

VMWARE PRESENTS

THE GORILLA GUIDE TO...[®]



Maximizing VMware vRealize Operations

David Davis, vExpert

INSIDE THE GUIDE:

- How to Get Started with vRealize Operations
- How to Deploy and Configure vRealize Operations
- What's New in vRealize Operations 6.7

**HELPING YOU NAVIGATE
THE TECHNOLOGY JUNGLE!**



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THE GORILLA GUIDE TO...

Maximizing VMware vRealize Operations

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ENTERING THE JUNGLE

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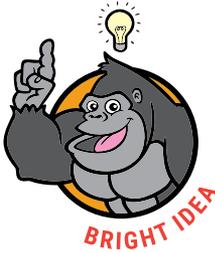
CALLOUTS USED IN THIS BOOK



The Gorilla is the professorial sort that enjoys helping people learn. In the Schoolhouse callout, you'll gain insight into topics that may be outside the main subject but that are still important.



This is a special place where readers can learn a bit more about ancillary topics presented in the book.



When we have a great thought, we express them through a series of grunts in the Bright Idea section.



Takes readers into the deep, dark depths of a particular topic.



Discusses items of strategic interest to business leaders.

ICONS USED IN THIS BOOK



DEFINITION

Defines a word, phrase, or concept.



KNOWLEDGE CHECK

Tests your knowledge of what you've read.



PAY ATTENTION

We want to make sure you see this!



GPS

We'll help you navigate your knowledge to the right place.



WATCH OUT!

Make sure you read this so you don't make a critical error!

CHAPTER 1

Getting Started with VMware vRealize Operations

IT professionals around the world trust VMware's vRealize Operations (vROps) for vSphere management, but not everyone maximizes the power that vROps can provide. Many don't know the tips and tricks that you can use to get the most out of it.

For instance, you may not know that vROps can manage the full data center stack, from applications to infrastructure; and it can do this across physical, virtual, and cloud environments. Perhaps you aren't aware of the multitude of resources available to soup up vROps into a performance and capacity management machine for the IT operations group. And, I'd be willing to bet that you aren't aware of the latest enhancements to vROps that allow you to enable self-driving cloud operations in your data center.

In this book, you'll learn all that and much more!

What is vRealize Operations?

Before we start, let's take a moment to give you a brief introduction to vROps to ensure that we're all on the same page.



EXPERIENCED VROPS ADMINS ONLY

Do you know this already?

If you already have a good understanding of vROps, you can skip this introductory chapter and the installation chapter (**Chapter 2**) to move directly to configuring vRealize Operations for Maximum Effect (**Chapter 3**). If you're already an experienced vROps administrator, I recommend you jump to the final chapter of the book, Maximizing vRealize Operations (**Chapter 4**).

VMware has designed vROps to provide what they call “Intelligent Operations” for your data center. If you take a moment to think about that phrase, you might consider the opposite: “unintelligent operations.” None of us want to manage our data center “unintelligently,” although it happens at so many companies.

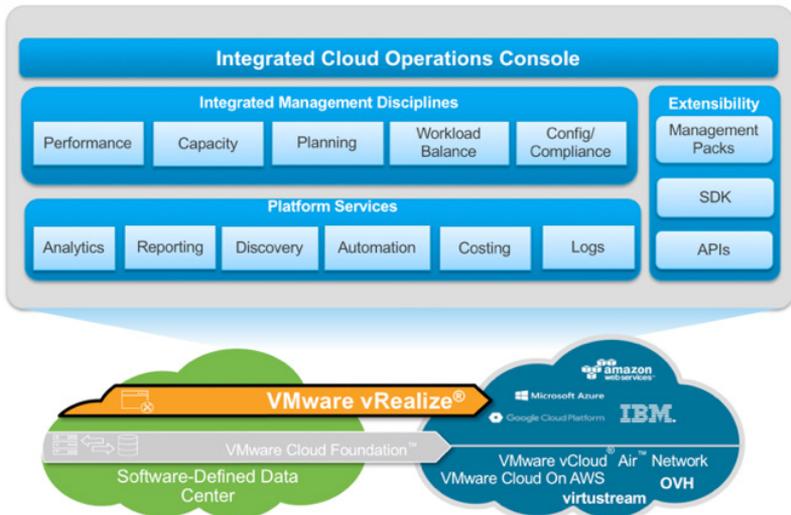


Figure 1-1

Many organizations are missing crucial information about their data centers. For example, they don't understand how their applications are performing today; they don't have a capacity plan for the future; and when trouble happens, they blindly restart software and hardware in hopes of returning the applications to the status quo.

All of these are a sign of a data center management group that doesn't have any intelligence around their data center operations. It's no secret that modern data centers are complex, so it makes sense that you'd need intelligent tools to manage such an environment. vROps is the tool, both now and in the future, that you should be using to manage your complex, modern data center.

With the release of vROps 6.7, VMware has updated their description of vROps by stating that it provides "Self-Driving Operations." This is an important addition to the description of "Intelligent Operations" that it's always provided. We'll learn more about this "self-driving" data center later in the book, when we cover maximizing vROps.

How Does vRealize Operations Work?

vROps deploys as a virtual appliance into a vSphere infrastructure. That virtual appliance includes both the database and the analysis engine. The integrated database stores collected data; the analysis engine presents that data to you, intelligently, and alerts you to what you need to know. The vROps virtual appliance connects to VMware vCenter to learn about the vSphere infrastructure hosts, clusters, virtual machines (VMs), virtual networks, and datastores.

It can also communicate with other data sources like applications, databases, servers, networks, and much more. vROps is designed to be able to pull data from just about anywhere and correlate that data with other data sources to give you a holistic view of what's happening in the data center. We'll go more into vROps architecture in a later chapter.

5 Reasons You Need a Virtualization Performance and Capacity Management Tool



1. Maximize VM density. Servers now have massive CPU and memory density. This gives them the ability to run more virtual machines (VMs) than you've ever likely run before on a single server.

Even if the potential number of VMs exceeds your comfort level, it's your job as a virtualization admin to push that hardware to the limits to maximize your company's IT investment. But how do you know what that number is? Just because one company can run 100 VMs on a server doesn't mean that your servers can.

The only way to find out what that number is for your particular servers and your company's specific applications is to slowly increase that number until your intelligent tool tells you to stop (which will be before applications see slowness). Maximizing VM density isn't something that you should try to do without the right analytics tools in place.

2. Prevent bottlenecks and downtime. Virtual infrastructure can and will hit resource bottlenecks, and it's your job to prevent that before they degrade application performance or cause application downtime. This can be tough to do without a tool that's monitoring your resource utilization 24/7, keeping a history, and making recommendations.

3. Correlate events and changes. With more complex virtual infrastructure comes multiple administrators and multiple changes. It's critical to have a system that tracks those changes and correlates them with system events and/or performance issues. This way, when unexpected downtime or performance bottlenecks occur, they can quickly be tied back to events and changes that may be the root cause.

4. Plan capacity growth. Most workloads tend to grow over time, as the user/customer base of those applications grows. The virtualization admin needs to be able to predict that growth before the virtual infrastructure runs out of capacity.

This foresight is important, since adding new capacity to the virtual infrastructure may require physical capacity (pCPU, pRAM, or pDisk) that takes time to purchase and add to the cluster. Your virtualization management tool must monitor the workloads of your applications over time, and be able to predict when additional capacity is needed, alerting you even months ahead of time.

5. Achieve a unified view. Too many so-called virtualization management tools monitor the virtual infrastructure with only insight from SNMP element monitoring, or with only basic information from the vCenter API. You need a tool that offers a unified view gained from a rich, and extensible, wealth of data.

For example, your virtualization management tool should have the ability to communicate directly with storage arrays for storage insight; it should have application insight into Tier 1 applications; and it should be able to provide insight into the hybrid cloud when your company is ready to migrate workloads.

In the past, when virtual infrastructures were smaller, more static, and less complex, analysis using only vCenter was adequate for most companies. They didn't feel the need to push their utilization levels, as they were satisfied with consolidating 10 or 20 VMs on a server (that's not hard to understand, when compared to the 1:1 OS-to-server ratio they were running with physical servers).

Today, enterprises can be running hundreds of VMs on each host and pushing the VM-to-host ratio to the maximum to squeeze every penny out of their data center investment. Additionally, many companies are using desktop virtualization and more complex multi-tiered applications than in the past.

While the adoption of virtualization management tools has increased, those tools haven't always proven to be worthwhile (or in some cases, these tools are even ignored by administrators). Some enterprises have managed their virtual infrastructure with vCenter and command-line tools for years and believe that there's no need to add another tool. And still others are using a third-party tool that just wasn't designed with virtualization in mind, such as an element-monitoring tool.

In just about all these cases, the enterprise doesn't realize what they're missing until it's too late. Unfortunately, too many of those companies don't understand that their existing tools aren't up to the job until they're trying to troubleshoot an application slowdown or, even worse, a virtual infrastructure outage.

For those who need a reminder of why vROps Management Suite is so necessary in today's data centers, or what makes vROps so valuable in today's data center, read on!

Understanding vRealize Operations Editions

Before you start using vROps, there are a few things you should know. The most important thing to know is that it's easy! Assuming you already have VMware vSphere, you can download the free 60-day trial of vROps, deploy it, and be up and running in less than 15 minutes. We'll walk you step-by-step through the deployment later in this book. If you want to try vROps without a download, you can do that in a live lab environment with the VMware Hands-On Labs (covered in the next section).

Before you kick off your deployment, let's review some of the "must-knows" of vROps, starting with how it's packaged and licensed.

vROps is offered in three editions: Standard, Advanced, and Enterprise. What's common across all editions is that they include vROps performance monitoring, analytics, predictive capacity management, predictive Distributed Resource Scheduler (pDRS), vRealize Log Insight, and vSAN integration.

vRealize Operations is also included in bundles such as the vRealize Suite, the vCloud Suite, and vSphere with Operations Management Enterprise Plus.

Traditionally vROps has been licensed per CPU but recently, VMware announced a new licensing option called hybrid cloud portable licensing, which offers the flexibility to manage workloads whether they're on-premises, third-party hypervisors, physical servers, or supported public clouds.

The benefit of the portable license unit (PLU) licensing model is that there's no license switching, or conversion required. The PLU allows usage of vROps to manage unlimited operating system instances (OSI) deployed on-premises on one vSphere CPU, or up to 15 OSIs deployed on the public cloud. It includes VMware Cloud on AWS (VMC), all

supported public clouds, VMware Cloud Providers, and third-party hypervisors and physical servers.

What is vSOM and How Can It Help You?

vSphere with Operations Management Enterprise Plus allows you to purchase vSphere bundled with vROps. For those building a new virtual infrastructure or adding more hosts to an existing virtual infrastructure, vSOM is a great option for buying vSphere and vROps in a single SKU and at a discounted license cost.

We previously covered the general benefits of vROps, but what about the specific benefits included in the Advanced and Enterprise editions of vROps? Let's analyze the additional functionality in the Advanced and Enterprise editions of the vRealize Suite.

vRealize Advanced Edition

There are a number of reasons that enterprises move up to the Advanced edition of vROps, including these major benefits:

- vROps high availability
- Customizable dashboards
- Super metrics
- Public cloud cost comparison
- What-if scenarios for adding VMs to private and public clouds
- Automated actions
- vSAN troubleshooting and capacity management
- vRealize Orchestrator integration
- Service discovery and application dependency mapping
- Third-party storage, network, hyper-convergence, and multi-cloud management packs

SELF-DRIVING OPERATIONS				
vRealize Operations		Standard	Advanced ¹	Enterprise ²
		vROPS STD	vROPS ADV ¹	vROPS ENT ²
Standalone		Per Operating System Instance (OS)	Per Operating Systems Instance (OS)/Per Processor (CPU)	Per Operating Systems Instance (OS)
Available in Suite		VMware vSphere with Operations Management (CPU)	VMware vRealize Suite/vCloud Suite Standard, Advanced (PLU)	VMware vRealize Suite/vCloud Suite Advanced, Enterprise (PLU)
vRealize Operations	Scale Out Operations Platform	•	•	•
	Single Sign-on	•	•	•
	Remote Collectors	•	•	•
	Visualization: Out Of the Box Dashboards, Views, Reports, Heat map, Performance Charts	•	•	•
	Policy Management	•	•	•
	Performance Monitoring and Analytics	•	•	•
	vSphere Security and Compliance	•	•	•
	Real-time Predictive Capacity Management including trending, metering, right-sizing, optimization	•	•	•
	Overall Data Center Cost Views	•	•	•
	What-if Scenarios for Adding VMs to Private Cloud and VMware Cloud on AWS (no Costing in STD)	•	•	•
	Business-Intent Based Manual Workload Optimization	•	•	•
	Predictive DRS and DRS Management	•	•	•
	Guided Remediation	•	•	•
	vRealize Log Insight Integration	•	•	•
	vSAN Overview & Migration Dashboards (EULA)	•	•	•
	Wavefront Integration	•	•	•
	Built-in High Availability (Automated Failover of Platform Nodes)		•	•
	Customizable Dashboards, Reports and Views		•	•
	Super Metrics		•	•
	Advanced APIs: Resource/Data Addition, Report Generation, etc.		•	•
	Fine-grained Cost Analytics for Reclamation, Planning and Public Cloud Cost Comparison		•	•
	What-if Scenarios for Adding VMs to Private and Public Clouds (AWS and VMware Cloud on AWS)		•	•
	Business-Intent Based Automated and Schedulable Workload Balancing		•	•

Figure 1-2

For customers wanting to do service discovery and mapping, they can leverage the vRealize Operations Service Discovery Management Pack (shown in **Figure 1-4**). vROps Service Discovery discovers all the services running in each VM and then builds a relationship or dependencies between services from different VMs, based on the network communication.

The management pack can create dynamic applications based on the network communication between the services and brings the functionality into VMWare vRealize Operations Manager that was earlier provided by VMWare vRealize Infrastructure Navigator.

SELF-DRIVING OPERATIONS				
vRealize Operations		Standard	Advanced ¹	Enterprise ¹
vRealize Operations	Automated Actions (EULA restricted)		•	•
	vSAN Troubleshooting and Capacity Management		•	•
	SDDC Health Management Pack		•	•
	vRealize Orchestrator Management Pack		•	•
	Monitoring of OS Resources (CPU, disk, memory, network)		•	•
	Service Discovery & Application Dependency Mapping ²		•	•
	3rd-Party Management Packs: Storage, Networking, Converged/Hyper Converged as well as non-vSphere hypervisors ³		•	•
	Multi-cloud Monitoring Management Packs: AWS, vCloud Air, OpenStack		•	•
	Care System Analytics Management Pack			•
	3rd party Database, Middleware, Application Management Packs			•
Application, Middleware and Database Monitoring			•	

Figure 1-3

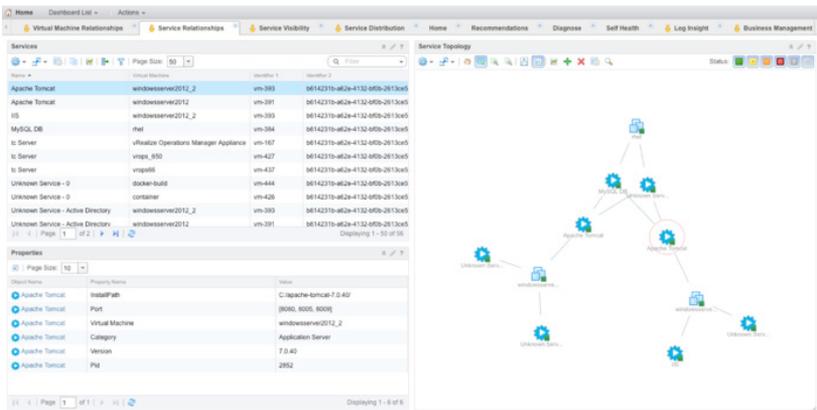


Figure 1-4

vRealize Operations Enterprise Edition Overview

What does vROps Enterprise edition offer above and beyond the Advanced edition? There are two important features:

- Performance monitoring of middleware, applications, and databases
- 3rd party database, middleware, and application monitoring

For example, with vROps Enterprise edition, you can use Blue Medora's SQL Server or Oracle database management packs with vROps.

When you select Advanced or Enterprise, you will receive VMware Configuration Manager. With Config Manager in the Advanced edition you'll be able to track changes to vSphere for configuration and regulatory compliance. With Config Manager in the Enterprise Edition, you'll be able to track OS-level changes, configuration, and patch management for compliance of all applications and operating systems.

One of the biggest reasons companies select the Enterprise edition is to be able to ensure compliance. This is especially important for companies regulated under Sarbanes-Oxley (SOX), Payment Card Industry (PCI), Health Insurance Portability and Accountability Act (HIPAA), Federal Information Security Act (FISMA), and so on.

While not every company is required to be in compliance with those guidelines, every company needs to keep their entire infrastructure secure. And given the current environment, it's no longer something admins are able to do manually or with a patchwork of tools.

Learning vROps in the VMware Hands-on Labs (HoL)

So how can you get access to the latest vROps and use it, first-hand, without ever having to install it? Fortunately, the smart people at VMware's Hands-on Labs have enabled access to the entire VMware product line. It's available to anyone at no cost, already installed, and includes detailed lab instructions which are easy to follow. (The author frequently uses the HoL to immediately access some of VMware's most complex products.)

vRealize Operations in the Hands-on Labs

VMware currently offers more than 50 HoL labs, with at least six of those covering specific components of the vRealize Suite. New labs are always being released; at the time of this writing, here are my favorite eight labs to learn vROps:

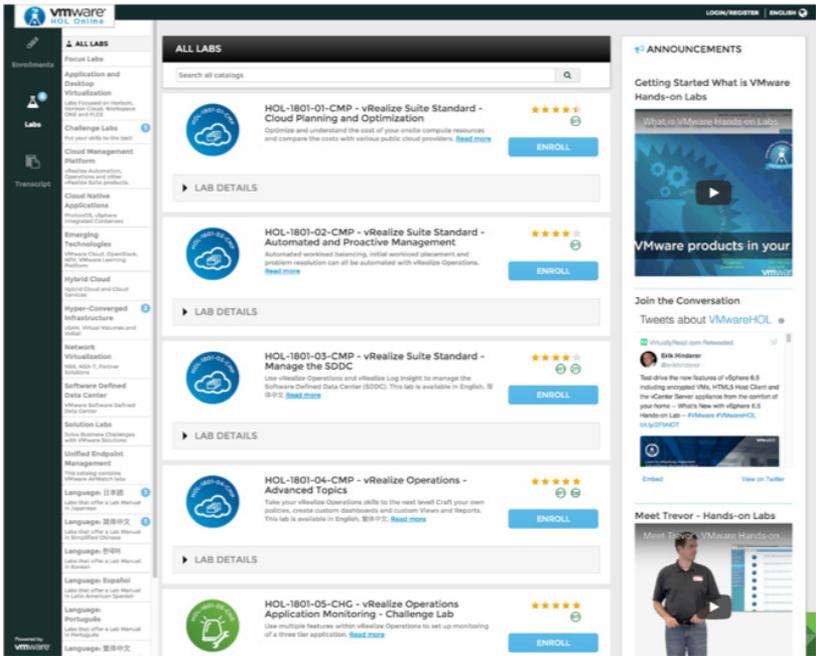


Figure 1-5

- HOL-1801-01-CMP: vRealize Suite Standard – Cloud Planning and Optimization
- HOL-1801-02-CMP: vRealize Suite Standard – Automated and Proactive Management
- HOL-1801-03-CMP: vRealize Suite Standard – Manage the SDDC
- HOL-1801-04-CMP: vRealize Operations – Advanced Topics
- HOL-1801-05-CHG: vRealize Operations Application Monitoring – Challenge Lab
- HOL-1806-01-CMP: vRealize Suite – Getting Started
- HOL-1806-03-VMP: vRealize Business for Cloud – Getting Started
- HOL-1811-02-SDC: vSphere with Operations Management – Getting Started

These labs cover the new features of vROps and vRealize Log Insight, how vROps manages a hybrid cloud, and more. If you're new to vROps and the vRealize Suite, I recommend going to the "Getting Started" labs first.

Summary

In this chapter, you've learned how vROps is packaged, about different features available in each edition, and how you can get some hands-on experience with the VMware HoL.

Read on to the next chapter to better understand the vROps architecture, learn how to deploy vROps step-by-step, and connect vROps to vCenter.

CHAPTER 2

Deploying vRealize Operations

Before you start any new deployment (yes, even in a lab environment), I always recommend that you first take a few minutes to understand the architecture behind the solution, and the basics of how to size it. This is important so that you don't get caught off guard later and end up unable to scale the solution as your company's needs dictate.

vRealize Operations Architecture Overview

A huge benefit of the vROps deployment model is that you don't have to install a new guest OS, install a database, install an app, or even connect it to the database.

vROps is typically deployed and runs entirely within a single VM that's very scalable. For enterprises that have multiple sites or require high availability, multiple VMs will be needed.

Figure 2-1 shows what the architecture looks like inside the vROps VM.

The single vROps VM includes the user interface, RESTful API, vROps controller, analytics analysis, and data storage.

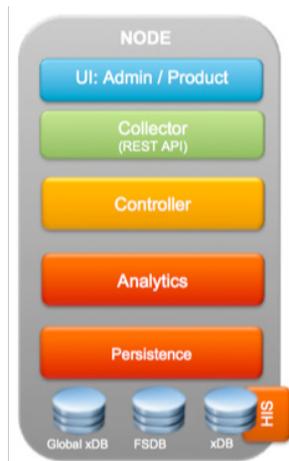


Figure 2-1

By deploying more vROps VMs, you can easily create a multi-node cluster, or even a multi-node highly available cluster, as shown in Figure 2-2.

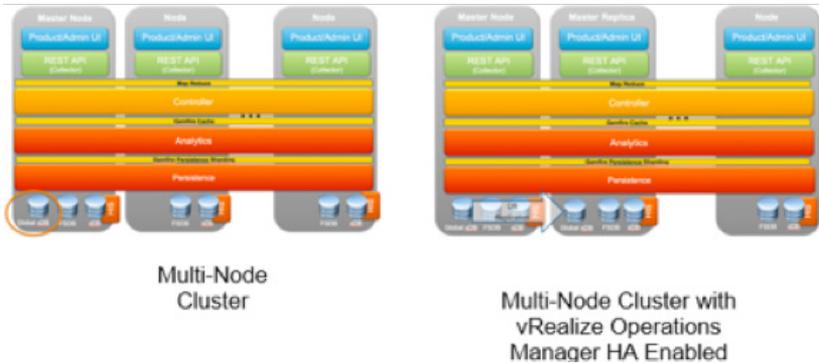


Figure 2-2

Sizing vRealize Operations

When deploying vROps for the first time, one of the things you need to take into consideration is the size of the virtual infrastructure you’ll manage. This will determine how you size your vROps deployment.

During the deployment process (which we will cover in more detail in the next chapter), you’ll be asked to size the vROps VM as small, medium, large, extra small, extra large, remote collector standard, remote collector large, or remote collector extra large.

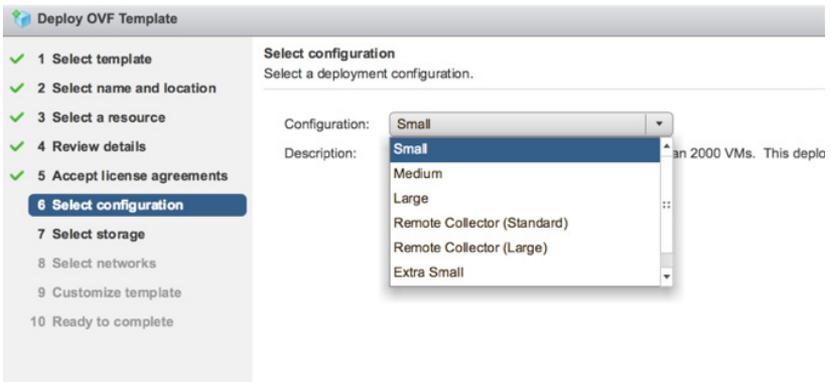


Figure 2-3

or remote collector large. (**Figure 2-3**). These sizes match up with a range of VM resources that will be used in your deployment, including vCPU, vRAM, and storage resources.

Figure 2-4 shows how the different sizes correspond to the vCPU and vRAM that will be allocated to the vROps VM:

Characteristics/ Node Size	Extra Small	Small	Medium	Large	Extra Large	Standard Size Remote Collectors	Large Size Remote Collectors
vCPU	2	4	8	16	24	2	4
Memory (GB)	8	16	32	48	128	4	16
Maximum Memory Configuration (GB)	N/A	32	64	96	N/A	8	32

Figure 2-4

VMware KB article 54370 details the sizing guidelines for vROps; I encourage you to review it for more sizing information.



What's great about the latest version of vROps – vRealize Operations Manager 6.7 – is that you can monitor 30% larger environments using the same vROps resource configuration.

Installing vRealize Operations for the First Time

Armed with the knowledge of vROps sizing and architecture, it's time to begin installation.

The vROps Manager deployment guide offers pages of installation prerequisites that you should be aware of if you're deploying it into a production environment. It's always recommended to have the latest version of the ESXi and vCenter before you deploy the latest version of the vROps.

Keep in mind that, unlike a traditional Windows application, with the vROps virtual appliance-based deployment model there's no need to do things like create a new VM, buy a Windows Server OS license, install Windows, create a new table and user on your SQL Server, install the Windows-based management application, connect it to SQL, etc.



NEW FASTER DEPLOYMENT WITH VROPS 6.7 WITH VCENTER 6.7

If you are running vCenter 6.7 and want to deploy vROps 6.7, there is a new highspeed deployment option that is covered in Chapter 4 of this book. If you aren't using vCenter 6.7 yet, then continue on with the typical deployment that is shown here.

Deploying the vRealize Operations Appliance

There are a few different ways to go about downloading and deploying the vROps appliance. For those new to vROps, I recommend that you go to this URL:

<https://www.vmware.com/go/vrealize-ops-dl-en>

It will bring you to the VMware evaluation center, where you can sign up for a free, 60-day fully-functioning license of vROps.

Existing VMware customers can go to the VMware download center and download vRealize operations OVA directly from there. If you're licensed for vROps, you'll need to enter your license key after deployment. (We'll cover where to enter your license later in this chapter.)

Once you've downloaded the vROps virtual appliance, you can go to the Home screen in the vSphere Web Client, click on **vRealize**

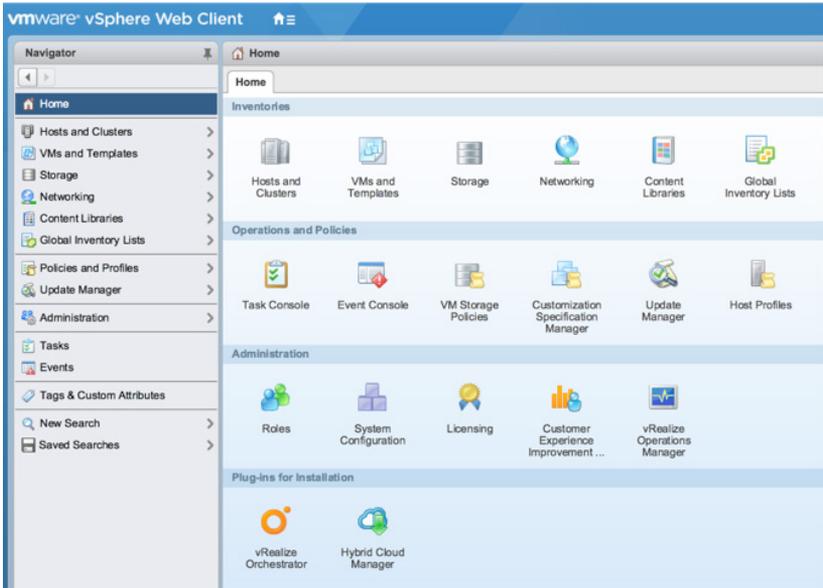


Figure 2-5

Operations Manager, and on the Getting Started tab, click **Deploy vRealize Operations** (see Figure 2-5).

This will bring up the Deploy OVF Template wizard to walk you through the process. It's here that you'll specify the OVA file you downloaded from VMware.com (Figure 2-6).

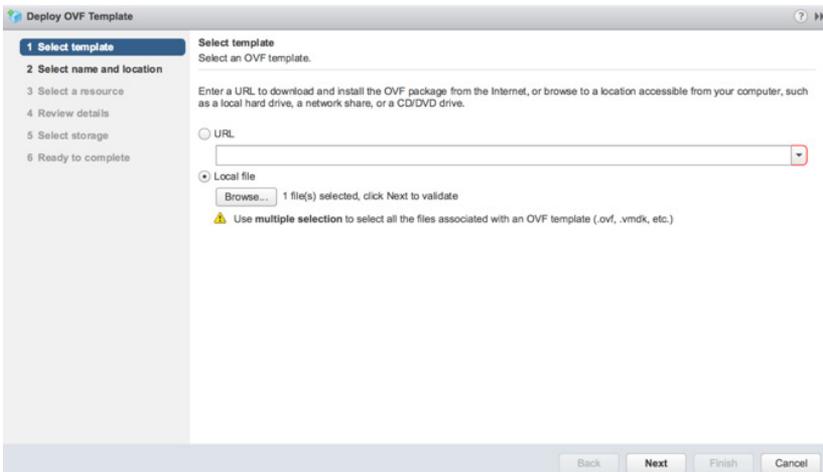


Figure 2-6

After that, you'll be walked through the deployment wizard, starting with giving the VM a name and selecting where you'd like to deploy it (Figure 2-7).

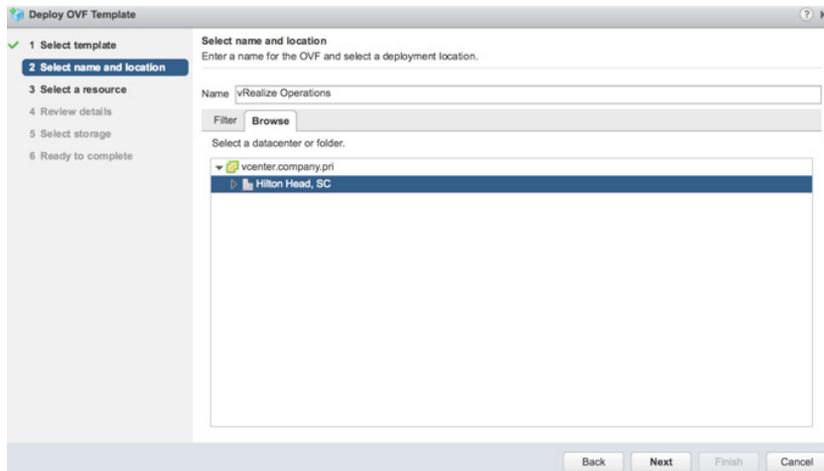


Figure 2-7

Next, select the virtual infrastructure resource where you'd like to deploy the virtual appliance (Figure 2-8).

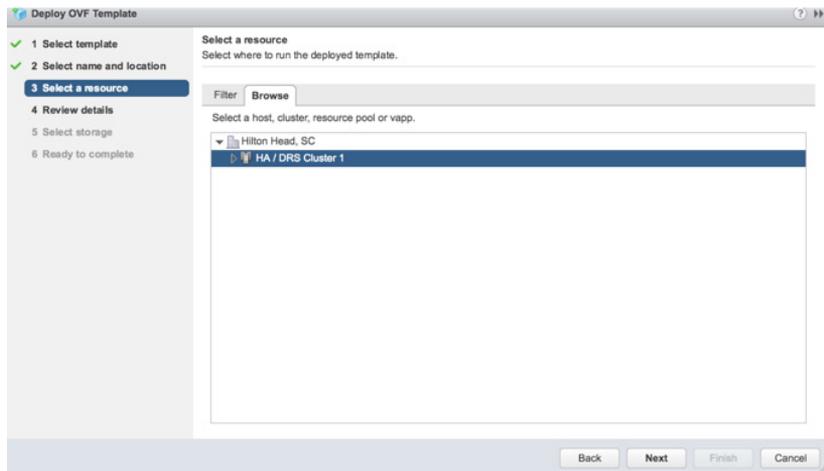


Figure 2-8

Deploying OVAs over Slow WiFi or a WAN is a No-No



If you ever do download an OVA file (for any virtual appliance) and try to deploy it using the vSphere Client (Windows or Web), make sure you have a good connection. In the past, I've struggled trying to deploy an OVF over a WAN or slow WiFi and had to troubleshoot numerous FAILED error messages. Eventually I discovered that when I connect via reliable Ethernet to the same network that the vSphere infrastructure is on, the errors simply disappear.

If you can't do that, try creating a Windows VM in the vSphere infrastructure, connecting to it via RDP, downloading the OVF file to that Windows VM (because it's on the same network as the vSphere infrastructure), and then deploying the OVF file from there.

Next, you'll have a chance to review the details of what you're about to deploy (**Figure 2-9**), including the version of the vROps and the required disk size.

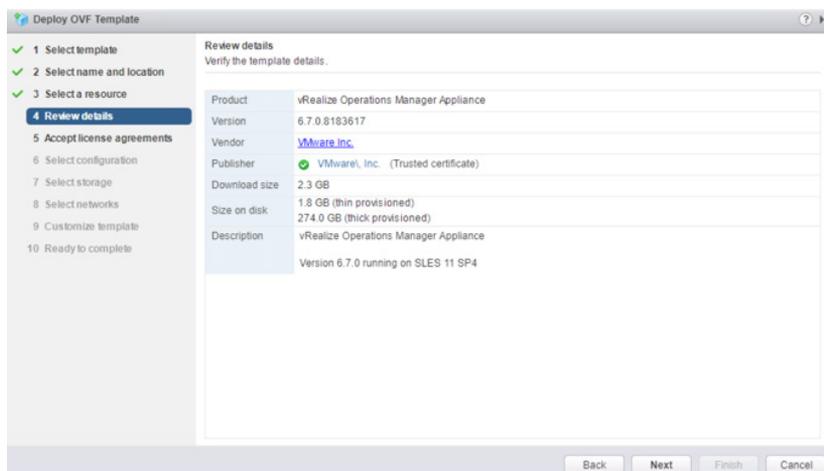


Figure 2-9

Accept the VMware end user license agreement by clicking **Accept** and then **Next**.

Now select the size of your virtual infrastructure, based on the sizing information discussed earlier in this chapter. Sizes range from extra small to extra large. As we saw, this will determine the resources that will be allocated to the VM once it's deployed.

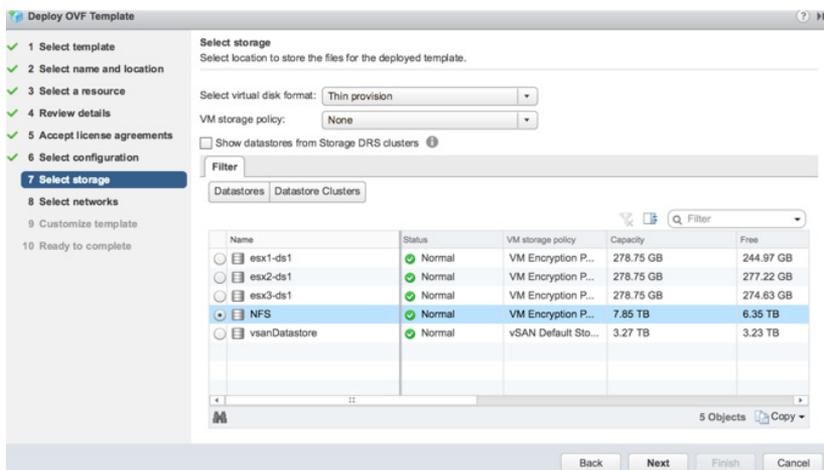


Figure 2-10

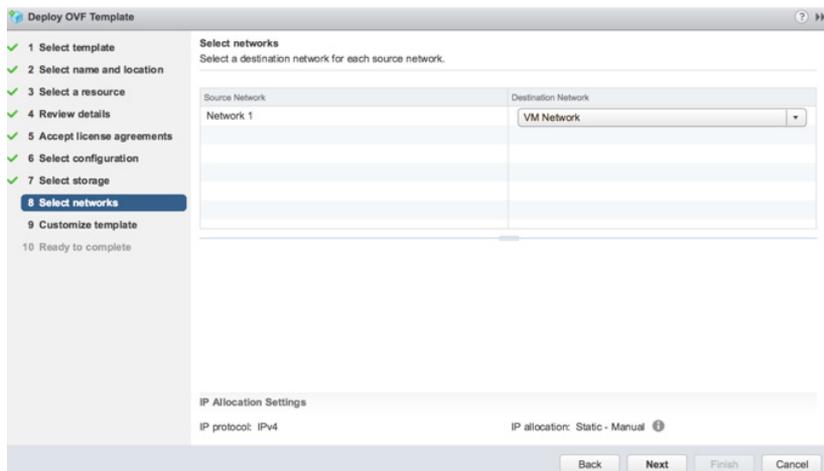


Figure 2-11

Select the datastore where you'll install vROps, the virtual disk format, and the VM storage policy (if applicable), and click **Next** (Figure 2-10).

Next, select the network to which the vROps VM will connect (Figure 2-11).

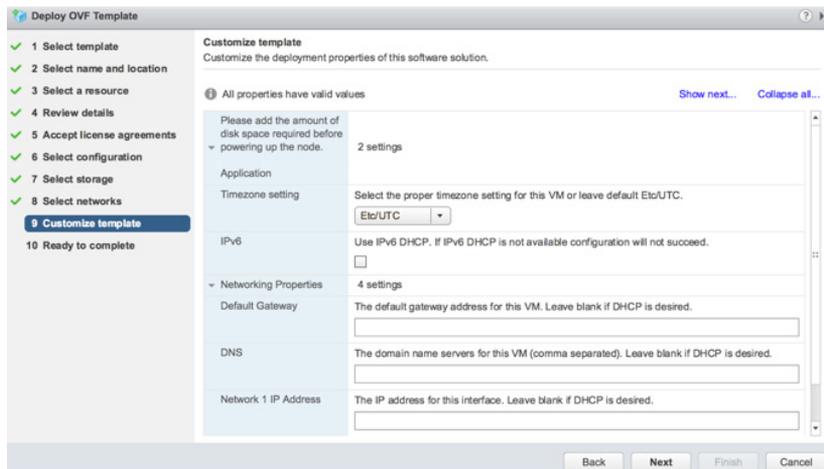


Figure 2-12

Next you have the chance to customize the template that will be used to create the VM (Figure 2-12). This includes the time zone and any static IP network settings you want to use. If you'll be using this in a production or lab environment, using a static IP address is recommended.

Finally, review everything and, if correct, click **Finish** (Figure 2-13).

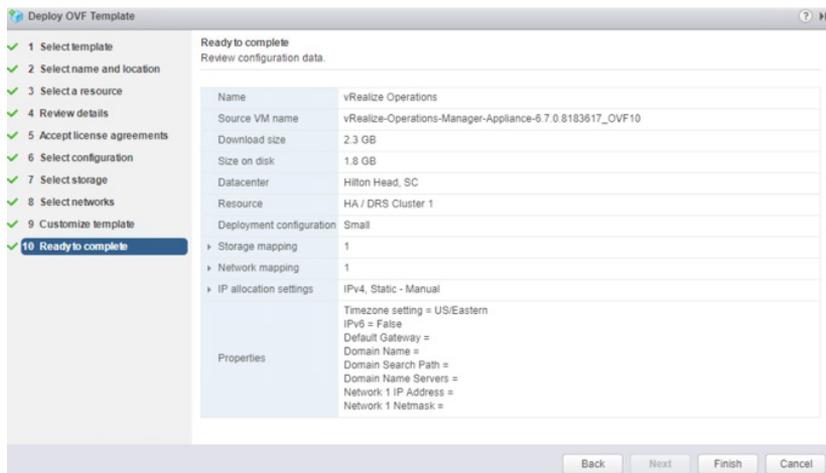


Figure 2-13

After a few minutes, you should see the new vROps VM deployed on the new host or cluster specified. After you power on the VM and a minute or so has passed, you can go to the vROps console. It will look very similar to **Figure 2-14**.

As you can see, it directs you to the URL for the vROps appliance.

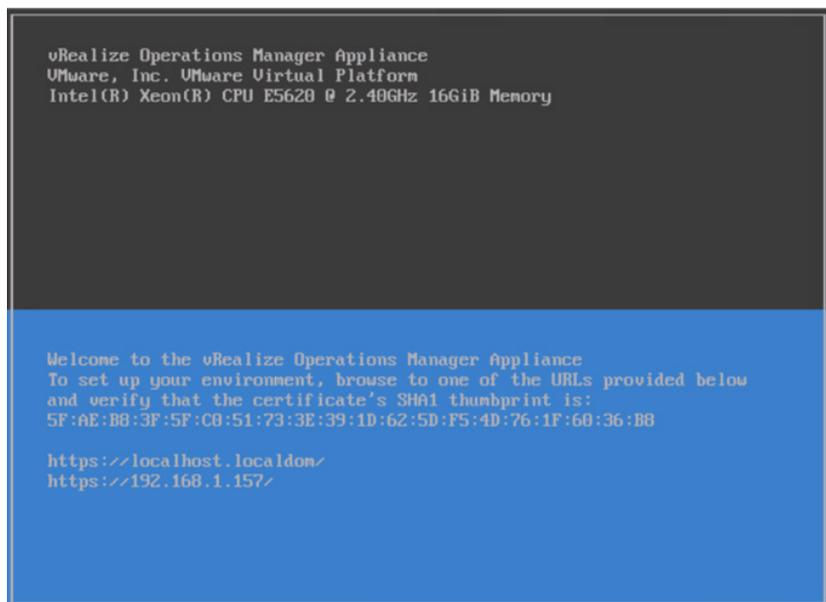


Figure 2-14

Performing Initial Configuration

Pointing your web browser to the correct URL will bring you to a screen that looks like **Figure 2-15**.

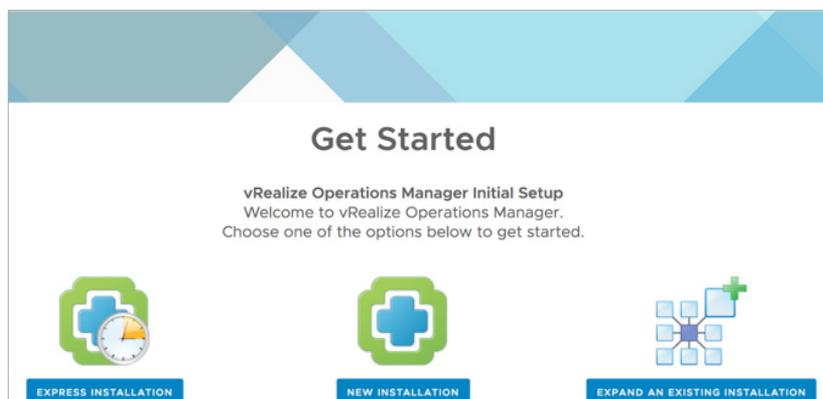


Figure 2-15

As you can see, the three options are to perform an express installation, a new installation or expand an existing installation.

In our case, we will choose the express installation to get vROps up and running as quickly as possible, but if you'd like to see every additional installation option you'd choose the new installation. If you already have an existing installation you would, of course, choose to expand that existing installation to add greater scalability or high availability to your pre-existing cluster.

Choosing the express installation begins the three steps of the vROps Manager initial set up wizard, which is initiated by clicking **Next** (**Figure 2-16**).

The first step is to enter the new password for the admin account. Keep in mind that you need to use a complex password that meets the requirements, as shown in **Figure 2-17**.

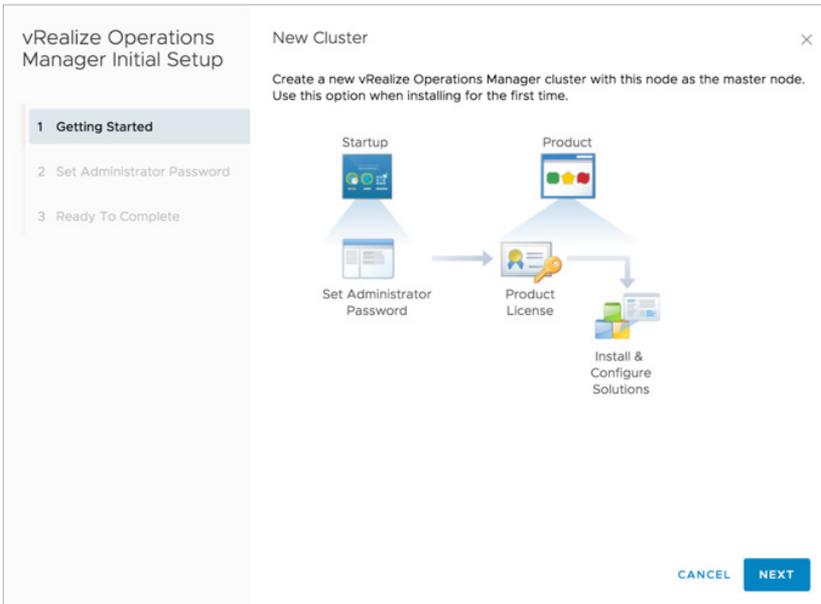


Figure 2-16

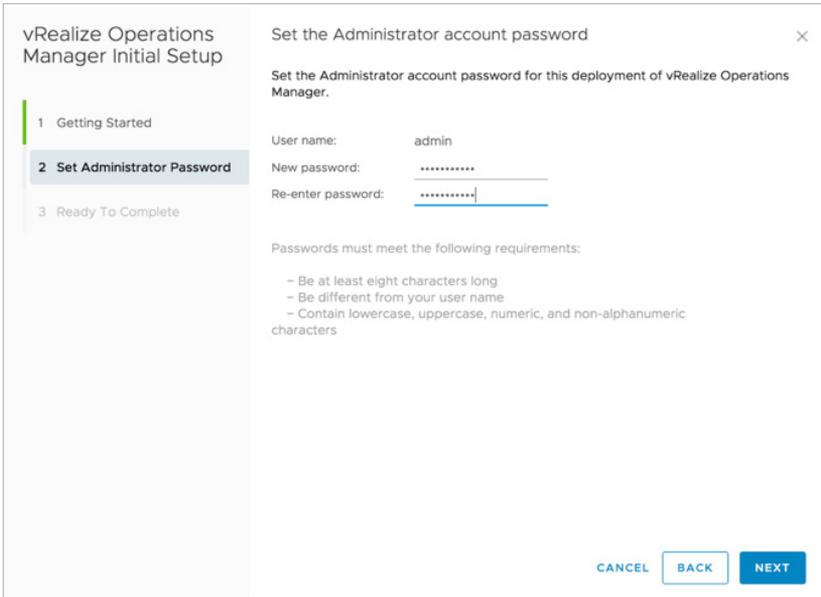


Figure 2-17

After clicking **Next**, you're ready to complete the vROps installation (**Figure 2-18**).

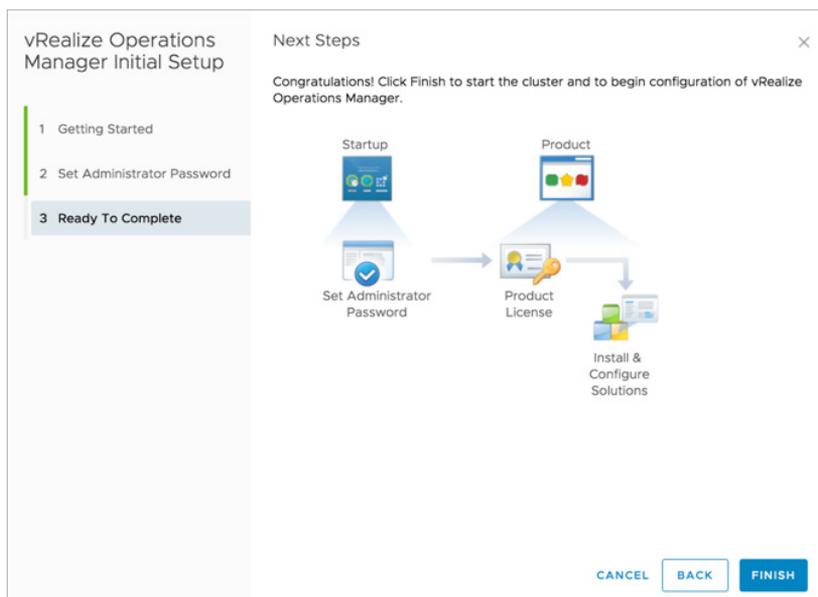


Figure 2-18

The additional options provide the ability to choose a custom security certificate, configure a name for the customer master node and enter an NTP server address for timekeeping.

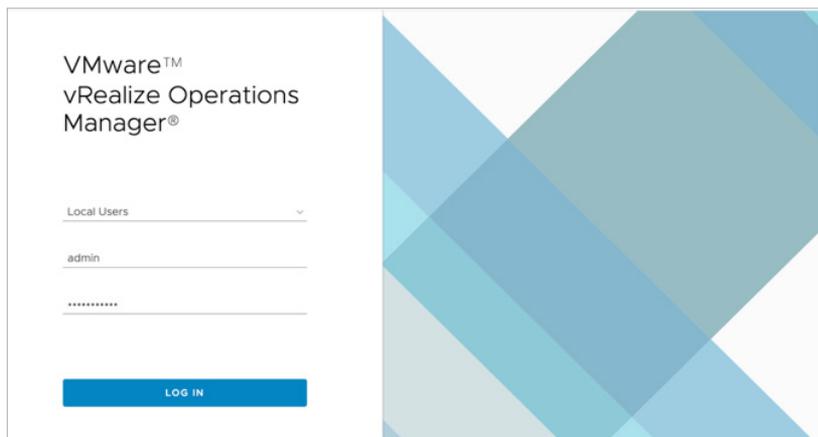


Figure 2-19

Once configured, the vROps web UI displays a login screen, at which point you can log in with the admin username and password you configured (**Figure 2-19**).

vRealize Operations Manager deployment is now complete, leading to the final five-step configuration wizard, shown in **Figure 2-20**.

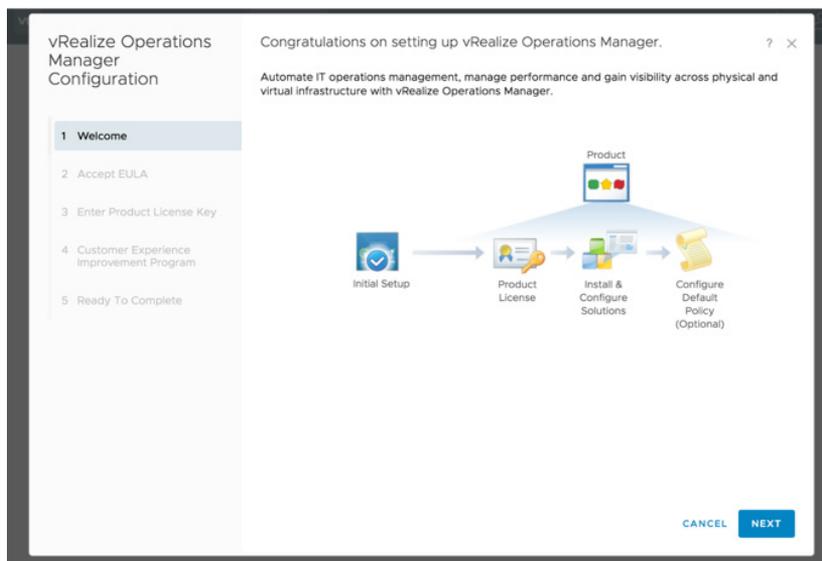


Figure 2-20

After clicking **Next** and accepting the license agreement, you're prompted to enter your product license key, shown in **Figure 2-21**.

You can choose to either take the default to evaluate vROps or, if you're a licensed vROps Manager user, you'd enter your key here.

For this tutorial, the product evaluation default was selected. One more checkbox about being part of the VMware customer experience improvement program, then click **Next**, then **Finish** (**Figure 2-22**) to complete the installation wizard.

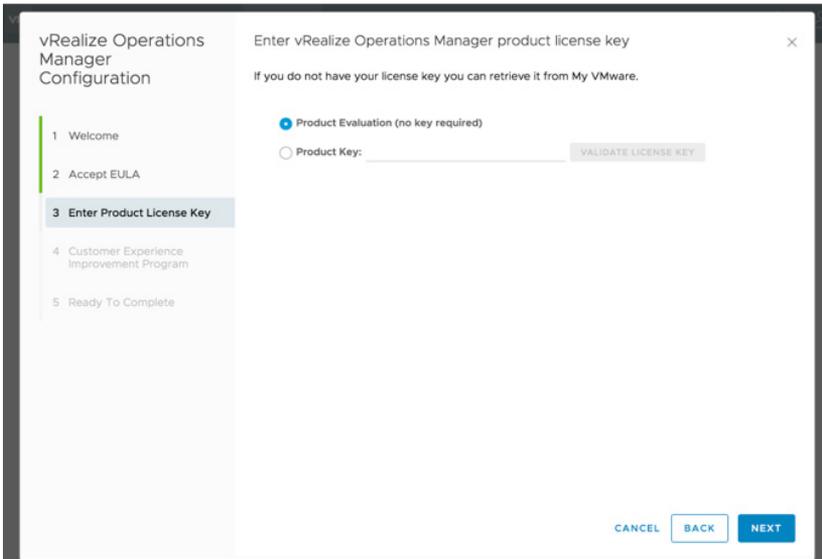


Figure 2-21

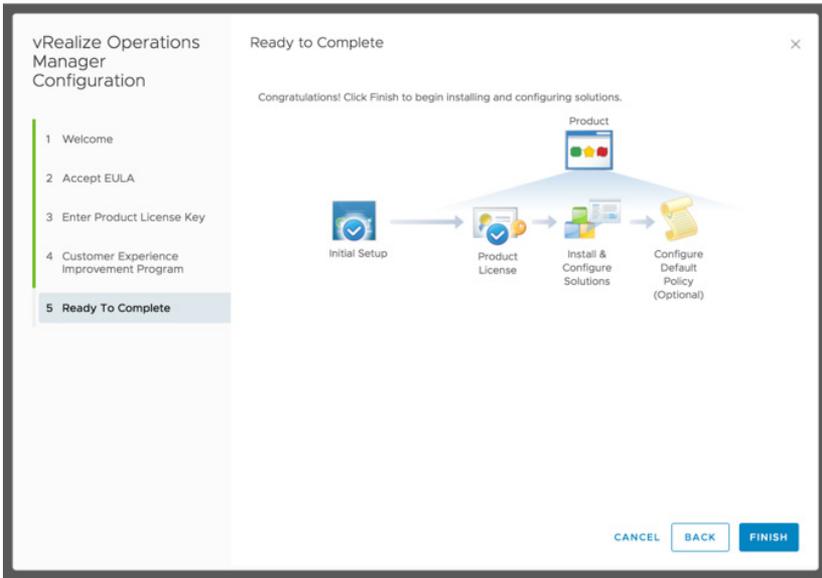


Figure 2-22

Configuring the VMware vSphere Solution

When first logging in to vROps, you're prompted to configure a solution. As **Figure 2-23** shows, you should choose **VMware vSphere**. You're connecting vROps to the vCenter server that's managing your vSphere infrastructure, enabling vROps to begin gathering performance data related to your hosts, clusters, storage, and VMs.

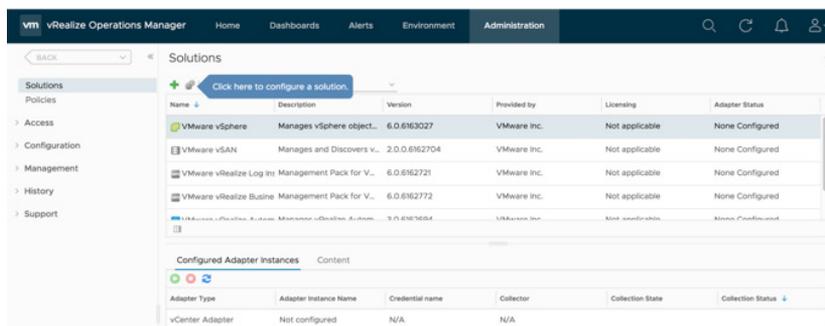


Figure 2-23

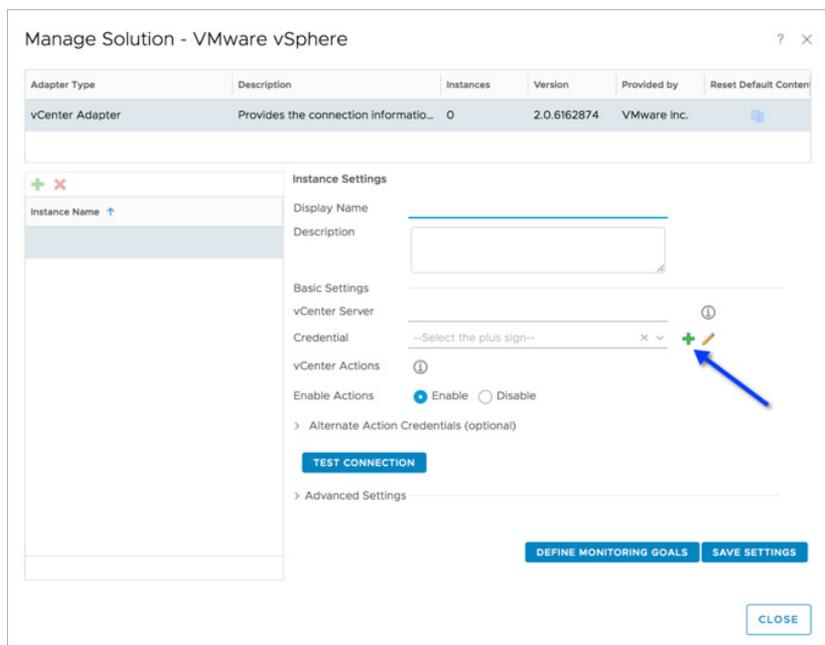


Figure 2-24

To configure the vSphere solution, select the **VMware vSphere** solution and click on the **gear icon** inside the **Administration** tab and under **Solutions**.

This brings you to the manage solution configuration. The first thing to do is add a new set of credentials by clicking the **Plus** sign on the right side of the credentials field (**Figure 2-24**).

It's here that you can add your administrative vCenter username and password, shown in **Figure 2-25**.

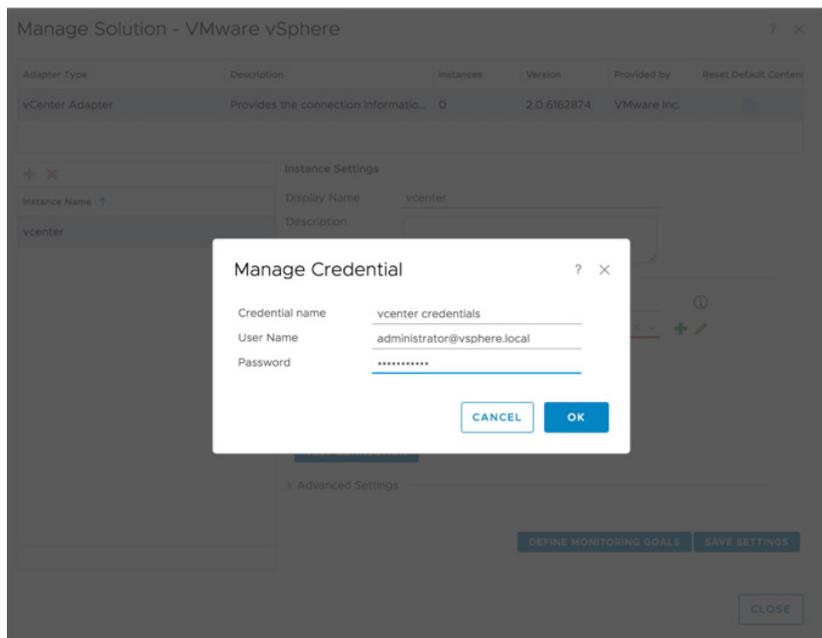


Figure 2-25

With your credentials added, you next add a display name for your vCenter server and your vCenter server's domain name or IP address; then click the button **Test Connection** (**Figure 2-26**).

If the test is successful, you'll be prompted to accept the default certificate (**Figure 2-27**).

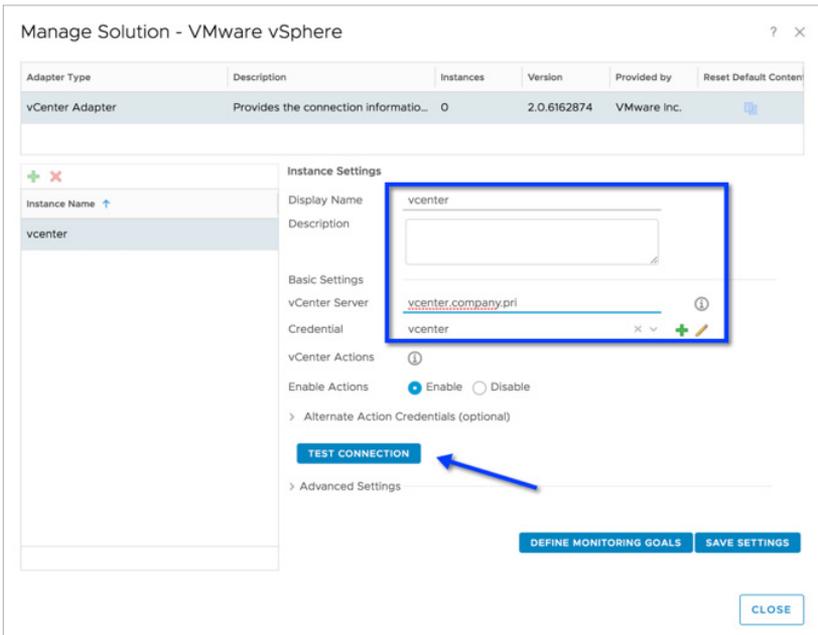


Figure 2-26

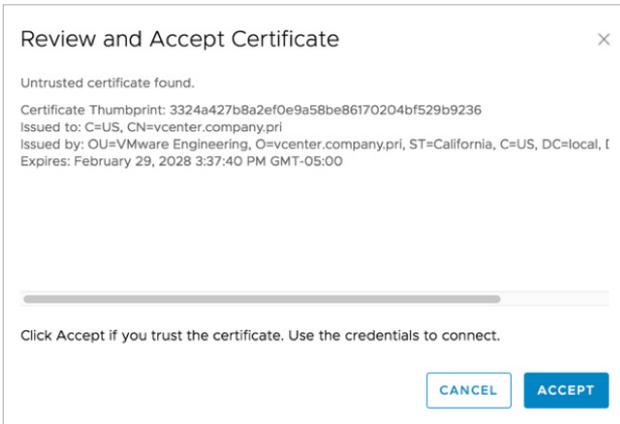


Figure 2-27

After clicking **Accept**, you should see a message like the one in **Figure 2-28** that says the test was successful.

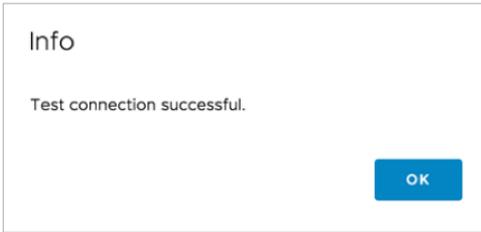


Figure 2-28

After you click **OK**, make sure that you click **Save Settings** before clicking **Close** to continue.

With the solution configured, you should now see that vROps is collecting data from vCenter, as shown in **Figure 2-29**.

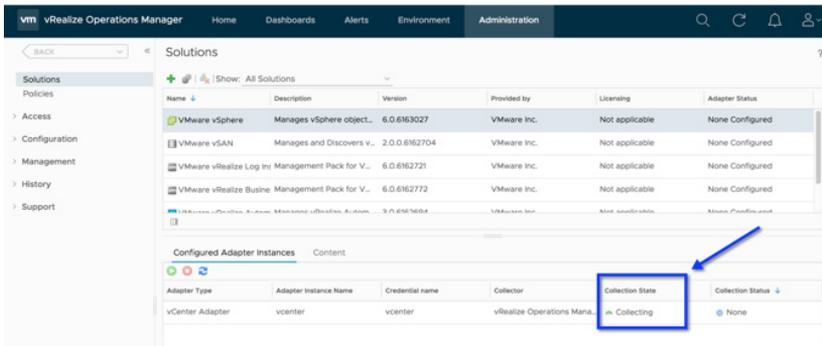


Figure 2-29

It will take some time for vROps to gather all the data that it needs to learn about your virtual infrastructure to start making recommendations for optimization; but just in the first few minutes, you'll start learning where your bottlenecks are and which of your VMs, hosts, and datastores are currently under the heaviest workloads (and what the source is of those workloads).

Accessing vRealize Operations

Every vROps administrator should know how to access critical vROps interfaces and how to log in to those interfaces.

Here's what you need to know:

The vROps Web User Interface

- Accessed by pointing your web browser to the URL (IP address or domain name) of the vROps VM. This IP address was either statically configured when you deployed vROps or obtained by DHCP. If you don't know the IP address of your vROps VM, simply go to the console of the VM inside the vSphere Web Client.
- The username for the web interface defaults to **admin**; the password was configured when you deployed vROps.

The vROps Administrative Interface

- It's accessed by pointing your web browser to the same IP address or domain name used to access vROps; but add “/admin” after it, like this: <http://192.168.1.157/admin>

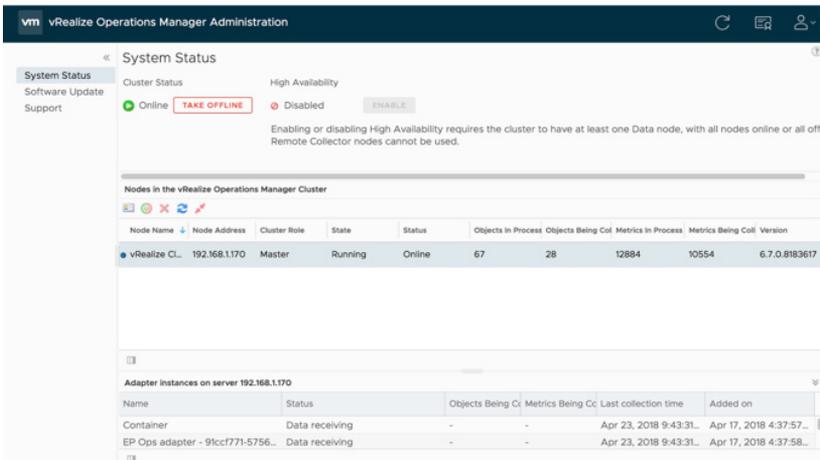
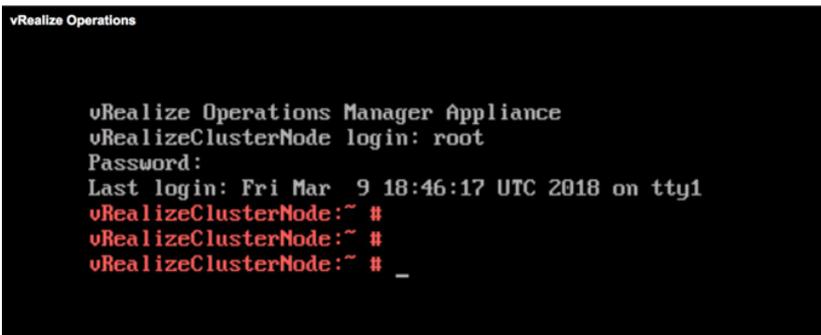


Figure 2-30

- The username for the web interface defaults to **admin**; the password was configured when you deployed vROps.

The vROps Console and SSH Access

- The vROps console (**Figure 2-30**) is typically used for troubleshooting and network reconfiguration. The console is accessed through the VM's console in the vSphere Web Client. SSH access may have been enabled when you deployed vROps; if not, it's possible to enable it by using the console access through the vSphere Web Client.
- You can log in to the console using the same admin account shown in **Figure 2-31**, but it's much more useful to log in as the root account. By default in vROps, there's no password set on the root account; so the first time you log in you'll be prompted to change the password. To do so you must enter the current password. Since the default password is blank, you can press enter to move on.
- The most commonly used administrative tools inside the vROps command-line console are in **"/opt/vmware/share/vami"**.



```
vRealize Operations
vRealize Operations Manager Appliance
vRealizeClusterNode login: root
Password:
Last login: Fri Mar  9 18:46:17 UTC 2018 on tty1
vRealizeClusterNode:~ #
vRealizeClusterNode:~ #
vRealizeClusterNode:~ # _
```

Figure 2-31

For example, **vami_config_net**, shown in **Figure 2-32**, is used to reconfigure networking on the vROps virtual appliance; this is very useful if you used DHCP IP addressing when you deployed the virtual

```
vRealizeClusterNode:/opt/vmware/share/vami #  
vRealizeClusterNode:/opt/vmware/share/vami # ./vami_config_net  
  
Main Menu  
  
0) Show Current Configuration (scroll with Shift-PgUp/PgDown)  
1) Exit this program  
2) Default Gateway  
3) Hostname  
4) DNS  
5) Proxy Server  
6) IP Address Allocation for eth0  
Enter a menu number [0]:
```

Figure 2-32

appliance, but later want to change to a static IP address or reconfigure the DNS servers being used.

Summary

In this chapter, you've learned about the vROps architecture, how to deploy vROps, and how to connect it to vCenter. You should now be up and running!

In the next chapter, you'll get detailed information on how vROps is configured in the real world regarding single sign-on, alert configuration, custom policies, and more.

CHAPTER 3

Configuring vRealize Operations for Maximum Effect

With vROps deployed and the initial configuration performed, you're ready to enable intelligent operations for your virtual infrastructure. In this chapter, you'll learn about some of the most common configurations you may want to perform, beyond the initial configuration. You'll also learn how to configure SSO authentication, custom policies, custom alerts, predictive DRS, automated workload balancing, capacity management, and more.

Configuring SSO in vROps

Some administrators always log in to vSphere using root or admin. Those are the same admins who always log in to vROps using the SuperUser “admin” account. This is a shame, because it's so easy to configure single sign-on (SSO) with vROps.

The benefit of SSO is that any login you can use to log in to the vSphere Web Client will also allow you to log in to vROps. And once you log in to the vSphere Web Client, you can use vROps without any authentication whatsoever. This is a huge convenience.

Prerequisites for Configuring SSO

To configure SSO in vROps, let's first talk about the prerequisites. These steps assume that you already have vSphere, vCenter, and vROps Manager installed and configured.

Finally, make sure that the time on your vROps server is synced with the time on your vCenter server. Network Time Protocol (NTP) is the best way to do this, and configuring NTP in vROps is easy. Just go into **Administration, Cluster Management** and, on the **Actions** menu, click on Network Time Protocol Settings, as shown in **Figure 3-1**.

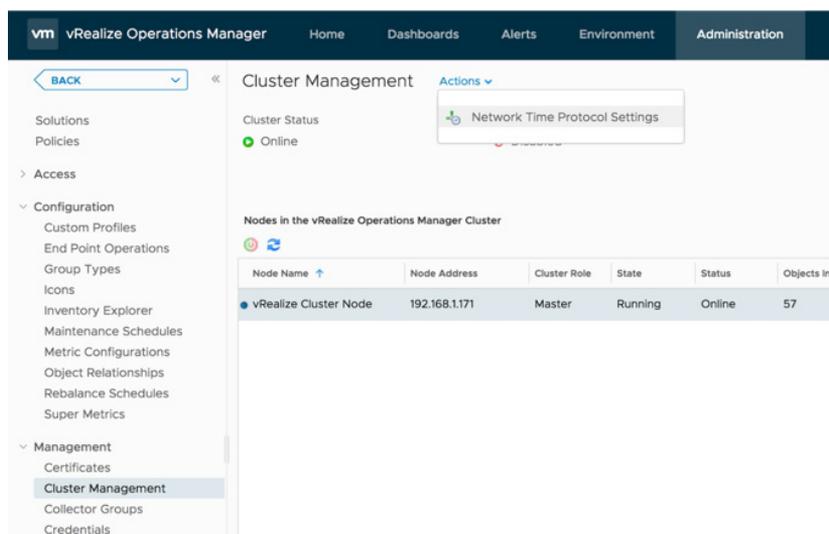


Figure 3-1

If you already have an NTP server (likely configured during deployment of vROps), you can move on from here. If you don't have an NTP server, enter the name of your NTP server and click **Add** to add your NTP server.

Next, make sure you have DNS configured for your vCenter server and vROps server. If you don't have DNS properly configured, you'll get the error "failed to retrieve single sign on SSL certificates, the host or port is not reachable".

Finally, note carefully the version, update, and patch levels of your vCenter server and your vROps server. I recommend the latest version of both.

Once you've met the prerequisites, you can move on to configuring SSO. To configure SSO in vROps, go to the **Administration** tab, and under **Access**, click on **Authentication Sources**. Then, click **Add** to add a new authentication source, as shown in **Figure 3-2**.

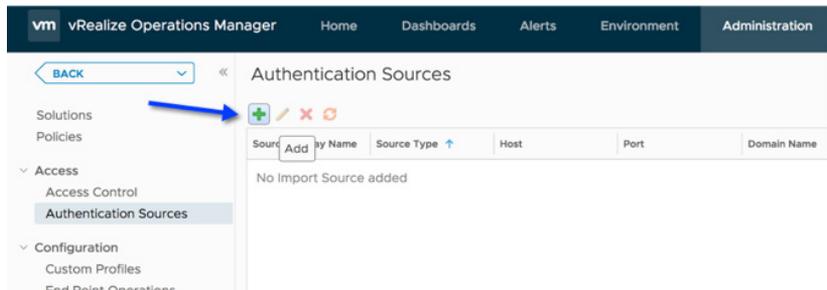


Figure 3-2

Note that under “source type” you can configure authentication to SSO SAML (likely pointing to vCenter), Windows Active Directory (AD), or Open LDAP.

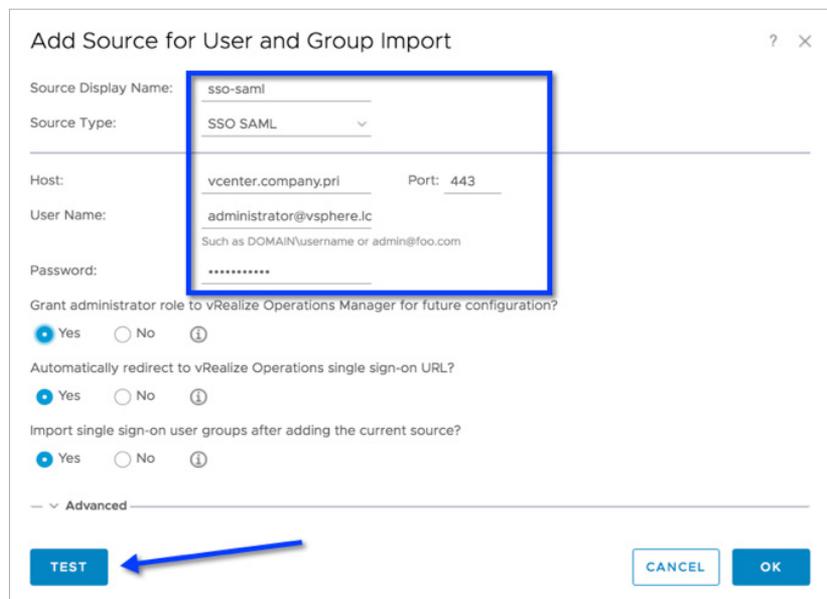


Figure 3-3

I'd recommend configuring your vCenter server to use AD authentication, then configuring vROps to point to vCenter for SSO SAML authentication. This is preferable to configuring vROps to go to AD for authentication.

Enter a name for the authentication source (whatever you want), keeping the default of SSO SAML for the source type. Then enter the vCenter IP address or host name, username, and password. See **Figure 3-3**.

Next, accept the certificate from vCenter and click **OK**, as shown in **Figure 3-4**.

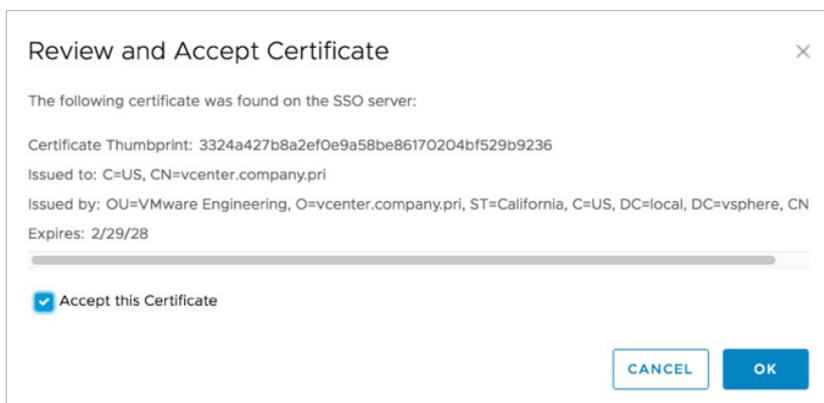


Figure 3-4

Then, as **Figure 3-5** shows, specify which groups you want to import. Assign vROps roles to the user groups that you're importing (**Figure 3-6**).

In this case, we added the vCenter administrators@vsphere.local account and made it an administrator for vROps.

In production environments, you might want to create an AD group in which you add your vROps administrators, then authorize that group to administer or simply use vROps.

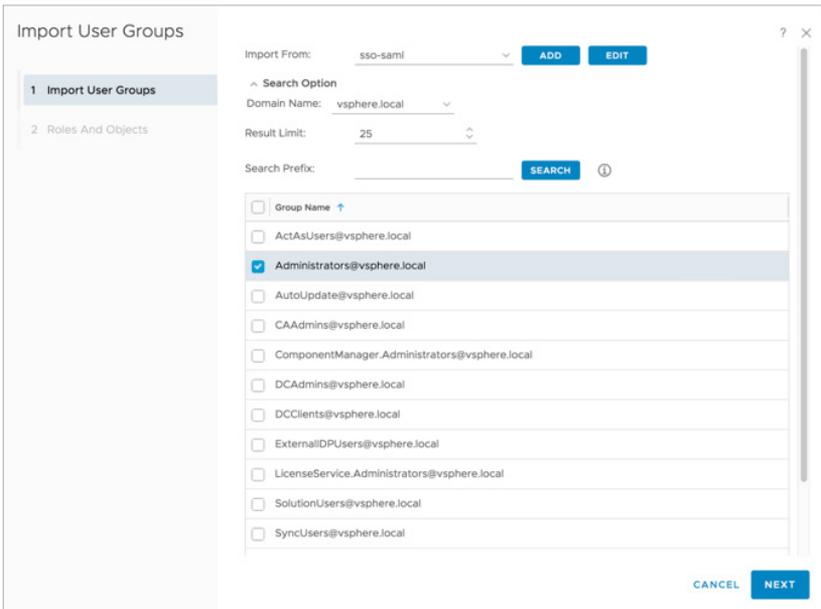


Figure 3-5

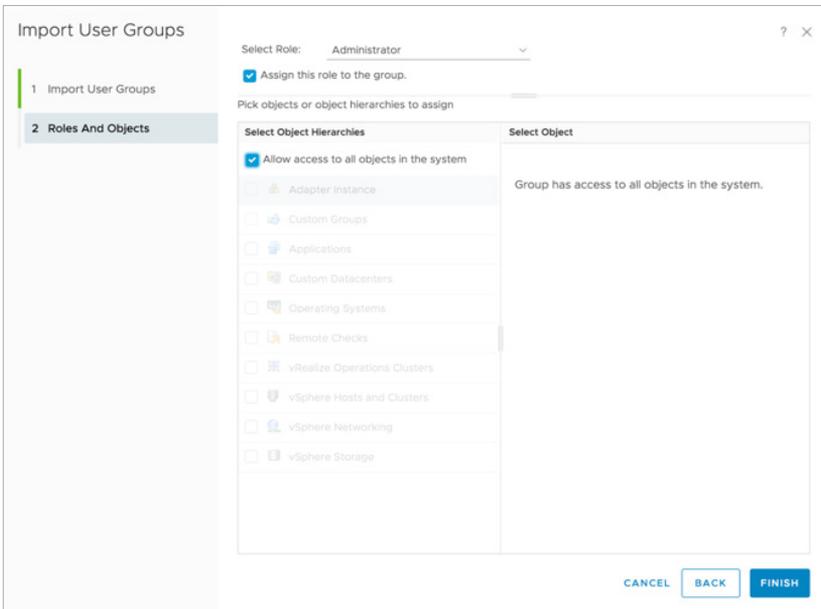


Figure 3-6

At this point, your configuration should be complete. To test it, log out of vROps and the vSphere Web Client.

Log back into the vSphere Web Client and open the web page for vROps; you should be automatically logged in with no authentication.

As you can see in **Figure 3-7**, vROps is allowing the AD admin account to log in.

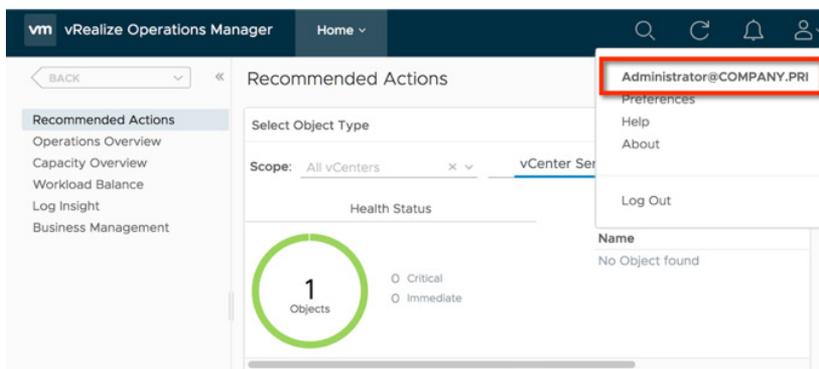


Figure 3-7

Remember: the goal of this SSO configuration is that you never have to log in to vROps again (during normal usage), as long as you're already logged into the vSphere Web Client. Mission accomplished!

Understanding Policies in vROps

Customizing the vROps configuration to your liking and the needs of your virtual infrastructure doesn't take long, and it's a task every admin needs to perform. If you don't do it at the start, at some point, you will likely need to do it in the future so you might as well do it right, from the start.

If you click on **Home** at the top of the vROps web interface, then click on **Administration**, you'll be taken to the administrative interface where just about all vROps customizations are made (**Figure 3-8**).

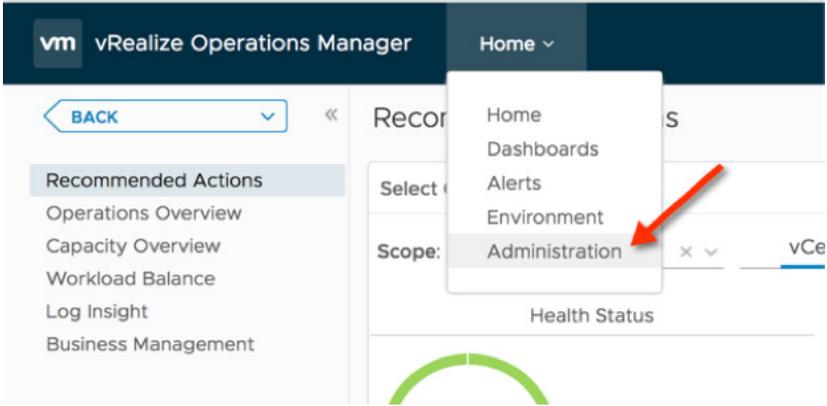


Figure 3-8

In the administrative interface, click on **Policies** on the left to configure and customize vROps policies (**Figure 3-9**).

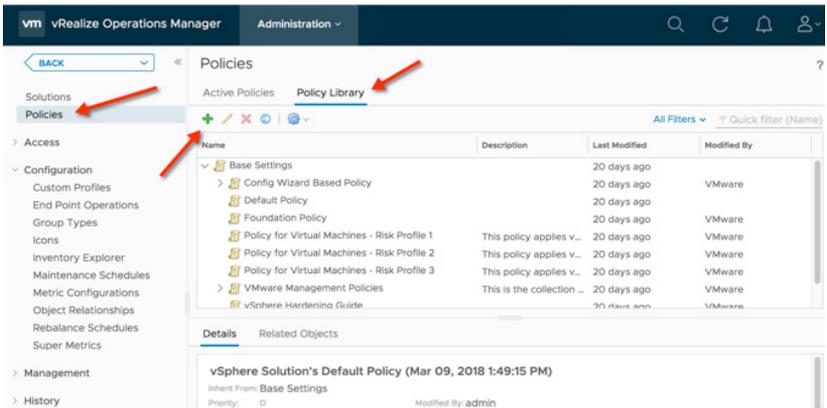


Figure 3-9

Understanding Policies in vROps

Yes, vROps continually learns about your environment and doesn't solely work off of thresholds, but there are some things that you inherently know about your virtual infrastructure that vROps can't know.

For example, you may have a high-priority production cluster (with many more resources intentionally allocated) and a low priority dev/test cluster (with many fewer resources intentionally allocated). You don't want vROps alerting you that you need to add more resources to dev/test if you intentionally under-provisioned the dev/test cluster for the workload.

Perhaps it's more critical to be alerted to a low memory situation on a production cluster than it is for a test/dev cluster. Or you might want to exclude the vROps VMs from monitoring and alerting on themselves.

What is a vROps Policy?

A policy is a set of rules that you define for vRealize Operations Manager to use to analyze and display information about the objects in your environment.

You can create, modify, and administer policies to determine how vRealize Operations Manager displays data in dashboards, views, and reports.



You can see the importance of customization. And since policies are applied to groups, there are times when you'll want to wait on the creation of new policies and first create a new group type and associated groups. But if you already have a group type to which you want to apply your policy, you can go ahead and create the new policy.



Be careful if you choose to modify the default policy, as you're modifying how vROps does its job, and the information that you see across vROps in dashboards, reports, and views will forever be changed.

Ideally, you want to create a new policy for something such as, let's say, your dev/test cluster.

To do this (assuming you already had a group in mind), click on the **Policy Library** tab, then the **Plus** sign to Create a New Policy (shown in **Figure 3-9**). From there, you would give the policy a name and description.

It's common to create a new policy by starting with an existing policy. The policy that you start with is called the “base policy,” as the new policy you create inherits its settings from that policy. See **Figure 3-10**.

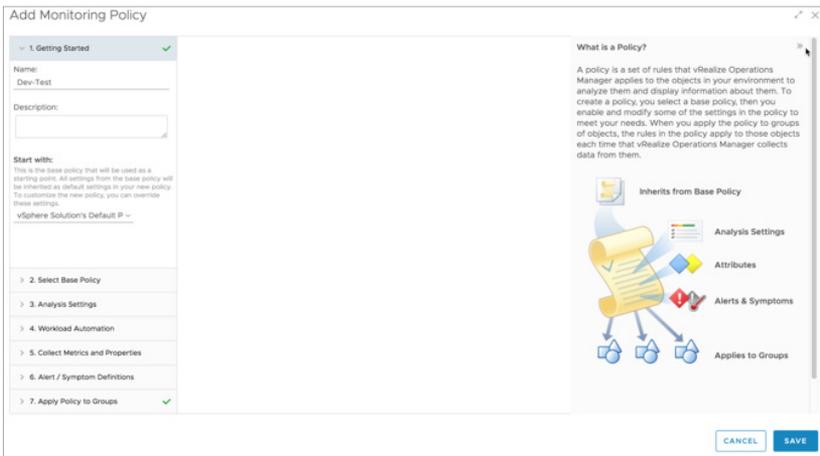


Figure 3-10

From there, as shown in **Figure 3-11**, you'll associate a policy with a group.

In this case, I associated that policy with the new “Dev-Test” group that I created (**Figure 3-11**). This is called the “Monitoring Policy.”

At this point, if you used a policy template you have the option of just clicking **Finish** to complete the policy creation. Or if you want to view or modify all the potential options for the policy configuration and alerts, you can do so.

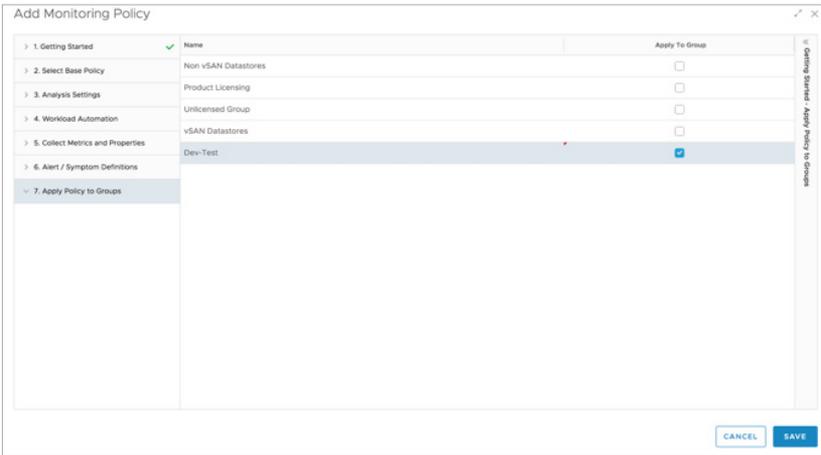


Figure 3-11

When you're done, your new policy will show up in the policy library, as shown in **Figure 3-12**.

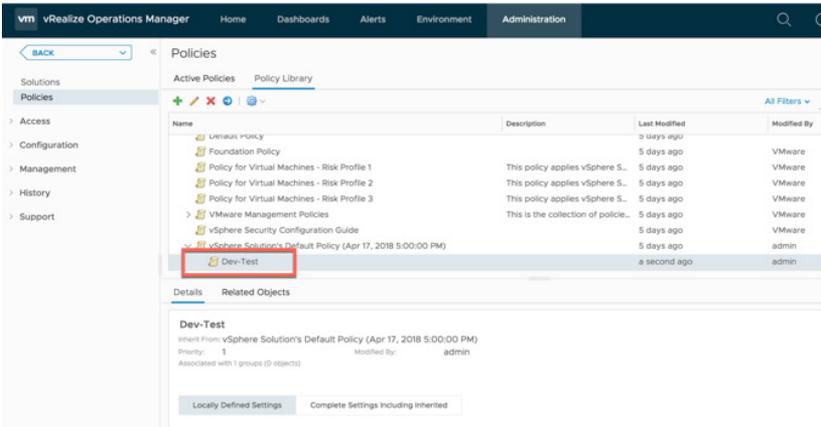


Figure 3-12

Understanding vROps Groups

vROps includes groups already created for you. Some of those groups are system defined (the adapter groups) and cannot be changed. Other groups are user-defined and can be modified or added to.

Examples of system-defined adapter groups include Operating Systems World, Universe, vSAN World, and vSphere World. These groups contain objects such as the vCenter server, ESXi hosts, data centers, etc.

Examples of the pre-defined user groups include Department, Environment, Function, Location, Security zone, and Service Level Object. You should use the vROps grouping to organize the objects in your virtual infrastructure in the way that makes the most sense to you. If possible, use the pre-defined user groups.

However, if those groups don't suit you, vROps group types also allow you to create your own custom object groups, specifically tailored for your environment. **Figure 3-13** shows the creation of the Dev-Test group, for example.

The screenshot shows a 'New group' dialog box. At the top, the group name is 'Dev-Test'. Below that, 'Group Type' is set to 'Environment' and 'Policy' is '--Select--'. A checkbox labeled 'Keep group membership up to date' is checked. A section titled 'Define membership criteria' contains a search bar with the text 'Cluster Compute Resource'. Below this, a criteria set is defined: 'Object name is HA / DRS Cluster 1'. There are also fields for 'Objects to always include' and 'Objects to always exclude'. At the bottom, there are three buttons: 'PREVIEW', 'CANCEL', and 'OK'.

Figure 3-13

By choosing a dynamic group membership (“Keep group membership up to date,” from **Figure 3-13**, for instance), you’re able to define a vSphere inventory object like a folder, cluster, resource pool, or even

a virtual data center. All the objects under that object will always be associated with the group you've created, regardless of whether they're added or removed. This is great for dynamically changing environments, as most are today.

Once the group's created, the logical inventory view allows you to use that group for all common vROps functions, such as showing the performance and capacity for all associated resources.

For more information on policies, group types and groups, check out the **vROps Configuration Guide** (<https://docs.vmware.com/en/vRealize-Operations-Manager/6.7/vrealize-operations-manager-67-config-guide.pdf>) in the vROps documentation for more detailed information.

Automated Remediation in vROps

There are many data center monitoring tools out there that tell you that you have a problem. Remember the robot from the old sci-fi show "Lost In Space"? It was always throwing up its arms and screeching "Warning! Warning! Danger!"



At one point that may have been helpful (if stressful), but our expectations and needs have evolved. Today's tools are able to predict problems before they happen and tell you how to fix them before they impact your applications. Prediction and suggested remediation are the new minimum expectation. However, there are very few tools out there that will not only predict and suggest remediation but automate the process.

Consider, for example, an employee/manager analogy where the employee keeps bringing common problems to the manager, asking the manager how to solve the recurring issues. No manager wants to hear about the same problems over and over again when the

fix is already known. What could the manager do? After dressing the employee down and threatening to make them eligible for unemployment benefits, said manager could write a script that the employee could execute, on their own, to solve the problem.

Another analogy that might help is to think in terms of the cloud. Cloud management requires a tool that knows what can go wrong in your cloud infrastructure and automatically solve it for you, before it impacts applications; and, yes, even without notifying you about it in the middle of the night. The ideal would be for your cloud monitoring and management tool to email you a report in the morning that says, “I fixed these problems for you while you were sleeping, and the applications were never impacted.”

This is exactly the type of functionality that vROps Intelligent Operations can provide.

vROps offers many different actions that can be automated without any scripting and without vRealize Automation. Examples include powering on a VM, powering off a VM, resizing most VM resources, and more. With these actions, vROps is able to prevent downtime or application performance issues *before* they happen.

vRealize Operations Automated Remediation

There are a few different ways to automatically remediate trouble with vROps:

- **Automated Workload Optimization.** The ability of vROps to move running VMs from one cluster to another, to proactively prevent performance bottlenecks before they happen.
- **vROps Automated Actions.** vROps can perform more than 39 different actions on objects managed by the vCenter adapter. You can manually perform these actions or configure alerts to trigger remediation with one of them.

- **vRealize Automation Integrated Actions.** The same actions that can be automated with vROps can also be automated with vRealize Automation, allowing you to perform more complex automations.
- **Webhooks.** By leveraging vRealize Orchestrator integration, you can trigger an alert based on an email, SNMP trap, or REST API notification; that alert can then perform an automated action.

The first thing you need to know is that for these vROps actions to work, the vCenter adapter must have **Enable Actions** set to **Enable**, as shown in **Figure 3-15**.

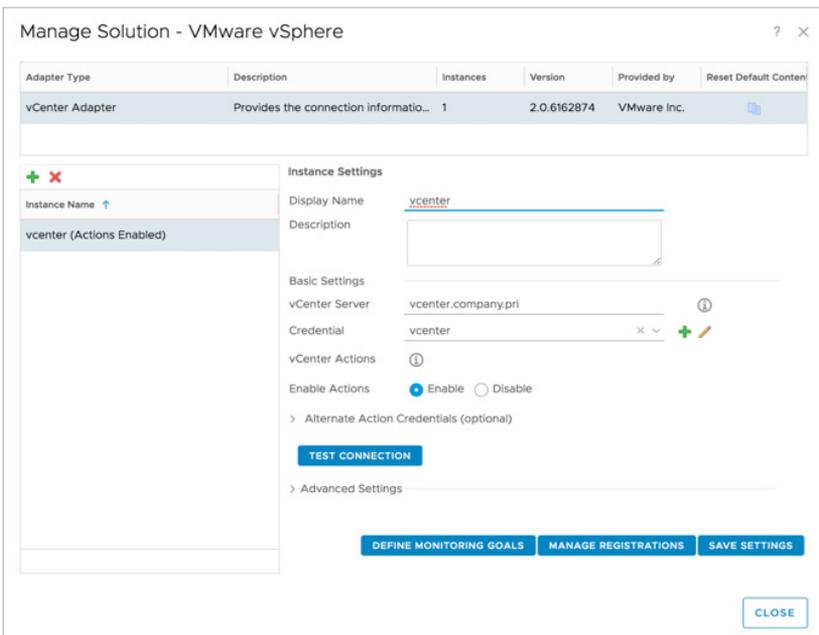


Figure 3-15

In the past, you would configure the vCenter Python Adapter separately, but starting with vROps 6.6 that's no longer necessary.

You can view the multitude of different actions that you can either perform manually or automate by going to **Alerts**, **Alert Settings**, and **Actions**, as you see in **Figure 3-16**.

Action Name	Action Type	Adapter Type	Resource Adapter Type	Associated Object Types	Recommendations
Delete Idle VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Delete Powered Off VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Delete Unused Snapshots for Dat...	Update	vCenter Python Actions Adapter	vCenter Adapter	Datasc..., Host System, Cluster ...	1
Delete Unused Snapshots for Dat...	Update	vCenter Python Actions Adapter	vCenter Adapter	Datasc..., Host System, Cluster ...	0
Delete Unused Snapshots for VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	1
Delete Unused Snapshots for VM ...	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Move VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine	1
Power Off VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	1
Power On VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Rebalance Container	Update	vCenter Python Actions Adapter	vCenter Adapter	Custom Datacenter, Datacenter	1
Set CPU Count and Memory for V...	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Set CPU Count and Memory for V...	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Set CPU Count for VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	3
Set CPU Count for VM Power Off ...	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Set CPU Resources for VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	1
Set DRS Automation	Update	vCenter Python Actions Adapter	vCenter Adapter	Cluster Compute Resource	3
Set Memory for VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	1
Set Memory for VM Power Off All...	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0
Set Memory Resources for VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	3
Shut Down Guest OS for VM	Update	vCenter Python Actions Adapter	vCenter Adapter	Virtual Machine, Host System, Clu...	0

Figure 3-16

If you take a look at a specific vSphere object and click on the **Actions** drop down for that object, you can see the actions that apply to that object and which can be performed manually. For example, **Figure 3-17** shows a VM and the manual actions that can be performed.

To automate these types of actions, you need to modify a recommendation to perform an action (remediate) instead of just recommend remediation steps. To do this, go to the **Alerts** menu, then into **Alert Settings**, **Recommendations**, and find a recommendation

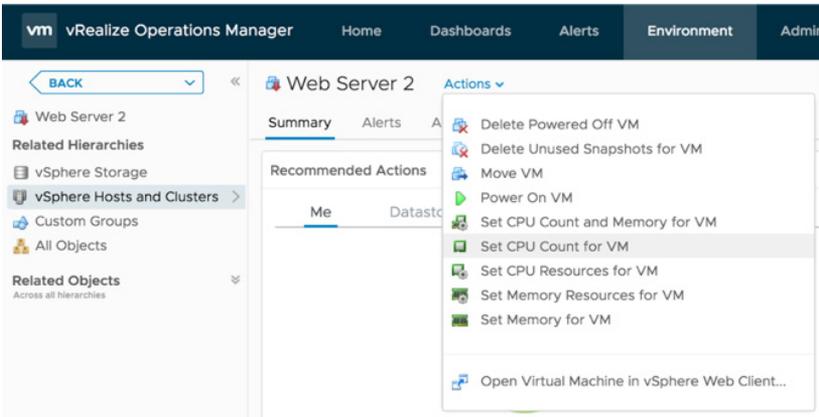


Figure 3-17

you want to automate. **Figure 3-18** for example, shows a pre-defined recommendation to add more memory to a VM.

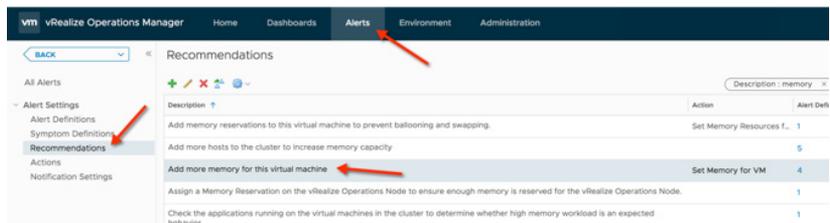


Figure 3-18

In this case, there's a pre-defined action as well to add more memory to the VM to automatically remediate the memory contention issue and resolve application slowness. See **Figure 3-19**.

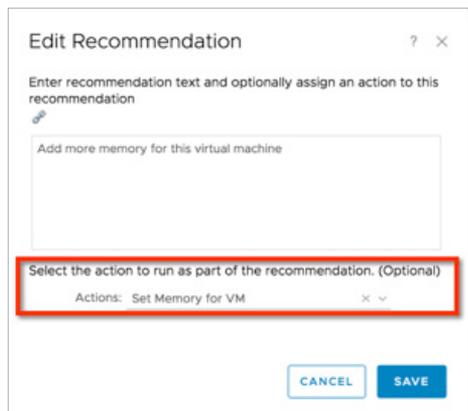


Figure 3-19

Automated remediation takes alert recommendations (which already exist in your vROps installation) and allows you to turn on an action to take that supersedes the recommendation.

When automated actions kick in, they're displayed under **Administration, History, Recent Tasks**.

While drinking your coffee in the morning, you can look in **Recent Tasks** to find out everything that vROps resolved for you while you were sleeping.

Configuring Alerts

According to the vROps documentation, vROps Alerts are events that occur on the monitored objects when data analysis indicates deviations from normal metric values, or when a problem occurs with one of the vRealize Operations components.

In other words, alerts are things you need know about.

vROps Alerts come in three flavors:

- Critical
- Immediate
- Warning

Critical alerts should be acted upon immediately; immediate alerts (somewhat counter-intuitively) should be acted on “as soon as possible;” and warning alerts should be checked “when you get time”.

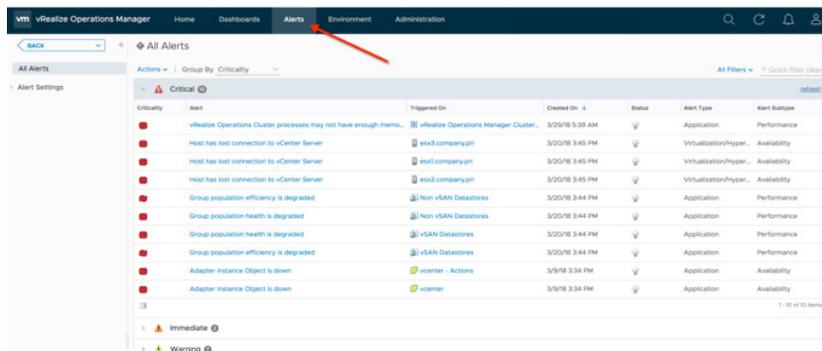


Figure 3-20

Alerts are visible in a few different areas in vROps. The most obvious is the main **Alerts** menu, as shown in **Figure 3-20**. Another place to see alerts is from the **Operations Overview**, as you can see in **Figure 3-21**.

vROps comes with many different alerts preconfigured. Under the **Alerts** menu, then under **Alert Settings**, you’ll find **Alert Definitions** (**Figure 3-22**), where you can see all the predefined alerts; customize those alerts; and create your own custom alerts, should you decide to do so.

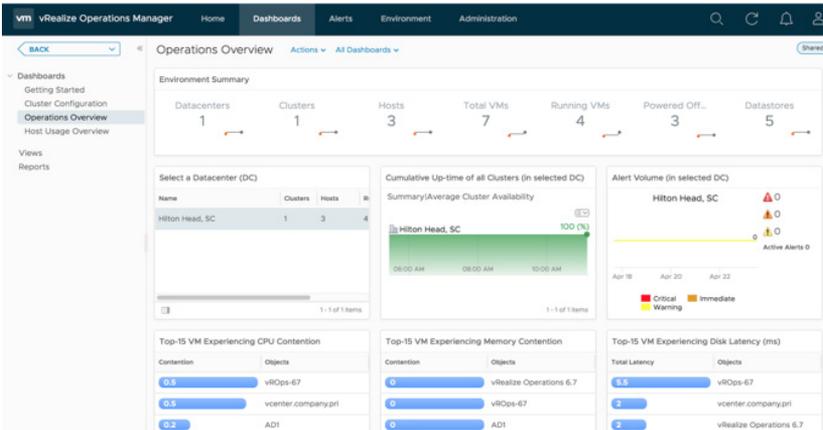


Figure 3-21

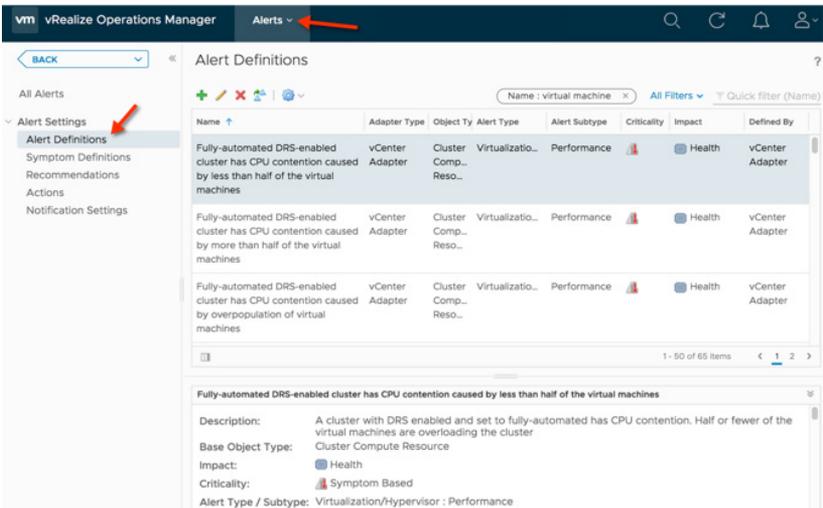


Figure 3-22

Reacting to Alerts

It's important to know the different actions that you can take when you receive an alert. vROps is typically very helpful in resolving alerts by explaining the problem, offering metrics to support its analysis, and providing recommended actions to remediate the issue (Figure 3-23).

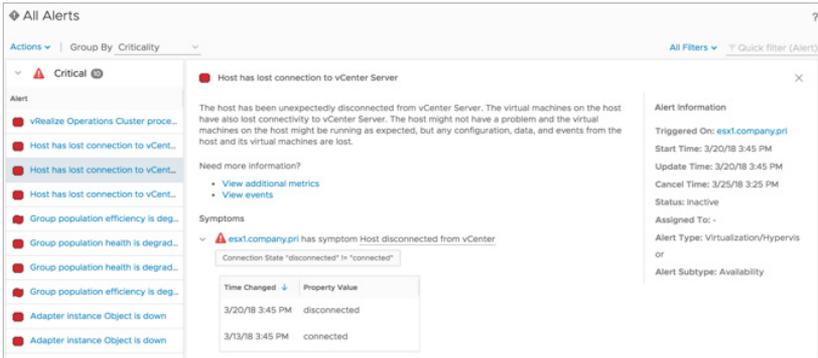


Figure 3-23

If you select an alert in the **Alerts** menu, you can take ownership, cancel the alert, suspend the alert, go to the alert definition, or release ownership (**Figure 3-24**).

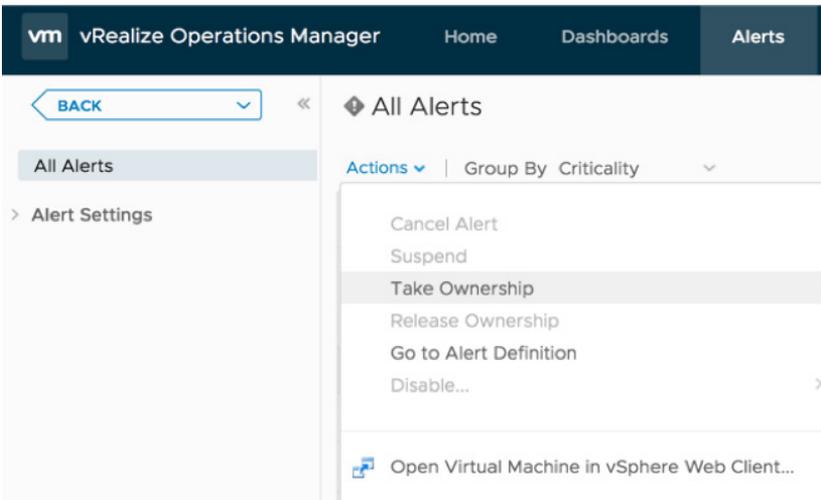


Figure 3-24

Predictive DRS

Back in vROps 6.4, VMware introduced predictive distributed resource scheduler, a.k.a. pDRS. So, what does pDRS do that the DRS you already know and love, doesn't?

If you're a typical vSphere admin, it's likely that you already use VMware's DRS in your vSphere infrastructure, and it's equally likely that you love it (I know I do). You may think that DRS is already perfect (and I agree, it's pretty cool); but what if DRS had the information it needed to actually predict the needs of your applications? With that, your applications can achieve the fastest performance possible and your vSphere infrastructure can have the fastest workload balancing ever. Would that interest you?

vSphere and DRS have been working together since vROps 6.2 when Intelligent Workload Placement with DRS was announced. With Intelligent Workload Placement, vROps helped to rebalance VM workloads across clusters.

With Intelligent Workload Placement in place, you may think that DRS doesn't need any help balancing workloads within a cluster; after all, DRS already does its job very well. But let's look at the different approaches that DRS has available to it.

Traditionally, DRS has worked by reactively balancing workloads when applications (running on VMs) aren't getting the resources they need. DRS analyzes the resources allocated (CPU and memory) and looks to see if those resources are continuously available; if they aren't, it moves that VM to a host that has those resources available.

While this works well in most cases, there is the potential for contention and, thus, negative application performance impact (albeit very short). DRS is included with vSphere Enterprise Plus.

The next step up from reactive is balance, which is the Intelligent Workload Placement approach discussed earlier. With the balance method, vSphere DRS and vROps begin working together.

This is an improvement over the reactive method, because vROps is working at a higher level than DRS to analyze performance across multiple clusters. While this is by itself better than DRS, the downside

is that it comes with high overhead and doesn't do anything to prevent application performance issues and contention before it happens.

Enabling Predictive Distributed Resource Scheduler (pDRS)

Thus, neither reactive or balanced can guarantee to prevent application performance issues. While they typically fix application performance issues very quickly, there's no guarantee that they will; in addition, there's no proactive diagnosis and prevention of problems before they happen.



Figure 3-25

Predictive DRS does exactly this, helping the admin get out ahead of their infrastructure (**Figure 3-25**). With minimal overhead, pDRS predicts what resources each VM will need that day using the past resource consumption of each VM as a guide to future needs.

It combines that predictive ability with the knowledge of what VMs are on each host, and the resources that each host is able to contribute. vROps makes these predictions using its dynamic thresholds. The great thing about these dynamic thresholds is that they're tailored to each individual VM and application.

To enable pDRS, log into your vSphere Web Client (not vROps), go to your **DRS Cluster Configuration**, enable **vSphere DRS** and check the box to **Enable Predictive DRS** (see **Figure 3-26**).

Next, navigate to the **Administration** menu in vROps, then to **Solutions**. Edit your vSphere Solution, then under the advanced settings, enable the vCenter adapter to **Provide data to vSphere Predictive DRS**, as shown in **Figure 3-27**.

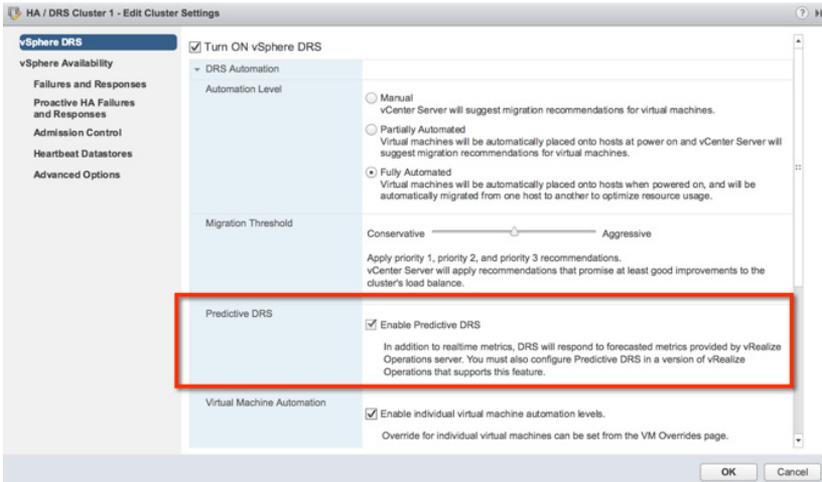


Figure 3-26

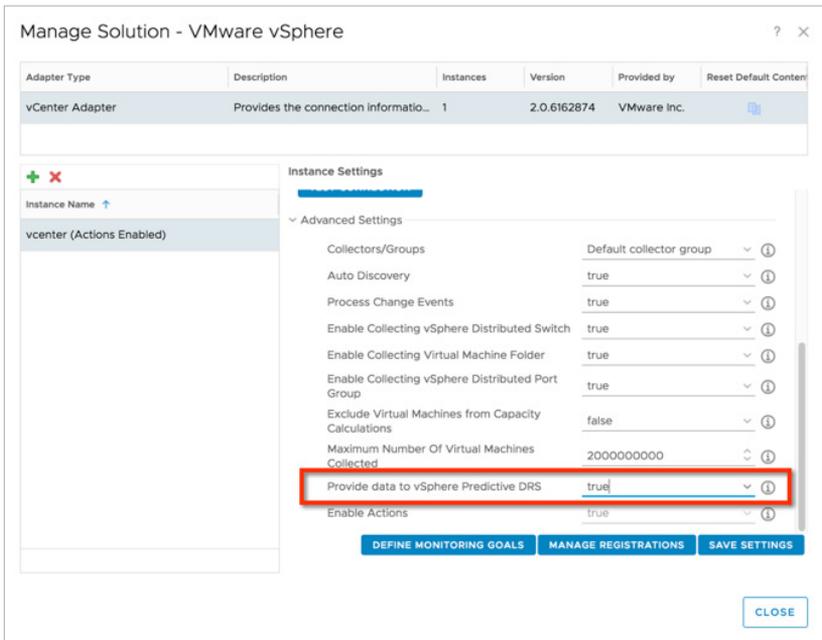


Figure 3-27

Each hour, predictive DRS will combine its knowledge of the environment combined with the historical resource utilization of each VM, then take action vSphere to ensure that the VMs receive the resources

they need *before they're needed*. The end result is that your critical applications never get the chance to suffer performance degradation.

Automated Workload Optimization

Announced with vROps 6.7 was a new automated capacity management feature called “automated workload optimization”. You might be thinking, “Wait! Doesn’t DRS automate the balancing of workloads in vSphere?” The answer is that yes, DRS automates the balancing of workloads (although, technically, it doesn’t balance at all; it ensures that workloads get the resources that they need).

Unlike DRS, which works within vSphere clusters, automated workload optimization automates the optimization of workloads *between* vSphere clusters. Thus, to leverage AWO, the first requirement is having multiple vSphere clusters.

I like to say that DRS works *intra-cluster*, and automated workload optimization works *inter-cluster*.

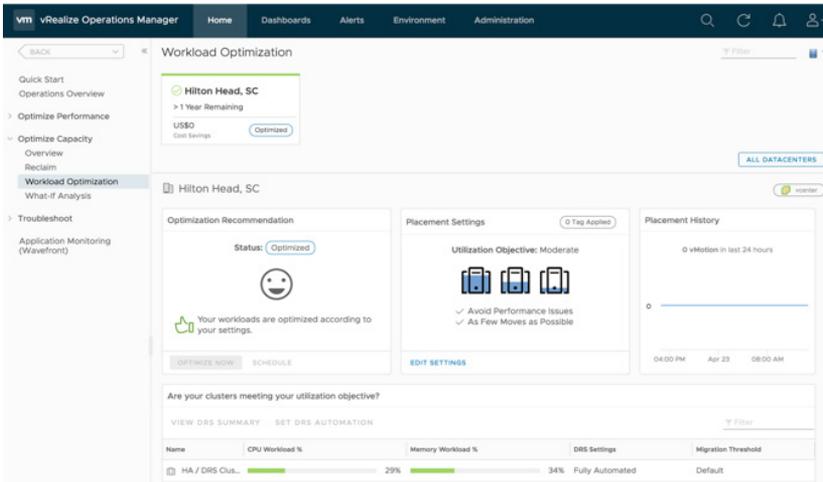


Figure 3-28

How does Automated Workload Optimization Work?

You'll find **Workload Optimization** on the vROps Home screen, under the **Optimize Capacity** section. See **Figure 3-28**.

You can control how you'd like the workloads to be placed in the **Placement Settings** tile by clicking on **Edit Settings**, as shown in **Figure 3-29**.

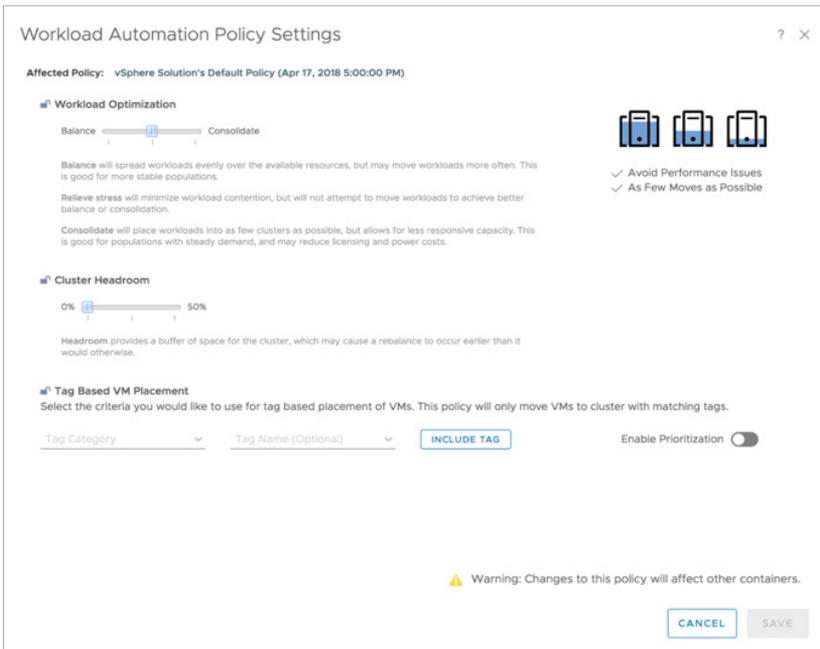


Figure 3-29

Once you have multiple clusters managed by vROps, you can choose to **Rebalance Clusters** manually (**Figure 3-30**), configure rebalancing on a **Schedule**, or make workload balancing **Automatic**.

We'll learn more about optimizing your vSphere infrastructure in the next chapter of this book.



Figure 3-30

Maximizing Capacity Analysis with vROps

The **Utilization Overview** dashboard in vROps (Figure 3-31) offers a host of valuable metrics:

- Total environment capacity
- Used capacity
- CPU capacity trends
- Memory capacity trends

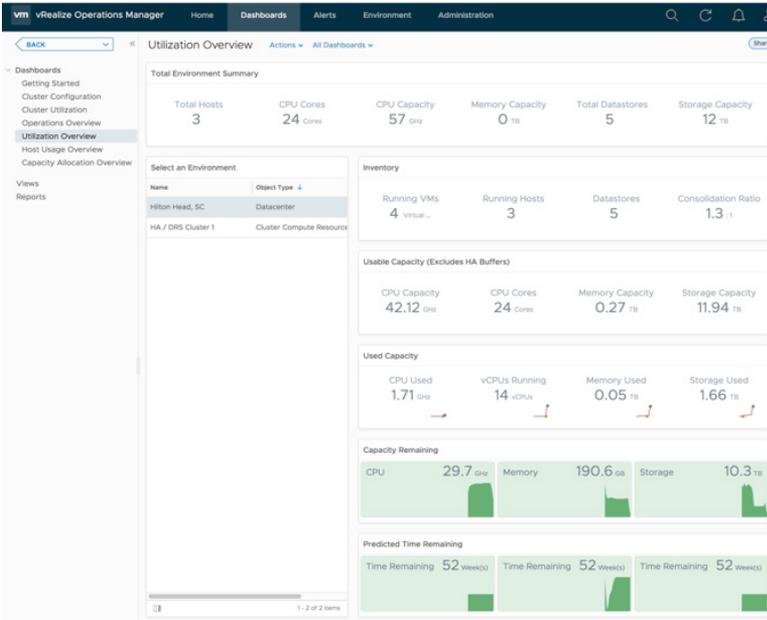


Figure 3-31

- Disk capacity trends
- Predict how much time remains before your most critical resources are depleted

By drilling down into a specific cluster, you'll move down into the environment level; from there you can drill even deeper. For example, check out the workload analysis of the cluster in **Figure 3-32**.

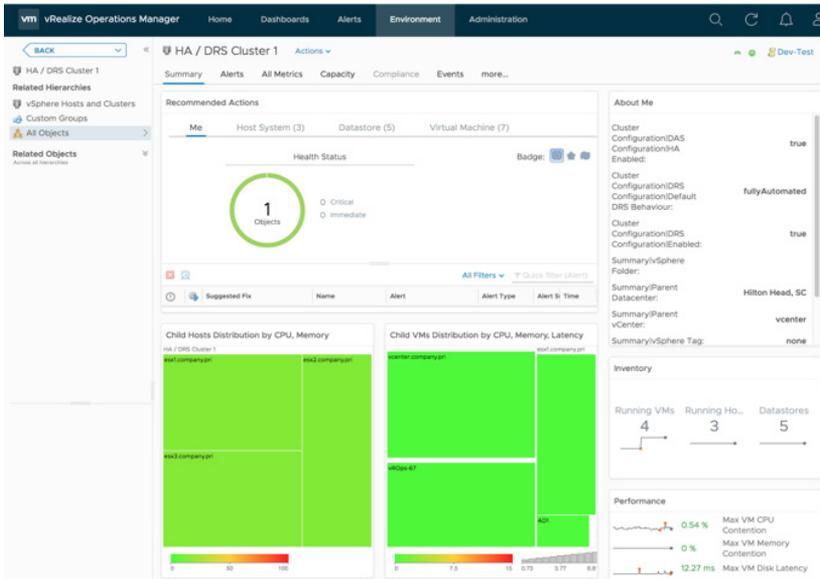


Figure 3-32

This drilldown can be done for a specific host, VM, or datastore. For example, **Figure 3-33** shows the capacity remaining for a specific VM. In this case you should be concerned, since just 35 days remain until memory runs out in your vCenter Server VM.

vROps can show the capacity and time remaining for any object it manages, including clusters, hosts, datastores, and VMs. It will proactively alert you should the capacity and time remaining fall below predetermined levels.

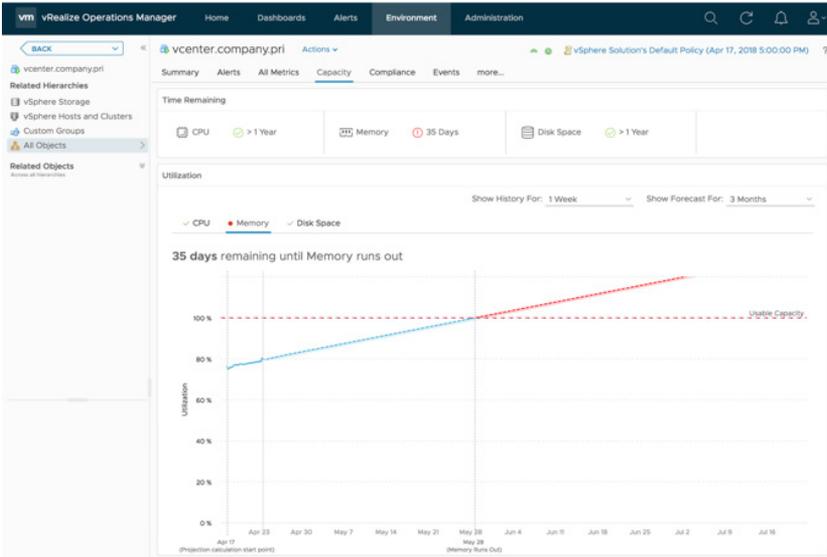


Figure 3-33

Maximize Troubleshooting with vROps

While vROps does its best to predict and prevent problems before they happen, it's likely that at some point you'll need to use vROps to troubleshoot your vSphere infrastructure.

To that end, vROps constantly performs performance analysis to identify bottlenecks there. As you can see in **Figure 3-34**, vROps offers troubleshooting dashboards for clusters, datastores, hosts, VMs and vSAN, in addition to the ability to troubleshoot via log data.

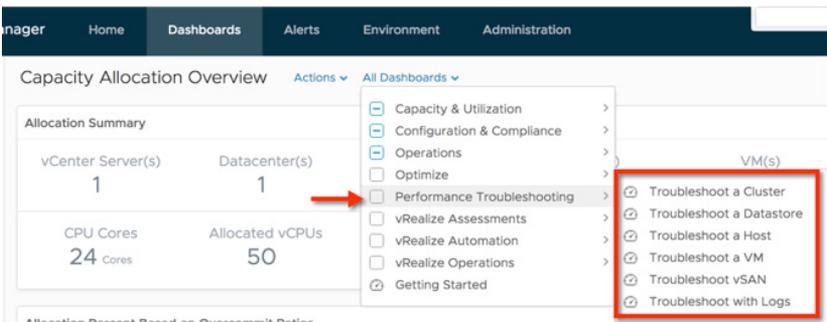


Figure 3-34

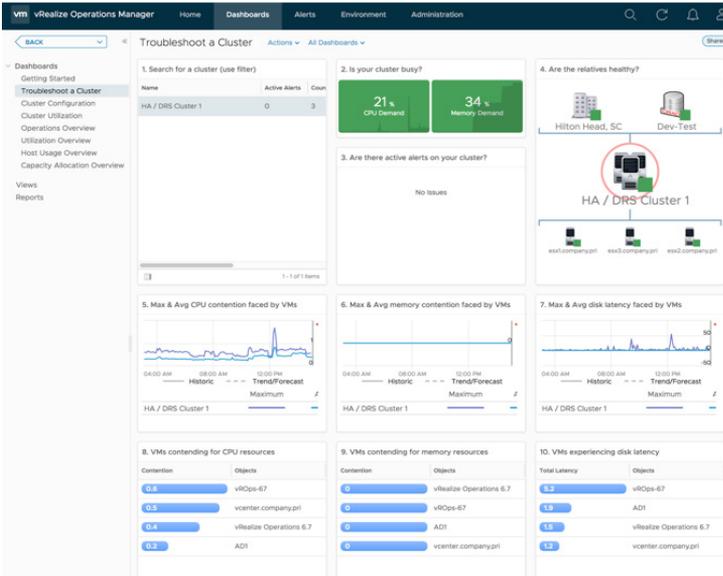


Figure 3-35

Figure 3-35 shows how easy it is to use the **Troubleshoot a Cluster** dashboard. It enables you to quickly identify the type of contention faced by each VM in the cluster.

Besides the troubleshooting dashboards, the real power of vROps shines through when you realize how often the vROps Smart Alerts are able to point you to the root cause of an issue and provide recommendations for remediation so that you can quickly resolve any trouble that might occur.

vSAN Management

In the past, vROps was capable of analyzing vSAN, but only when you installed the vROps Management Pack for vSAN. However, vSAN management is built into vROps 6.6 and later.

Using vSAN management and monitoring in vROps requires you to enable it by connecting it to your vCenter Server. In vROps, go to the **Administration** menu, then to **Solutions**; select the **VMware vSAN** solution, then the **Gear** icon to configure (Figure 3-36).

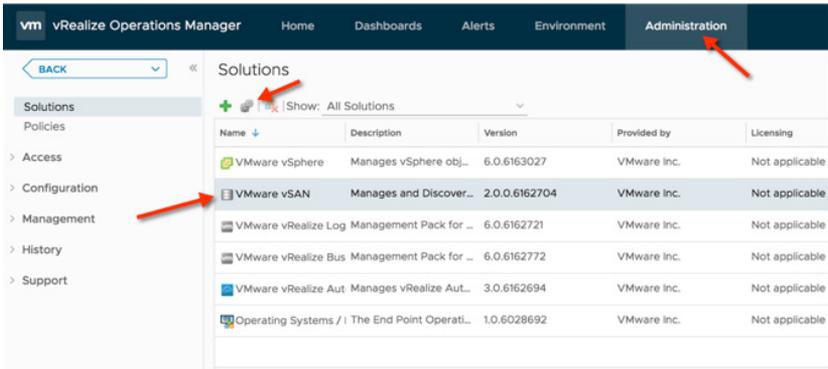


Figure 3-36

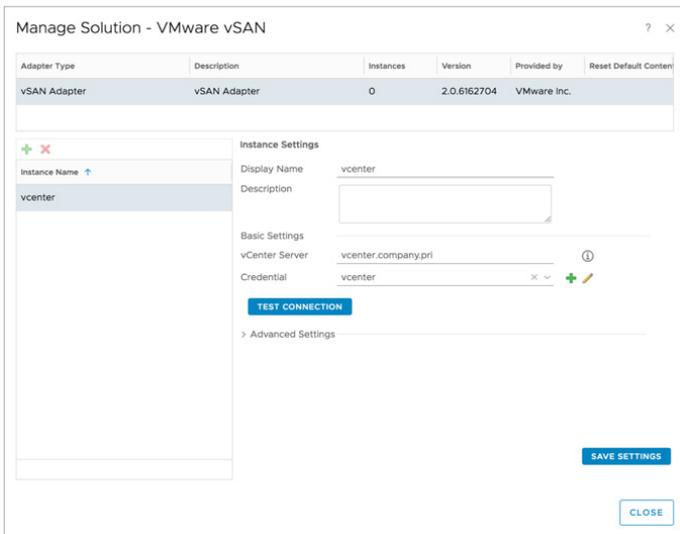


Figure 3-37

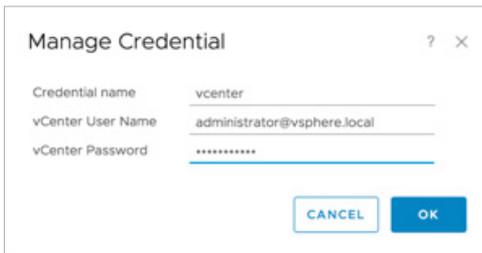


Figure 3-38

From there, you'll add your **vCenter Server Hostname** and **Credentials** to connect to your vCenter server (**Figure 3-37** and **Figure 3-38**).

After you get a successful test of the connection and credentials, make sure that you click **Save Settings**.

At this point, vROps will begin gathering statistics from your vCenter server related to vSAN; then you'll quickly start seeing some very insightful statistics and recommendations from vROps.

vSAN Dashboards in vRealize Operations

vROps offers a number of dashboards, including:

- vSAN Capacity Overview
- Migrate to vSAN
- vSAN Operations Overview
- Troubleshoot vSAN

Figure 3-39 displays the **vSAN Operations Overview Dashboard**.

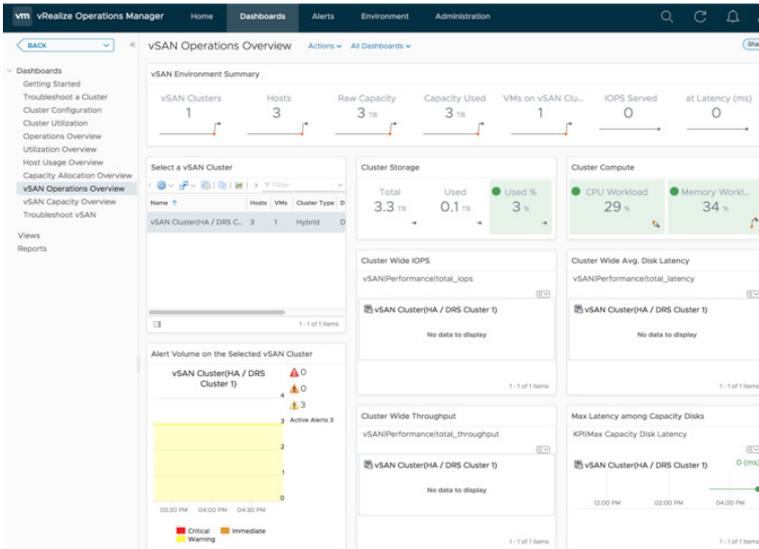


Figure 3-39

For those using vSAN, these dashboards are invaluable. They allow you to plan capacity across multiple vSAN clusters, optimize vSAN clusters, prevent vSAN trouble before it happens, and, if needed, troubleshoot vSAN (**Figure 3-40**).

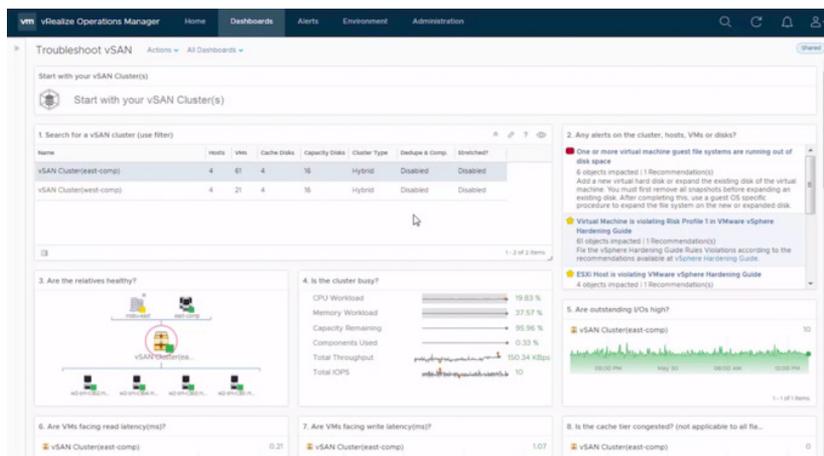


Figure 3-40

Summary

In this chapter, you've learned how to configure the most common vROps features and how to maximize your vSphere infrastructure using vROps features like predictive DRS, vSAN management, and powerful capacity dashboards.

With the latest version of vROps, some even more powerful features have been released. In the next chapter we'll dive into the latest vROps features that will allow you to enable a self-driving vSphere infrastructure.

Drive on!

Maximizing vRealize Operations

If you want to get the maximum power of vROps, make sure you read this chapter completely! With the recently announced vROps 6.7, VMware has brought what they call “Self-Driving Operations for the Data Center.” What does this mean for you? VMware says that the self-driving data center will bring “Continuous performance optimization based on operational and business intent, efficient capacity management, proactive planning and intelligent remediation.”

The goal for the self-driving data center is to provide a unified management platform so that the IT organization can optimize, plan, and scale the software-defined data center and multiple cloud deployments, from the applications to the infrastructure.

High Speed Installation

If you are running vCenter 6.7 you can now automatically deploy a new instance of vROps 6.7 directly from the vSphere client without having to go through the traditional installation steps that we covered in Chapter 2 of this book. With the new high speed installation, vCenter will download the vROps 6.7 OVA, deploy it, and completely configure it. In addition to the deployment, the high speed installation also includes the automatic configuration of the vSphere Adapter to communicate with the vCenter server that you deployed it from.

In fact, if you are running vCenter 6.7 and don't have vROps 6.7 installed, vCenter will prompt you to install it (as you see in **Figure 4-1**).

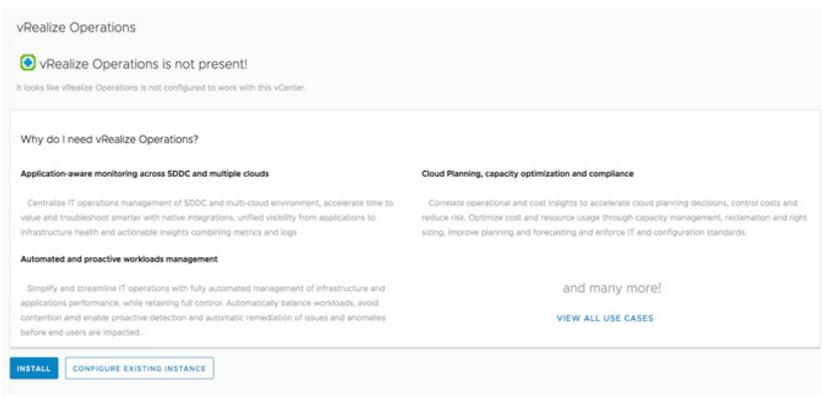


Figure 4-1

From there, you can select either the online or offline installation mode, provide your vCenter server credentials, define your environment (datacenter, cluster, host, datastore, and network), and provide IP address details. With that information, vCenter will automatically deploy vROps, activate the new vROps dashboards for vCenter, and configure the vSphere adapter in vROps.

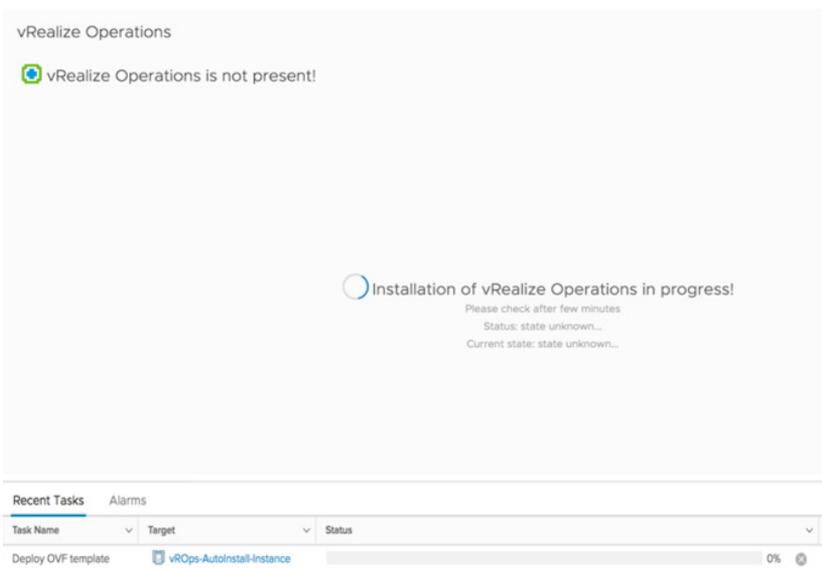


Figure 4-2

You can be up and running with vROps faster than ever by combining vSphere 6.7, vCenter 6.7, and vROps 6.7!

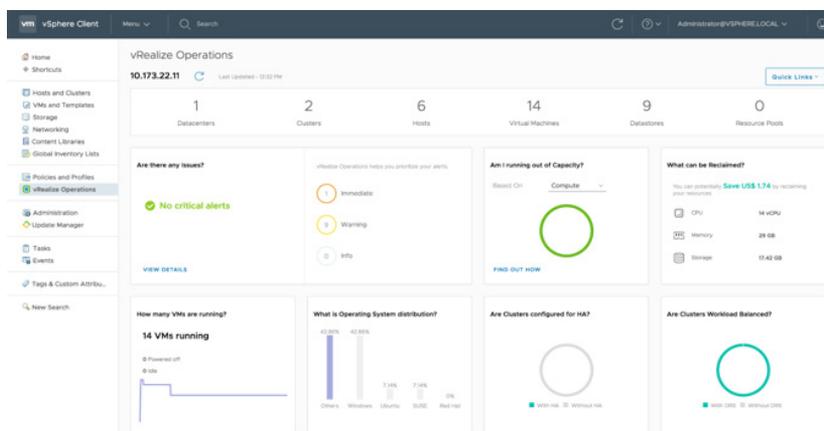


Figure 4-3

vRealize Operations 6.7 Plugin for vSphere Web Client

One of my favorite new features happens when you combine vROps 6.7 and vCenter 6.7. Only with that magical combination can you use the new vROps 6.7 plugin for the vCenter 6.7 HTML5 web client (**Figure 4-3**).

The vRealize Operations within vCenter plugin provides you with six new dashboards directly inside your vCenter UI (**Figure 4-4**).

The end result is that you get all the goodness of vROps in your vSphere client, helping you be more productive than ever.

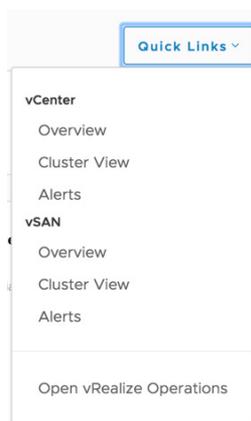


Figure 4-4

Enhanced User Interface

The new release of vROps 6.7 includes an updated user interface that makes vROps easier to use, ultimately making you more productive.

The new UI includes a use case and persona-based “Quick Start Dashboard” to help you quickly perform operational tasks. It also includes updated workflows for enterprise-wide troubleshooting with metrics and logs. **Figure 4-5** shows the new interface.

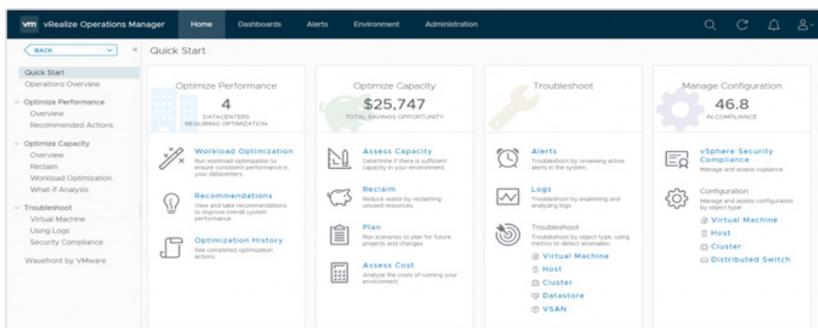


Figure 4-5

Automating Performance Based on Intent

The ultimate goal of the self-driving data center is to allow admins to define how the data center's intended to run, and then for vROps to make it happen.

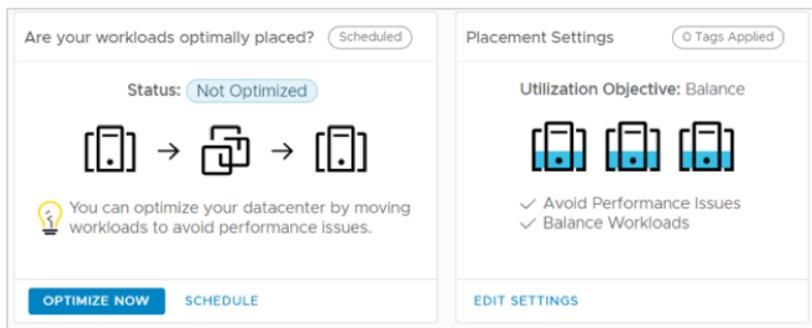


Figure 4-6

The first step is to access the current performance of your data center. **Figure 4-6** shows the vOps 6.7 automated workload balancing and optimization window.

Simply define intent by configuring settings such as target utilization and cluster headroom, then define tag-based placement requirements, as shown in **Figure 4-7**. Some examples of tag-based placement:

- SLA tiers: Gold, Silver, Bronze
- License policies: Windows, Oracle, Linux
- Compliance: PCI, HIPAA
- App affinity policies

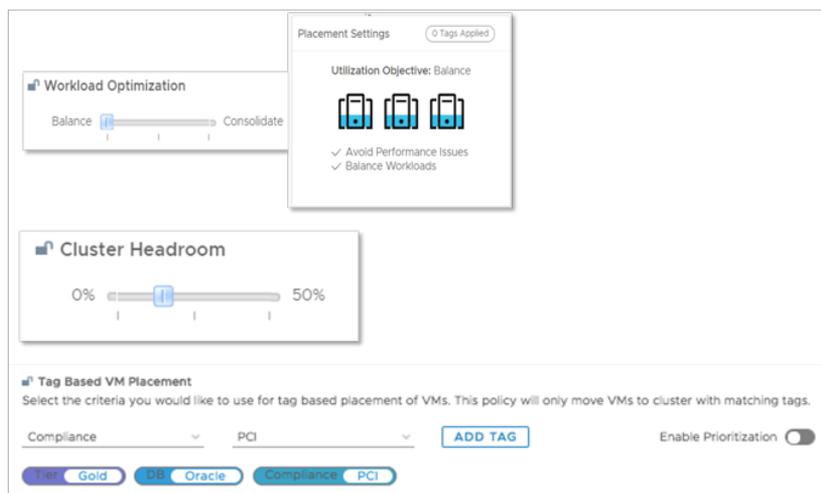


Figure 4-7

After you've defined intent, turn on self-driving operations by automating workload balancing and performance optimization (**Figure 4-8**). There are several ways to automate optimization action:

- **Run it now manually**, based on recommendations
- **Schedule it** for an automated ongoing optimization

- **Automate** to run when performance troubles occur, and desired performance intent isn't met



Figure 4-8

Assess Capacity and Cost Savings with Automate Optimization

Intuitive dashboards help prioritize which data centers are at risk for capacity shortfalls, view total cost of ownership and get detailed insights on potential cost savings from reclamation, and analyze optimum densities for the future.

Figure 4-9 shows an example of the kind of savings opportunities presented. As you can see, cost data is directly correlated with capacity analytics to ensure that you intelligently reclaim capacity when it's not needed.

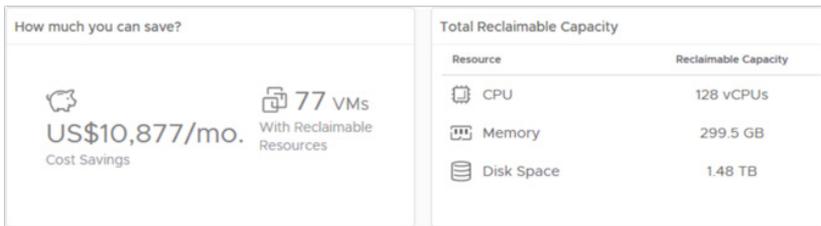


Figure 4-9

After getting an idea of which data centers to prioritize and what could be the potential cost savings (**Figure 4-10**), you can easily automate optimization actions. This includes reclamation, right-sizing and automating workload balancing to reduce license costs, as well as densification to consolidate workloads into minimal clusters while assuring that you meet goals for performance, target utilization and defined intent.

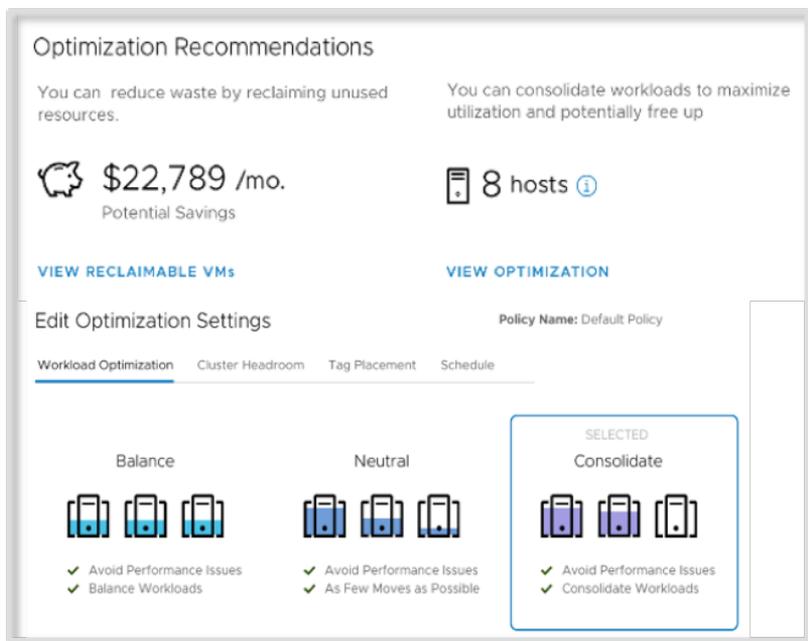


Figure 4-10

The new capacity analytics engine is able to view historical trends and predict the most constrained resources such as CPU, memory, and disk space. It can also give recommendations to either reclaim unused capacity or even add capacity (**Figure 4-11**).

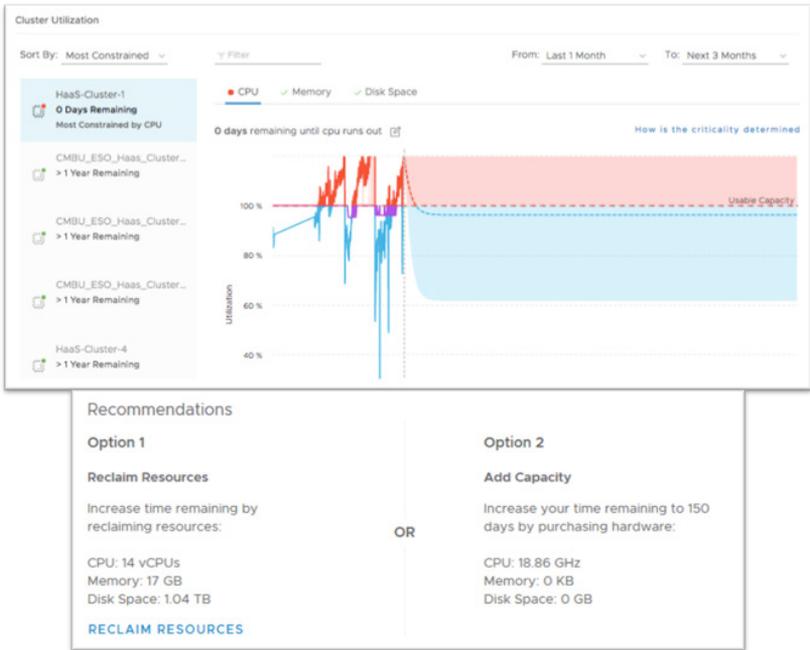


Figure 4-11

Model What-If Scenarios for Private and Public Cloud Workload Distribution

Many companies are trying to find the best solution for running their workloads. For some of those workloads, it makes the most sense to move them into the public cloud; but which public cloud?

The new version of vROps allows you to perform what-if scenario analysis to decide where to run workloads between VMware Cloud on AWS and AWS EC2, as shown in **Figure 4-12**.

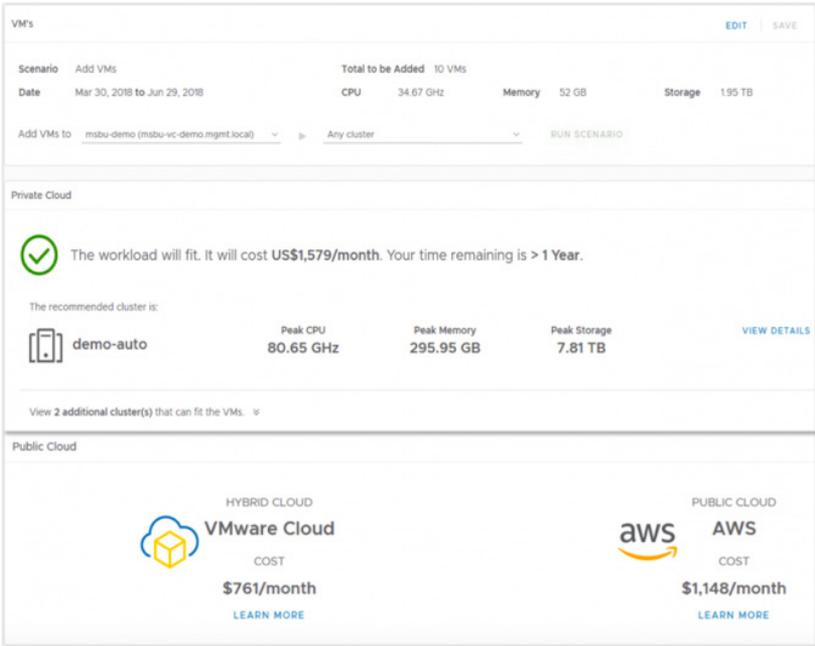


Figure 4-12

Integration of vRealize Operations and Wavefront by VMware

vROps 6.7 features a new out-of-the-box integration with Wavefront to enable IT and application owners to triage and resolve issues faster (Figure 4-13). vROps easily on-boards Wavefront app monitoring by automatically discovering VMs and apps, then provisioning the required OS and app data collectors to send metrics to Wavefront.

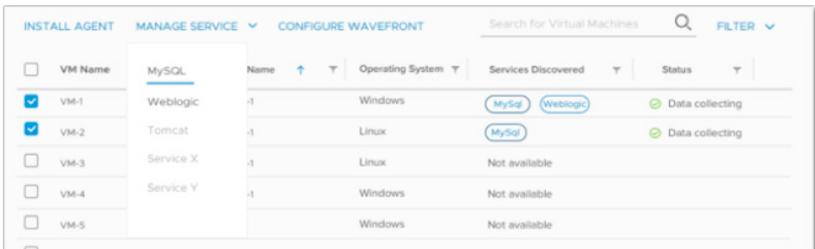


Figure 4-13

This capability enables IT to gain control and provide app monitoring capabilities to their DevOps teams for the next generation of apps, in addition to traditional applications.

What's Next?

In this book you've learned the power of vROps: how it works, how it's packaged, how it's installed, and how it's configured.

More importantly, you've learned how to maximize the power of vROps to make the most of your vSphere infrastructure. When paired together, vSphere 6.7 and vRealize 6.7 are an unstoppable data center solution that provides powerful features like predictive DRS, workload optimization, cost savings, and, ultimately, the self-driving data center.

Get Started with vRealize Operations Today!

If you already have vROps but aren't running the latest version, check out the vROps Upgrade Center:

<https://www.vmware.com/products/vrealize-operations/upgrade-center.html>

If you don't have vROps in place already, you can sign up for a free 60-day evaluation:

<https://my.vmware.com/en/web/vmware/evalcenter?p=vrops-eval>

