module, we will explore how to monitor the Operating System through the End Point Operations (EPOps) feature of vRealize Operations.

As you may already know, the standard vCenter adapter for vRealize Operations allows you to perform detailed monitoring of all layers of your virtualization infrastructure, including virtual machines, hosts, clusters, datastores and virtual networking. While it also offers some limited insight into the guest, such as disk space utilization, it lacks some of the operating system specific metrics.

This is where the End Point Operations feature comes into play. End Point Operations uses a Java-based agent that is installed in the guest OS that allows you to expose OS-specific metrics, such as OS CPU usage, memory usage and swapping.

Another very important feature of End Point Operations is that it doesn't have to run on a virtual machine. You can install the agent on physical hardware (as long at the OS is supported) and bring in physical machines under the vRealize Operations single pane of glass.

How it works

Typically, your vRealize Operations system collects information about your virtual machines by querying the vCenter API. When you implement the Endpoint Operations feature, you augment the data collected from vCenter with information from inside the OS.

This is done by installing an agent on the machine (virtual or physical). The agent is a small program that probes the OS and hardware and sends data back to vRealize
Operations. Within vRealize Operations, metrics from vCenter are seamlessly integrated with those coming through Endpoint Operations.
Exploring Endpoint Operations

In this section, we are going to look closer at what the End Point Operations feature offers and how to use it.

Launch the Live vRealize Operations Manager Console

Open Firefox Browser from Windows Quick Launch Task Bar

1. Click on the Firefox Icon on the Windows Quick Launch Task Bar.

Live vRealize Operations Manager Console

1. Select Live vRealize Operations Manager from the browser toolbar or from the shortcut in the browser.
Authenticate via the VMware Identity Manager.

1. Choose **VMware Identity Manager** from the drop down if not already selected
2. Click on **Redirect**
VMware Identity Manager Authentication

User name = hol
Password = VMware1!
Domain = corp.local

1. Click Sign in
Set Browser Zoom Level

The lab environment has a default resolution of 1280x800. To minimize the need for extensive scrolling within the vRealize Operations user interface, please adjust the zoom level in Firefox.

1. Open the Firefox Menu drop down.
2. Set the desired zoom level. Typically 80-90% is sufficient to provide adequate screen space for your lab environment. Also making use of the full-screen option is recommended.

Finding a virtual machine and its associated OS metrics

Let's find a virtual machine and explore its relationships to the OS metrics collected by the End Point Operations solution.

1. Click on the Magnifying Glass to expand the search field at the top right corner, type web-01a. A list of matching objects will show up.

Note that several object types have "web-01a" in their name. In this case:
• EP Ops Agent - This object is the Endpoint Operations agent itself. It monitors things like the number of metrics sent per minute by the agent to the server, the time spent fetching the metrics and the agent's JVM memory usage statistics.

• Linux - This is the operating system that is being monitored by the Endpoint Operations agent. It monitors things like availability, disk and file system I/O statistics, network interface Rx and Rx statistics, and CPU memory and disk utilization.

• MultiProcess - This is the web server process information being monitored by the Endpoint Operations agent. In this case it is an Apache web server service running on the web-01a VM. IT monitors things like CPU and memory usage of the Apache service.

• Virtual Machine - This is the VM itself. Information about the Virtual Machine object is collected directly from vCenter and does not depend on the Endpoint Operations agent.

2. From the list, click the web-01a.corp.local link under the Linux section.

You will be taken to the Summary page for the operating system.

Locating the OS metrics

1. Click the All Metrics Tab.
2. Expand the Show Object Relationship pane by clicking on the double down arrow.

This depicts the relationships to the operating system - parents are the virtual machine and the set of all Linux operating systems and children are the Endpoint Operations agent and the Web Service Process in this case. These relationships are automatically discovered. You can traverse up the vSphere infrastructure tree by:

3. Double-click on the web-01a VM icon to see its relationships
VM Relationships

Here you see the discovered relationships to the VM. The web-01a.corp.local is the operating system object that you just navigated from. You can also see the datastore child and host and vSphere distributed port group parents that come from vCenter along with several service types and services that come from the Service Discovery Management Pack that is also installed in the lab pod. Feel free to traverse up and down the relationship trees by double-clicking on the icons representing the various objects.

When you are ready to continue,

1. Click the **Reset To Initial Object** icon to return focus to the Linux operating system object

Drilling down into the OS specifics

The bottom pane shows the available metrics and properties for the Linux operating system object.
1. Expand the **All Metrics --> UTILIZATION** category and double-click on **Percent Used Memory (%)** to display a graph of that metric. You can double-click any other metrics to add their metric graphs as well.

2. You can change the time scale of the metric graphs by clicking the calendar icon if you want.

Remember that these metrics are collected from the operating system via the Endpoint Operations agent. If you look at metrics for the virtual machine object (the parent of this Linux OS object) you will see metrics that are collected from vCenter. CPU and memory metrics will usually differ between the Endpoint Operations metrics from the OS and the vSphere metrics from vCenter. This is to be expected because they each have a different perspective of the resource usage.

### Adding process-level monitoring

In addition to the standard OS metrics, such as CPU, disk, network and memory utilization, you may also monitor specific processes running on a machine. This will give you availability and utilization on a per-process basis.

The processes you wish to monitor are selected using a simple query language. You can search using process name, program path, pid file, pid and a number of other criteria. In our example, we’re going to look at the VM Tools process. We do that by matching anything that contains the string "vmtoolsd" in the process name. The "ct" operator in "State.Name.ct" stands for "contains". If you want an exact match, you would use "eq" (for "equals").

1. On the **web-01a.corp.local** Linux OS resource you left open in the last step, click on the **Actions** menu.
2. Select **Monitor OS Object**
3. Select **Monitor Processes**. A dialog box should pop up.
Edit the process monitoring rule

1. In the Display Name field, type VM Tools.
2. In the process.query field, type State.Name.ct=vmtoolsd.
3. Click OK.

The browser will auto reload and you should see a new resource called VM Tools. It will probably show up with a gray status icon at first, since it takes a few minutes for the first data to be collected.
Look at an existing process

Since it will take a few minutes for the metrics to be collected for the process monitor we just set up, let's look at one that was already defined here.

1. Click on the **Web Service process** to bring focus to that object

Viewing process-level metrics
1. In the metrics list on the left, expand **UTILIZATION** and double-click on **Cpu Usage (%)** and **Memory Size (bytes)** to display the historical graphs for those metrics.

The graphs show the CPU and memory utilization for the specific web services process running in the web-01a server - in this case the process was defined as **State.Name.eq=httpd** since that is the Linux process name for an Apache web server service.

2. At this point, the VM Tools process monitor that you defined should be collecting data and its indicator should be green. If so, click on the icon representing that process and you can see metrics specific to the VM Tools process on this Linux server.

**Conclusion**

You should now be able to utilize the End Point Operations solution to see how operating system metrics and even process-level metrics can be collected via the End Point Operations Agent, and how to correlate that with the overall operating system statistics over different time ranges. Note that you could use these metrics in vRealize Operations super metric definitions, alerts, reports and dashboards.
Application Monitoring

One of the key features of Intelligent Operations is the ability to manage multiple applications, such as MS SQL Server, Oracle, SAP, and others.

In this module, we look at how to extend vRealize Operations Manager with management packs for Microsoft SQL Server, Oracle Database and SAP for resources monitoring. We will explore dashboards and metrics installed from management packs for vRealize Operations. Note that these are just examples of the dozens of available management packs for vRealize Operations Manager.

vRealize Operations Management Packs

Management packs extend vRealize Operations to manage external objects such as MS SQL Server, Oracle, SAP, and others. Management packs for vRealize Operations are simple to install and configure. In general, the steps are listed below. For this lab, the management packs have already been downloaded and installed. You will not be required to complete the steps below. They are only listed for reference.
**Note:** Different management packs require different editions of vRealize Operations Manager - Standard, Advanced or Enterprise. See the vRealize Operations data sheet for specific information.

1. Download management packs or find links for more information from [https://marketplace.vmware.com](https://marketplace.vmware.com)

2. Log in to the **vRealize Operations Manager** console and select the **Administration** tab.

3. Add a solution importing the management pack installer that was previously downloaded.

The instructions for installing new management packs is defined in [VMware's Information Center](https://www.vmware.com) website.

Let's start taking a look now at the management pack for SQL Server and how it can provide greater visibility and control of the MS SQL Server Application.

**Launch the vRealize Operations Manager - Blue Medora Management Packs Console**

Note that this instance of vRealize Operations Manager is running in Historical View Mode (HVM) in the lab environment. It is not collecting any live data but is replaying data that was captured in a live environment in the past. Because of this, some vRealize Operations functionality is disabled. Also, you may find screens within vRealize Operations Manager that show license warning watermarks. This is to be expected in this lab pod.

Blue Medora is an integration development house that builds many of the vRealize Operations management packs. See their website for more information on their [True Visibility Suite](https://www.bluemedora.com).
Blue Medora vRealize Operations Manager Console

1. Return to the **HOL-1801 Lab Links** browser tab
2. Select **vRealize Operations Manager - Blue Medora Management Packs** link to launch the UI in a new tab

**Set Browser Zoom Level**

The lab environment has a default resolution of 1280x800. To minimize the need for extensive scrolling within the vRealize Operations user interface, please adjust the zoom level in Firefox.

1. Open the **Firefox Menu** drop down.
2. Set the desired zoom level. Typically 80-90% is sufficient to provide adequate screen space for your lab environment. Also making use of the full-screen option is recommended.
Log In

Login with the local admin credentials.

1. Select **Local Users** from the drop down.

   User name = admin
   Password = VMware1!

2. Click **LOG IN**
The Microsoft SQL Server Management Pack

One of the vRealize Operations management packs available from Blue Medora is the Management Pack for Microsoft SQL Server. This management pack retrieves data from Microsoft SQL Server to monitor, manage, and collect key performance metrics regarding SQL Server resources. During each data collection cycle, the Management Pack queries the Microsoft SQL Server using JDBC to obtain data regarding server resources.

The Management Pack for Microsoft SQL Server can collect performance, health, availability, and capacity data for a Microsoft SQL Server and its related resources. The following resource kinds are recognized within the Microsoft SQL Server Management Pack:

- Microsoft SQL Server Adapter Instance
- Microsoft SQL Server Always On Availability Group
- Microsoft SQL Server Database
- Microsoft SQL Server Instance
- Microsoft SQL Server Query
- Microsoft SQL Server Tag

Review the Management Pack for Microsoft SQL Server Solutions properties

For the purpose of this module, the management packs have already been installed. If you have any questions about how to install the management packs, please refer to the VMware vRealize Operations Manager Information Center web site and search for "Configuring Additional Solutions and Adapters in vRealize Operations Manager" for further details.
In this Lab everything has already been configured. You do NOT need to change anything.

This step is provided to let you know how you will insert the MSSQL Server credentials and settings for vRealize Operations Monitoring.

1. Select **Administration**.
2. Click on **Solutions**.
3. **Scroll** down the list of solutions and select **Microsoft SQL Server**
4. Click on the **Configure** Icon. There are no changes needed for this lab. Once you review the available configure options you can select "**Close**" (not shown)

### Application Monitoring Dashboards

Out of the box, the application management packs come with dashboards to provide you with the visibility into the application performance.

1. Click the **Dashboards** tab.
2. Click on the **All Dashboards** drop down.
3. Hover over **Microsoft SQL Server**.
4. Click **Microsoft SQL Server Overview** to open that dashboard.
Application Monitoring Dashboards - Microsoft SQL Server Overview

In this environment there are two SQL Server instances and a total of 11 databases. The color of each box represents the health of each component (server instance or database in this case).

Double-clicking any of the heatmap boxes representing the objects will take you to that object's Summary page.
MS SQL Server Details Dashboards

1. Click the All Dashboards drop down.
2. Hover over the Microsoft SQL Server dashboard group.
3. Hover over the Details dashboard group.
4. Click Microsoft SQL Server Top-N SQL Database Usage to open that dashboard.

Let's explore what additional information is available from the dashboards provided by the Blue Medora Management Pack.
Microsoft SQL Server Details Dashboards - Top-N SQL Database Usage

Here, you can see several Top-5 widgets showing databases order-ranked by various metrics. It gives you a quick view on the performance and utilization for all MS SQL DB Instances running in the environment.

There are several other dashboards provided by the Microsoft SQL Server management pack that show various performance and utilization metrics for database servers, databases and queries in the Microsoft SQL Server environment.
Microsoft SQL Server Alert Definitions

The Microsoft SQL Server management pack also includes a number of alerts (and associated symptoms). To view all alert definitions:

1. Expand **Alert Settings** and then click **Alerts**.
2. Click **Alert Definitions**.

Filter Alert Definitions

To filter the list of alerts to only show those defined by a particular management pack:

1. In the top-right corner of the alert definitions page, click the **All Filters** dropdown.
2. Click **Defined By** to set the filter field.
Show Only Microsoft SQL Server Alert Definitions

To filter the list of alerts to only show those defined by the Microsoft SQL Server management pack:

1. Type **Microsoft SQL** in the filter field.
2. Press the **Enter** key.

View the Microsoft SQL Server Alert Definitions

Note that there are 21 alerts that were added to the vRealize Operations Manager instance by the Microsoft SQL Server management pack. Feel free to browse through the list of alerts.

The Oracle Database Management Pack

The Management Pack for Oracle Database is an embedded adapter for vRealize Operations (vROps) that monitors Oracle Database systems remotely through a JDBC connection to retrieve performance data regarding Oracle Database resources.
The Management Pack can collect performance data, relationships (associations), and events for the following Oracle Database resources:

- Oracle DB Adapter Instance
- Oracle DB Environment
- Oracle DB Database
- Oracle DB Instance
- Oracle DB Tablespace
- Oracle DB Query

**Application Monitoring Dashboards - Oracle Applications**

As we have explored application monitoring for MSSQL Server, we can do the same for the Oracle DB dashboards. On the Dashboards tab:

1. Click the **All Dashboards** drop down.
2. Hover over the **Oracle DB** dashboard group.
3. Click **Oracle Overview** to view that dashboard.
1. Here, you can see the databases and instances associated with Oracle.

Note the databases that were found. One is defined on-prem (vSphere) and the other is defined off-prem (AWS) yet vRealize Operations Manager can manage all instances and provide you a unified view.
Similar to the previous steps, navigate to the Oracle IOPS dashboard. In this dashboard you can see the "IOPS" details based on the selected object.

1. Single Click the **Oracle-Prod-Int (TRANS) instance selector** to show more details
2. The **Oracle Instance IOPS** will change based on your selection

If you wish to see the details for the off-prem DB in AWS, follow the same steps to have the IOPS details updated with it's metrics.
Conclusion

You have completed Module 4 - Operating System and Application Monitoring

You should now have an understanding of:

- Expand vRealize Operations monitoring capabilities through the use of management packs
- How to use vRealize Operations to manage and monitor Operating Systems
- Manage and monitor applications such as Microsoft SQL and Oracle and many, many others

Feel free to proceed to any module below which interests you most:

Module 1 - 360-degree troubleshooting with metrics and logs (30 minutes)

Module 2 - Health and performance monitoring (30 minutes)

Module 3 - Software Defined Data Center and Multi-Cloud Monitoring (30 minutes)

Evaluate vRealize Log Insight

Would you like to see how vRealize Suite Standard could help better manager your applications and infrastructure? Request a free 60-day evaluation [here](#) to try it out in your own environment.

How to End Lab

If you wish to conclude your lab at this time click on the END button. This will terminate your lab and all progress. Do this only if you wish to NOT proceed with the other modules.
Module 5 - Extending monitoring through the stack - from physical to application (30 minutes)
Introduction - Managing Physical Data Center Components

For most data center operations teams, it's pretty hard to get a comprehensive view of what's going on in their IT ecosystems. Virtualization and cloud service abstractions have made cross-platform relationships between different layers of the IT stack more complex. Heterogenous, hybrid environments are the norm which is why visibility is a major challenge facing operations teams today.

VMware provides the best-of breed operations management for vSphere with vRealize Operations Manager (vROPS). Blue Medora complements vRealize Operations Manager and extends its capabilities. In this module, we will be guided through managing physical data center components with the Blue Medora management packs. We will look at how to extend vROPS for visibility into Cisco UCS, NetApp and F5 (physical assets).

Management Packs

Management Packs extend the capabilities of vRealize Operations Manager to third-party products and technologies to enable end-to-end operations intelligence with data visualizations, dashboards, reports, alerts, and actions. A Management Pack can also be delivered in the form of an agent plugin, content pack or compliance pack that extend the power to hybrid and heterogeneous environments, providing comprehensive visibility in a single operations console across applications, compute, storage and network devices.
vRealize Operations and Blue Medora

Let's begin exploring the environment and gain more insight and understanding in the environment with vRealize Operations Manager and the Blue Medora Management Packs.

Launch the Blue Medora vRealize Operations Manager Console

Open Firefox Browser from Windows Quick Launch Task Bar

1. Click on the **Firefox Icon** on the Windows Quick Launch Task Bar.

Blue Medora vRealize Operations Manager Console

1. Select **Blue Medora vRealize Operations Manager** from the browser toolbar or from the shortcut in the browser.

vRealize Operations Manager – Live Instance

vRealize Operations Manager – Historical Instance

vRealize Operations Manager – Blue Medora Management Packs
Log In

Login with the local admin credentials.

1. Select Local Users from the drop down.

   ID = admin
   Password = VMware1!

2. Click LOG IN
Set Browser Zoom Level

The lab environment has a default resolution of 1280x800. To minimize the need for extensive scrolling within the vRealize Operations user interface, please adjust the zoom level in Firefox.

1. Open the **Firefox Menu** drop down.
2. Set the desired zoom level. Typically 80-90% is sufficient to provide adequate screen space for your lab environment. Also making use of the full-screen option is recommended.

Dashboard List for UCS Fabric Interconnect Overview (Networking)
1. Click the down arrow next to All Dashboards.
2. Click UCS, UCS Fabric Interconnect Overview

This view will show you how the health of the UCS networking environment along with the throughput, relationship to VMs, switches, and chassis relationship. Let's take a closer look...

Dashboard List for UCS Fabric Interconnect Details

![Dashboard List](image)

This Dashboard view will show you the health of the UCS networking environment along with the throughput, VM mapping, switches, and chassis relationship. Feel free to explore the content in each widget a little further.

1. The Alerts widget gives you visibility into problem areas. Based on the information collected there are 2 active alerts that relate to the power supply.
2. The Relationships widget will allow you to drill into the environment for a closer look for all associated objects.
Review UCS Relationship

Let's dive deeper into the related objects in the Cisco UCS Environment

1. Select **Home** tab.
2. Search for **ucs-1.bluemedora.localnet** in the top right corner (search box) and select the Host System object.
1. Click on the **more** tab to see additional options.
2. Click on the **Environment** tab and select **Map** option (not shown) to get a visual on the host relationships.
Host System Relationship

Since the Blue Medora agentless management pack has visibility into the hardware you can easily determine impacted areas when troubleshooting a problem or outage.

1. This view shows you all the associated datastores and VMs.
2. This section shows you the chassis, blade, and hypervisor that is linked to the host.
Host System Performance

Let's take a look at the performance before moving on to other dashboard options

1. Select **Summary** tab for the host system
2. Scroll down to see a quick view of the **performance** and **capacity** information on this host.

Note that performance doesn't seem to be an issue at the moment but capacity could become a problem soon based on growth rate.
The Blue Medora VMware vRealize Operations Management Pack for NetApp Storage provides end-to-end visibility, analytics, and capacity planning for workloads running on NetApp storage.

1. Click the Dashboards tab and select All Dashboards,
1. Select the **Host System** (orange) that is experiencing warnings. This will populate additional information in the other dashboard widgets.

2. The **relationship** widget will show you a layout of the environment and help you identify the problem areas. In this case the host is running fine (green) but the UCS chassis is displaying warnings which is why it is defined in a different color.

3. By selecting the host system it will also show you **KPIs** linked to the host. More specifically it will help you understand read and write IOPS for the NetApp storage.
NetApp Datastore

Since this dashboard is a topology of the NetApp infrastructure we can quickly view the key performance indicators and relationships for the selected resource. Let's take a look at a NetApp datastore.

1. **Scroll down** using the righ-hand scroll bar, until you can see the **Datastores**.
2. Click on the first **NetApp Volume**
NetApp Datastore Review

1. With the first **Datastore** still selected go ahead and explore the additional **widgets**.
2. The widgets provide key information about the physical NetApp volume and allow you to drill down on other metrics that would be important to identify potential performance and capacity issues.

**Module completed, please close any open browser.**
Conclusion

You have completed **Module 5 - Extending monitoring through the stack; from physical to application**

You should now have an understanding of:

- Expand vRealize Operations monitoring capabilities through the use of Blue Medora Management Packs
- How to use vRealize Operations to manage and monitor physical assets such as Cisco UCS Hardware, and NetApp Storage.

This concludes lab HOL-1801-03-CMP

**Evaluate vRealize Log Insight**

Would you like to see how vRealize Suite Standard could help better manager your applications and infrastructure? Request a free 60-day evaluation [here](#) to try it out in your own environment.

**How to End Lab**

If you wish to conclude your lab at this time click on the **END** button. This will terminate your lab and all progress. Do this only if you wish to **NOT** proceed with the other modules.
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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