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This document provides installation, configuration, and usage instructions for Citrix SCOM Management Pack for XenApp and XenDesktop.

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Chapter 1: Quick introduction

About XenApp/XenDesktop Management Pack

Citrix SCOM Management Pack for XenApp and XenDesktop (XenApp/XenDesktop Management Pack) is an availability and performance management solution that extends end-to-end service monitoring capabilities of Microsoft System Center Operations Manager (SCOM) to include the Citrix XenApp and XenDesktop (XenApp/XenDesktop) infrastructure.

With XenApp/XenDesktop Management Pack you can:

- Improve the XenApp/XenDesktop infrastructure availability and health
  The virtual application and desktop infrastructure availability is checked with rigorous connectivity probing and active service checks. It is important that users are able to connect to their virtual desktops and applications. This is a process that involves many Delivery Controller components (such as Broker Service or Machine Creation Services).

- Gain more insight into the XenApp/XenDesktop performance and usage information
  It is critical to know how users are using the virtual infrastructure delivering desktops & applications in order to be able to tune it accordingly. With XenApp/XenDesktop Management Pack you will get more insight into which users are logging to the virtual desktops and applications (identify slow logons and logon bursts), how many users are connecting to the Sites, if the infrastructure is able to handle all user requests accordingly, for example by maintaining the size of the idle pool defined by the desktop group power management policy, by ensuring enough resources for delivery of applications and desktops defined by the load management policy, and so on. Another aspect is the end-user resource usage (what is the resource usage for each user connection/session) and virtual infrastructure resource usage (what is the resource usage of my server OS machines). Detailed machine and session performance information helps in managing your infrastructure and enables better planning and decision making.

XenApp/XenDesktop Management Pack fully integrates the topology, health, and performance data into SCOM.

It provides centralized monitoring in SCOM and covers the following key scenarios:
- Are Delivery Controllers up and running?
- Is the infrastructure (for example, brokers, machine creation services, and so on) on the site level operational?
- Do users have issues connecting to the virtual desktops and applications (for example, delivery group limit/capacity is reached, desktop or server OS machines cannot register, other infrastructure issues are present)?
- What is the availability of published applications?
- Are there any events that indicate a problem with the infrastructure?
- Have any performance thresholds been violated?
- What is my server OS machine performance?
- What is the user session resource usage on server/desktop OS machines?
- Are there any user logons with long duration? Which logon phases are the root cause?

**Product architecture**

Figure 1.1 A high-level view of the XenApp/XenDesktop Management Pack architecture

Product licensing
For XenApp/XenDesktop Management Pack to operate properly, its licensing must be covered. Licensing of XenApp/XenDesktop Management Pack is covered when both conditions are fulfilled:

• For the monitored Site there is at least one XenApp or XenDesktop license on the License Server whose Subscription Advantage period covers the current XenApp/XenDesktop Management Pack version.

XenApp/XenDesktop Management Pack periodically checks whether the listed conditions are fulfilled. If either condition is not fulfilled, the product stops gathering and reporting new data to SCOM (topology updates, incoming alerts, newly discovered objects), but preserves the already collected data locally on the agent-managed computers. In case of problems with connectivity between an agent-managed computer and the respective Delivery Controller and/or the License Server the Site is using, the product assumes that licensing is covered in order to remain fully functional.

**Caution:** You must check if licensing is covered *before* installing XenApp/XenDesktop Management Pack and putting the product into use. For instructions on how to check, see “Preparing for the installation”.

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**Chapter 2: Installation and configuration**

This chapter contains instructions that you must follow to install and configure XenApp/XenDesktop Management Pack. Perform all procedures in the documented order of precedence.

**Preparing for the installation**

Before installing XenApp/XenDesktop Management Pack, make sure the following general prerequisites are fulfilled:

• You environment meets the hardware and software requirements. For software requirements, see the *Citrix SCOM Management Pack for XenApp and XenDesktop Compatibility Matrix*. For hardware and/or other requirements, see the *Citrix SCOM Management Pack for XenApp and XenDesktop Release Notes*.

• Licensing of XenApp/XenDesktop Management Pack is covered. The licensing is covered when both of the following conditions are true:
  ○ The XenApp/XenDesktop Site that you plan to monitor with XenApp/XenDesktop Management Pack uses a valid Platinum license.
  ○ At least one XenApp or XenDesktop license (effective within the Site) has the Subscription Advantage period that covers the current version of XenApp/XenDesktop Management Pack.

To check if a Subscription Advantage period covers the current product version, do the following:
1. Take note of the date-based version of the current product release. For information, see the Citrix SCOM Management Pack for XenApp and XenDesktop Release Notes.

2. Launch Citrix Studio.

   Citrix Studio is a Microsoft Management Console snap-in.

3. In the left pane of the Microsoft Management Console window, expand Console Root > Citrix Studio (<SiteName>) > Configuration and click Licensing.

4. In the Licensing Overview pane, under Licenses, search for the lines that have either of the following values in the Product column:

   Citrix XenApp Platinum
   Citrix XenDesktop Platinum

5. For each matching line from step 4, check if its Subscription Advantage Date value is bigger than the date (date-based version) from step 1.

6. If at least one value is bigger, the licensing for XenApp/XenDesktop Management Pack is covered.

   - A SCOM management group is chosen for XenApp/XenDesktop monitoring. The computer that hosts the SCOM management server of this management group is referred to as management server computer.

   - SCOM agent is installed on all the computers that host XenApp/XenDesktop Delivery Controllers, and these computers are configured as agent nodes in the management group.

   - The SCOM agent Action Account has administrative privileges on all the computers that host XenApp/XenDesktop.

   - For each XenApp/XenDesktop Site, a domain user account is chosen that you will use for remote monitoring of server OS machines and desktop OS machines. Depending on your domain configuration, you can use the same account for multiple Sites.

   **Important:** Citrix recommends that you create a new, dedicated user account for exclusive use for the above-mentioned purposes.

   The user account must have the following properties:

   - It has administrative privileges in all XenApp/XenDesktop Delivery Controllers and all server OS machines within the Site.

   - It has the Read Only Administrator role (or a role with higher privileges) assigned in XenApp/XenDesktop with the scope set to All.
Figure 2.1 Creating an administrator account in Citrix Studio

Figure 2.2 Editing an administrator account in Citrix Studio
This user account is referred to as `<MPXAXDAgentAccount>` in the remainder of this document.

**Note:** For monitoring multiple XenApp/XenDesktop Sites, you may need to choose (or create) multiple user `<MPXAXDAgentAccount>` accounts. This depends on the domain configuration.

- Windows Remote Management 2.0 (WinRM 2.0) is enabled on all server OS machines.
  To enable WinRM on the local computer, open a Command Prompt window and run the `winrm quickconfig` command.
- WinRM 2.0 is correctly configured. For instructions on how to verify that the WinRM 2.0 configuration is correct, see “Verifying WinRM communication”.
- The default management packs that the included management packs depend on are imported in SCOM:
  - Citrix Management Pack Library depends on the following:
    - Health Library
    - System Center Core Library
    - System Library
    - Windows Core Library
  - Citrix Management Pack for XenApp and XenDesktop depends on the following:
    - Citrix Management Pack Library
    - Data Warehouse Library
    - Health Library
    - Performance Library
    - System Center Core Library
    - System Library
    - Windows Core Library
    - Windows Service Library
  - Citrix Management Pack for XenApp and XenDesktop Reports depends on the following:
    - Citrix Management Pack for XenApp and XenDesktop
    - Data Warehouse Library
    - Microsoft Generic Report Library
    - System Library
  - Citrix Management Pack for XenApp and XenDesktop (EndUser) depends on the following:
    - Citrix Management Pack for XenApp and XenDesktop
    - Data Warehouse Library
    - Health Library
    - System Center Core Library
    - System Library
Windows Core Library
- Citrix Management Pack for XenApp and XenDesktop (EndUser)

Reports depends on the following:
- Citrix Management Pack for XenApp and XenDesktop
- Citrix Management Pack for XenApp and XenDesktop (EndUser)
- Data Warehouse Library
- Microsoft Generic Report Library
- System Library

**Note** If you accidentally delete any of the listed default management packs, you can import them back from the files in the SCOM installation directory.

For XenApp/XenDesktop machine and session performance monitoring, make sure the following additional prerequisites are fulfilled as well:

- The `<MPXAXDAgentAccount>` user account has administrative privileges in desktop OS machines and proxies.
- Proxies must be running either Windows Server 2012 R2 or Windows Server 2012.
- Windows Remote Management 2.0 (WinRM 2.0) is enabled on all desktop OS machines.

**Installing the product on the SCOM management server computer**

The server-side part of XenApp/XenDesktop Management Pack must be installed on the computer that hosts SCOM management server.

To install XenApp/XenDesktop Management Pack on the SCOM management server computer, do the following:

1. Log on to the management server computer. Use a user account from the local **Administrators** user group that has administrative privileges in SCOM.

2. In Windows Explorer, locate the
   `Citrix_SCOM_Management_Pack_for_XenAppXenDesktop_<Version>.exe` file (where `<Version>` is the current software version), and double-click it to invoke the installation process. Wait for the Setup Wizard to appear.

3. In the Welcome page of the Setup Wizard, click **Next**.
4. In the View Relevant Product Configuration page, click Next.

5. In the License Agreement page of the Setup Wizard, carefully read the end user license agreement. If you accept the terms of the agreement, click Next.

**Figure 2.4** The License Agreement page

Proceed as follows:

- To install the product to the default folder listed in the Setup Wizard, no special actions are required.
- To install the product to a different folder, follow the substeps:
  a. Click **Change**.
  b. In the Browse For Folder dialog box, browse to a desired installation folder, select it, and click **OK**.

7. In the Configure Post-Install Actions page of the Setup Wizard, decide whether the Setup Wizard should automatically import the included management packs into SCOM.

**Figure 2.5** The Configure Post-Install Actions page

To let the Setup Wizard import the management packs, select the **Automatically import the Management Pack** option. Citrix recommends this choice.

To import the management packs into SCOM manually at a later time, leave the **Automatically import the Management Pack** option unselected. For instructions about how to import or reimport the management packs, see “Manually importing included management packs into SCOM”
8. Click **Install**. The Setup Wizard displays the Installing the product page and starts copying the installation files.

9. After the installation completes, the installation completion page is displayed.

   If you let the Setup Wizard to automatically import the management packs, click **Next**. In the opposite case, click **Finish** to close the Setup Wizard.

10. If you let the Setup Wizard to automatically import the management packs, it displays the Executing post-install actions page. Attend the import process.

11. In the post-installation completion page, click **Finish** to close the Setup Wizard.

**Figure 2.6** The post-installation completion page

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**Configuring the XenApp/XenDesktop monitoring accounts and profile in SCOM**

To configure Run As accounts and the associated Run As profile in SCOM, do the following:

1. Log on to the SCOM management server computer. Use a user account from the local **Administrators** user group.

2. Launch the SCOM Operations console.

3. In the **Administration** view, in the left pane, expand **Run As Configuration**, and then click **Accounts**.

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4. In the Tasks pane, expand **Actions**, and then click **Create Run As Account**.

5. In the Create Run As Account Wizard window, click **Next**.

6. In the General Properties page, in the **Run As account type** drop-down menu, leave the default selection (Windows).

7. In the **Display name** text box, type a name that the SCOM Operations console will use to refer to the monitoring account. Click **Next**.

8. In the Credentials page, type user name, password, and domain of the `<MPXAXDAgentAccount>` user account in the respective text boxes. Click **Next**.


   Citrix recommends that you select the **More secure** option. In this case, you must subsequently edit the Run As account to include the XenApp/XenDesktop Delivery Controller computers.

10. Click **Create** to save the configuration data of the new account.

11. If you are configuring SCOM for multiple-Site monitoring, repeat steps 4 to 10 for each XenApp/XenDesktop Site, each time specifying display name and credentials of the appropriate user account.

12. Click **Close** to close the wizard.

13. In the **Administration** view, in the left pane, expand **Run As Configuration**, and then click **Profiles**.

14. In the middle pane, in the Name column, double-click **Citrix XenApp/XenDesktop Monitoring Account**.

15. In the Run As Profile Wizard window, click **Next** and then click **Next** again.

16. In the Run As Accounts page, click **Add**.

17. In the Add a Run as Account dialog box, from the Run As account drop-down list, select the display name of the Run As account.

18. Depending on whether you plan to monitor multiple XenApp/XenDesktop Sites and/or your security requirements, proceed as follows:

   o For monitoring multiple-Site environments or for increased security, select the **A selected class, group, or object** option (more secure). Then follow the steps:
     a. Click **Select** and then select **Object**.
b. In the Object Search dialog box, in the Look for drop-down list, select Windows Computer and then click Search.

c. In the Available items list, select the XenApp/XenDesktop Delivery Controller, and then click Add.

d. Click OK to close the dialog box.

- For monitoring single-Site environments and for ordinary security, select the All targeted objects option (less secure).

19. If you are configuring SCOM for multiple-Site monitoring, repeat steps 14 to 16 for each XenApp/XenDesktop Site, each time using the appropriate Run As account.

Figure 2.7 SCOM Run As profile setup for a multisite XenApp/XenDesktop environment

20. Click OK to close the Add a Run As Account dialog box.

21. Click Save to save the changes.

22. Click Close to close the Run As Profile Wizard window.

23. If you selected the More secure option in step 9, distribute the Run As accounts to the appropriate agent-managed computers: for each chosen account, do the following:

   a. In the Administration view, double-click the user account.

   b. In the Run As Account Properties dialog box, click the Distribution tab.

   c. Click Add.

   d. In the Computer Search dialog box, search for and add the computers. Click OK.

Figure 2.8 Configure distribution of the Run As accounts
e. In the Run As Account Properties dialog box, click **Apply** and then click **OK**.

**Note:** After saving the updated Run As profile, it may take up to 10 minutes for the configuration to get distributed to all specified computers.

---

**Verifying the installation on the SCOM management server computer**

To verify that the XenApp/XenDesktop Management Pack installation on the management server computer is correct, do the following:

1. Log on to the management server computer.

2. Go to **Start > Control Panel**, click **Programs**, and then click **Programs and Features**.

3. Check for the presence of the following entry in the Name column:

   **Citrix SCOM Management Pack for XenApp and XenDesktop**

4. Check if there is the **CitrixMPShare** folder shared on the computer and whether it points to the `$ProgramData$\Citrix\CitrixMPShare` location.

   The shared folder is vital for communication between the management server and the agent node during installation of the agent.

5. Launch the SCOM Operations console.

6. In the Monitoring view, expand the items in the left pane until they match the following figures (combined).
Figure 2.9 Elements of XenApp/XenDesktop Management Pack, as seen in the SCOM Operations console (part 1)
Figure 2.10 Elements of XenApp/XenDesktop Management Pack, as seen in the SCOM Operations console (part 2)

Configuring access to the shared folder for agent installation

**Note:** Steps of this procedure must be followed only once on a SCOM management server computer. In case you previously installed any of the following Citrix Management Pack products on the same computer, you do not need to repeat the steps:

- Provisioning Services Management Pack
- StoreFront Management Pack
- Web Interface Management Pack
To configure access to the shared folder for agent installation, do the following:

1. Log on to the SCOM management server computer. Use a user account from the local **Administrators user group**.

2. Choose a local user account (local to the computer with the shared folder) or a domain user account that will have access to the shared folder.

   **Important:** Citrix recommends creating a new, dedicated user account that you will use only for deployment of the Management Pack agent to managed computers.

3. Using an operating system administrative tool, add the user account to the **CitrixMPShareUsers user group**.

4. Launch the SCOM Operations console.

5. In the **Administration view**, in the left pane, expand **Run As Configuration**, and then click **Accounts**.

6. In the Tasks pane, expand **Actions**, and then click **Create Run As Account**.

7. In the Create Run As Account Wizard window, click **Next**.

8. In the **Run As account type** drop-down menu, leave the default selection (**Windows**).
9. In the **Display name** text box, type a name that the SCOM Operations console will use to refer to the newly created SCOM user account. Click **Next**.

10. In the **User name** text box, type the user name of the operating system user account that you chose in step 2.
11. In the **Password** and **Confirm password** text boxes, type the valid password of the operating system user account.

12. In the **Domain** text box, update the value if needed. Click **Next**.

13. Depending the effective security policy in your SCOM environment, select either the **Less secure** or **More secure** option.

   Note: Selecting **More secure** requires manual steps to be performed in SCOM for each newly added managed computer.

14. Click **Create**.

15. After the message about successful account creation appears, click **Close**.
16. In the left pane, under Run As Configuration, click **Profiles**.

17. In the Profiles list, right-click **Citrix Management Pack Network Share Account**, and then select **Properties**.
18. In the Run As Profile Wizard window, click **Next** twice.

19. In the Add Run As accounts page, click **Add**.

20. In the Add a Run As Account dialog box, in the Run as account list, select the newly created SCOM user account.
21. Select the **A selected class, group, or object** option.

22. Click **Select** and then select **Class**.

23. In the Class Search dialog box, in the **Filter by (optional)** text box, type **Windows Computers**.

24. Click **Search**.

25. In the Available items list, select **All Windows Computers**.
26. Click **OK** to close the Class Search dialog box.

27. Click **OK** to close the Add a Run As Account dialog box.

28. Click **Save** to update the profile. This may take a while.

29. Click **Close** to close the Run As Profile Wizard window.

**Configuring agent nodes to act as SCOM proxies**

Each agent node where XenApp/XenDesktop is installed must be configured to act as a SCOM proxy computer. This configuration enables the agent to relay or forward information from or about other computes or network devices to the management server.

To configure the agent nodes to act as SCOM proxy computers, do the following:

1. Choose the computers that will act as SCOM proxies in your XenApp/XenDesktop environment.
2. Log on to the management server computer.

3. Launch the SCOM Operations console.

4. In the **Administration** view, expand **Device Management**, and then click **Agent Managed**.

5. For each XenApp/XenDesktop (agent-managed) computer, follow the steps:
   
   a. Right-click the host name, and select **Properties**.
   
   b. Click the **Security** tab.

   c. Select the *Allow this agent to act as proxy and discover managed objects on other computers* option.

   d. Click **OK**.

---

**Configuring Citrix Director URL**

To enable opening Citrix Director in the user context from session alerts using the **Start Citrix Director** alert task, the URL of the Citrix Director web interface must be configured for each monitored Site.

To configure a Citrix Director URL, do the following:

1. Log on to the management server computer. Use a user account from the local **Administrators** user group.

2. Go to **Start > All Programs > Citrix > XenDesktop Management Pack**.

3. Click **XenApp and XenDesktop MP Configuration**.

4. In the Citrix Management Pack Configuration window, in the Director URL tab, click **Add**.

5. In the Add Director URL dialog box, type the following data in the respective text boxes:

   o Site name
   o URL of Citrix Director
6. Click **OK**.

7. Repeat steps 4 to 6 for each additional Citrix Director URL you want to configure.

8. Optionally, to modify the configuration data of an entry, click **Modify**. In the Modify Director URL dialog box, modify the data as required, and then click **OK**.

9. Optionally, to remove a Citrix Director URL configuration, click **Remove** and then click **Yes**.

10. Click **OK** to apply the configuration changes and close the window.

---

**Note:** If you change a Citrix Director URL for the Site in which XenApp/XenDesktop Management Pack Agent or XenApp/XenDesktop Management Pack Machine Agent is already installed on the Delivery Controllers, you must run the **Update Configuration on Citrix XAXD Agent** or **Update Configuration on Citrix XAXD Machine Agent** task.

---

**Installing the product on the Delivery Controller computers**

To install XenApp/XenDesktop Management Pack on a Delivery Controller computer (agent-managed computer), do the following:

1. Log on to the management server computer.

2. Launch the SCOM Operations console.

3. In the **Monitoring** view, in the left pane, expand **Citrix Library**, and then click **XenApp/XenDesktop Delivery Controller Computers**.

4. In the middle pane, select a monitored node from the XenApp/XenDesktop Delivery Controller Computers list.

5. In the Tasks pane, expand **MPXAXD Delivery Controller Computer Role Tasks**, and then click **Install Citrix MPXAXD Agent**.

6. In the Run Task – Install Citrix MPXAXD Agent dialog box, adjust the task parameters as follows:

   - **UpgradeAgent**: This option, when set to true, causes uninstallation of the existing XenApp/XenDesktop Management Pack Agent from the agent-managed computer before the current version is installed. Before such uninstallation, the SCOM agent must be put into maintenance mode.
     
     Default value: false

   - **IgnorePrereqCheck**: You may not alter this option.
     
     Default value: false

   - **AgentInstallationSource**: This option defines the location of the Management Pack agent installation package and its configuration files. If no value is specified, the installation process attempts to identify the location based on the data received from the management server.
     
     The value for this option must be specified according to the agent-managed computer – SCOM management server relationship:
     
     - If the agent-managed computer is managed by the management server where XenApp/XenDesktop Management Pack is installed, leave the value empty.
     
     - If the agent-managed computer is managed by some other management server or the computer hosts a multi-homed SCOM agent, specify the host name of the management server computer where XenApp/XenDesktop Management Pack is installed.
     
     - If the agent-managed computer does not have access to the CitrixMPShare shared folder on the management server computer, specify the location of the Management Pack agent installation package and its configuration files in the UNC format. A prerequisite is that these files are copied from the CitrixMPShare shared folder to a location the agent-managed computer has access to.
Default value: (empty)

- **AgentInstallationDestination**: This option defines the Management Pack agent installation directory on the agent-managed computer. If no value is specified, the Management Pack agent is installed to the `@ProgramData@\ComTrade\XenDesktop MP Agent` directory.
  
  Default value: (empty)

7. Click **Run** to invoke the installation process.

8. Observe the output the task generates. If the task reports no errors, the installation on the agent-managed computer is correct.

**Tip**: The task initially performs a prerequisite check. If any of the installation prerequisites are not fulfilled, the process is interrupted before the actual installation begins. In this case, invoke the **Check Installation Prerequisites for Citrix MPXAXD Agent** task to pinpoint the problematic prerequisite.

---

### Configuring XenApp/XenDesktop Management Pack Agent for monitoring VDA services on server OS machines

**Note**: This section is applicable only if WinRM is configured to use non-default ports.

The XenApp/XenDesktop Management Pack Agent monitors VDA services on the server OS machines remotely and it therefore connects to the server OS machines by using WinRM. By default, XenApp/XenDesktop Management Pack Agent uses the default WinRM port (5985), and it does not utilize SSL. However, if this configuration changes during the deployment of Citrix Director, you may need to manually update Windows Registry on the XenApp/XenDesktop Management Pack Agent computer. Add or change the following values in the `HKEY_LOCAL_MACHINE\SOFTWARE\Comtrade\XenDesktop MP Agent` registry key:

- **WinRMPort** (string value): port number that WinRM uses.
- **WinRMUseSSL** (string value): yes, no, true, or false

In case the listed values do not exist or are empty, XenApp/XenDesktop Management Pack Agent follows its default behavior.

---

### Verifying the installation and configuration on the Delivery Controller computers

To verify that the XenApp/XenDesktop Management Pack installation and configuration on a Delivery Controller computer is correct, do the following:
1. Log on to the management server computer. Use a user account from the local Administrators user group.

2. Launch the SCOM Operations console.


4. In the middle pane, select a Delivery Controller computer.

5. In the Tasks pane, expand Actions, and then click Check Requirements and Configuration for Citrix MPXAXD Agent.

6. Observe the output the task generates. If all checks are denoted successful, the installation and configuration on the Delivery Controller computer are correct.

**Installing the product on the proxy nodes**

If you plan to monitor server OS machine and session performance, XenApp/XenDesktop Management Pack Machine Agent must be installed on the proxy nodes. For a general overview of machine monitoring concepts, see “Machine and session performance monitoring”. They will help you plan the proxy nodes and their configuration properly.

To install XenApp/XenDesktop Management Pack on a proxy node, do the following:

1. Log on to the proxy node. Use a user account from the local Administrators user group.

2. Copy the MPXAXDMachineAgent.exe, Support.exe and Support.exe.config files from the \<ManagementServeHostName>\CitrixMPShare\XenDesktop Machine MP shared folder to a location on the proxy node.

3. Run the following command to check if the prerequisites for machine agent installation are fulfilled:

   Support /checkprereq

4. If all prerequisites are denoted as fulfilled, run the following command to invoke the Machine Agent installation process:

   MPXAXDMachineAgent


5. Follow instructions of the Setup Wizard. During the process:
- In the Agent Service Account page, type the literal string of the `<MPXAXDAgentAccount>` user account into the corresponding text box.
- In the Delivery Controllers page, specify the Delivery Controller computers that should be monitored by this proxy.

**Configuring XenApp/XenDesktop Management Pack Machine Agent**

If WinRM is configured to use a non-default port (a port different from 5985) in your XenApp/XenDesktop environment, you must specify a port that will be used for VDI monitoring. To do this, update the Port value in the following keys in Windows Registry:

- **For OS machines:**
  ```
  HKEY_LOCAL_MACHINE\SOFTWARE\Comtrade\XenDesktop MP Machine Agent\WinRMProtocols
  ```

- **For Delivery Controllers:**
  ```
  HKEY_LOCAL_MACHINE\SOFTWARE\Comtrade\XenDesktop MP Machine Agent\ControllerWinRMProtocol
  ```

**Verifying the installation and configuration on the proxy nodes**

After the installation, the XenApp/XenDesktop Management Pack Machine Agent computers are discovered in the Monitoring view of the SCOM Operations console as XenApp/XenDesktop Machine Monitoring Proxy Computes inside Citrix Library. To check if Machine Agent is fully operational, execute the Check Requirements and Configuration for Citrix XAXD Machine Agent task.
Verifying WinRM communication

XenApp/XenDesktop Management Pack Machine Agent communicates with Delivery Controllers and server OS machines by using WinRM protocol and Kerberos authentication. The following checks help you determine if WinRM is correctly configured.

- **Proxy nodes:**
  On the proxy node, to check if Kerberos authentication on the WinRM client is enabled, run the following command:
  ```
  winrm get winrm/config/Client
  ```
  Inspect the command output. If the value of the Kerberos parameter in the Auth group is not true, run the following command:
  ```
  winrm set winrm/config/client/auth @{Kerberos="true"}
  ```

- **Server OS machines or desktop OS machines:**
  On the proxy node, to verify if WinRM client on the proxy node can access the OS machine, log on by using the `<MPXAXDAgentAccount>` user account, and run the following command:
  ```
  winrm identify -r:http://<OSMachineHostName>:5985 -auth:Kerberos
  ```
  In case of success, the command output should be similar to the following:
  ```
  IdentifyResponse
  ProductVendor = Microsoft Corporation
  ProductVersion = OS: 6.1.7600 SP: 0.0 Stack: 2.0
  ```
  In case of failure, proceed as follows:
  - If the command reports the Access denied error, it indicates that the `<MPXAXDAgentAccount>` user account does not have administrative privileges on the OS machine. Reconfigure the user account accordingly.
  - On the OS machine, run the following command to check Kerberos authentication is enabled for WinRM:
    ```
    winrm get winrm/config/Service
    ```
    Inspect the command output. If the value of the Kerberos parameter in the Auth group is not true, run the following command:
    ```
    winrm set winrm/config/service/auth @{Kerberos="true"}
    ```

- **Delivery Controllers:**
  On the proxy node, log on by using the `<MPXAXDAgentAccount>` user account, and run the following command:
  ```
  winrm identify -r:http://<DeliveryControllerHostName>:5985 -auth:Kerberos
  ```
  In case of success, the command output should be similar to the following:
IdentifyResponse
ProductVendor = Microsoft Corporation
ProductVersion = OS: 6.1.7600 SP: 0.0 Stack: 2.0

In case of failure, proceed as follows:

- If the command reports the Access denied error, it indicates that the 
  `<MPXAXDAgentAccount>` user account does not have administrative privileges on the 
  Delivery Controller computer. Reconfigure the user account accordingly.
- On the Delivery Controller computer, run the following command to check Kerberos 
  authentication is enabled for WinRM:

  ```
  winrm get winrm/config/Service
  ```
  Inspect the command output. If the value of the Kerberos parameter in the Auth group 
  is not true, run the following command:

  ```
  winrm set winrm/config/service/auth @{Kerberos="true"}
  ```

Chapter 3: Uninstallation

This chapter contains instructions that you must follow to effectively uninstall XenApp/XenDesktop 
Management Pack. Perform all procedures in the documented order of precedence.

Uninstalling the product from the Delivery Controller computers

To uninstall XenApp/XenDesktop Management Pack Agent from a Delivery Controller computer (an 
agent-managed computer), do the following:

1. Log on to the management server computer.

2. Launch the SCOM Operations console.

3. In the Monitoring view, expand **Citrix Library**, and then click **XenApp/XenDesktop Delivery 
   Controller Computers**.

4. In the middle pane, select a Delivery Controller.

5. In the Tasks pane, expand **Actions**, and then click **Uninstall Citrix MPXAXD Agent**.

6. Repeat steps 4 and 5 for each additional Delivery Controller.
Uninstalling the product from the proxy nodes

To uninstall XenApp/XenDesktop Management Pack Machine Agent from a proxy node (an agent-managed computer), do the following:

1. Log on to the proxy node with a user account from the local Administrators user group.
2. Make sure no other users are logged on to the computer.
3. Go to Start > Control Panel, click Programs, and then click Programs and Features.

   **Important:** If a warning informs you about other logged on users, the program might not uninstall completely.

5. In the Programs and Features dialog box, click Yes to confirm uninstallation.

Removing dependent management packs (customizations)

To remove the customizations that you made to the management packs included in XenApp/XenDesktop Management Pack, do the following:

1. Log on to the management server computer.
2. Launch the SCOM Operations console.
3. In the Administration view, click Management Packs.
4. In the middle pane, locate the management packs that depend on the management packs included in XenApp/XenDesktop Management Pack.
5. For each such dependent management pack, follow the steps:
   a. Right-click it and then click Delete.
   b. On the message stating that deleting the management pack might affect the scoping of some user roles, click Yes.

**Note:** When Run As account is added to the Citrix XenApp/XenDesktop Monitoring Account profile, Microsoft.SystemCenter.SecureReferenceOverride management pack is created with reference to Citrix Management Pack for XenApp and XenDesktop.
Before removing Citrix Management Pack for XenApp and XenDesktop, remove the dependent management pack. If `Microsoft.SystemCenter.SecureReferenceOverride` management pack already contains overrides for profiles that are defined for other Management Pack products, these profiles must be reconfigured after the `Microsoft.SystemCenter.SecureReferenceOverride` management pack is removed.

Removing included management packs
To remove the management packs included in XenApp/XenDesktop Management Pack, do the following:

1. Log on to the management server computer.
2. Launch the SCOM Operations console.
3. In the Administration view, click **Management Packs**.
4. Remove references to the included management packs from the `Microsoft.SystemCenter.SecureReferenceOverride` management pack. To do this perform the following steps:
   a. Identify which included management packs are referenced. In the **Administration > Management Packs** context of the SCOM Operations console, right-click `Microsoft.SystemCenter.SecureReferenceOverride` and select **Properties**. In the dialog box, click the **Dependencies** tab.
   b. For each such referenced management pack, find out its ID. Right-click the referenced management pack. In the dialog box, take note of the value in the ID text box on the General tab.
   d. Make a copy of the file you exported the management pack to.
   e. Edit the originally exported file: use the IDs to find and remove all dependencies to the management packs from the **Manifest > References** context (the `<Reference>` elements) and the **Monitoring > Overrides** context (the `<SecureReferenceOverride>` elements).
   f. Import back the altered `Microsoft.SystemCenter.SecureReferenceOverride` management pack from the modified file.
5. In the middle pane, right-click **Citrix Management Pack for XenApp and XenDesktop (EndUser) Reports**, and then select **Delete**.

6. On the message stating that deleting the management pack might affect the scoping of some user roles, click **Yes**.

7. Repeat steps 5 and 6 with the following management packs (in the presented order of precedence):
   - **Citrix Management Pack for XenApp and XenDesktop (EndUser)**
   - **Citrix Management Pack for XenApp and XenDesktop Reports**
   - **Citrix Management Pack for XenApp and XenDesktop**

8. Check if other Citrix SCOM Management Pack products are installed on the management server computer. If none of them is installed, repeat steps 5 and 6 with **Citrix Management Pack Library**.

**Uninstalling the product from the SCOM management server computer**

To uninstall XenApp/XenDesktop Management Pack from the SCOM management server computer, do the following:

1. Log on to the management server computer. Use a user account from the local **Administrators** user group that has administrative privileges in SCOM.

2. Make sure no other users are logged on to the computer.

3. Go to **Start > Control Panel**, click **Programs**, and then click **Programs and Features**.


   **Important**: If a warning informs you about other logged on users, the program might not uninstall completely.

5. In the Welcome page of the Setup Wizard, click **Uninstall**.

6. In the Uninstalling the product page, the Setup Wizard reports the uninstallation progress.

7. In the Completion page of the Setup Wizard, click **Finish**.

8. Check if other Citrix SCOM Management Pack products are installed on the management server computer. If none of them is installed, follow the steps:
a. Stop sharing the CitrixMPShare shared folder.

b. Delete the %ProgramData%\Citrix\CitrixMPShare folder.

c. Using an operating system administrative tool, delete the local CitrixMPShareUsers user group.

Chapter 4: Usage
Optional configuration
Tuning thresholds for performance monitors and rules

Some monitors and rules have default thresholds that might need additional tuning to suit your environment. You should evaluate monitors and rules to determine whether the default thresholds are appropriate for your environment. If a default threshold is not appropriate for your environment, you should baseline the relevant performance counters, and then adjust the threshold by overriding them.


Adding optional SLA dashboards
For this purpose, you must import the optional Citrix Management Pack for XenApp and XenDesktop SLA Dashboards management pack into SCOM. It provides service level objectives (SLA and SLO objects) for XenApp/XenDesktop environment monitoring.

Installation
Management pack dependencies

The Citrix Management Pack for XenApp and XenDesktop SLA Dashboards management pack has the following dependencies:

- Citrix-specific management packs:
  - Citrix Management Pack for XenApp and XenDesktop
  - Citrix Management Pack for XenApp and XenDesktop (EndUser)

- Default management packs:
  - Health Library
Software requirements


Importing the management pack

For instructions on how to import the unsealed management pack, see “Manually importing included management packs into SCOM”. The management pack is located in the \%ProgramFiles\%\Comtrade\XenDesktop MP directory in the Comtrade.XenApp.And.XenDesktop.SLADashboards.xml file.

Configuration and usage

Citrix Management Pack for XenApp and XenDesktop SLA Dashboards is an example of how SCOM 2012 SLA dashboards can be used together with the XenApp/XenDesktop Management Pack which collects all the information needed to create useful and personalized service level objectives for your environment. This sample management pack includes the following pre-set definitions for service level objectives:

- Desktop OS Delivery Group SLOs:
  - Availability > 99.000 %
  - Max User Logon Duration < 50 seconds
  - Max Desktop OS Random Delivery Group Usage (%) < 90 %

- Server OS Delivery Group SLOs:
  - Availability > 99.000 %
  - Max User Logon Duration < 30 seconds
  - Min Load Available (%) > 10 %

- Site SLOs:
  - Availability > 99.000 %
  - Max Number of Concurrent Users < 300
  - Max Number of Active Sessions < 500
  - Max Logon Duration < 40 seconds

In real world scenarios, you would create different service level tracking rules for each site and delivery group in your organization. You may also want to include other parameters for setting the service level objectives.
Note: The management pack also provides two service level views which report on service level objectives defined in service level tracking rules. For a complete list available monitors and performance collection rules that can be used to set service level objectives, see the XenApp/XenDesktop Management Pack Reference Guide.

Configure dashboards with default SLAs

Once the management pack is imported, locate the views in the Monitoring view in the SCOM Operations console as seen in the following figure.

Figure 4.1 Management pack views

The Delivery Group SLA Dashboard and Site SLA Dashboard views are not configured by default, so you must select one or more service level tracking rules for each of the views.

Delivery Group SLA Dashboard

To configure the Delivery Group SLA Dashboard view, do the following:

1. Launch the SCOM Operations console.

2. In the Monitoring view, in the left pane, expand Citrix XenApp and XenDesktop > Dashboards, and then click Delivery Group SLA Dashboard.
3. In the upper right corner of the dashboard view, click the settings icon and then select **Configure**.

**Figure 4.2:** Delivery Group SLA Dashboard

4. In the Update Configuration wizard window, click **Next**.

**Figure 4.3** The Update Configuration wizard

5. In the Scope page, click **Add**.
6. In the Add SLA dialog box, in the Service Level column, select **Desktop OS Group Health** and click **Add**.
7. Repeat step 6 for Server OS Delivery Group Health.

8. Click **OK** to close the dialog box.

9. In the Scope page, adjust the time interval for the SLA.
10. Click **Finish** to close the wizard.

Once the view is refreshed, it shows the delivery group service level objective report for the time period selected, as shown in the figure that follows.
Site SLA Dashboard

To configure the Site SLA Dashboard view, do the following:

1. Launch the SCOM Operations console.

2. In the Monitoring view, in the left pane, expand Citrix XenApp and XenDesktop > Dashboards, and then click Site SLA Dashboard.

3. In the upper right corner of the dashboard view, click the settings icon and then select Configure.
4. In the Update Configuration wizard window, click **Next**.

5. In the Scope page, click **Add**.

6. In the Add SLA dialog box, in the Service Level column, select **Site Health** and click **Add**.

7. Click **OK** to close the dialog box.

8. In the Scope page, adjust the time interval for the SLA.

9. Click **Finish** to close the wizard.

Once the view is refreshed, it shows the site service level objective report for the time period selected, as shown in the figure that follows.

**Figure 4.9 Site SLA Dashboard**

![Site SLA Dashboard](image)

**Custom SLAs**

Citrix Management Pack for XenApp and XenDesktop SLA Dashboards also includes some general service level target rules that may be used as an example. To make the SLA dashboards useful in practice, you must create your own SLAs that are tailored to your needs.

Following the steps below, a new SLA for a site named “Boston” will be created, and it will check whether we are crossing maximum allowed number of concurrent users, since we only have 1,000 concurrent licenses available.

Perform the following:

1. Launch the SCOM Operations console.

2. In the **Authoring** view, expand **Authoring > Management Pack Objects**.
3. Right-click **Service Level Tracking** and then select **Create**.

4. In the Service Level Tracking wizard, type a display name in the **Name** text box.

   In our example, type Boston Site SLA.

**Figure 4.10** The General page of the Service Level Tracking wizard

Click **Next**.

5. In the Objects to Track page, click **Select**.

6. In the Select a Target Class dialog box, from the **Search result filter** drop-down list, select **All**.

7. In the Target column, select **XAXD Site** and then click **OK** to close the dialog box.

8. In the Objects to Track page, from the **Select destination management pack** drop-down list, select a custom management pack where this SLA will be stored. If no such management pack exists, create a new one.
Figure 4.11 The Objects to Track page

Click Next.

9. In the Service Level Objectives page, click Add and select Collection rule SLO.

10. In the Service Level Objective (Collection Rule) dialog box, type a display name in the Service level objective name text box.

   In our example, type Maximum Concurrent Users.

11. Under Targeted class, click Select. In the dialog box, in the Target column, select XAXD Site Data Collector and then click OK to close the dialog box.

12. Under Performance collection rule, click Select. In the dialog box, in the Name column, click Number of Concurrent Users (Performance DB DW) and then click OK to close the dialog box.

13. Under Aggregation method, click Max.
In our example, we do not want more users at any time.

14. In the Service level objective goal drop-down list, select **Less Than** and then type **1000** in the text box.

**Figure 4.12** The Service Level Objective (Collection Rule) dialog box

15. Click **OK** to close the Service Level Objective (Collection Rule) dialog box.

16. In the Service Level Tracking wizard window, click **Next**.

17. In the Summary page, click **Finish**.

Once the new SLA is created, you can use it in the SLA dashboards as explained in “Configure dashboards with default SLAs”.

You can use the procedure in this section to create personalized SLAs for sites, delivery groups, or any other object that the XenApp/XenDesktop Management Pack discovers. For a complete list of performance rules and availability monitors that can be used to configure service level objectives, see the *XenApp/ XenDesktop Management Pack Reference Guide*. 
Key monitoring scenarios

Failed registrations

Before any desktop or application can be brokered by XenApp and XenDesktop, Virtual Delivery Agent (VDA) installed on the desktop or server machine has to register with one of the Delivery Controllers in a XenApp/XenDesktop site. This is done each time a machine is started. If the machine is not registered correctly, it cannot be used. Thus, these situations may have a big impact on the number of available machines in a delivery group.

There are many causes why a registration may fail, including no VDA being installed on a desktop or server machine, DNS problems, firewall configuration, time synchronization, and so on.

XenApp/XenDesktop Management Pack monitors via the Failed Registrations in Delivery Group monitor if a certain machine in a delivery group could not register itself with the XenDesktop broker. If a failed registration is detected, the corresponding delivery group health status changes to Warning and alert is generated and displayed in the Alerts view and in the Failed Registrations view in Machines folder. Both views also contain alerts for each failed registration of a machine, with details on a machine name, a delivery group name, and a site name. Additional details may also be found in the Event view, where all Citrix-related Windows events are logged.

Failed registrations are monitored only for the powered-managed virtual machines and not for managed physical machines.

Machine and session performance monitoring

Machine and session monitoring functionality enables an insight into server OS machines and sessions performance (on desktop OS and server OS machines). Besides the possibility to receive alerts when a specific machine or session metric crosses a threshold, the following reports can also be generated:

- **Server OS Machine – Performance:** This report shows server performance for selected Server OS machines. Displayed metrics: CPU, Memory, Disk, Network, Load Index, number of sessions, average Latency and ICA RTT for sessions on server.
- **User – Desktop/Application Activity:** This report shows application/desktop usage for selected user. With session monitoring you can see also session performance data for the duration of connection.

Machine and session performance data is collected remotely using Windows Remote Management (WinRM) with XenApp/XenDesktop Management Pack Machine Agent installed on one or more Windows computers (called proxies). Machine Agent communicates on one side with the delivery controllers to get a list of machines registered with a specific delivery controller. Then it collects performance data for all of them using WinRM. One proxy can be configured to handle machines for one or more delivery controllers. In every case—if you decide to have multiple proxies (one for each
delivery controller) or have one proxy for all of them (or something in between)—assure that every delivery controller is handled by exactly one proxy.

**Figure 4.13 Machine monitoring**

Proxies use WinRM with Kerberos authentication to communicate with machines and Delivery Controllers. All WinRM communication is done in the context of an account that is configured for the Citrix MPXAXD Machine Agent service on the proxy node. For this communication to work all machines (server OS and desktop OS) must have WinRM 2.0 installed and enabled (HTTP port: 8985, enabled Kerberos authentication). The user account used for the Citrix MPXAXD Machine Agent service must be a domain user account and it must have administrative privileges on machines, Delivery Controllers and proxy nodes.

In advanced scenarios, you can use different accounts for WinRM communication for different machines. In the XenDesktop MP Configuration tool, you can specify machine hostname mask and account pairs. For any machine matching specific machine hostname mask, the corresponding user
account is used for WinRM communication. For machines without matching hostname mask, the Citrix MPXAXD Machine Agent service user account is used.

In general, setting up one proxy for each delivery controller will work in any environment. However, in smaller environments one proxy can handle multiple delivery controllers. Best practice is to size proxies to handle no more than 2,000 server OS machines or desktop OS machines that are running concurrently.

One proxy can handle delivery controllers from the same XenApp/XenDesktop site. If there is a need to monitor machines from two different sites, you must set up separate proxies for these sites.

To enable machine monitoring, firewall must be configured as required by WinRM:

- On machines, incoming traffic on the TCP port 5985 must be enabled.
- On delivery controllers, incoming traffic on the TCP port 5985 must be enabled.

If a non-default WinRM port is used in your environment, communication through this port must be enabled in the firewall.

Database sizing

Calculating Operations Manager database and data warehouse sizes

Size of the Operations Manager database depends on the size of the XenApp/XenDesktop environment. XenApp/XenDesktop Management Pack installs additional datasets to Operations Manager data warehouse. It provides better, more comprehensive as well as more optimized data collection and data processing for better XenApp/XenDesktop architecture and end-user analysis, planning, and troubleshooting.

The maximum database space consumption for a few sample environments with default database grooming is presented in the table that follows.

Table 4.1 Database space consumption

<table>
<thead>
<tr>
<th>Users (approximate number)</th>
<th>500</th>
<th>2,000</th>
<th>10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sites</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Delivery Controllers</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Desktop OS delivery groups</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Server OS delivery groups</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Server OS machines</td>
<td>10</td>
<td>50</td>
<td>500</td>
</tr>
</tbody>
</table>
**Grooming settings for MPXAXD datasets**

**Important:** Be very careful when changing grooming settings. In large environments with numerous concurrent sessions, increasing the retention interval may have significant impact on the SCOM data warehouse.

XenApp/XenDesktop Management Pack consists of two custom datasets: Machine dataset and Session dataset. Each dataset provides tables for performance data and tables for stale or discovery data. Grooming for tables is specified in number of days and the default values are provided in table that follows.

---

### Table 4.2 Machine dataset grooming

<table>
<thead>
<tr>
<th></th>
<th>Working hours: 8x5</th>
<th>Working hours: 24x7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Machine dataset</strong></td>
<td>DB / DW / Total</td>
<td>DB / DW / Total</td>
</tr>
<tr>
<td><strong>Performance Raw</strong></td>
<td>57 / 433 / 500</td>
<td>57 / 1031 / 1088</td>
</tr>
<tr>
<td><strong>Performance Hourly</strong></td>
<td>98 / 1405 / 1503</td>
<td>98 / 3756 / 3854</td>
</tr>
<tr>
<td><strong>Performance Daily</strong></td>
<td>295 / 6956 / 7215</td>
<td>295 / 18705 / 19000</td>
</tr>
<tr>
<td><strong>Machines</strong></td>
<td>9999</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4.3 Session dataset grooming

<table>
<thead>
<tr>
<th></th>
<th>DB / DW / Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session dataset</strong></td>
<td>DB / DW / Total</td>
</tr>
<tr>
<td><strong>Performance Raw</strong></td>
<td>57 / 1031 / 1088</td>
</tr>
<tr>
<td><strong>Performance Hourly</strong></td>
<td>98 / 3756 / 3854</td>
</tr>
<tr>
<td><strong>Performance Daily</strong></td>
<td>295 / 18705 / 19000</td>
</tr>
<tr>
<td><strong>Sessions</strong></td>
<td>400</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td>400</td>
</tr>
</tbody>
</table>
To change grooming settings, do the following:

1. Open SQL Server Management Studio and connect to the reporting data warehouse.

2. In the Object Explorer pane, expand Databases, expand OperationsManagerDW database, and then expand Tables.

3. Right-click dbo.Dataset and then select Open Table.

4. Make a note of DatasetID GUID values for rows with DatasetDefaultName equal to each of the following values:
   - MPXAXD Machine DataSet
   - MPXAXD Session DataSet

5. In the Object Explorer pane, right-click dbo.StandardDatasetAggregation and then select Open Table.

6. In the DatasetID column, locate the dataset GUID noted in step 4.

7. Locate the MaxDataAgeDays column and edit the value to set the grooming interval.

8. Repeat steps 6 and 7 for the other GUID value.

Manually importing included management packs into SCOM
For general instructions about how to import management packs into SCOM, see the How to Import an Operations Manager Management Pack webpage on the Microsoft TechNet website.

To import the sealed management packs for XenApp/XenDesktop manually, do the following:

1. Log on to the management server computer.

2. Launch the SCOM Operations console.

3. In the Administration view, click Management Packs.
4. Make sure all required default management packs are present in the list in the middle pane. For a list of requirements, see “Preparing for the installation”.

5. In the Tasks pane, expand Actions, and then click Import Management Packs.

6. In the Import Management Packs dialog box, click Add, and then select Add from disk.

7. In the Online Catalog Connection, click No.

8. In the Select Management Packs to import dialog box, browse to the folder that contains the following management pack files, select those files, and then click Open.

   - Comtrade.Citrix.Library.mp

9. Click Install.

Customizing sealed management packs

Similarly to customizing the default SCOM management pack, you can customize the sealed management packs that XenApp/XenDesktop Management pack provides. For details, see the Microsoft TechNet website:

- For general information about customization of management packs, see the Customizing Management Packs webpage.
- For instructions on how to customize a management pack, see the Create a New Management Pack for Customizations webpage.

Chapter 5: Support

General support resources

Citrix® offers a variety of resources for support with your Citrix environment, including the following:
• The Knowledge Center is a self-service, Web-based technical support database that contains thousands of technical solutions, including access to the latest hotfixes, service packs, and security bulletins.

• Technical Support Programs for both software support and appliance maintenance are available at a variety of support levels.

• The Subscription Advantage program is a one-year membership that gives you an easy way to stay current with the latest product version upgrades and enhancements.

• Citrix Education provides official training and certification programs on virtually all Citrix products and technologies.

For more information about Citrix services and support, see the Citrix Support Services and Resources website.

You can also participate in and follow technical discussions offered by the experts on various Citrix products at the Welcome to the Citrix Community, Citrix Discussions, and Citrix Services websites.

Contacting Citrix Customer Service
To contact Citrix Customer Service, see the Contact Support website.