VMware vRealize Operations for Published Applications Installation and Administration

VMware vRealize Operations for Published Applications 6.4

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VMware vRealize Operations for Published Applications Installation and Administration

1

VMware vRealize Operations for Published Applications Installation and Administration provides information about how to monitor the performance of your Citrix XenDesktop/Citrix XenApp 7.6, 7.7, 7.8, 7.9, and 7.11 environments in VMware vRealize™ Operations Manager™.

Intended Audience

This information is intended for users who monitor the performance of a Citrix XenDesktop/Citrix XenApp 7.6, 7.7, 7.8, 7.9, and 7.11 environments in VMware vRealize Operations Manager and administrators who are responsible for maintaining and troubleshooting a Citrix XenDesktop/Citrix XenApp 7.6, 7.7, 7.8, 7.9, and 7.11 environments.

Introducing vRealize Operations for Published Applications

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vRealize Operations for Published Applications collects performance data from monitored software and hardware objects in your XenDesktop/XenApp 7.8/7.9/7.11, and vCenter environments and provides predictive analysis and real-time information about problems in your XD-XA infrastructure.

vRealize Operations for Published Applications presents data through alerts, on configurable dashboards, and on predefined pages in vRealize Operations Manager.

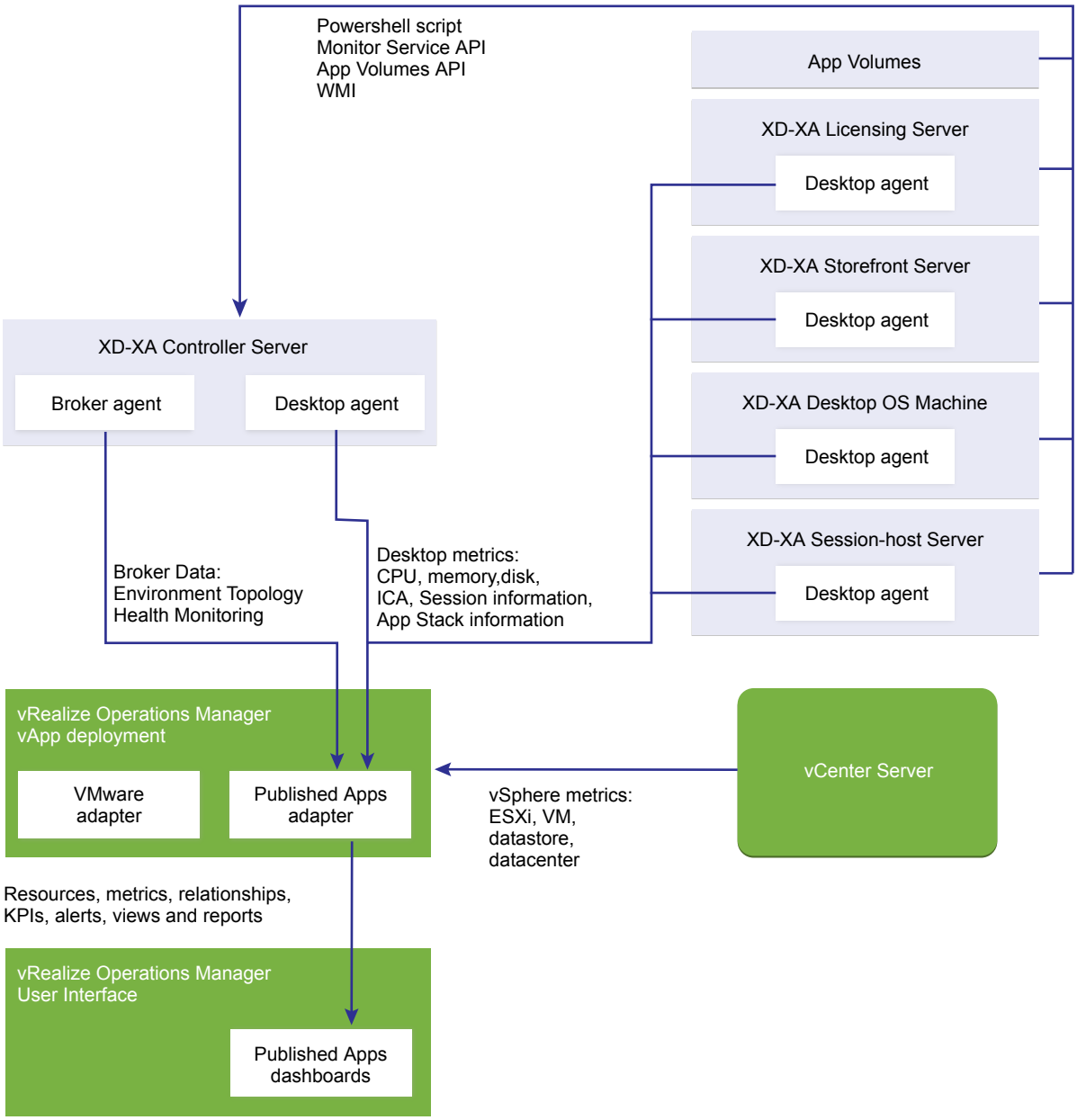
IT administrators can use vRealize Operations for Published Applications to quickly obtain an overview of how the XenDesktop and XenApp environments are behaving and view important metrics associated with that environment. Help desk specialists can view objects related to end user sessions, perform basic troubleshooting, and resolve user problems.

This chapter includes the following topics:

vRealize Operations for Published Applications Architecture

The vRealize Operations for Published Applications components include the XD-XA adapter, broker agent, and desktop agents.

VMware vRealize Operations for Published Applications Architecture



vRealize Operations for Published Applications Desktop Agent

The vRealize Operations for Published Applications desktop agent runs as a service on the XenDesktop Delivery Controller on each License server, RDS host, Store Front server, and on all VDI machines.

The desktop agent monitors Citrix ICA sessions and HDX sessions and applications launched in the Citrix ICA and HDX sessions by using standard functions and APIs of Windows OS. The desktop agent periodically collects the Citrix ICA sessions' data on properties and performance, and sends the data to the adapter using a secure connection.

vRealize Operations for Published Applications Broker Agent

The vRealize Operations for Published Applications broker agent runs on an active delivery controller, and collects and sends information to the XD-XA adapter.

When you configure a broker agent, you pair the broker agent with a XD-XA adapter instance.

vRealize Operations for Published Applications Adapter

The vRealize Operations for Published Applications adapter collects Citrix XenDesktop inventory information from the broker agent and collects metrics and performance data from desktop agents. The vRealize Operations for Published Applications adapter sends that information to vRealize Operations Manager. The information is displayed in pre-configured XenDesktop dashboards in the vRealize Operations Manager user interface.

The vRealize Operations for Published Applications adapter runs on a cluster node or remote collector node in vRealize Operations Manager. You can create a single vRealize Operations for Published Applications adapter instance to monitor multiple XenDesktop 7.6/7.7/7.8/7.9/7.11 sites. During broker agent configuration, you pair the broker agent with a vRealize Operations for Published Applications adapter instance.

If you are monitoring multiple XenDesktop sites, you can pair the broker agent installed in each site with the same vRealize Operations for Published Applications adapter instance as long as the total number of objects that the vRealize Operations for Published Applications adapter instance handles does not exceed 10,000. You can create more vRealize Operations for Published Applications adapter instances on different remote nodes to support large scale environments.

Important Creating more than one vRealize Operations for Published Applications adapter instance for each cluster node or remote collector is not supported. Also, creating more than one vRealize Operations for Published Applications adapter instance for each site is not supported. vRealize Operations for Published Applications 7.6/7.7/7.8/7.9/7.11 adapter cannot monitor the XenApp 6.5 environments.

If your vRealize Operations for Published Applications environment resembles one of the following configurations, VMware recommends that you create the vRealize Operations for Published Applications adapter instance on a remote collector node.

XenDesktop deployments with multiple sites	To improve scalability, create the vRealize Operations for Published Applications adapter instance on a remote collector node to offload processing from the vRealize Operations Manager cluster data nodes.
Remote datacenters	To minimize network traffic across WAN or other slow connections, install a remote collector node with a separate vRealize Operations for Published Applications adapter instance in remote datacenters. Pair each vRealize Operations for Published Applications adapter instance with the broker agent that is located in the same remote datacenter.

System Requirements for vRealize Operations for Published Applications

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vRealize Operations for Published Applications has specific system requirements. Verify that your environment meets these system requirements before you install vRealize Operations for Published Applications.

This chapter includes the following topics:

Product Compatibility for vRealize Operations for Published Applications

vRealize Operations for Published Applications is compatible with the following products.

- vCenter Server 5.5 and 6.0
- App Volumes 2.11 and 2.12 (App Volumes 3.*x* not supported for vRealize Operations for Published Applications 6.4)
- vRealize Operations Manager 6.2, 6.2.1, 6.3, and 6.4
- Citrix XenDesktop/XenApp 7.6/7.7/7.8/7.9/7.11 running on Windows Server 2008R2 (SP1) and Windows Server 2012.

Note Refer to vRealize Operations for Published Application 6.1 for support of Citrix XenApp 6.5.

Software Requirements for vRealize Operations for Published Applications

Each component of vRealize Operations for Published Applications has requirements for the software on the system where it is installed.

vRealize Operations for Published Applications Desktop Agent Software Requirements

You install the vRealize Operations for Published Applications desktop agent on Citrix Delivery Controllers, Session RDS servers, Store Front server, License server, and the VDI machines.

vRealize Operations for Published Applications Broker Agent Software Requirements

You install the vRealize Operations for Published Applications broker agent on an active delivery controller.

The vRealize Operations for Published Applications broker agent has the following software requirements. Verify that you enable PS remoting on the deliver controller by using Microsoft PowerShell before you install the broker agent.

- Windows Server 2008R2 SP1 or Windows Server 2012
- Microsoft .Net Framework 4.5.1

vRealize Operations for Published Applications Adapter Software Requirements

You install the vRealize Operations for Published Applications adapter on a vRealize Operations Manager server that is running.

The vRealize Operations for Published Applications adapter has the following software requirements.

- VMware vRealize Operations Manager 6.2, 6.2.1, 6.3, and 6.4

Setting Remote Signed Execution Policy

To set the remote signed execution policy, perform the following steps:

```
Set-ExecutionPolicy RemoteSigned
Enable-PSRemoting
Restart WinRM service
    net stop winrm
    net start winrm
Restart Broker-Agent service
```

Installing and Configuring vRealize Operations for Published Applications

4

Installing vRealize Operations for Published Applications involves downloading the installation files from the VMware product download page and installing and configuring software components on machines in your vRealize Operations for Published Applications environment.

Install and Configure vRealize Operations for Published Applications

You install and configure vRealize Operations for Published Applications software components on machines in your Citrix XenDesktop/XenApp 7.6/7.7/7.8/7.9/7.11 and vRealize Operations Manager environments.

Prerequisites

- Verify that your environment meets product compatibility, hardware, and software requirements. See Chapter 3, "System Requirements for vRealize Operations for Published Applications," on page 11.
- Verify that vRealize Operations Manager is deployed and running. If you need to upgrade vRealize Operations Manager, perform the upgrade before you install vRealize Operations for Published Applications.
- Download the vRealize Operations for Published Applications installation files from the product download page. See "Downloading the vRealize Operations for Published Applications Installation Files," on page 15.
- Verify that you have a license key for the vRealize Operations for Published Applications solution.
- Verify that you have a license key for vRealize Operations Manager.
- The time on all the servers must be synced to a NTP server.

Note Upgrading from vRealize Operations for Published Applications 6.1 to vRealize Operations for Published Applications 6.4 is not supported.

Note For vRealize Operations for Published Applications 6.1 and vRealize Operations for Published Applications 6.4 to co-exist, they must be installed on different collector nodes.

Procedure

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Registered VMware users can download the vRealize Operations for Published Applications installation files from the product download page.

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After you install the broker agent, you use the Broker Agent Configuration wizard to configure the broker agent on the Citrix XenDesktop Delivery Controller where you installed the broker agent. You can also use the Broker Agent Configuration wizard to make changes to your broker agent configuration.

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You can configure broker agent to use non-admin user for Citrix Desktop Delivery Controller.

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You install desktop agents on all Delivery Controllers, Store Front server, RDS host, License server, and VDI machines.

12 Push the vRealize Operations for Published Applications Desktop Agent Pair Token Using a Group Policy on page 24

To use vRealize Operations for Published Applications to monitor a XenDesktop Site, you must create a Group Policy (GPO) to contain the vRealize Operations for Published Applications group policies. You then apply the GPO to the remote desktops that you want to monitor.

Downloading the vRealize Operations for Published Applications Installation Files

Registered VMware users can download the vRealize Operations for Published Applications installation files from the product download page.

Table 4-1. vRealize Operations for Published Applications Installation Files

File Name	Component	Where to Install
`VMware-vrops-v4paadapter-6.4-`*`buildnumber`*`.pak`	Adapter	vRealize Operations Manager server
`VMware-v4pabrokeragent-x86_64-6.4-`*`buildnumber`*`.exe`	Broker agent installer for 64-bit Windows OS	On XenDesktop Controller
`VMware-v4padesktopagent-x86_64-6.4-`*`buildnumber`*`.exe`	Desktop agent installer for 64-bit Windows OS	On XenDesktop Controllers, RDS servers, Store Front servers, Licence servers, and VDI machines
`VMware-v4padesktopagent-6.4-`*`buildnumber`*`.exe`	Desktop agent installer for 32-bit Windows OS	On Session Host servers and VDI machines

Install the vRealize Operations for Published Applications Solution

You install the vRealize Operations for Published Applications solution from a PAK file in vRealize Operations Manager.

Procedure

1 Copy the `VMware-vrops-v4paadapter-6.4-`*`buildnumber`*`.pak` file to a temporary folder.

2 Log in to the vRealize Operations Manager user interface with **administrator** privileges.

3 In the left pane of vRealize Operations Manager, click the **Administration** icon and click **Solutions**.

4 Install the vRealize Operations for Published Applications solution.

   a On the **Solutions** tab, click the plus sign.

   b Browse to locate the temporary folder and select the PAK file.

   c Click **Upload.**

      The upload might take several minutes.

   d Read and accept the EULA and click **Next**.

      Installation details appear in the window during the upload process.

   e When the installation is complete, click **Finish**.

After the installation is finished, vRealize Operations for Published Applications is listed as a solution.

What to do next

Provide licensing information for the vRealize Operations for Published Applications solution. See "Adding a vRealize Operations for Published Applications License Key," on page 16.

Open the Ports Used by vRealize Operations for Published Applications

After you install the vRealize Operations for Published Applications adapter, you disable the firewall service, open the default ports, and restart the firewall.

Prerequisites

Note If you are using vRealize Operations Manager 6.4, opening the ports is not necessary.

- Install the vRealize Operations for Published Applications adapter.
- Verify that you have **root** privileges.

Procedure

1 Log in to vRealize Operations Manager collector server.

2 Access the command prompt and run the `service vmware-vcops-firewall stop` to disable the vRealize Operations Manager firewall service.

3 Open the default ports by editing the configuration file.

Option	Action
Linux	a Access the `vmware-vcops-firewall.conf` file in the `/opt/vmware/etc/vmware-vcops-firewall.conf` directory. b In a text editor, modify the properties for the RMI service ports that you want to change, for example *TCPPORTS="$TCPPORTS 3095:3098"* .
Windows	a Access **Windows Firewall** and select **Windows Firewall > Advanced Settings > Inbound Rules > New Rule > Port** and click **Next**. b Select **Specific local ports** and type the ports that you are using, for example***3095-3098***. The default ports are 3095-3098. If you changed the default ports, specify the ports that you are using.

4 Run the `vmware-vcops-firewall start` command to start the service.

If the `service vmware-vcops-firewall start` command does not enable the ports, start the collector server.

What to do next

Add a vRealize Operations for Published Applications license key. See "Adding a vRealize Operations for Published Applications License Key," on page 16

Adding a vRealize Operations for Published Applications License Key

After you install the vRealize Operations for Published Applications solution, you must add a vRealize Operations for Published Applications license key in the vRealize Operations Manager user interface. vRealize Operations for Published Applications is not functional until it is licensed.

Note You must also add a license key for vRealize Operations Manager.

You can have an evaluation license key or a product license key for vRealize Operations for Published Applications. The evaluation license key (**`eval`**/**`EVAL`**) provides 60 days of unlimited product use. A product license key is encoded with an expiration date and a license count.

To add your vRealize Operations for Published Applications license key, select **Administration > Licensing** in the vRealize Operations Manager user interface and add your license key to **VMware Published Apps Solution** on the **License Keys** tab.

For detailed information about adding license keys, see the *vRealize Operations Manager Customization and Administration Guide*.

If your vRealize Operations for Published Applications license key expires, the vRealize Operations for Published Applications adapter stops populating vRealize Operations Manager with data. If you have a valid license key but you exceed the license count, vRealize Operations Manager generates alerts on certain dashboards. The vRealize Operations for Published Applications adapter does not restrict data when the license count is exceeded.

Associate XD-XA Objects with Your vRealize Operations for Published Applications License Key

You must associate XD-XA objects with your vRealize Operations for Published Applications license key by editing license groups in vRealize Operations Manager.

A license group is a way to gather certain objects, called license group members, under a particular license key. By default, the vRealize Operations Manager and vRealize Operations for Published Applications license groups both include all host, virtual machine, and datastore objects. Because these objects are members of both license groups, they are covered by both your vRealize Operations Manager license and your vRealize Operations for Published Applications license.

Each license group includes membership criteria that you can use to filter the objects that are members of the license group. By editing the membership criteria for the vRealize Operations Manager and vRealize Operations for Published Applications license groups, you can specify that certain objects are covered only under your vRealize Operations for Published Applications license key.

Prerequisites

Add your vRealize Operations for Published Applications license key. See "Adding a vRealize Operations for Published Applications License Key," on page 16.

Procedure

1. Log in to the vRealize Operations Manager user interface.
2. In the left pane, select **Administration > Licensing**.
3. Click the **License Groups** tab.

   License groups appear in the top pane. The license group for vRealize Operations for Published Applications is called **VMware VRealize Operations for Published Apps 6.4 Licensing**. The license group for vRealize Operations Manager is called **Product Licensing**.
4. Edit the membership criteria for the **VMware Published Application Licensing** group.
   a. Select **VMware vRealize Operations for Published Apps 6.4 Licensing** and click **Edit** on the toolbar.
   b. Select the vRealize Operations for Published Applications license key under **VMware vRealize Operations for Published Applications** and click **Next**.
   c. In the first **Select the Object Type that matches all of the following criteria** drop-down menu, select **XSite**, define the **criteria Relationship**, **Descendant of**, **is**, and type `XEnvironment` in the Object name text box.
   d. In the second **Select the Object Type that matches all of the following criteria** drop-down menu, select **Host System**, define the **criteria Relationship**, **Descendant of**, **is**, and type `XEnvironment` in the Object name text box.

e In the third **Select the Object Type that matches all of the following criteria** drop-down menu, select **Virtual Machine**, define the **criteria Relationship**, **Descendant of**, **is**, and type `XEnvironment` in the Object name text box.

f In the fourth **Select the Object Type that matches all of the following criteria** drop-down menu, select **Datastore**, define the **criteria Relationship**, **Descendant of**, **is**, and type `XEnvironment` in the Object name text box.

g Click **Next** and then click **Finish** to save your configuration.

5 Edit the membership criteria for the **Product Licensing** group.

You must edit the membership criteria for the **Product Licensing** group to exclude the objects that you included in the **VMware Published Application Licensing** group.

a Select **Product Licensing** and click **Edit** on the toolbar.

b Select the vRealize Operations Manager license key under **vRealize Operations Manager** and click **Next**.

c In the first **Select the Object Type** that matches all of the following criteria drop-down menu, select **Host System**, define the criteria **Relationship**, **Descendant of**, **is not,** and type `Xenvironment` in the **Object** name text box.

d In the second **Select the Object Type that matches all of the following criteria** drop-down menu, select **Virtual Machine**, define the criteria **Relationship**, **Descendant of**, **is not**, and type `Xenvironment` in the **Object** name text box.

e In the third **Select the Object Type that matches all of the following criteria** drop-down menu, select **Datastore**, define the criteria **Relationship**, **Descendant of**, **is not**, and type `Xenvironment` in the Object name text box.

f In the fourth **Select the Object Type that matches all of the following criteria** drop-down menu, select **Datastore**, define the criteria **Relationship**, **Descendant of**, **is not**, and type **`Xenvironment`** in the **Object name** text box.

g Click **Next** and then click **Finish** to save your configuration.

Create an Instance of the vRealize Operations for Published Applications 6.4 Adapter

After you install the vRealize Operations for Published Applications solution, you must create an instance of the vRealize Operations for Published Applications adapter in vRealize Operations Manager.

You can create a single vRealize Operations for Published Applications adapter instance to monitor multiple XenDesktop sites. If you need to create multiple vRealize Operations for Published Applications adapter instances, you must create each adapter instance on a unique cluster node or remote collector.

When you restart a vRealize Operations for Published Applications adapter instance, it takes several minutes before the vRealize Operations for Published Applications desktop agent and broker agent send information to the vRealize Operations for Published Applications adapter.

Prerequisites

Install the vRealize Operations for Published Applications solution and add your license key.

Procedure

1 Log in to the vRealize Operations Manager user interface with **administrator** privileges.

2 Click the **Administration** icon and click **Solutions**.

3 Select **VMware vRealize Operations for Published Apps XD-XA** and click the **Configure** (gear) icon on the toolbar.

4 Select **vRealize Operations for Published Apps XD-XA** in the adapter table.

5 Click the **Add** (plus sign) icon on the lower pane toolbar to add an adapter instance.

6 In **Adapter Settings**, type a name and description for the adapter instance.

7 In **Basic Settings**, configure an adapter ID and credential for the adapter instance.

a Type an identifier for the adapter instance in the **Adapter ID** text box.

The identifier must be unique across all vRealize Operations for Published Applications adapter instances in the cluster.

b Configure the credential to use when the broker agent pairs with the vRealize Operations for Published Applications adapter instance.

Option	Action
Use an existing credential	Select the credential from the **Credential** drop-down menu. When you create a vRealize Operations for Published Applications adapter instance for the first time, the **Credential** drop-down menu is empty.
Add a new credential	1 Click the **Add New** (plus sign) icon . 2 Type a name for the credential in the **Credential name** text box. 3 Type a server key for the adapter instance in the **Server Key** text box. The server key is required to enable pairing between the broker agent and the adapter. A server key is user-defined and functions like a password; remember your server key, as you must provide it when you configure the broker agent. 4 Click **OK** to save the new credential. 5 Select the new credential from the **Credential** drop-down menu.

c Click **Test Connection** to test the connection with the credential that you selected.

8 In **Advanced Settings**, select a collector to manage the adapter processes from the **Collector/Groups** drop-down menu.

To run the adapter instance on a remote collector, select the remote collector. If you do not have a remote collector, select **Default collector group**.

9 Click **Save Settings** to save the adapter instance.

The adapter instance is added to the list.

What to do next

Install the vRealize Operations for Published Applications broker agent. See "Install the vRealize Operations for Published Applications Broker Agent," on page 20.

Enabling Firewall Rules for XenDesktop Delivery Controllers and PVS Server

Before you install the broker agent and desktop agent, you must enable specific firewall rules for the XenDesktop Delivery Controller and PVS server.

The broker agent cannot communicate with the XenDesktop Delivery Controller and PVS server if the firewall is enabled on these servers.

Enable the following rules in XenDesktop Delivery Controller servers and PVS server.

- Enable `Ping` in the firewall for all servers using the File and Printer Sharing (Echo Request - ICMPv4-In) rule.
- Enable `Remote WMI` in the firewall for all servers using the Windows Management Instrumentation (WMI-In) rule.

Enable the following rule in XenDesktop Delivery Controller Server.

- Enable `Remote Powershell` by running the `Enable-PSRemoting` command in PowerShell command prompt.

If the PVS Server in Citrix XenDesktop environment is not in same domain as Delivery Controller, you can add a new field manually in broker agent configuration file: <pvs_server_credentials> </pvs_server_credentials>

Broker Agent configuration file can be found at following location: `C:\ProgramData\VMware\vRealize Operations for Published Apps\Broker Agent\conf\v4pa-brokeragent.config`.

Install the vRealize Operations for Published Applications Broker Agent

You install the vRealize Operations for Published Applications broker agent on an Active XenDesktop Delivery Controller.

You only install one broker agent for each XenDesktop Site.

A check box in the Broker Agent Setup wizard controls whether the Broker Agent Configuration wizard opens immediately after you install the broker agent. This check box is selected by default.

Prerequisites

- Install the vRealize Operations for Published Applications solution, add your license key, and create an instance of the vRealize Operations for Published Applications adapter.
- Verify that you downloaded the broker agent installation file.
- Verify that you configured the XenDesktop Controller, Store Front, and PVS server for remote WMI by granting DCOM remote access/activation permissions to the servers. The user name must include the user name that you indicated for the servers.
- XenDesktop Delivery controller's SSL certificate should be added as a trusted certificate if HTTPS (SSL) is enabled for OData (Monitoring Service).
- If OData (Citrix Monitoring Service) is configured on listen on SSL, the Broker Agent will create connections to XenDesktop Delivery Controller using HTTPS.

  So a valid certificate should be installed on Delivery Controller and this certificate should be added as a trusted certificate in Delivery Controller.

  OR

  If the certificate is issued by a Certificate Authority, this CA should be a trusted publisher in Delivery Controller.

Procedure

1 Log in to the machine where you plan to install the broker agent using a domain account that is part of the local administrators group.

2 Install the broker agent.

Option	Action
Command line	a Access the command prompt. b Install the broker agent for your environment using the `/s`, `v`, or `/qn` options. ■ Run the `VMware-v4pabrokeragent-x86_64-6.4-buildnumber.exe` command.
EXE file	a Copy the file for your environment to a temporary folder, and double-click the EXE file to start the installation procedure. ■ Double-click the `VMware-v4pabrokeragent-x86_64-6.4-`*`buildnumber`*`.exe` file. b Follow the steps in the installer.

The broker agent is installed and saved to the `Program Files` folder.

What to do next

Configure the broker agent. See "Configure the vRealize Operations for Published Applications Broker Agent," on page 21.

Configure the vRealize Operations for Published Applications Broker Agent

After you install the broker agent, you use the Broker Agent Configuration wizard to configure the broker agent on the Citrix XenDesktop Delivery Controller where you installed the broker agent. You can also use the Broker Agent Configuration wizard to make changes to your broker agent configuration.

A check box in the Broker Agent Setup wizard controls whether the Broker Agent Configuration wizard opens immediately after you install the broker agent. This check box is selected by default.

During broker agent configuration, you pair the broker agent with a vRealize Operations for Published Applications adapter instance. Pairing the broker agent with a vRealize Operations for Published Applications adapter instance is a necessary authentication step that enables the broker agent and desktop agents to communicate with the vRealize Operations for Published Applications adapter. The broker agent and desktop agents cannot communicate with the vRealize Operations for Published Applications adapter until the pairing process is complete.

If you are monitoring multiple XenDesktop Sites, you can pair the broker agent installed in each Site with the same vRealize Operations for Published Applications adapter instance as long as the total number of desktops that the vRealize Operations for Published Applications adapter instance handles does not exceed 10,000.

Each time you restart the broker agent service, a new log file is created.

If a log file was created for the day and the broker agent is restarted on that day, a new log file is created. The name of the new log file is `v4pa_brokeragent_svc_<`*`date`*`>_00.log`, and the log rotation follows this series.

Prerequisites

- Install the vRealize Operations for Published Applications broker agent. See "Install the vRealize Operations for Published Applications Broker Agent," on page 20.
- Verify that you have the server key for the vRealize Operations for Published Applications adapter. You specified the server key when you created a credential for the adapter instance.
- Verify that you have the IP address or FQDN of the machine where you installed the vRealize Operations for Published Applications adapter.

Procedure

1 If the Broker Agent Configuration wizard is not already open, start it by selecting **Start > VMware > vRealize Operations for Published Apps Broker Agent Settings**.

2 In the **Adapter IP/FQDN Address** text box, type the IP address of the vRealize Operations Manager node or remote collector where the vRealize Operations for Published Applications adapter instance is running.

3 In the **Port** text box, type the port used to connect to the vRealize Operations for Published Applications adapter.

   By default, the broker agent uses port 3095 to communicate with the vRealize Operations for Published Applications adapter. You can modify the default port number, depending on your network configuration.

4 Type and confirm the pairing key for the vRealize Operations for Published Applications adapter.

5 Click **Pair** to pair the broker agent with the vRealize Operations for Published Applications adapter, and click **Test** to test the connection.

   The status of the pairing process appears in the Text area.

6 After the pairing process succeeds, click **Next**.

7 On the Copy Information page, click **Copy** to copy the certificate string to the clipboard and click **Next**.

   Save this text to copy to the GPO Template.

8 Provide the requested information on the Citrix Delivery Controller Information window.

   a Type the XenDesktop environment domain name, domain administrator, and credentials.

   b Click **Test** to validate the connection to the XenDesktop Controller server.

   c Click **Next**.

9 (Optional) Select the **Configure App Volumes** check box.

   a Enter the FQDN and/or IP address of the App Volumes Manager to monitor.

   b Enter the port for App Volumes.

   c Enter the administrator username for the App Volumes Manager.

   d Enter the password for the App Volumes Manager.

   e Click **Test** to test the connection.

   f Repeat for any other App Volumes Managers you want to monitor.

10 (Optional) Edit the interval values on the Intervals and Timeouts page, and click **Next**.

11 (Optional) Configure the logging level and log rotation on the Configure the logging parameters page, and click **Next**.

12 When the Service Configuration window appears, select **Start/Restart**, and then click **Next**.

13 Review the configurations and click **Finish** to apply the configurations.

The vRealize Operations for Published Applications broker agent is configured and available.

Note To configure the Broker-Agent to use a Read-Only/Custom Administrator account for XenDesktop Delivery Controller, go to "Configure Broker Agent to use Non-Admin User for Citrix Desktop Delivery Controller," on page 23.

What to do next

Verify the status of the vRealize Operations for Published Applications broker agent in the Windows Services Management Console.

Review the logs by browsing to the `C:\ProgramData\VMware\VMware vRealize Operations for Published Apps\Broker Agent\logs` directory.

Configure Broker Agent to use Non-Admin User for Citrix Desktop Delivery Controller

You can configure broker agent to use non-admin user for Citrix Desktop Delivery Controller.

Prerequisites

If you want to configure broker agent to use Read-Only/Custom administrator for connecting to Citrix delivery controller, follow these steps:

- Ensure that the Read-Only/Custom Administrator has read access to Site and Monitoring Databases.
- Ensure that Read-Only/Custom Administrator has read/execute/remote access over WinRM, RemotePowershell and WMI (Root\CIMV2).

Procedure

1 You can achieve this by adding the user to local "Administrators" group of the delivery controller machine.

or

2 Follow these steps if you don't want the user to have Administrator access on delivery controller.

a Login to delivery controller as full administrator.

b Run command `winrm configSDDL default` from command prompt. Add Read/Execute permissions for Read-Only/Custom Administrator.

c Run `Set-PSSessionConfiguration -name Microsoft.PowerShell -ShowSecurityDescriptorUI` from powershell prompt. Add Read/Execute permissions for Read-Only/Custom Administrator.

d Go to **Computer Management** > **Services and Applications** > **WMI Control**.

e Right click and select **Properties**.

f Go to **Security** tab.

g Click **CIMV2** > **Security**.

Add **Execute Methods** and **Remote Enable** permissions for Read-Only/Custom Administrator.

h Restart the **WinRM** Service.

i Download and install the "subinacl" tool from http://www.microsoft.com/en-us/download/details.aspx?id=23510.

j Add **Execute Methods** and **Remote Enable** permissions for Read-Only/Custom Administrator.

k From Command Prompt, navigate to **subinacl** installation directory. By default, it gets installed in "C:\Program Files (x86)\Windows Resource Kits\Tools".

l Run `subinacl.exe /service CitrixBrokerService /grant=DOMAIN\USER_NAME=S`.

Install a vRealize Operations for Published Applications Desktop Agent

You install desktop agents on all Delivery Controllers, Store Front server, RDS host, License server, and VDI machines.

Prerequisites

Verify that you downloaded the desktop agent installation file.

Procedure

1 Log in to the machine where you plan to install the desktop agent, using a domain account that is part of the local administrators group.

2 Install the desktop agent.

Option	Action
Command line	a Access the command prompt. b Run the Desktop agent: ■ For 64-bit: Run the `VMware-v4padesktopagent-x86_64-6.4-buildnumber.exe` command using the `/s /v/qn` options. ■ For 32-bit: Run the `VMware-v4padesktopagent-6.4-buildnumber.exe` command using the `/s /v/qn` options.
EXE file	a Copy the `VMware-v4padesktopagent-x86_64-6.4-`*`buildnumber`*`.exe (64-bit) or VMware-v4padesktopagent-6.4-`*`buildnumber`*`.exe (32-bit)` file to a temporary folder. b Double-click the `VMware-v4padesktopagent-x86_64-6.4-`*`buildnumber`*`.exe` or the `VMware-v4padesktopagent-x86_64-6.4-`*`buildnumber`*`.exe (64-bit) or VMware-v4padesktopagent-6.4-`*`buildnumber`*`.exe (32-bit)file`. c Follow the steps to complete the installer.

The desktop agent is installed in `Program Files` folder.

Push the vRealize Operations for Published Applications Desktop Agent Pair Token Using a Group Policy

To use vRealize Operations for Published Applications to monitor a XenDesktop Site, you must create a Group Policy (GPO) to contain the vRealize Operations for Published Applications group policies. You then apply the GPO to the remote desktops that you want to monitor.

You use the Microsoft Group Policy Editor to create the GPO. After you create the GPO, you must apply it to a base image or to an Organizational Unit (OU) on your Active Directory server, depending on your configuration.

vRealize Operations for Published Applications group-policy settings are provided in the `v4pa_desktopagent.admx` file that is installed in the *`%programfiles%`*`\VMware\vRealize Operations for Published Apps\Broker Agent\extras\GroupPolicyFiles` directory.

The language-specific resources, for example `.adml` files, are installed in the `%programfiles %\VMware\vRealize Operations for Published Apps\Broker Agent\extras\GroupPolicyFilese\`*`language`* directory.

If there is an Authentication Failure for a desktop agent you must update the GPO policy for desktop agent authentication. When you update the GPO policy for desktop agent authentication, and there are other policies that require updating, all pending policies are updated, not just the GPO policy for desktop agent authentication.

Procedure

1 Create an organizational unit (OU) in the domain controller machine.

2 If the XD-XA server was already added to the computer account, move the XD-XA server to the OU.

   a Access Active Directory Users Computers, and select **Computer**, right-click your XD-XA server, and in the context menu select **Move...**.

   b In the Move object into container window, select the OU you created.

   The XD-XA server is now moved to the OU.

3 Create a Group Policy object using the Group Policy Management Console (GPMC).

4 Copy the certificate string and the RMI URL from the broker agent configuration utility.

5 Copy the `v4pa_desktopagent.admx` file to `PolicyDefinitions` folder, which is in the `c:\Windows\PolicyDefinitions` directory.

   The `v4pa_desktopagent.admx` file is in the "*%ProgramFiles%*`\VMware\vRealize Operations for Published Apps\Broker Agent\extras\GroupPolicyFiles` directory.

6 Copy the `v4pa_desktopagent.adml` file to `en-us` folder, which is in the `c:\Windows\PolicyDefinitions\en-us` directory.

   The `v4pa_desktopagent.adml` file is in the "*%ProgramFiles%*`\VMware\vRealize Operations for Published Apps\Broker Agent\extras\GroupPolicyFiles\en_us` directory.

7 Set the Group Policy.

   a On the controller machine, click **Start** and type the `gpmc.msc` command in the search box.

   b Right-click the GPO that you created and select **Edit**.

   c Select **Computer Configuration > Policies > Administrative Templates > VMware Published Apps Agent Configuration > vRealize Operations**, and double-click the item in the right pane.

   d Select **Enable** and copy the RMI URL and certificate string in the policy template.

   You might receive a warning that you exceeded the maximum number of characters per line.

   e (Optional) Break the line by pressing **Enter**, and click **Apply**, and then click **OK**.

8 Verify on the XD-XA server machine that the RMI URL and certificate string in the `HKLM\Software\Policies\VMware, Inc.\vRealize operations for published Apps\Desktop Agent` directory. RMI URL is of the format `rmi://<vrops_ip>:3095.`

What to do next

Install desktop agent on the VDI and RDSH hosts you want to monitor. If you already installed a desktop agent and planned to push through GPO at later stage, there might be exceptions in the desktop agent log files. After the pair token is pushed using the GPO, you should restart the desktop agent service.

Enable PowerShell Remoting on the Server

5

You must enable the PowerShell remoting on the machine where the broker agent is installed. This is a one-time activity to enable the broker agent to collect the data from the Citrix Controller and send to the vRealize Operations for Published Applications adapter.

Procedure

1 Open PowerShell prompt and run the following command:

```
Enable-PSRemoting -Force
```

2 To change scripts execution policy to allow remote scripts, run the following command:

```
Set-ExecutionPolicy RemoteSigned
```

Enabling HTTP or HTTPS Protocols for PowerShell Remoting

6

This chapter describes how to enable either HTTP or HTTPS protocols for PowerShell remoting.

Note Many users have PowerShell remoting already configured in the Citrix environment, with HTTP or HTTPS protocols already enabled. If this is the case for you, you can skip this chapter.

This chapter includes the following topics:

Enable HTTP Protocol for PowerShell Remoting

If you have not already enabled PowerShell Remoting and want to use the HTTP protocol, follow these steps.

If you plan to use the HTTPS protocol instead, skip this section and see "Enable HTTPS Protocol for PowerShell Remoting," on page 30.

Procedure

- To use HTTP for PowerShell remoting, run the following command on the host:

```
winrm quickconfig
```

Port 5985 is opened to listen to incoming connection. Sometimes, the connection from the remote PowerShell does not work because of the following error:

```
Connecting to remote server failed with the following error message : The WinRM client cannot process the request.
```

If the authentication scheme is different from Kerberos or if the client computer is not connected to a domain, you must use HTTPS transport. Or, add the destination machine to the TrustedHosts configuration setting.

Use the following command to configure TrustedHosts:

```
winrm.cmd
```

Note Computers in the TrustedHosts list might not be authenticated. For more information, run the following command:

```
winrm help config
```

You can also run the following command to set the remote host as a trusted host on the client:

```
winrm set winrm/config/client'@{TrustedHosts="10.0.5.35"}'
```

What to do next

Once you have enabled the protocol, skip to "Configure a Firewall," on page 33.

Enable HTTPS Protocol for PowerShell Remoting

If you have not already enabled PowerShell Remoting and want to use the HTTPS protocol, follow these steps.

If you want to enable the HTTP protocol instead of the HTTP protocol, see "Enable HTTP Protocol for PowerShell Remoting," on page 29. However, it is recommended to implement HTTPS for encrypting the traffic between the client and remote server.

These are the steps for enabling the HTTPS protocol:

Procedure

1 "Acquire an SSL Certificate," on page 30

2 "Create a Self-Signed SSL Certificate Using the IIS Manager," on page 31

3 "Create a Self-Signed SSL Certificate Using Makecert.exe," on page 31

4 "Create a Self-Signed SSL Certificate Using OpenSSL," on page 31

5 "Import the SSL Certificate on the Remote Machine," on page 32

6 "Configure a WinRM HTTPS Listener," on page 33

Acquire an SSL Certificate

To set up PowerShell remoting to use the HTTPS protocol, deploy an SSL certificate to the remote server.

To acquire an SSL certificate, first generate a self-signed certificate. There are two purposes for using SSL certificates with PowerShell remoting:

- Encrypting traffic between client and server
- Verifying server identity (CN check)

The following are the methods to generate a self-signed SSL certificate:

"Create a Self-Signed SSL Certificate Using the IIS Manager," on page 31

"Create a Self-Signed SSL Certificate Using Makecert.exe," on page 31

"Create a Self-Signed SSL Certificate Using OpenSSL," on page 31

In all these methods, replace `HOSTNAME` with either the remote server host name or the IP address to be used to connect to that server; for example, srv1.mycompany.com or 32.53.2.87.

Ensure that your setup meets the following requirements when generating an SSL certificate to use with PowerShell remoting:

- Set the Certificate Enhanced Key Usage (EKU) "Server Authentication" (OID=1.3.6.1.5.5.7.3.1).
- Set the Certificate Subject to "CN=HOSTNAME".

In all these methods, an SSL certificate in PKCS12 format (PFX file) without a password is generated.

Create a Self-Signed SSL Certificate Using the IIS Manager

If IIS 7 or IIS 8 is installed on the remote server, you can use the IIS Manager to generate self-signed SSL certificates.

Procedure

1 Open the **IIS Manager**.

2 In the Connections pane, select the top-most machine node.

3 Click **Server Certificates** in the Details pane.

4 Click **Create Self-Signed Certificate** in the Actions pane.

5 Enter **`HOSTNAME`** as certificate friendly name.

6 Select **Personal** as the certificate store.

Create a Self-Signed SSL Certificate Using Makecert.exe

makecert.exe is a part of Microsoft Windows SDK. If you have Microsoft Visual Studio .NET installed, you can use both the `makecert.exe` and `pvk2pfx.exe` tools.

Procedure

1 Open the Visual Studio command prompt as an Administrator.

2 Navigate to the folder where you want to create the certificate files.

3 To create a certificate and a private key file, run the following command:

```
makecert –r –pe –n "CN=HOSTNAME" –eku 1.3.6.1.5.5.7.3.1 –sky exchange –sv HOSTNAME.pvk
HOSTNAME.cer
```

4 To convert the files into a `.pfx` file, run the following command:

```
pvk2pfx –pvk HOSTNAME.pvk –spc HOSTNAME.cer –pfx HOSTNAME.pfx
```

5 Deploy the generated SSL certificate to the remote server and import it there.

Create a Self-Signed SSL Certificate Using OpenSSL

You can create a self-signed certificate using OpenSSL.

Prerequisites

Download the Win32 OpenSSL Light package for generating SSL certificates from http://slproweb.com/products/Win32OpenSSL.html to a folder of your choice; for example, `C:\Utils\OpenSSL`.

Procedure

1 To add Server Authentication to EKU, open `openssl.cfg` and add `extendedKeyUsage` setting under the v3_ca section.

```
[ v3_ca ] extendedKeyUsage = serverAuth
```

2 Open command prompt and go to `C:\Utils\OpenSSL\bin`, and set the default OpenSSL configuration variable.

```
set OPENSSL_CONF=C:\Utils\OpenSSL–Win32\bin\openssl.cfg
```

3 Generate a self-signed certificate with a new private key.

```
openssl req –x509 –nodes –days 9999 –newkey rsa:2048 –keyout HOSTNAME.key –out HOSTNAME.cer –
subj "/CN=HOSTNAME"
```

4 Convert the certificate and the private key to a `.pfx` file.

```
openssl pkcs12 –export –out HOSTNAME.pfx –inkey HOSTNAME.key –in HOSTNAME.cer –name
"HOSTNAME" –passout pass:
```

5 Deploy the generated SSL certificate (HOSTNAME.PFX file in the bin folder) to the remote server and import it there .

Import the SSL Certificate on the Remote Machine

Import the PFX certificate file on the remote server. You can do so by attaching your local disk drive to the Remote Desktop session and copying the file in Windows Explorer.

Procedure

1 Import the certificate into the Local Machine certificate store by pasting the following script in the PowerShell console:

Replace *path-to-pfx-file* with the path to the PFX file; for example, `C:\OpenSSL–Win64\bin\`.

```
function Install–Certificate ($certPath, [string]$storeLocation = "LocalMachine", [string]
$storeName = "My")

{
$cert = New–Object
System.Security.Cryptography.X509Certificates.X509Certificate2($certPath,"",
"MachineKeySet,PersistKeySet")
$store = New–Object
System.Security.Cryptography.X509Certificates.X509Store($storeName, $storeLocation)
$store.Open("ReadWrite")
$store.Add($cert)
$store.Close()
"Thumbprint: $($cert.Thumbprint)"
}

Install–Certificate path–to–pfx–file\xenapp–dc.vcops.local.pfx
```

The output of this script is a certificate thumbprint, which is required when setting up an HTTPS listener for the WinRM service. If you generated a SSL certificate in the IIS Manager, you can get its thumbprint using the following PowerShell command:

```
Get–ChildItem cert:\LocalMachine\My | Where–Object { $_.Subject –eq "CN=HOSTNAME" }
```

2 Copy the certificate to the remote machine (delivery controller) using Windows Explorer.

Configure a WinRM HTTPS Listener

All queries go through WinRM, so you need to configure a WinRM HTTPS listener on the machine where the broker agent is installed.

Procedure

- To configure a WinRM HTTPS listener on the remote server, run the following command on the PowerShell prompt:

```
winrm create winrm/config/Listener?Address=*+Transport=HTTPS @{Hostname="xenapp-
dc.vcops.local";CertificateThumbprint=  " 4D9157F66867A73A55A0B9F6DAC045EB52D4BF9A"}
```

Configure a Firewall

By default, WinRM uses port 5986 for a HTTPS listener. Add a new firewall rule to allow inbound connections on the 5986 port.

Procedure

- To add a new firewall rule to allow inbound connections on the 5986 port, run the following command:

```
netsh advfirewall firewall add rule name="Windows Remote Management (HTTPS-In)" dir=in
action=allow protocol=TCP localport=5986
```

If you work with an Azure VM, add a new endpoint for 5986 port on the VM settings page. If you work with an AWS EC2 instance, add a new rule to its security group.

Update the etc/host file for DNS Resolution

Update the etc/host file to fix the DNS resolution if you are using HOSTNAME as the fully qualified domain name instead of the IP address.

Install the Certificate on the Client

Procedure

1. Open Windows Management Console.
2. Go to **File > Remove Snap In**.
3. Click **Certificates > Add**.
4. Select **Computer Account**, click **Next**, and then click **Finish**. Click **OK** on the wizard to continue.

   The wizard closes and Console1 snap in is visible.
5. Select and expand the **Certificates**.
6. Select **Trusted Root Certification Authorities > Certificates**, go the tree panel on the right, and right-click **All Tasks > Import**.

   The Welcome to Certificate Import wizard appears.
7. Click **Next** and browse to the certificate copied from the host.
8. Click **Next**.

   A message confirms the success of the import operation.

The imported certificates are displayed in the tree panel on the right.

Test the Connection from the Client Machine

Procedure

1 If you want to use HTTP protocol for PowerShell remoting, run the following command on the client machine to allow connections to all hosts:

```
winrm set winrm/config/client @{TrustedHosts="*"}
```

2 Test it on the PowerShell console by running the following commands:

```
Invoke-Command    -ComputerName XENAPP-DC -Port 5986 -Credential (Get-Credential) `
-UseSSL -SessionOption (New-PSSessionOption -SkipCACheck -SkipCNCheck) `
-ScriptBlock { Write-Host "Hello from $($env:ComputerName)" }
```

Testing of the connection is successful if you see the greeting from remote machine.

Use makecert for SSL Certification

Procedure

1 Run the following command:

```
makecert -r -pe -n "CN=[HOSTNAME]" -eku 1.3.6.1.5.5.7.3.1 -sky exchange -sv
xenapp6.stengdomain.fvt.pvk xenapp6.stengdomain.fvt.cer
```

2 Enter 1234 as password.

```
pvk2pfx -pvk [HOSTNAME] -spc xenapp6.stengdomain.fvt.cer -pfx xenapp6.stengdomain.fvt.pfx
```

3 Enter 1234 as password again.

```
Invoke-Command -ComputerName [HOSTNAME] -Port 5986 -Credential (Get-Credential) `
-UseSSL -SessionOption (New-PSSessionOption -SkipCACheck -SkipCNCheck) `
-ScriptBlock { Write-Host "Hello from $($env:ComputerName)" }
Invoke-Command -ComputerName [HOSTNAME] -Port 5986 -Credential (Get-Credential) `
-UseSSL -SessionOption(New-PSSessionOption -SkipCACheck -SkipCNCheck) `
-ScriptBlock { Write-Host "Hello from $($env:ComputerName)" }
Invoke-Command -ComputerName [HOSTNAME] -Port 5986 -Credential (Get-Credential) `
-UseSSL -SessionOption New-PSSessionOption -SkipCACheck -SkipCNCheck) `
-ScriptBlock {Write-Host    "Hello from $($env:ComputerName)"}
Update etc/host to put    remote computer IP and DNS name for using it in .net
```

Monitoring Your Citrix XenDesktop and Citrix XenApp Environments 7

When you install the vRealize Operations for Published Applications solution, preconfigured dashboards and predefined report templates appear in the vRealize Operations Manager user interface. You can use the Citrix XenDesktop and Citrix XenApp dashboards and reports along with the standard vRealize Operations Manager object monitoring features to monitor your Citrix XenDesktop and Citrix XenApp environments.

This chapter includes the following topics:

Using the XD-XA Dashboards

The XD-XA dashboards are in the **Published Applications** group in the **Dashboard List** menu in the vRealize Operations Manager user interface.

Widget Interaction in XD-XA Dashboards

vRealize Operations Manager supports interaction between widgets in a single dashboard. Widgets are combined so that the content of the destination widget is updated according to the value selected in the source widget.

For information about creating and modifying dashboards and customizing widgets see *vRealize Operations Manager Customization and Administration Guide*.

Table 7-1. Widget Interaction in XD-XA Dashboards

Dashboard	Source Widget	Destination Widget
XD-XA Overview	Sites	Site Indicator Metrics
XD-XA Overview	Sites	SQL Connectivity
XD-XA Overview	Sites	VCenter Server
XD-XA Overview	VCenter Server	Reclaimable Capacity
XD-XA Overview	VCenter Server	Capacity Remaining
XD-XA Help Desk	Session Details	Session Logon Breakdown
XD-XA Help Desk	Session Details	Session Processes
XD-XA Help Desk	Session Details	Selected Session Related Objects
XD-XA Help Desk	Session Details	Selected User Session Alerts

Table 7-1. Widget Interaction in XD-XA Dashboards (Continued)

Dashboard	Source Widget	Destination Widget
XD-XA Help Desk	Session Details	Machine Object
XD-XA Help Desk	Session Details	Client
XD-XA Help Desk	Virtual Machine	VM Metrics
XD-XA Help Desk	Selected Session Related Objects	Session Related Metrics
XD-XA Help Desk	Machine Object	Virtual Machine
XD-XA Server Desktops	Session-host Servers	Session Host Server Resource Utilization
XD-XA Servers Desktops	Session-host Servers	Session Host Server Indicator Metrics
XD-XA Servers Desktops	Session-host Servers	Top Alerts
XD-XA Servers Applications	Applications	Application Users
XD-XA Servers Applications	Applications	Application Instance Trend
XD-XA Servers Applications	Applications	Application Instances
XD-XA Servers Applications	Applications	Application Launch Duration Trend
XD-XA Servers Applications	Applications	Session-Host Servers
XD-XA Servers Applications	Applications Instances	Application Instance Resource Trend
XD-XA Servers Applications	Session Host Servers	Session Indicator Metrics
XD-XA VDI Desktops	VDI Desktops	VDI Session Details
XD-XA VDI Desktops	VDI Desktops	VDI Desktop Resource Utilization
XD-XA VDI Desktops	VDI Desktops	Running Application List
XD-XA VDI Desktops	VDI Desktops	Top Alerts
XD-XA Session Details	Session Details	Session logon Breakdown
XD-XA Session Details	Session Details	Session Metrics
XD-XA Session Details	Session Details	Session Processes
XD-XA Session Details	Users	User Logon Duration Trend
XD-XA Session Details	Users	Application Launched by User
XD-XA User Experience	vCPU Experience	vCPU Relationship
XD-XA User Experience	vDisk Experience	vDisk Relationship
XD-XA User Experience	vDisk Experience	vDisk Latency Chart
XD-XA User Experience	vRAM Experience	vRAM Relationship
XD-XA User Experience	vRAM Experience	vRAM Chart

Introducing the XD-XA Dashboards

You can use the preconfigured XD-XA dashboards to monitor the performance of your XenDesktop environment.

Table 7-2. XD-XA Dashboard Summary

Dashboard	What It Shows	When To Use It
"XD-XA Overview," on page 39	Status of your end-to-end XD-XA environment, including the XD-XA-related alerts, key Site metrics, Site related vCenter capacity.	■ Assess overall XD-XA performance, and the overall user experience. ■ View the top XD-XA-related alerts. ■ View Site related vCenter remaining capacity and reclaimable capacity.
"XD-XA Help Desk," on page 39	Information about all sessions running in your environment. The Sessions Details widget lists all of connected VDI desktop sessions, RDS desktop sessions, and application sessions in your environment and is the master widget for the dashboard.	■ View existing alerts of the system and the selected session. ■ Metrics of selected session, Health, Workload, Logon Time, ICA Round Trip Latency, ICA Input Bandwidth, and ICA Output Bandwidth. ■ View important logon metrics, Brokering Duration, HDX ■ Connection Duration, Authentication Duration, GPO duration, Profile Load Duration, and Interactive Duration.
"XD-XA Server Desktops," on page 40	Session-host server metrics and related vSphere VMs, server resource utilization and server indicator metrics.	■ Check servers alerts, server indicator metrics, and resource utilization metrics.
"XD-XA Session Details," on page 40	Detailed information of all the sessions, session logon breakdown, session performance metrics, running processes of the session, users summary, User logon duration trend, and the report of what application are launched by a user and when.	■ Check detailed session information, check session logon details, retrieve session running processes for trouble shooting, check users summary, check user logon duration trend, and look at the report of what application are launched by a user and when.
"XD-XA Server Applications," on page 41	Application summary data, application instance number trend, application instance summary data, application instance resource utilizaiton, application launch duration trend, application users, Application related servers, and server indicator metrics.	■ Check application summary data, performance data, launch duration historical trend, the report of which users launched applications and when, application related server indicator metrics.
"XD-XA VDI Desktops," on page 41	VDI Desktops related alerts, VDI Desktop summary information and VDI session detailed information, VDI desktop session resource utilization, and running application list of a VDI desktop session.	■ Check VDI Desktop overall status, top alerts, resource utilization, and retrieving session running application list for troubleshooting.

Table 7-2. XD-XA Dashboard Summary (Continued)

Dashboard	What It Shows	When To Use It
"XD-XA User Experience," on page 42	vCPU Experience heatmap, vDisk Experience heatmap, vRAM Experience heatmap, vCPU relationship, vDisk relationship, vRAM relationship, vCPU chart, vDisk chart, vRAM chart, and Delivery Group critical alerts.	■ Check overall and detailed vCPU/vDisk/vRAM experience, check delivery controller critial alerts.
"XD-XA Root Cause Analysis Dashboard," on page 42	Detailed information on specific metrics, including performance over time.	■ Troubleshoot problems related to specific object-related metrics.

Understanding the Health Badge

The health badge indicates immediate issues that might require your attention. It helps you identify the current health of your system.

vRealize Operations Manager combines workload, anomalies, and faults to assess the overall health of your system and to determine the expected workload level in that environment. A low health score might indicate a potential issue.

The health badge is enabled on vRealize Operations for Published Applications objects.

Table 7-3. Understanding the Health Badge

Object	Description
XD-XA Application Instance	The Application Performance Problem alert is triggered when application instance performance problem is detected, when CPU processor time is too high, or memory consumed is more.
XD-XA Application Session	The Application Session Network alert is triggered when the session latency is too high. The Application Session performance Problem alert is triggered when CPU processor time is too high or memory consumed is more.
XD-XA Broker Agent Collector	Not receiving data from the Broker Agent alert is triggered when Broker agent is not reachable.
XD-XA Desktop OS Machine	Desktop OS Machine is not available for use alert is triggered when VDA machine is not available Published Apps Adapter is not receiving Data from the Desktop Agent alert is triggered when Desktop agent is not working/not working on server on Store front. Desktop OS Machine Performance Problem alert is triggered when CPU processor time is too high.
XD-XA Desktop Session	The Desktop Session Network alert is triggered when the session latency is too high. The Desktop Session performance Problem alert is triggered when CPU processor time is too high or memory consumed is more.
XD-XA Delivery Controller	Delivery Controller Database Configuration Fault alert is triggered when Citrix Broker Service is down or there is no connectivity. The StoreFront Service has Failed alert is triggered when store front service is not accessible from Delivery Controller The Host service has failed alert is triggered when Citrix host service is down. The Monitor service has failed alert is triggered when Citrix monitor service is down. The Machine Creation Service has failed alert is triggered when machine service is down service is down. Published Apps adapter is not receiving data from the Desktop Agent alert is triggered when Desktop agent is not working on Delivery controller. Delivery Controller Performance Problem alert is triggered when CPU processor time is too high.
XD-XA Licensing Server	Published Apps Adapter is not Receiving Data from the Desktop Agent alert is triggered when Desktop agent is not working on licensing server. License Server Performance Problem alert is triggered when CPU processor time is too high.

Table 7-3. Understanding the Health Badge (Continued)

Object	Description
XD-XA PVS	The PVS Server is not reachable from XD Controller alert is triggered when PVS server is not reachable.
XD-XA Store Front	StoreFront Server cannot be accessed alert is triggered when store front service is down. Published Apps Adapter is not Receiving Data from the desktop agent alert is triggered when Desktop agent is not working on the Store Front. StoreFront Performance Problem alert is triggered when CPU processor time is too high.
XD-XA Site	The Site Database service has Failed alert is triggered when site database is down. This alert is triggered in the following scenarios: A site performance problem has been detected. One or more store front servers of this site have performance problem. Check the CPU usage or memory for possible cause. A site performance problem has been detected. One or more license servers of this site have performance problem. Check the CPU usage or memory for possible cause. A site performance problem has been detected. One or more delivery controllers of this site have performance problem. Check the CPU usage or memory for possible cause. A site performance problem has been detected. One or more desktop os machines of this site have performance problem. Check the CPU usage or memory for possible cause. A site performance problem has been detected. One or more server os machines of this site have performance problem. Check the CPU usage or memory for possible cause.
XD-XA Server OS machine	Published Apps Adapter is not receiving data from the desktop agent alert is triggered when Desktop agent is not working on session host machine. Server OS Machine Performance Problem alert is triggered when CPU processor time is too high.

XD-XA Overview

The XD-XA Overview dashboard shows the overall status of your environment. Use the XD-XA Overview dashboard to visualize the end-to-end XenDesktop and XenApp environments, XD-XA-related alerts, key Site metrics, and Site-related vCenter capacity.

Tips for using the XD-XA Overview Dashboard

- To view the overall status of a Site, view the values of the Site Session Metrics and Site Capacity Metrics widgets.
- Use the Virtual Machine of Controller Server widget to view badge health and badge workload for the VM of the controller server.
- To view the overall status of a Site, view the Top Alerts, values of the Site Session Metrics widgets.
- To view the overall capacity of the site related vCenter, view Remaining Capacity and reclaimable capacity widgets.

XD-XA Help Desk

Thee Help Desk dashboard helps you view detailed information about all sessions running in your environment. The Sessions Details widget lists all the connected VDI desktop sessions, RDS desktop sessions, and application sessions in your environment and is the master widget for the dashboard.

Tips for using the Help Desk Dashboard

Use the All Environment Alerts widget to view all existing alerts of the system. Click each alert to view detailed information.

Use the Selected User Session Alerts widget to view alerts of the selected session. Click each alert to view detailed information.

Use the Selected Session Related Objects widget to look at the related object of the selected session .

Use the Session Related Metrics widget to metrics of selected session, Health, Workload, Logon Time, ICA Round Trip Latency, ICA Input Bandwidth, and ICA Output Bandwidth. Additionally, if a session has any associated App Volumes App Stacks, they will show up in the Atttached App Stacks column.

Use the Session Logon Breakdown widget to view important logon metrics, Brokering Duration, HDX Connection Duration, Authentication Duration, GPO duration, App Volumes App Stack Attach Time, Profile Load Duration, and Interactive Duration.

Run actions in the Session Processes widget to obtain information about in-guest desktop processes and their resource usage, including CPU, memory, and I/O use. The Get Desktop Processes and Get Desktop Services actions can help you determine which desktop processes and applications are using the most resources. The Get Desktop/Client Traceroute action provides information about network distance and quality between the desktop and client .

Use the Machine Object widget to show the machine object (created by vRealize Operations for Published Applications) of selected session.

Use the Virtual Machine widget to show the related virtual machine of selected session.

Use the VM Metrics widget to show metrics of related virtual machine, VM Health, VM Workload, CPU, CPU Ready, CPU Contention, Co-stop, vCPU Count, vCPU recommended, Memory, Disk Latency, Disk IOPs, and Memory Swap.

Use the Client widget to show the client info of selected session.

Use the VM Host widget to show the ESXi host of the related VM that is hosting the selected session.

Use the Host Metrics widget to show metrics of the related host.

XD-XA Server Desktops

Use the XD-XA Servers dashboard to assess server metrics and related vSphere VMs, server resource utilization, and server indicator metrics.

Tips for using the XD-XA Server Desktops Dashboard

- Use the Virtual Machine of Session-host Server widget to view the badge health and badge workload for the VM of the session-host server.
- Use the Session-host Server Resource Utilization widget to view the CPU Processor Time, Disk Read and Write, and Memory Available.
- Use the Top Alert and Session-host Servers widget to view the server alerts and server summary data.
- Use the Session-host server resource utilization widget to view server resource utilization data.
- Use the Session-host Server Indicator Metrics widget to view server users and sessions summary data.

XD-XA Session Details

Use the XD-XA Session Details dashboard to view detailed information about sessions, application sessions, and server sessions.

Tips for using the XD-XA Session Details Dashboard

- To view session processes, select a session from the Sessions widget and view the information in the Session Processes widget.
- Use the Session Indicator Metrics widget to view session health, reconnect duration, logon duration, profile load duration, session duration and session state.

- To view session processes, select a session from the Sessions widget and view the information in the Session Processes widget.
- Use the Session Logon Breakdown widget to view important logon metrics, profile load time, shell load time, App Volumes App Stack attach times, and Interactive session time.
- Use the Users widget to view all Users in XD-XA environment.
- Use the User logon duration trend to view user logon historical trend.
- Use the Applications Launched By User widget to get a report of which application are launched by a user, and when they're launched. Use the Desktop Applications Launched by User widget to do the same with desktop applications.

XD-XA Server Applications

Use the XD-XA Server Applications dashboard to check application summary data, performance data, launch duration historical trend, the report of which users launched applications and when, and application-related server indicator metrics.

Tips for using the XD-XA Server Applications Dashboard

- Use the Application Launch Duration widget to view application launch historical trend.
- Use the Application User widget to view the report of which users launched applications and when and application-related server indicator metrics.

XD-XA VDI Desktops

Use the XD-XA VDI Desktops dashboard to view VDI Desktops-related alerts, VDI Desktop summary information and VDI session detailed information, VDI desktop session resource utilization. and running application list of a VDI desktop session.

Note Get Process to retrieve applications running in a VDI session is not supported.

Configuring Applications for Viewing in Reports

In order to use the following reports from the VDI Pools Dashboard, you must first configure applications that you want to monitor:

- XD-XA Desktop Application Usage
- XD-XA Desktop Application Instance Usage

Use the following steps to configure applications for these reports:

1 Edit `/usr/lib/vmware-vcops/user/plugins/inbound/V4PA_adapterx/conf/v4pa-desktop-app-config.properties` in the master node. Add application information to it. For example, to add information for calculator and notepad applications, modify the file like so:

```
#app name, app full path, pod name(optional)
#for pod Cluster-SERVER621
calculator,C:\ProgramData\Microsoft\Windows\Start
Menu\Programs\Accessories\Calculator.lnk,Cluster-SERVER621
#for all pods
notepad,C:\Windows\notepad.exe
```

2 By default, the app instance feature is disabled, and you can only see Desktop Applications Tier and Desktop Application objects. To enable the app instance feature, go to `/usr/lib/vmware-vcops/user/plugins/inbound/V4PA_adapterx/conf/v4pa.properties` and change the value of `enableDesktopApplicationInstance` to `true`.

3 Restart the entire cluster after making these changes, or just restart the remote collector. `Use service vmware-vcops -full-restart` on the remote collector. The property has to be changed on the master node; the remote cluster is updated after the restart.

Tips for using the XD-XA VDI Desktops Dashboard

- Use the Top Alerts widet to view all desktop OS machine-related alerts.
- Use the Running Application List widget to view the current running applications on a VDI desktop.
- Use the Desktop Applications widget to view a list of all the configured applications hosted by a VDI desktop.
- Use the Desktop Application Users widget to see a history of user logon information for a selected application, indicating who uses the application, and when the application is used.

XD-XA User Experience

Use the XD-XA User Experience dashboard to view detailed information of vCPU Experience heatmap, vDisk Experience heatmap, vRAM Experience heatmap, vCPU relationship, vDisk relationship, vRAM relationship, vCPU chart, vDisk chart, vRAM chart, and Delivery Group critical alerts.

Tips for using the XD-XA User Experience Dashboard

- Use the vCPU/vDisk/vRAM experience heat map widgets to view overall user experience.
- Use the Delivery Group Critical Alerts widget to view overall critical alert number of all Delivery Groups.

XD-XA Root Cause Analysis Dashboard

The XD-XA Root Cause Analysis Dashboard enables you to see chart displays of selected object metrics, giving you more detailed view of a metric that indicates a (potential) problem for further analysis.

To use the XD-XA Root Cause Analysis Dashboard, select an object of interest (that is, one that you want to troubleshoot) from either the XD-XA User Experience dashboard or the XD-XA Help Desk dashboard.

- From the XD-XA User Experience dashboard:
  a Select an object from one of the heat maps or object relationship views.
  b Click the **Navigate** icon at the top left corner of the widget.
  c Select **XD-XA Root Cause Analysis** to go to the XD-XA Root Cause Analysis Dashboard.
- From the XD-XA Help Desk Dashboard:
  a Select either:
    - an active user session in the XD-XA Connected Sessions widget
    - an object in the Selected Session Related Object widget
  b Click the **Navigate** icon at the top left corner of the widget.
  c Select **XD-XA Root Cause Analysis** to go to the XD-XA Root Cause Analysis Dashboard.

On the XD-XA Root Cause Analysis Dashboard, select an object in the Selected Object Relationship widget. This will display key metrics for the object in the Selected Object Analysis Snapshot widget. The color of a given metric may change to indicate a metric of interest (e.g., yellow or red). In some cases the metric will indicate a performance or over-subscription issue; in others it will indicate a higher-than-normal metric that may be contributing to an actual problem.

Clicking on a metric automatically adds it to the Selected Metric Chart widget, allowing for further analysis. You can add additional metrics from the same object, or you can select other related objects and their metrics to see if there is a correlation of key indicated metrics.

Double-clicking on related objects in the Selected Object Relationships widget enables you to see additional environment relationships. For example, double-clicking a VM will show the host, datastore, and VDI pool related to the VM; selecting the host, datastore, or pool will show additional key metrics for those items that can also be added to the available chart for further analysis.

Using the XD-XA Reports

VMware vRealize Operations Manager has several report templates that you can generate for detailed information about sites, license usage, and servers. You can also create new report templates, edit existing report templates, and clone report templates.

To access the vRealize Operations for Published Applications report templates, select **Content > Report** in vRealize Operations Manager.

Introducing the XD-XA Reports

The predefined report templates provide detailed information about your XenDesktop and XenApp environments. You can generate the report as a PDF or CSV file.

Table 7-4. Summary of XD-XA Report Templates

XD-XA Report Templates	Report Content
XD-XA Application Report	Includes information about your applications.
XD-XA Application Instance Usage Report	Includes information about CPU and memory usage of an application instance.
XD-XA Desktop Application Instance Usage Report	Includes information about CPU and memory usage of a desktop application instance.
XD-XA Desktop Application Usage Report	Includes information about desktop application usage.
XD-XA License Trend Report	Includes information about the trend of XenDesktop and XenApp license usage.
XD-XA License Usage Report	Includes information about the total duration of three kinds of session (VDI desktop session, RDS desktop session, and application session) of the users.
XD-XA Server Report	Includes overall information about your servers.
XD-XA Site Overview Report	Includes summary information about your Sites. You can see application statistics, application instance trend, and session trend.
XD-XA User Usage Summary Report	Includes summary information about the user usage.

Subjects for Reports

When you configure reports, vRealize Operations Manager generates the report subjects according to your configurations.

To ensure the best possible reports, use the following report subjects.

Table 7-5. Subjects for Reports

Report	Subject
XD-XA Application Report	Application and Site
XD-XA Application Instance Usage Report	Application Instance

Table 7-5. Subjects for Reports (Continued)

Report	Subject
XD-XA Desktop Application Instance Usage Report	Desktop Application Instance
XD-XA Desktop Application Usage Report	Desktop Application
XD-XA License Trend Report	License
XD-XA License Usage Report	Licensing Server
XD-XA Server Report	Server OS Machine
XD-XA Site Overview Report	Site
XD-XA User Usage Summary Report	User

Subjects for Report Views

When you configure the views for a report, vRealize Operations Manager generates the views according to your configurations.

To ensure the best possible report views, use the following view subjects.

Table 7-6. Subjects for Report Views

Report View	Subject
XD-XA Application Daily User Count Trend	Application
XD-XA Application Instance Count Trend	Application
XD-XA Application Instance Summary	Application Instance
XD-XA Application Instance Usage	Application Instance
XD-XA Application Launch Duration Trend	Application
XD-XA Desktop Application Instance Usage	Desktop Application Instance
XD-XA Desktop Application Usage	Desktop Application
XD-XA Farm Application Summary	Application
XD-XA License Usage Summary	Licensing Server
XD-XA License Usage Trend	License
XD-XA License Usage Trend	License
XD-XA Server CPU Trend	Server OS Machine, Delivery Controller
XD-XA Server Disk Trend	Server OS Machine, Delivery Controller
XD-XA Server ICA Bandwidth Trend	Server OS Machine
XD-XA Server Memory Trend	Server OS Machine, Delivery Controller
XD-XA Server Network Trend	Server OS Machine, Delivery Controller
XD-XA Server Summary	Server OS Machine, Delivery Controller
XD-XA Site App Instance Trend	Site
XD-XA Site Session Trend	Site
XD-XA Site Summary	Site
XD-XA User Session Logon Duration Trend	User
XD-XA User Usage View	User

Using the vRealize Operations for Published Applications Alerts

vRealize Operations for Published Applications alerts help you troubleshoot system problems.

The Alerts tab, located on the left side of the vRealize Operations for Published Applications screen, displays information about current system alerts, such as status, criticality, and creation and cancellation dates. Use the filter to find specific alerts (e.g., filtering on "failed" will display the "Failed to communicate with target pod" alert). Clicking on an alert shows specific information, such as symptoms, cause, and recommendations, if any.

Application Crash Alerts

Use application alerts when an application crashes.

With vRealize Operations for Published Applications alerts, you can monitor events when an application launched inside a session crashes. The crash summary alert is shown on the Alerts page. Click the link for the alert to see details of the crash, including cause and recommended action.

Managing RMI Communication in vRealize Operations for Published Applications

8

The vRealize Operations for Published Applications components communicate by using Remote Method Invocation (RMI). The vRealize Operations for Published Applications adapter exposes RMI services that can be called by an external client. The vRealize Operations for Published Applications adapter acts as a server and the broker agents and desktop agents act as clients. You can change the default ports for these RMI services.

For detailed descriptions of the vRealize Operations for Published Applications components, see "vRealize Operations for Published Applications Architecture," on page 8.

This chapter includes the following topics:

RMI Services

The vRealize Operations for Published Applications adapter exposes various RMI service.

RMI registry service — The broker and desktop agents initially connect to the RMI registry service and request the address of a specific RMI server. Because the RMI registry service is used only for lookup and no sensitive data is transmitted to it, it does not use an encrypted channel.

Desktop message server — The desktop agents connect to the desktop message server and use it to send XD-XA performance data collected by the desktop agent. The desktop message server uses an SSL/TLS channel to encrypt the data that is sent from the desktop agents.

Broker message server — The broker agent connects to the broker message server and uses it for sending XD-XA inventory information to the vRealize Operations for Published Applications adapter. The broker message server uses an SSL/TLS channel to encrypt the data that is sent from the broker agent.

Certificate management server — The broker agent connects to the certificate management server during the certificate pairing process. The certificate management server does not use an encrypted channel. Certificates are encrypted by using the server key during the certificate pairing process. For information, see Chapter 13, "Certificate Pairing," on page 63.

Default Ports for RMI Services

The RMI services use certain default ports. The default ports are left open on the firewall on cluster nodes and remote collector nodes.

Table 8-1. Default Ports for RMI Services

RMI Service	Default Port
RMI registry	3095
Desktop message server	3096
Broker message server	3097
Certificate management server	3098

Changing the Default RMI Service Ports

You can change the default ports for the RMI registry service, desktop message server, broker message server, and certificate management server.

RMI Service Port Properties

The RMI service ports are defined in properties in the `msgserver.properties` file on the server where the vRealize Operations for Published Applications adapter is running.

Table 8-2. RMI Service Port Properties

RMI Service	Property
RMI registry	registry-port
Desktop message server	desktop-port
Broker message server	broker-port
Certificate management server	certificate-port

Change the Default RMI Service Ports

You can change the default RMI service ports by modifying the `msgserver.properties` file on the server where the vRealize Operations for Published Applications adapter is running.

Prerequisites

- Verify that you can connect to the node where the vRealize Operations for Published Applications adapter is running.
- Become familiar with the RMI service port properties. See "RMI Service Port Properties," on page 48.

Procedure

1 Log in to the node where the vRealize Operations for Published Applications adapter is running.

2 In a text editor, open the `msgserver.properties` file.

Platform	File Location
Linux	`/usr/lib/vmware-vcops/user/plugins/inbound/V4PA_adapter3/work/msgserver.properties`
Windows	`C:\vmware\vcenter-operations\user\plugins\inbound\V4PA_adapter3\work\msgserver.properties`

3 Modify the properties for the RMI service ports that you want to change.

4 Save your changes and close the `msgserver.properties` file.

What to do next

Open the new RMI service port or ports on the vRealize Operations Manager firewall. See "Open the Ports Used by vRealize Operations for Published Applications," on page 16.

Update the vRealize Operations Manager Firewall

If you change the default port for an RMI service, you must open the new port on the vRealize Operations Manager firewall.

Note If the vRealize Operations for Published Applications adapter is running on a remote collector, see the documentation for the firewall on the remote collector node for information about updating the firewall.

Procedure

1 On the cluster node where the vRealize Operations for Published Applications adapter is running, use a text editor to open the `vmware-vcops-firewall.conf` file.

The `vmware-vcops-firewall.conf` file is in the `/opt/vmware/etc/` directory.

2 Update the appropriate ports in the `vmware-vcops-firewall.conf` file and save the file.

3 Restart the firewall service to make your changes take effect.

a Execute `service vmware-vcops-firewall restart`.

4 On windows, **Access Windows Firewall** and select Windows **Firewall** > **Advanced Settings** > **Inbound Rules** > **New Rule** > **Port** and click **Next**. Select **Specific local ports** and type the ports that you are using, for example, **3095-3098**. The default ports are 3095-3098.

Changing the Default TLS Configuration in vRealize Operations for Published Applications

9

The vRealize Operations for Published Applications broker message server uses an TLS channel to communicate with the broker agents. The vRealize Operations for Published Applications desktop message server uses an TLS channel to communicate with the desktop agents. You can change the default TLS configuration for servers and agents by modifying TLS configuration properties.

This chapter includes the following topics:

Default TLS Protocols and Ciphers for vRealize Operations for Published Applications

When an RMI connection is established between an agent and a server, the agent and server negotiate the protocol and cipher to use

Each agent and server has a list of protocols and ciphers that it supports. The strongest protocol and cipher that is common to both the agent list and server list is selected for the TLS channel.

By default, RMI agents and servers are configured to accept only TLSv1.2 connections with the following ciphers.

- TLS_DHE_DSS_WITH_AES_128_GCM_SHA256
- TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
- TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
- TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

TLS Configuration Properties

The TLS protocols and ciphers for the desktop and broker message servers are specified in properties in the `msgserver.properties` file. The TLS protocols and ciphers for the desktop and broker agents are specified in properties in the `msgclient.properties` file.

Table 9-1. SSL/TLS Configuration Properties

Property		Default Value
sslProtocols	List of accepted TLS protocols, separated by commas.	TLSv1.2
sslCiphers	List of accepted TLS ciphers, separated by commas.	TLS_DHE_DSS_WITH_AES_128_GCM_SHA256 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 TLS_DHE_RSA_WITH_AES_128_GCM_SHA256 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

Change the Default TLS Configuration for Servers

You can change the default TLS configuration that the desktop message server and broker message server use by modifying the `msgserver.properties` file on the server where the vRealize Operations for Published Applications adapter is running.

Prerequisites

- Verify that you can connect to the node where the vRealize Operations for Published Applications adapter is running.
- Become familiar with the TLS configuration properties. See "TLS Configuration Properties," on page 52.

Procedure

1 Log in to the node where the vRealize Operations for Published Applications adapter is running.

2 In a text editor, open the `msgserver.properties` file.

Platform	File Location
Linux	`/usr/lib/vmware-vcops/user/plugins/inbound/V4PA_adapter3/work/msgserver.properties`
Windows	`C:\vmware\vcenter-operations\user\plugins\inbound\V4PA_adapter3\work\msgserver.properties`

3 Modify the SSL/TLS configuration properties.

4 Save your changes and close the `msgserver.properties` file.

Change the Default TLS for Agents

You can change the TLS configuration that the desktop agents and broker agents use to connect to the desktop and broker message servers by modifying the `msgclient.properties` file.

Prerequisites

- For the desktop agents, verify that you can connect to the remote XD-XA server.
- For a broker agent, verify that you can connect to the host where the XD-XA broker agent is installed.
- Become familiar with the TLS configuration properties. See "TLS Configuration Properties," on page 52.

Procedure

1 Modify the TLS configuration properties for a desktop agent.

   a Log in to the XD-XA server where the XD-XA agent is running.

   b In a text editor, open the `msgclient.properties` file.

   The `msgclient.properties` file is in the `C:\ProgramData\VMware\vRealize Operations for Published Apps\Desktop Agent\conf` directory.

   c Modify the TLS configuration properties.

   d Save your changes and close the `msgclient.properties` file.

2 Modify the TLS configuration properties for a broker agent.

   a Log in to the remote collector host where the broker agent is installed.

   b In a text editor, open the `msgclient.properties` file.

   The `msgclient.properties` file is in the `C:\ProgramData\VMware\vRealize Operations for Published Apps\Broker Agent\conf` directory.

   c Modify the TLS configuration properties.

   d Save your changes and close the `msgclient.properties` file.

Managing Authentication in vRealize Operations for Published Applications

10

RMI servers provide a certificate that the agents use to authenticate the vRealize Operations for Published Applications adapter. Broker agents use SSL/TLS client authentication with a certificate that the vRealize Operations for Published Applications adapter uses to authenticate the broker agents. Desktop agents provide tokens that the vRealize Operations for Published Applications adapter uses to authenticate the desktop agents.

To increase security, you can replace the default self-signed certificates that the vRealize Operations for Published Applications adapter and broker agents use.

Understanding Authentication for Each Component

Each vRealize Operations for Published Applications component handles authentication differently.

vRealize Operations for Published Applications Adapter Authentication

When an RMI connection is established between the desktop message server and a desktop agent, or between the broker message server and a broker agent, the agent requests a certificate from the server to perform authentication. This certificate is validated against the agent's trust store before proceeding with the connection. If the server does not provide a certificate, or the server certificate cannot be validated, the connection is rejected.

When the vRealize Operations for Published Applications adapter is first installed, a self-signed certificate is generated. The desktop message server and broker message server use this self-signed certificate by default to authenticate to their agents. Because this certificate is generated dynamically, you must manually pair the vRealize Operations for Published Applications adapter and broker agent before the agents can communicate with the vRealize Operations for Published Applications adapter. See Chapter 13, "Certificate Pairing," on page 63.

Desktop Agent Authentication

Connections to the desktop message server require an authentication token to verify that the connection is coming from a valid desktop agent. The desktop agent generates a unique authentication token for each remote desktop.

In addition, the desktop agent generates a serverID for the XD-XA server and write the serverID into vRealize Operations Manager. When a desktop agent attempts to send data to the vRealize Operations for Published Applications adapter, the adapter will verify whether the authentication token has been cached in memory. If there is no server with same name, the adapter caches the server name and authentication token in memory. If the server has been cached, compare the cached authentication token and the one sent. If the tokens are same, accept the message, else reject the desktop agent message.

The vRealize Operations for Published Applications adapter also checks whether a VM with same serverID exists in vRealize Operations Manager, and adds the VM into the topology when a VM with the same name exists.

Broker Agent Authentication

When an RMI connection is established to the broker message server, the broker message server requests a certificate from the client to perform client authentication. The certificate is validated against the trust store for the vRealize Operations for Published Applications adapter before proceeding with the connection.

If the client does not provide a certificate, or the agent's certificate cannot be validated, the connection is rejected. When you first install the broker agent, a self-signed certificate is generated. The broker agent uses this self-signed certificate by default to authenticate to the vRealize Operations for Published Applications adapter. Because this certificate is generated dynamically, you must manually pair the vRealize Operations for Published Applications adapter and broker agent before the broker agent can communicate with the vRealize Operations for Published Applications adapter. For more information, see Chapter 13, “Certificate Pairing,” on page 63.

11 Certificate and Trust Store Files

The vRealize Operations for Published Applications components use a certificate trust store to store trusted certificates and root certificates for certificate authorities. Certificates and trust stores are stored in Java key store format.

This chapter includes the following topics:

vRealize Operations for Published Applications Adapter Certificate and Trust Store Files

The certificate and trust store files for the vRealize Operations for Published Applications adapter are in the adapter's `work` directory. These files are in Java key store format.

The work directory is on the node where the vRealize Operations for Published Applications adapter is installed. On Linux, the path to the work directory is `/usr/lib/vmwarevcops/user/plugins/inbound/V4PA_adapter3/`. On Windows, the path to the work directory is `C:\vmware\vcenteroperations\user\plugins\inbound\V4PA_adapter3\`.

You can use the Java keytool utility to view and control the certificate store and trust store files.

Table 11-1. Java Key Stores in the `work` Directory

Java Key Store	Description
`v4pa-adapter.jks`	Contains the certificate that the adapter uses to authenticate itself to agents.
`v4pa-truststore.jks`	Contains the trust store that the adapter uses to authenticate the broker agent certificate.

The names of the key store files and their credentials are defined in the `msgserver.properties` file, which is also in the work directory.

Table 11-2. Adapter Key Store Configuration Properties in the `msgserver.properties` File

Property	Default Value	Description
keyfile	`v4pa-adapter.jks`	Name of the key store file that contains the adapter certificate.
keypass		Password to the key store file that contains the adapter certificate. The password is dynamically generated.

Table 11-2. Adapter Key Store Configuration Properties in the `msgserver.properties` File (Continued)

Property	Default Value	Description
trustfile	`v4pa-truststore.jks`	Name of the key store file that contains the adapter trust store.
trustpass		Password to the key store file that contains the adapter trust store. The password is dynamically generated.

Broker Agent Certificate and Trust Store Files

The broker agent certificate and trust store files are in the `C:\ProgramData\VMware\vRealize Operations for Published Apps\Broker Agent\conf` directory on the vRealize Operations for Published Applications broker server host. These files are Java key store files.

You can use the Java keytool utility to view and control the certificate store and trust store files.

Table 11-3. Java Key Stores in the `conf` Directory

Java Key Store	Description
`v4pa-brokeragent.jks`	Contains the certificate that the broker agent uses to authenticate itself to the vRealize Operations for Published Applications adapter.
`v4pa-truststore.jks`	Contains the trust store that the broker agent uses to authenticate the vRealize Operations for Published Applications adapter certificate.

The names of the key store files and their credentials are defined in the `msgclient.properties` file, which is also in the conf directory.

Table 11-4. Broker Agent Key Store Configuration Properties in the `msgclient.properties` File

Property	Default Value	Description
keyfile	`v4pa-brokeragent.jks`	The name of the key store file that contains the broker agent's certificate.
keypass		The password to the key store file that contains the broker agent's certificate. The password is dynamically generated.
trustfile	`v4pa-truststore.jks`	The name of the key store file that contains the broker agent's trust store.
trustpass		The password to the key store file that contains the broker agent's trust store. The password is dynamically generated.

12 Replacing the Default Certificates

By default, the vRealize Operations for Published Applications adapter and the broker agent use self-signed certificates for authentication and data encryption. For increased security, you can replace the default self-signed certificates with certificates that are signed by a certificate authority.

This chapter includes the following topics:

Replace the Default Certificate for the vRealize Operations for Published Applications Adapter

A self-signed certificate is generated when you first install the vRealize Operations for Published Applications adapter. The desktop message server and the broker message server use this certificate by default to authenticate to the agents. You can replace the self-signed certificate with a certificate that is signed by a valid certificate authority.

Prerequisites

- Verify that you can connect to the node where the vRealize Operations for Published Applications adapter is running.
- Verify that you have the password for certificate store. You can obtain the password from the `msgserver.properties` file. See "vRealize Operations for Published Applications Adapter Certificate and Trust Store Files," on page 57.
- Become familiar with the Java keytool utility. Documentation is available at http://docs.oracle.com.

Procedure

1 Log in to the node where the vRealize Operations for Published Applications adapter is running.

2 Navigate to the vRealize Operations for Published Applications adapter's `work` directory.

Platform	Directory Location
Linux	`/usr/lib/vmware-vcops/user/plugins/inbound/V4PA_adapter3/work`
Windows	`C:\vmware\vcenteroperations\user\plugins\inbound\V4PA_adapter3\work`

3 Use the `keytool` utility with the `–selfcert` option to generate a new self-signed certificate for the vRealize Operations for Published Applications adapter.

Because the default self-signed certificate is issued to VMware, you must generate a new self-signed certificate before you can request a signed certificate. The signed certificate must be issued to your organization.

For example:

```
keytool -selfcert -alias v4pa–adapter -dname dn–of–org -keystore v4pa–adapter.jks
```

dn-of-org is the distinguished name of the organization to which the certificate is issued, for example, "OU=Management Platform, O=VMware, Inc., C=US".

By default, the certificate signature uses the SHA1withRSA algorithm. You can override this default by specifying the name of the algorithm with the `–sigalg` option.

4 Use the `keytool` utility with the `–certreq` option from the adapter `work` directory to generate a certificate signing request.

A certificate signing request is required to request a certificate from a certificate signing authority.

For example:

```
keytool -certreq -alias v4pa–adapter -file certificate–request–file –keystore v4pa–
adapter.jks
```

certificate-request-file is the name of the file that will contain the certificate signing request.

5 Upload the certificate signing request to a certificate authority and request a signed certificate.

If the certificate authority requests a password for the certificate private key, use the password configured for the certificate store.

The certificate authority returns a signed certificate.

6 To import the certificate, copy the certificate file to the vRealize Operations for Published Applications adapter `work` directory and run the `keytool` utility with the `-import` option.

For example:

```
keytool -import -alias v4pa–adapter -file certificate–filename –keystore v4pa–adapter.jks
```

certificate-filename is the name of the certificate file from the certificate authority.

When the `keytool` utility is finished, the signed certificate is imported to the adapter certificate store.

7 To start using the new certificate, restart the vRealize Operations for Published Applications adapter on the node where the adapter is running.

Platform	Action
Linux	Run the `service vmware–vcops restart` command.
Windows	Use the Windows Services tool (`services.msc`) to restart the vRealize Operations for Published Applications Adapter service.

What to do next

After you restart the vRealize Operations for Published Applications adapter, you must pair any broker agents that are attached to the vRealize Operations for Published Applications adapter. See Chapter 13, “Certificate Pairing,” on page 63.

Replace the Default Certificate for the Broker Agent

A self-signed certificate is generated when you first install the broker agent. The broker agent uses this certificate by default to authenticate to the vRealize Operations for Published Applications adapter. You can replace the self-signed certificate with a certificate that is signed by a valid certificate authority.

Prerequisites

- Verify that you can connect to the XD-XA Session host where the broker agent is installed.
- Verify that the keytool utility is added to the system path on the data collector host where the broker agent is installed.
- Verify that you have the password for the certificate store. You can obtain this password from the `msgserver.properties` file. See "Broker Agent Certificate and Trust Store Files," on page 58.
- Become familiar with the Java keytool utility. Documentation is available at http://docs.oracle.com

Procedure

1 Log in to the vRealize Operations for Published Applications Server host where the broker agent is installed.

2 Use the `keytool` utility with the `–selfcert` to generate a new self-signed certificate.

Because the default self-signed certificate is issued to VMware, you must generate a new self-signed certificate before you request a signed certificate. The signed certificate must be issued to your organization.

For example:

```
keytool -selfcert -alias v4pa–brokeragent -dname dn–of–org -keystore v4pa–brokeragent.jks
```

dn-of-org is the distinguished name of the organization to which the certificate is issued, for example, "OU=Management Platform, O=VMware, Inc. , C=US".

By default, the certificate signature uses the SHA1withRSA algorithm. You can override this default by specifying the name of the algorithm in the `keytool` utility.

3 Use the `keytool` utility with the `–certreq` option to generate the certificate signing request.

A certificate signing request is required to request a certificate from a certificate signing authority.

For example:

```
keytool -certreq -alias v4pa–brokeragent -file certificate–request–file –keystore v4pa–
brokeragent.jks
```

certificate-request-file is the name of the file that will contain the certificate signing request.

4 Upload the certificate signing request to a certificate authority and request a signed certificate.

If the certificate authority requests a password for the certificate private key, use the password configured for the certificate store.

The certificate authority returns a signed certificate.

5 Copy the certificate file to the `conf` directory and run the `keytool` utility with the `–import` option to import the signed certificate into the certificate store for the broker agent.

You must import the certificate file to the certificate store for the broker agent so that the broker agent can start using the signed certificate.

For example:

```
keytool –import –alias v4pa–brokeragent –file certificate–filename –keystore v4pa–brokeragent.jks
```

certificate-filename is the name of the certificate file from the certificate authority.

6 Run the `keytool` utility with the `–import` option to import the certificate authority root certificate into the trust store file for the broker agent.

For example:

```
keytool –import –alias aliasname –file root_certificate –keystore v4pa–truststore.jks –trustcacerts
```

root_certificate is the name of the certificate authority root certificate.

7 Restart the broker agent to start using the new certificate.

You can restart the broker agent by using the vRealize Operations for Published Applications Broker Agent Settings wizard, or by restarting the vRealize Operations for Published Applications Broker Agent Service.

What to do next

After you restart the broker agent, you must pair it with the vRealize Operations for Published Applications adapter. See Chapter 13, “Certificate Pairing,” on page 63.

Certificate Pairing 13

Before broker agents can communicate with the vRealize Operations for Published Applications adapter, the adapter certificate must be shared with the agents, and the broker agent certificate must be shared with the adapter. The process of sharing these certificates if referred to as certificate pairing.

The following actions occur during the certificate pairing process:

1 The broker agent's certificate is encrypted with the adapter's server key.

2 A connection is opened to the certificate management server and the encrypted certificate is passed to the adapter instance. The adapter decrypts the broker agent's certificate by using the server key. If decryption fails, an error is returned to the broker agent.

3 The broker agent's certificate is placed in the adapter's trust store.

4 The adapter's certificate is encrypted with the adapter's server key.

5 The encrypted certificate is returned to the broker agent. The broker agent decrypts the adapter's certificate by using the server key. If decryption fails, an error is returned to the user.

6 The adapter's certificate is placed in the broker agent's trust store.

7 The adapter's certificate is sent to all XD-XA hosts via Group Policy.

After the certificates are successfully paired, they are cached in the trust stores for each individual component. The broker certificate and the trust store are sent to all session hosts. The adapter certificate is stored in the trust store and the broker certificate is stored in the v4pa-brokeragent.jks. If you provision a new XD-XA server, the adapter's certificate is sent to the server by using the Group Policy, and you do not need to pair the certificates again. However, if either the adapter or broker agent certificate changes, you must pair the certificates again.

You use the vRealize Operations for Published Applications Broker Agent Settings wizard to pair certificates.

SSL/TLS and Authentication-Related Log Messages

14

The vRealize Operations for Published Applications adapter logs SSL/TLS configuration and authentication-related messages.

Table 14-1. vRealize Operations for Published Applications Adapter Log Message Types

Log Message Type	Description
CONFIGURATION	The SSL/TLS configuration that is being used.
AUTHENTICATION SUCCESS	A remote desktop has been successfully authenticated.
AUTHENTICATION FAILED	A remote desktop has failed authentication.

Only CONFIGURATION and AUTHENTICATION FAILED events are written to the log by default. To troubleshoot problems, you can raise the logging level to log other types of events.

You can view log messages and modify logging levels in the vRealize Operations Manager user interface.

Upgrade vRealize Operations for Published Applications

15

You can directly upgrade from vRealize Operations for Published Applications 6.2, 6.2.1, or 6.3 to 6.4.

Note Upgrading from vRealize Operations for Published Applications 6.1 to vRealize Operations for Published Applications 6.4 is not supported.

Prerequisites

- Verify that your environment meets product compatibility, hardware, and software requirements.
- Verify that XD Controller is installed and running.
- Verify that vRealize Operations Manager is deployed and running.
- If you have not yet upgraded to vRealize Operations Manager 6.2, 6.2.1, 6.3, or 6.4, upgrade vRealize Operations Manager before you upgrade vRealize Operations for Published Applications.
- Verify that a vCenter adapter is configured for each vCenter Server instance in your Published Applications infrastructure. The vCenter adapter is provided with vRealize Operations Manager.
- Download the vRealize Operations for Published Applications installation files from the product download page.
- Verify that you have a license key for the vRealize Operations for Published Applications solution.

Procedure

1. On the XD Controller host where the previous broker agent is installed, select **VMware > vRealize Operation for Published Applications Broker Agent Settings** and stop the Broker Agent service.

   Stopping the broker agent service prevents errors or unhandled messages from occurring while the vRealize Operations for Published Applications solution is being upgraded.
2. Copy the `VMware-vrops-v4paadapter-6.4-buildnumber.pak` file to a temporary folder.
3. Log in to the vRealize Operations Manager user interface with admin privileges.
4. In the left pane of vRealize Operations Manager, click the **Administration** tab and click **Solutions**.
5. On the **Solutions** tab, select **vRealize Operation for Published Apps XD-XA** and click the **Add** (plus sign) icon.
6. Browse to locate the temporary folder and select the PAK file.
7. Select **Force installation** and **Reset out-of-the-box content** and click **Upload** to overwrite the previous solution.
8. Read and accept the EULA and click **Next**.

   Installation details appear in the window during the upload process.

9 When the upgrade is complete, click **Finish.**

Note You must restart vRealize Operations Manager cluster after the upgrade for the process to complete. To do so, run `service vmware-vcops --full-restart` on the master node of the vRealize Operations Manager.

10 If the port numbers are already not present in the `/opt/vmware/etc/vmware-vcops-firewall.conf` file on the vRealize Operations Manager, add the following command after TCPPORTS="$TCPPORTS 3091:3094":

```
TCPPORTS="$TCPPORTS 3095:3098"
```

11 Restart the firewall by running the following command.

```
/etc/init.d/vmware-vcops-firewall restart
```

12 Check the status of the firewall by running the following command.

```
/etc/init.d/vmware-vcops-firewall status
```

What to do next

After the upgrade is finished, you must delete the existing solution for vRealize Operations for Published Applications 6.2/6.2.1 and add new license for XD-XA solution.

After the vRealize Operations for Published Applications solution is licensed, you can install/upgrade and configure the new version of the vRealize Operations for Published Applications solution.

This chapter includes the following topics:

Upgrade Broker Agent

vRealize Operations for Published Applications Broker Agent 6.2, 6.2.1, and 6.3 can be upgraded to 6.4.

Prerequisites

Install the vRealize Operations for Published Applications solution, add your license key, and create an instance of the vRealize Operations for Published Applications adapter.

Verify that you downloaded the Broker Agent installation file.

Procedure

1 Using a domain account that is part of the local administrators group, log in to the XD Controller where you plan to install the Broker Agent.

2 Copy the *`VMware-v4pabrokeragent-x86_64-6.4-buildnumber.exe`* file to a temporary folder on the XD Controller.

3 In the temporary folder, double-click the EXE file to start the Broker Agent setup wizard.

4 Accept the EULA and click **Next**.

5 Select the **Launch the** vRealize Operations for Published Applications **Broker Agent configuration utility** check box for the Broker Agent Configuration wizard to open immediately after the Broker Agent is installed .

6 Click **Install** to begin the upgrade.

7 When the installation finishes, click **Finish** to exit the Broker Agent setup wizard.

During this process, the earlier version of Broker Agent service is stopped, its configuration is preserved, Broker Agent is uninstalled, and the new version of Broker Agent is installed.

8 When the configuration utility opens, enter the vRealize Operations Manager IP address and the pairing credentials, and pair them on the first screen of the wizard. Subsequent screen have the data such as Controller Credentials populated from the previous installation .

9 On the Configure The Broker Agent Service page of the wizard, restart the Broker Agent service and click **Next**.

Note In case of upgrade, the Broker Agent service is not started automatically.

10 Click **Finish**.

Upgrade Desktop Agent

vRealize Operations for Published Applications Desktop Agent 6.2/6.2.1/6.3 can be upgraded to 6.4 on all required machines.

To upgrade the Desktop Agent, perform the following task:

Procedure

1 Using a domain account that is part of the local administrators group, log in to the desktop machine where you plan to upgrade the Desktop Agent.

2 Copy the *VMware-v4padesktopagent-x86_64-6.4-buildnumber.exe* or VMware-v4padesktopagent-6.4-*buildnumber*.exe file to a temporary folder on the required machines.

3 In the temporary folder, run the EXE file to start the Desktop Agent setup wizard.

4 Accept the EULA and click **Next**.

5 Click **Install** to begin the upgrade.

6 When the installation finishes, click **Finish** to exit the Desktop Agent setup wizard.

Note You can only upgrade Desktop Agent 6.2/6.2.1/6.3 to 6.4. If you have Desktop Agent 6.1 or 6.0 installed, you must uninstall the Desktop Agents and install Desktop Agent 6.4.

Create a vRealize Operations Manager Support Bundle

16

If the vRealize Operations for Published Applications adapter does not operate as expected, you can collect log and configuration files in a support bundle and send the support bundle to VMware for analysis.

Procedure

1 Log in to the vRealize Operations Manager user interface with admin privileges.

2 Click the **Administration** tab and select **Support > Support Bundles**.

3 Click the **Create Support Bundle** (plus sign) icon.

4 Select the type of support bundle to generate and the nodes to include in the support bundle.

5 Click **OK** to create the support bundle.

The progress of the support bundle appears in the Status column on the Support Bundles pane. Support bundle creation might take several minutes, depending on the size of the logs and the number nodes. You can click the **Reload Support Bundle** icon to refresh the status.

6 Select the support bundle and click the **Download Support Bundle** icon to download the support bundle to the server.

You cannot download a support bundle until its status is Succeed. For security, vRealize Operations Manager prompts you for credentials when you download a support bundle.

7 (Optional) Send the support bundle to VMware for support.

Download vRealize Operations for Published Applications Broker Agent Log Files

17

If the vRealize Operations for Published Applications broker agent does not operate as expected, you can download the broker agent log files.

Prerequisites

Verify that you have **administrator** privileges.

Procedure

1 Log in to the machine where the broker agent is installed.

2 Navigate to `C:\programdata\VMware\vRealize Operations for Published Apps\Broker Agent\logs` on broker agent machine.

The `logs` directory contains the broker agent log files.

3 Use an archive program to create a ZIP file that contains the log files in the `logs` directory.

4 Send the ZIP file to VMware for support.

Download vRealize Operations for Published Applications Desktop Agent Log Files

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If the vRealize Operations for Published Applications desktop agent is not operating as expected, you can download the desktop agent log files from the remote desktop and send the log files to VMware for support.

vRealize Operations for Published Applications retains desktop agent log files of the previous seven days by default. You can specify the number of days that vRealize Operations for Published Applications retains desktop agent log files by updating the registry entry `LogPruneThreshold` under `HKEY_LOCAL_MACHINE\SOFTWARE\VMware, Inc.\vRealize Operations for Published Apps\Desktop Agent`.

Procedure

1 Log in to the controller server or session host server where the desktop agent is installed.

2 Navigate to `C:\ProgramData\VMware\vRealize Operations for Published Apps\Desktop Agent\logs` and locate the desktop agent log files.

Desktop agent log file names begin with `v4pa-`.

3 Use an archive program to create a ZIP file that contains the desktop agent log files.

4 Send the ZIP file to VMware for support.

View Collector and vRealize Operations for Published Applications Adapter Log Files

19

You can view collector and vRealize Operations for Published Applications adapter log files in the vRealize Operations Manager user interface. Log files are organized in log type folders.

Prerequisites

Verify that you have **administrator** privileges.

Procedure

1 Log in to the vRealize Operations Manager user interface with admin privileges.

2 Click the **Administration** tab, click **Support**, and click **Logs**.

3 Select **Log Type** from the **Group by** drop-down menu.

4 Double-click the **Collector** folder and double-click the folder for the node on which the adapter instance is running.

5 View the log files.

   a Double-click a log file to view the contents of the log file.

   b Type line numbers in the **Starting line** and **# of lines** text boxes and click the **Load log content** icon (>) to view a specific part of the log file.

6 Click the **Reload Tree** icon to reload the log tree information and collapse all open folders.

Modify the Logging Level for vRealize Operations for Published Applications Adapter Log Files

20

You can modify the logging level for the collector node that contains the log files for a vRealize Operations for Published Applications adapter instance.

Prerequisites

Verify that you have **administrator** privileges.

Procedure

1 Log in to the vRealize Operations Manager user interface.

2 Click the **Administration** tab, click **Support**, and click **Logs**.

3 Select **Log Type** from the **Group by** drop-down menu.

4 Expand the **Collector** folder.

5 Select the node on which the vRealize Operations for Published Applications adapter instance is running and click the **Edit Properties** icon.

6 Add **V4PA_adapterx** as a new log name.

7 Select a logging level from the drop-down menu in the Logging Level column.

   To troubleshoot problems, set the logging level to Info. To view detailed messages, including micro steps, queries, and returned results, set the logging level to Debug.

   Note If you set the logging level to Debug, log files can become large very quickly. Set the logging level to Debug only for short periods of time.

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