



# **Zenoss Core Configuration Guide**

Release 5.3.3

Zenoss, Inc.

[www.zenoss.com](http://www.zenoss.com)

# Zenoss Core Configuration Guide

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# About this guide

*Zenoss Core Configuration Guide* describes how to set up Zenoss Core and to prepare your environment for monitoring. Use this guide after completing all of the steps required for your deployment in *Zenoss Core Installation Guide*.

## Related Zenoss Core publications

| Title                                   | Description   |
|---|---|
| <i>Zenoss Core Administration Guide</i> | Provides an overview of Zenoss Core architecture and features, as well as procedures and examples to help use the system.               |
| <i>Zenoss Core Configuration Guide</i>  | Provides required and optional configuration procedures for Zenoss Core, to prepare your deployment for monitoring in your environment. |
| <i>Zenoss Core Installation Guide</i>   | Provides detailed information and procedures for creating deployments of Control Center and Zenoss Core.                                |
| <i>Zenoss Core Planning Guide</i>       | Provides both general and specific information for preparing to deploy Zenoss Core.   |
| <i>Zenoss Core Release Notes</i>        | Describes known issues, fixed issues, and late-breaking information not already provided in the published documentation set.            |
| <i>Zenoss Core Upgrade Guide</i>        | Provides detailed information and procedures for upgrading deployments of Zenoss Core.  |

## Additional information and comments

Zenoss welcomes your comments and suggestions regarding our documentation. To share your comments, please send an email to [docs@zenoss.com](mailto:docs@zenoss.com). In the email, include the document title and part number. The part number appears at the end of the list of trademarks, at the front of this guide.

## 1

# Enabling access to browser interfaces

---

Control Center and Zenoss Core have independent browser interfaces that are served by independent web servers. Both web servers are configured to use SSL/TLS communications.

The Control Center web server listens at the hostname of the Control Center master host and port 443. For a Control Center master host with the fully qualified domain name (FQDN) `cc-master.example.com`, the hostname URL is `https://cc-master`. You can substitute an IP address for the hostname portion of the URL.

The Zenoss Core web server can listen at *port public endpoints* and *virtual host public endpoints*.

- A *port public endpoint* is a combination of the IP address or hostname of the Control Center master host and a port number. The default configuration of Zenoss Core does not include any port public endpoints. If the Control Center master host has more than one interface, you can configure port public endpoints with different hostnames. Also, you can disable TLS communications for a port public endpoint.

To use a port public endpoint to gain access to the Zenoss Core browser interface, no additional network name resolution entries are required. The default entries for the network interfaces of the Control Center master host are sufficient.

- The default *virtual host public endpoint* is the text `zenoss5` prepended to the hostname of the Control Center master host and port 443. For the FQDN `cc-master.example.com`, the URL of the default virtual host public endpoint is `https://zenoss5.cc-master:50443`. You can change the name of the default virtual host and configure additional virtual host public endpoints.

To use a virtual host public endpoint to gain access to the Zenoss Core browser interface, you must add name resolution entries for the virtual host to the DNS servers in your environment or to the hosts files of individual client systems.

The following sections provide additional information about public endpoints, and instructions for creating public endpoints and configuring virtual hostname resolution.

## Creating and changing public endpoints

---

This section provides instructions for creating and changing port public endpoints and virtual host public endpoints.

## Creating public endpoints overview

The following table lists communication requirements and outlines the process for creating public endpoints. Step-by-step instructions follow this overview.

| Port public endpoint  | Virtual host public endpoint  |
|---|---|
| Port public endpoints can communicate with or without SSL/TLS.  | Virtual host public endpoints must use SSL/TLS communications.  |
| <ol style="list-style-type: none"> <li>1 Create the endpoint.</li> <li>2 Configure the Zope service.</li> </ol> | <ol style="list-style-type: none"> <li>1 Create the endpoint.</li> <li>2 Configure the Zope service.</li> <li>3 Configure virtual hostname resolution.</li> </ol> |

## Changing public endpoints

To change an existing public endpoint, create a new endpoint and then delete the existing endpoint.

## Creating a port public endpoint

Use this procedure to create a new port public endpoint. Port public endpoints can communicate with or without SSL/TLS.

- 1 Log in to the Control Center browser interface.
- 2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).

The screenshot shows the Zenoss Control Center interface. The top navigation bar includes 'Control Center' and tabs for 'Applications', 'Resource Pools', 'Hosts', 'Logs', and 'Backup / Restore'. The user is logged in as 'ccuser'. The breadcrumb trail shows 'Applications / Zenoss.resmgr'. The main content area displays the 'Zenoss.resmgr' service page with options for 'Service Logs', 'Edit Service', 'Edit Variables', 'Start', 'Stop', and 'Restart'. Below this is the 'Public Endpoints' table, which lists services and their endpoints. A button 'Add Public Endpoint' is visible in the top right of the table area.

| Service       | Endpoint           | Type  | Protocol | URL                                    | Actions           |
|---------------|--------------------|-------|----------|--|-------------------|
| HMester       | hbase-masterinfo-1 | vhost | https    | https://hbase.resmgr-520.zenoss.lab    | Start Stop Delete |
| RabbitMQ      | rabbitmq_admin     | vhost | https    | https://rabbitmq.resmgr-520.zenoss.lab | Start Stop Delete |
| reader        | opentsdb-reader    | vhost | https    | https://opentsdb.resmgr-520.zenoss.lab | Start Stop Delete |
| Zenoss.resmgr | zproxy             | vhost | https    | https://zenoss5.resmgr-520.zenoss.lab  | Start Stop Delete |

Last Update: a few seconds ago 4 Result(s)

- 3 On the right, above the **Public Endpoints** table, click **Add Public Endpoints**.  
The default view of the **Add Public Endpoint** dialog box displays the fields for creating a port public endpoint.

#### 4 Define a new port public endpoint.

- a In the **Type** area, click **Port**.
- b From the **Service - Endpoint** list, select **Zenoss.core - zproxy**.  
The selection is the last entry in the list.
- c In the **Host** field, enter a hostname or IP address that is assigned to a network interface on the Control Center master host.  
The default value is the hostname that was added with the Deployment Wizard when Zenoss Core was initially deployed. If the Control Center master host has more than one network interface, you can add the hostname or IP address that is assigned to another interface.
- d In the **Port** field, enter a safe, unused port number that is greater than or equal to 1024 and less than or equal to 65535.  
For a list of ports that are considered unsafe, see [Unsafe ports on Chrome](#). For the list of ports that the Control Center master host uses, refer to the *Zenoss Core Planning Guide*.
- e In the **Protocol** field, select **HTTPS** or **HTTP**.  
Optionally, you can set up a secure proxy server to handle HTTP requests that are sent to a port public endpoint.
- f Click **Add**.

Next step: Configure the **Zope** service to use the new port public endpoint. Choose one of the configuration options in the following table.

| Zope configuration   | Procedure  |
|--|--|
| HTTPS and the default secure proxy server  | <a href="#">Configuring Zope for HTTPS and the default secure proxy server</a> on page 8 |
| HTTP and no proxy server   | <a href="#">Configuring Zope for HTTP and no proxy server</a> on page 9                  |
| Note that when you configure Zope for HTTP protocol and no proxy server, you can only gain access to the Zenoss Core browser interface through port public endpoints that are configured for HTTP. Because virtual host public endpoints must use HTTPS protocol, any existing virtual host public endpoints stop working. |  |
| HTTP and a secure proxy server other than the default  | <a href="#">Configuring Zope for HTTP and a secure proxy server</a> on page 9            |

## Configuring Zope for HTTPS and the default secure proxy server

Before performing this procedure, create a port public endpoint or a virtual host public endpoint to use the HTTPS protocol.

Use this procedure to configure the **Zope** service for SSL/TLS communications and the secure proxy server that is included in Zenoss Core.

- 1 Log in to the Control Center browser interface.
- 2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).
- 3 In the **Services** table, expand **Zenoss > User Interface**, and then click **Zope**.  
The **Zope** service details page appears.
- 4 In the **Configuration Files** table, locate path **/opt/zenoss/etc/zope.conf**, and in the **Actions** column, click **Edit**.

The **Edit Configuration** window appears.



- 5 Configure Zope for secure communications with the proxy server.
  - a Locate the `cgi-environment` directive.  
The directive is about one-third of the way down from the top of the file, on or near line 380.
  - b Configure the proxy server for SSL/TLS communications:

```
<cgi-environment>
    HTTPS ON
</cgi-environment>
```

- 6 Configure the Beaker add-on product to use secure communications.
  - a Locate the `product-config` directive.  
The directive is at the bottom the file, on or near line 1122.
  - b Set the value of the `session.secure` key to `True`.
- 7 Click **Save**.

Next steps:

- If you created a port public endpoint before performing this procedure, the endpoint is ready to use.
- If you created a virtual host public endpoint before performing this procedure, proceed to [Configuring name resolution for virtual hosts](#) on page 12.



## Configuring Zope for HTTP and no proxy server

Before performing this procedure, create a port public endpoint to use the HTTP protocol. For more information, see [Creating a port public endpoint](#) on page 6.

Use this procedure to configure the **Zope** service for insecure communications with Zenoss Core browser interface clients.

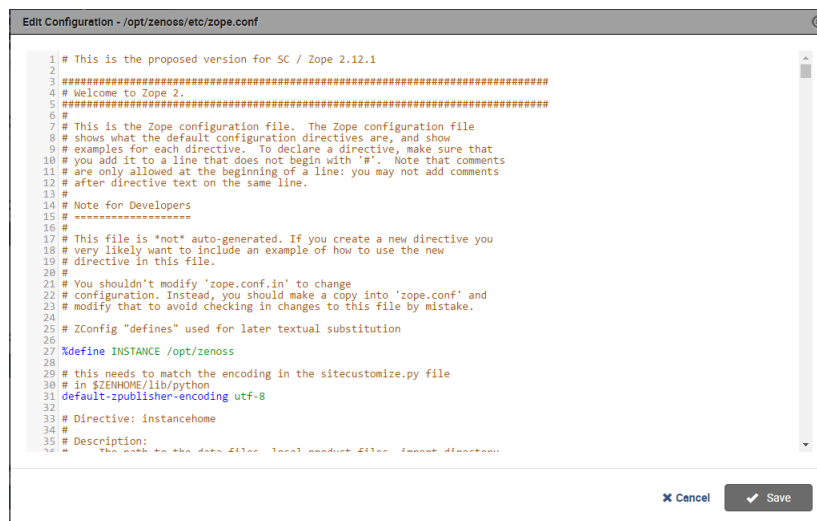
---

**Note** When you configure Zope for insecure communications, existing virtual host public endpoints stop working.

---

- 1 Log in to the Control Center browser interface.
- 2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).
- 3 In the **Services** table, expand **Zenoss > User Interface**, and then click **Zope**.  
The **Zope** service details page appears.
- 4 In the **Configuration Files** table, locate path **/opt/zenoss/etc/zope.conf**, and in the **Actions** column, click **Edit**.

The **Edit Configuration** window appears.



- 5 Configure Zope for insecure communications with the proxy server.
  - a Locate the `cgi-environment` directive.  
The directive is about one-third of the way down from the top of the file, on or near line 380.
  - b Configure the proxy server for insecure communications:

```
<cgi-environment>
  HTTPS OFF
</cgi-environment>
```

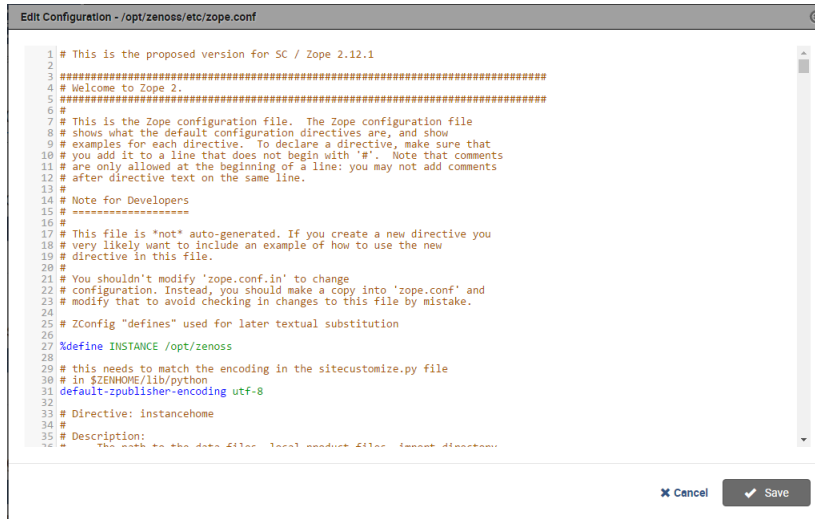
- 6 Configure the Beaker add-on product to use insecure communications.
  - a Locate the `product-config` directive.  
The directive is at the bottom the file, on or near line 1122.
  - b Set the value of the `session.secure` key to `False`.
- 7 Click **Save**.

## Configuring Zope for HTTP and a secure proxy server

Before performing this procedure, create a port public endpoint to use the HTTP protocol. For more information, see [Creating a port public endpoint](#) on page 6.

Use this procedure to configure the **Zope** service for SSL/TLS communications and a secure proxy server that is available on your network.

- 1 Log in to the Control Center browser interface.
- 2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).
- 3 In the **Services** table, expand **Zenoss > User Interface** and then click **Zope**.  
The **Zope** service details page appears.
- 4 In the **Configuration Files** table, locate path **/opt/zenoss/etc/zope.conf**, and in the **Actions** column, click **Edit**.  
The **Edit Configuration** window appears.



- 5 Configure Zope for secure communications with your proxy server.
  - a Locate the `cgi-environment` directive.  
The directive is about one-third of the way down from the top of the file, on or near line 380.
  - b Configure the proxy server for SSL/TLS communications:

```
<cgi-environment>
    HTTPS ON
</cgi-environment>
```

- 6 Configure the Beaker add-on product to use secure communications.
  - a Locate the `product-config` directive.  
The directive is at the bottom the file, on or near line 1122.
  - b Set the value of the `session.secure` key to `True`.
- 7 Click **Save**.

## Creating a virtual host public endpoint

Use this procedure to create a new virtual host public endpoint. Virtual host public endpoints must use SSL/TLS communications.

- 1 Log in to the Control Center browser interface.
- 2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).

The screenshot shows the Control Center Zenoss.resmgr interface. At the top, there's a navigation bar with 'Applications', 'Resource Pools', 'Hosts', 'Logs', and 'Backup / Restore'. The user is logged in as 'ccuser'. Below the navigation bar, the 'Zenoss.resmgr' header is visible with links for 'Service Logs', 'Edit Service', 'Edit Variables', 'Start', 'Stop', and 'Restart'. The main section is titled 'Public Endpoints' and contains a table with the following data:

| Service       | Endpoint           | Type  | Protocol | URL                                    | Actions           |
|---------------|--------------------|-------|----------|--|-------------------|
| HMaster       | hbase-masterinfo-1 | vhost | https    | https://hbase.resmgr-520.zenoss.lab    | Start Stop Delete |
| RabbitMQ      | rabbitmq_admin     | vhost | https    | https://rabbitmq.resmgr-520.zenoss.lab | Start Stop Delete |
| reader        | opentsdb-reader    | vhost | https    | https://opentsdb.resmgr-520.zenoss.lab | Start Stop Delete |
| Zenoss.resmgr | zproxy             | vhost | https    | https://zenoss5.resmgr-520.zenoss.lab  | Start Stop Delete |

Below the table, it says 'Last Update: a few seconds ago' and '4 Result(s)'. There is an 'Add Public Endpoint' button in the top right corner of the table area.

3 On the right, above the **Public Endpoints** table, click **Add Public Endpoints**.

4 Define a new virtual host public endpoint.

a In the **Type** area, click **VHost**.

The 'Add Public Endpoint' dialog box is shown. It has a 'Type' section with 'Port' and 'VHost' buttons. The 'VHost' button is selected. Below this, there is a 'Service - Endpoint' dropdown menu showing 'Zope - zope'. There is also a 'VHost Hostname' text input field. At the bottom, there are 'Cancel' and 'Add' buttons.

b From the **Service - Endpoint** list, select **Zenoss.core - zproxy**.

c In the **VHost Hostname** field, enter a virtual hostname.

The hostname must be different from the Control Center hostname. For example, if the Control Center host is `https://zenoss.123`, then the virtual hostname cannot be `zenoss-123`.

The following strings of text are valid in this field:

- A fully qualified domain name (FQDN). Any string of text that includes one or more full stop characters ( . ) is treated as an FQDN.
- A string of text that contains only letters and one or more hyphen characters ( - ). The string is prepended to the hostname of the Control Center master host, with a full stop character ( . ) separating the string and the hostname.

d Click **Add**.

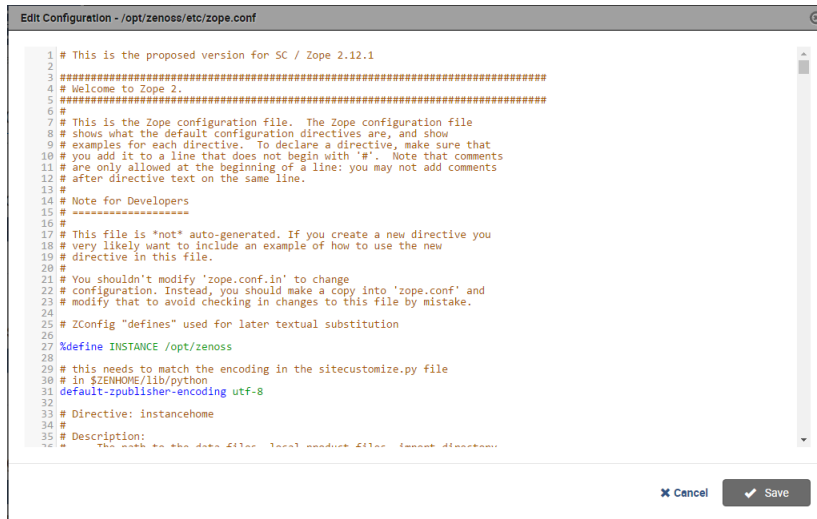
## Configuring Zope for HTTPS and the default secure proxy server

Before performing this procedure, create a port public endpoint or a virtual host public endpoint to use the HTTPS protocol.

Use this procedure to configure the **Zope** service for SSL/TLS communications and the secure proxy server that is included in Zenoss Core.

- 1 Log in to the Control Center browser interface.
- 2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).

- 3 In the **Services** table, expand **Zenoss > User Interface**, and then click **Zope**.  
The **Zope** service details page appears.
- 4 In the **Configuration Files** table, locate path **/opt/zenoss/etc/zope.conf**, and in the **Actions** column, click **Edit**.  
The **Edit Configuration** window appears.



- 5 Configure Zope for secure communications with the proxy server.
  - a Locate the `cgi-environment` directive.  
The directive is about one-third of the way down from the top of the file, on or near line 380.
  - b Configure the proxy server for SSL/TLS communications:

```
<cgi-environment>
    HTTPS ON
</cgi-environment>
```

- 6 Configure the Beaker add-on product to use secure communications.
  - a Locate the `product-config` directive.  
The directive is at the bottom the file, on or near line 1122.
  - b Set the value of the `session.secure` key to `True`.
- 7 Click **Save**.

Next steps:

- If you created a port public endpoint before performing this procedure, the endpoint is ready to use.
- If you created a virtual host public endpoint before performing this procedure, proceed to [Configuring name resolution for virtual hosts](#) on page 12.

## Configuring name resolution for virtual hosts

To enable access to browser interfaces by virtual hosts, add name resolution entries to the DNS servers in your environment or to the hosts files of individual client systems.

- On Windows client systems, the hosts file is `C:\Windows\System32\drivers\etc\hosts`.
- On Linux and OS/X client systems, the hosts file is `/etc/hosts`.

## Name resolution syntax

The following line shows the syntax of the entry to add to a name resolution file:

```
IP-Address FQDN Hostname zenoss5.Hostname
```

For example, the following entry identifies a Control Center master host at IP address 192.0.2.12, hostname cc-master, in the example.com domain.

```
192.0.2.12 cc-master.example.com cc-master zenoss5.cc-master
```

## Configuring name resolution on a Windows 7 system

To perform this procedure, you need Windows Administrator privileges.

- 1 Log in to the Windows 7 system as a user with Administrator privileges.
- 2 Click **Start > All Programs > Accessories > Notepad**.
- 3 Right click **Notepad** and then select **Run as administrator**.
- 4 Click **File > Open**, and then enter the following file path:  
C:\Windows\System32\drivers\etc\hosts
- 5 At the end of the file, add a name resolution entry.  
For more information, see [Name resolution syntax](#) on page 13.
- 6 Save the file, and then exit Notepad.

## Configuring name resolution on a Linux or OS/X system

To perform this procedure, you need superuser privileges on the client system.

- 1 Log in to the client system as `root` or as a user with `sudo` privileges.
- 2 In a text editor, Open the `/etc/hosts` file.
- 3 At the end of the file, add a name resolution entry.  
For more information, see [Name resolution syntax](#) on page 13.
- 4 Save the file, and then close the editor.

## Configuring Zenoss Core

---

This chapter contains configuration procedures that you perform after Zenoss Core is installed. Some of the procedures are optional, and indicated as such in the section title. For installation and deployment instructions, refer to the *Zenoss Core Installation Guide*.

### Starting Zenoss Core

---

You can start Zenoss Core from the Control Center browser interface or from the command-line interface.

#### Using the Control Center browser interface to start Zenoss Core

To perform this procedure, you need:

- A tested client system and browser
- A user account on the Control Center master host with access privileges for the Control Center browser interface

For more information, refer to the *Zenoss Core Installation Guide*.

- 1 Log in to the Control Center browser interface.
- 2 In the **Actions** column of the **Applications** table, click **Start** for **Zenoss.core**.
- 3 In the **Start Service** dialog, click **Start Service and 40 Children**.
- 4 Optional: Monitor the startup, if desired.
  - a In the **Applications** table, click **Zenoss.core**.
  - b Scroll down to the **Services** table and review the **Health** icon for each service.

As services are started the **Health** icon changes to a check mark.

#### Using the command line to start Zenoss Core

To perform this procedure, you need `serviced` CLI privileges. For more information, refer to the *Zenoss Core Installation Guide*.

- 1 Log in to the Control Center master host as a user with `serviced` CLI privileges.
- 2 Start Zenoss Core:

```
serviced service start Zenoss.core
```

- 3 Optional: Monitor the startup, if desired:

```
serviced service status Zenoss.core
```

## Default server passwords

Zenoss Core adds global configuration parameters to the run-time environments (Docker containers) of every service. The parameters include the default passwords of a MariaDB database server and a RabbitMQ server. The default passwords are the same in all Zenoss Core distributions. To avoid security issues, Zenoss recommends changing the default passwords of the preceding servers.

---

**Note** Changes to global configuration parameters persist across upgrades.

---

The following list associates the affected servers, their Zenoss Core services, and their account information.

---

**Note** The list includes both account names and passwords. Zenoss recommends changing the passwords of each account and strongly discourages changing the account names.

---

### MariaDB server for event and model databases

Administrator account: `global.conf.zep-admin-user`  
 Administrator password: `global.conf.zep-admin-password`  
 Event database user account: `global.conf.zep-user`  
 Event database user password: `global.conf.zep-password`  
 Administrator account: `global.conf.zodb-admin-user`  
 Administrator password: `global.conf.zodb-admin-password`  
 Model database user account: `global.conf.zodb-user`  
 Model database user password: `global.conf.zodb-password`

### RabbitMQ server

Service: **RabbitMQ**  
 User account: `global.conf.amqpuser`  
 User password: `global.conf.amqppassword`

## Changing MariaDB passwords

Use this procedure to change the passwords of the MariaDB databases for event and model data.

To perform this procedure, the **MariaDB** child service of Zenoss Core must be running.

- 1 Log in to the Control Center master host as `root`, or as a user with superuser privileges.
- 2 Log in to the Docker container of the **MariaDB** service as `zenoss`.

```
serviced service attach mariadb su - zenoss
```

- 3 Change the passwords.
  - a Start an interactive session.

```
export TERM=dumb; mysql -u root
```

- b** Access the administration database.

```
USE mysql
```

- c** Set the password of the `root` user.  
Replace *New-Password* with a new password:

```
SET PASSWORD FOR 'root'@'127.0.0.1' = PASSWORD('New-Password');
SET PASSWORD FOR 'root'@'localhost' = PASSWORD('New-Password');
```

Record the password for use in a subsequent step.

- d** Update the password of the `zenoss` user.  
Replace *New-Password* with a new password:

```
SET PASSWORD FOR 'zenoss'@'127.0.0.1' = PASSWORD('New-Password');
SET PASSWORD FOR 'zenoss'@ '%' = PASSWORD('New-Password');
```

Record the password for use in a subsequent step.

- e** Exit the interactive session.

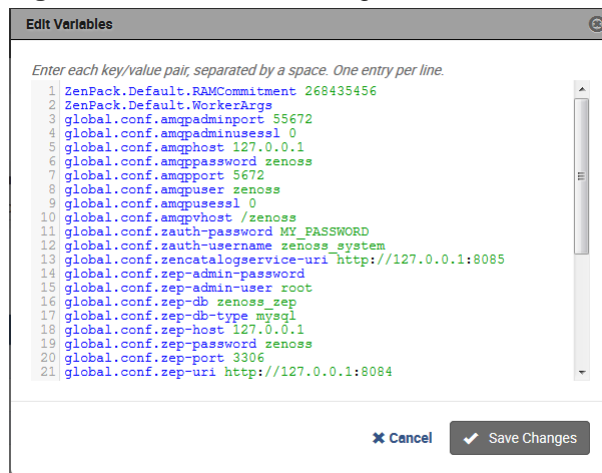
```
QUIT
```

The MariaDB server loads the grant tables into memory immediately when account management statements like `SET PASSWORD` are used, so the `FLUSH PRIVILEGES` statement is not necessary.

- 4** Log in to the Control Center browser interface.
- 5** In the **Applications** table, click **Zenoss.core**.
- 6** In the application title line, click **Edit Variables**.

Initially, the application title line appears immediately below the Control Center banner at the top of the page. When you scroll down the page, the application title line persists at the top of the page.

**Figure 1: Edit Variables dialog**



- 7** Update the passwords of the event and model databases.
  - a** In the **Edit Variables** dialog, locate the `global.conf.zep-password` and `global.conf.zodb-password` variables.  
These variables use the password of the `zenoss` user.
  - b** Replace their values with the new password specified previously.
  - c** Locate the `global.conf.zep-admin-password` and `global.conf.zodb-admin-password` variables.



These variables use the password of the `root` user.

- d Replace their values with the new password specified previously.
  - e At the bottom of the **Edit Variables** dialog, click **Save Changes**.
- 8 Restart Zenoss Core.
- a Scroll down to the **Services** table, and then locate the **MariaDB** service.
  - b In the application title line, click the **Restart** control.

## Changing the RabbitMQ server password

Use this procedure to change the password of the RabbitMQ server.

To perform this procedure, the **mariadb-model** child services of Zenoss Core must be running.

- 1 Log in to the Control Center master host as `root`, or as a user with superuser privileges.
- 2 Change the password of the `zenoss` user.
  - a Log in to the Docker container of the **RabbitMQ** service as `root`.

```
serviced service attach rabbitmq
```

- b Change the password.  
Replace *New-Password* with a new password:

```
rabbitmqctl change_password zenoss New-Password
```

Record the password for use in a subsequent step.

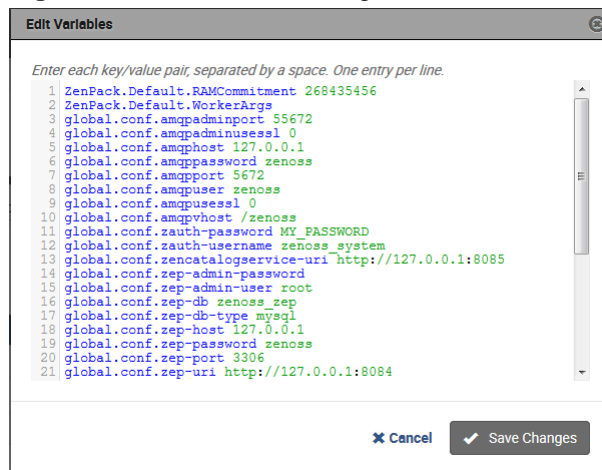
- c Log out of the Docker container.

```
exit
```

- 3 Log in to the Control Center browser interface.
- 4 In the **Applications** table, click **Zenoss.core**.
- 5 In the application title line, click **Edit Variables**.

Initially, the application title line appears immediately below the Control Center banner at the top of the page. When you scroll down the page, the application title line persists at the top of the page.

**Figure 2:** Edit Variables dialog



- 6 Change the password of the RabbitMQ server.
  - a In the **Edit Variables** dialog, locate the `global.conf.amqppassword` variable.

- b Replace its value with the new password specified previously.
  - c At the bottom of the **Edit Variables** dialog, click **Save Changes**.
- 7 Restart the **RabbitMQ** service.
  - a Scroll down to the **Services** table, and then locate the **RabbitMQ** service.
  - b In the **Actions** column of the service, click the **Restart** control.

## Deleting the RabbitMQ guest user account

---

By default, RabbitMQ distributions include the `guest` user account. To prevent security issues, Zenoss recommends deleting the account.

- 1 Log in to the Control Center master host as a user with `serviced` CLI privileges.
- 2 Attach to the RabbitMQ container.

```
serviced service attach rabbitmq
```

- 3 Delete the guest user account.

```
rabbitmqctl delete_user guest
```

- 4 Exit the container session.

```
exit
```

- 5 Restart the RabbitMQ service.

```
serviced service restart rabbitmq
```

## Creating a weekly maintenance script

---

The Zenoss Core databases require regular maintenance to perform optimally. This procedure creates a script for weekly invocation, to perform the required maintenance.

- 1 Log in to the Control Center master host as `root`, or as a user with superuser privileges.
- 2 Determine whether the `cronie-anacron` package is installed.
  - a Search the list of installed packages.

```
rpm -qa | grep -i anacron
```

- If the command returns no result, perform the next substep.
  - If the command returns a result, skip to the next step.
- b Install the package, if necessary.

```
yum install cronie-anacron
```

- 3 Determine whether a script is already installed.  
Some packages of Zenoss Core install the script.

```
ls -l /etc/cron.weekly
```

- If the result includes `serviced-zenossdbpack`, the maintenance script is installed. Stop performing this procedure.

- If the result does not include `serviced-zenossdbpack`, the maintenance script is installed. Complete this procedure.
- 4 Create a shell script for weekly invocation.
  - a Open `/etc/cron.weekly/serviced-zenossdbpack` with a text editor. The file is empty.
  - b Add the following content to the file.

```
#!/bin/sh
${SERVICED:=/opt/serviced/bin/serviced} service run zope
zenossdbpack
```

- c Save the file, and then close the text editor.
- 5 Set file permissions.

```
chmod 0755 /etc/cron.weekly/serviced/zenossdbpack
```

## MariaDB database utilities

---

The [Percona Toolkit](#) is a collection of helpful utilities for MySQL and MariaDB databases. For licensing reasons, Zenoss can not distribute it. Zenoss strongly recommends that all installations of Zenoss Core install the Percona Toolkit.

### Installing the Percona Toolkit with internet access

To perform this procedure, you need one of the following:

- a login account on the master host that is a member of the `docker` group
- the password of the `root` user account

For more information, refer to the *Zenoss Core Installation Guide*.

- 1 Log in to the Control Center master host.
- 2 Install the package.

```
serviced service run zope install-percona
```

At the end of the installation process, the message `Container not committed` appears. This is normal. The tools are installed in the distributed file system, not in an image.

### Installing the Percona Toolkit without internet access

To perform this procedure, you need one of the following:

- a login account on the master host that is a member of the `docker` group
- the password of the `root` user account

In addition, you need the Percona Toolkit package file. This procedure includes steps for downloading it to a client system, and then copying it to the Control Center master host.

- 1 On a client system, use a web browser to download the latest version of the [Percona Toolkit](#) package.
- 2 Log in to the Control Center master host.
- 3 Prepare the package for installation.

- a On the Control Center master host, create a directory for the package, and then change directory.

```
mkdir /tmp/percona && cd /tmp/percona
```

- b Copy the package to the temporary location.  
You may use a file transfer utility such as [WinSCP](#).
- c Update the access permissions of the file and directory.

```
chmod -R 777 /tmp/percona
```

- 4 Start a shell as the `zenoss` user in a Zope container.

- a Change directory to the location of the Percona Toolkit file.

```
cd /tmp/percona
```

- b Start an interactive shell in a Zope container and save a snapshot named `PerconaToolkit`.

```
mySnap=InstallPerconaToolkit  
serviced service shell -i -s $mySnap zope bash
```

- c Switch user to `zenoss`.

```
su - zenoss
```

- 5 Install the package and exit the Zope container.

- a Create a directory for the package.

```
PERCONADIR=/var/zenoss/percona  
mkdir -p $PERCONADIR
```

- b Extract the package files.

Replace *Version* with the version number of the package file:

```
tar --strip-components=1 -C $PERCONADIR -xzf \\\  
/mnt/pwd/percona-toolkit-Version.tar.gz
```

- c Exit the `zenoss` shell.

```
exit
```

- d Exit the Zope container.

```
exit
```

- 6 Commit the named snapshot.

```
serviced snapshot commit $mySnap
```

- 7 Restart the `zeneventserver` service.

```
serviced service restart zeneventserver
```

## Optional: Assigning a virtual IP address to a resource pool

The **zentrap** and **zensyslog** services are designed to receive data from devices in your environment at a specific IP address. Typically, the address is assigned to a specific host. However, if the host fails, then no data is received. To avoid this issue, you can assign a virtual IP address to a resource pool, and then Control Center can create a virtual IP interface on any host in the pool. Zenoss recommends using a virtual IP with resource pools that include Zenoss Core collection services as a best practice.

To perform this procedure, you need an unused IPv4 address in the same subnet as the other hosts in the resource pool to modify. To avoid conflicts, ask your networking specialist to assign or reserve the address. In addition, all of the hosts in the resource pool to modify must have the same network interface names.

- 1 Log in to the Control Center browser interface.
- 2 At the top of the page, click **Resource Pools**.
- 3 In the **Resource Pool** column of the **Resource Pools** table, click the name of the resource pool to modify.
- 4 At the right side of the **Virtual IPs** table, click **Add Virtual IP**.
- 5 In the **Add Virtual IP** dialog, specify the virtual IP.
  - a In the **IP** field, enter an IPv4 address.  
The address must be in the same subnet as the other hosts in the current resource pool.
  - b In the **Netmask** field, enter an IPv4 subnet mask.  
The mask must match the range of addresses in the current resource pool. The following table associates commonly-used subnet masks with the number of addresses they include.

| Subnet mask     | Addresses in subnet |
|-----------------|---------------------|
| 255.255.255.192 | 64                  |
| 255.255.255.224 | 32                  |
| 255.255.255.240 | 16                  |
| 255.255.255.248 | 8                   |

- c In the **Interface** field, enter the name of the network interface that is used on all hosts in the resource pool.
- d At the bottom of the **Add Virtual IP** dialog, click **Add Virtual IP**.

When you configure devices to send `syslog` or SNMP trap messages, use the virtual IP address assigned to a resource pool.

## Optional: Replacing the default digital certificate

The default configuration of the Zenoss Core web server uses a Zenoss self-signed certificate for SSL/TLS communications. Use this procedure to install your own digital certificate.

To perform this procedure, you need:

- the certificate and key files of a digital certificate from a certificate authority or from a digital certificate created with a utility such as OpenSSL

---

**Note** Currently, certificates that require a passphrase are not supported.

---

- superuser privileges on the Control Center master host

- 1 Log in to the Control Center master host.
- 2 Copy the certificate and key files of your digital certificate to `/etc` on the master host.  
You can store the files in any location that remains unchanged during operating system upgrades.

- 3 Configure Control Center to use your digital certificate.
  - a Open `/etc/default/serviced` with a text editor.
  - b Locate the `SERVICED_CERT_FILE` declaration, and then replace its value with the absolute path of your certificate file.
  - c Remove the number sign character (`#`) from the beginning of the line.
  - d Locate the `SERVICED_KEY_FILE` declaration, and then replace its value with the absolute path of your key file.
  - e Remove the number sign character (`#`) from the beginning of the line.
  - f Save the file, and then close editor.
- 4 Reload the Control Center service.

```
systemctl reload serviced
```

## Optional: Enabling monitoring on IPv6 networks

This procedure describes how to configure Zenoss Core to enable monitoring of devices that are located on an IPv6 network. The network must be reachable from the IPv4 network environment in which Control Center is deployed.

Use this procedure to route an IPv6 address block to Control Center using Docker's virtual bridge interface, `docker0`. Zenoss Core can monitor IPv6 devices that have addresses in the routed block.

To perform this procedure, each Control Center host needs a unique IPv6 prefix routed to it by an upstream router, and the Docker service on each Control Center host must be configured to forward IPv6 packets.

For example, a multi-host deployment with one master host and three delegates could have the IPv6 configuration in the following table.

| Control Center host | IPv6 link prefix           | IPv6 routed prefix      |
|---------------------|----------------------------|-------------------------|
| Master              | 2001:DB8:ABCD:1000::500/64 | 2001:DB8:ABCD:2000::/64 |
| Delegate 1          | 2001:DB8:ABCD:1000::501/64 | 2001:DB8:ABCD:2001::/64 |
| Delegate 2          | 2001:DB8:ABCD:1000::502/64 | 2001:DB8:ABCD:2002::/64 |
| Delegate 3          | 2001:DB8:ABCD:1000::503/64 | 2001:DB8:ABCD:2003::/64 |

The following example shows how to configure the static routes in the preceding table on an upstream Cisco router:

```
ipv6 route 2001:DB8:ABCD:2000::/64 2001:DB8:ABCD:1000::500
ipv6 route 2001:DB8:ABCD:2001::/64 2001:DB8:ABCD:1000::501
ipv6 route 2001:DB8:ABCD:2002::/64 2001:DB8:ABCD:1000::502
ipv6 route 2001:DB8:ABCD:2003::/64 2001:DB8:ABCD:1000::503
```

Perform the following steps on each Control Center host:

- 1 Log on to the Control Center host as `root`, or as a user with superuser privileges.
- 2 Configure IPv6 packet forwarding.
  - a Open `/etc/sysctl.d/ipv6.conf` with a text editor.
  - b Add or edit the following line:

```
net.ipv6.conf.all.forwarding=1
```

- c Save the file, and then close the text editor.
- 3 Enable IPv6 packet forwarding without rebooting the host.

```
sysctl -w net.ipv6.conf.all.forwarding=1
```

- 4 Configure Docker for IPv6 communications.
  - a Open `/etc/sysconfig/docker` with a text editor.
  - b Add the following flags to the end of the *OPTIONS* declaration.  
Replace *Subnet-Block* with the IPv6 subnet to route to Control Center, in CIDR notation:

```
--ipv6 --fixed-cidr-v6="Subnet-Block"
```

- c Change the delimiter of the *OPTIONS* declaration to the apostrophe character (`'`).  
The default delimiter of the *OPTIONS* declaration is the quotation mark character (`"`), which is the same delimiter used with the `--fixed-cidr-ipv6` flag.
  - d Save the file, and then close the text editor.
- 5 Restart the Docker service.

```
systemctl restart docker
```

After all Control Center hosts are configured, test IPv6 by using the Docker container of the **zenping** service to ping a known address:

```
serviced service attach zenping ping6 -c 1 ipv6.google.com
```

If the ping is successful, Docker is able to resolve IPv6 addresses and you can monitor devices on the IPv6 network.

## Optional: Customization management

Zenoss Core software is distributed as Docker images. Upgrades often replace images, so customizations of Zenoss Core services are lost, unless customizations are installed with a change management system.

Quilt is a utility for managing software changes, and Zenoss recommends installing it to manage customizations.

### Installing Quilt with internet access

To perform this procedure, you need superuser privileges on the Control Center master host.

Use this procedure to add the Quilt patch management system to Zenoss Core.

- 1 Log in to the Control Center master host.
- 2 Install the Quilt package.

```
serviced service run zope install-quilt
```

### Installing Quilt without internet access

To perform this procedure, you need superuser privileges on the Control Center master host and the Quilt package file. This procedure includes steps for downloading the package to a client system, and then copying it to the Control Center master host.

Use this procedure to add the Quilt patch management system to Zenoss Core.

- 1 On a client system, use a web browser to download the latest version of [the Quilt package](#).
- 2 Log in to the Control Center master host.
- 3 Prepare the package for installation.
  - a On the Control Center master host, create a directory for the package, and then change directory.

```
mkdir /tmp/quilt && cd /tmp/quilt
```

- b Copy the package to the temporary location.  
You may use a file transfer utility such as [WinSCP](#).
- c Update the access permissions of the file and directory.

```
chmod -R 777 /tmp/quilt
```

- 4 Start a shell as the `zenoss` user in a Zope container.
  - a Change directory to the location of the Quilt package file.

```
cd /tmp/quilt
```

- b Start an interactive shell in a Zope container and save a snapshot named `InstallQuilt`.

```
mySnap=InstallQuilt  
serviced service shell -i -s $mySnap zope bash
```

- c Switch user to `zenoss`.

```
su - zenoss
```

- 5 Extract the package files, and then compile and install Quilt.
  - a Extract the package files.

```
tar xzvf /mnt/pwd/quilt-*.tar.gz -C /tmp
```

- b Compile and install the package.

```
cd /tmp/quilt-* && ./configure --prefix=/opt/zenoss/var/ext \  
&& make && make install
```

- 6 Exit the container.
  - a Exit the `zenoss` shell.

```
exit
```

- b Exit the Zope container.

```
exit
```

- 7 Commit the named snapshot.

```
serviced snapshot commit $mySnap
```

## Optional: Configuring OpenTSDB compaction

Zenoss Core uses OpenTSDB to store the monitoring data it collects. When OpenTSDB compaction is enabled, multiple columns in an HBase row are merged into a single column, to reduce disk space. In testing, Zenoss has



observed that these merges result in duplicate data points, so by default, compaction is disabled. Duplicate data points do not affect data integrity.

---

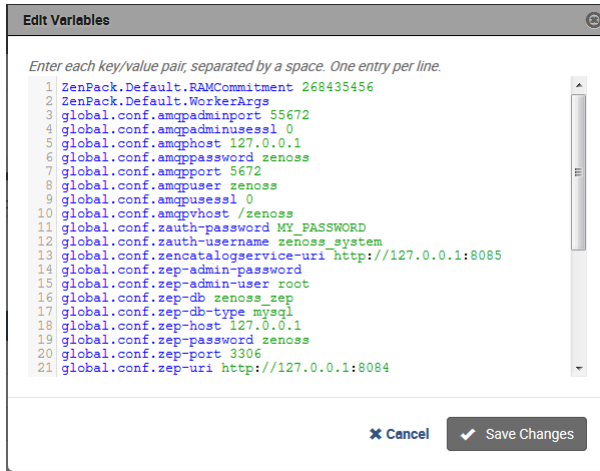
**Note** Enabling compaction slows performance and is not recommended.

---

- 1 Log in to the Control Center browser interface.
- 2 In the **Applications** table, click **Zenoss.core**.
- 3 In the application title line, click **Edit Variables**.

Initially, the application title line appears immediately below the Control Center banner at the top of the page. When you scroll down the page, the application title line persists at the top of the page.

**Figure 3:** Edit Variables dialog



- 4 In the **Edit Variables** dialog, scroll to the bottom of the list.
- 5 Change the value of the `tsd.storage.enable_compaction` variable from `False` to `True`.
- 6 Click **Save Changes**.
- 7 Restart the OpenTSDB services.
  - a Scroll down the page to the **Services** table, and then locate the **opentsdb** service.
  - b In the **Actions** column of the **opentsdb** service, click the **Restart** control.

## Preparing for monitoring

---

Zenoss Core uses standard management APIs to collect performance data, and therefore does not install proprietary agents on your infrastructure devices to collect monitoring data. However, Zenoss recommends that you review the information in this chapter to verify that the devices to you want to monitor are ready to respond to requests for data.

---

**Note** This chapter describes how to prepare the most common IT infrastructure. If the infrastructure you want to monitor is not described here, please refer to the corresponding ZenPack documentation in the [ZenPack catalog](#).

---

When your infrastructure is ready to monitor, the Zenoss Core Setup Wizard guides you through the process of discovering devices on your network and adding devices by category and type.

## Extending monitoring with ZenPacks

---

Data centers typically contain many different types of hardware, software, and cloud services from a long list vendors. To keep your company's data secure, all devices, network infrastructure, and services must be monitored.

Zenoss Core is ready to monitor a large number of common devices and network infrastructure as soon it is installed. However, you can monitor an even larger number of devices in Zenoss Core through the use of ZenPacks. A ZenPack is a plug-in that extends not only monitoring capabilities, but also adds new capabilities to the Zenoss Core itself. This can be as simple as adding new device classes or monitoring templates, or as complex as extending the data model and providing new collection daemons.

There are hundreds of ZenPacks available, some developed, supported, and maintained by Zenoss, and many others that are developed and maintained by the Zenoss user community.

You can use ZenPacks to add:

- Monitoring templates
- Data sources
- Graphs
- Event classes
- User commands
- Reports
- Model extensions
- Product definitions

Simple ZenPacks can be created completely within the Zenoss Core. More complex ZenPacks require development of scripts or daemons, using Python or another programming language. ZenPacks can also be distributed for installation on other Zenoss Core systems. For information on how to create a new ZenPack, refer to *Zenoss Core Administration Guide*.

## ZenPack information resources

Zenoss Core includes a link (the question mark icon) to the documentation of the ZenPacks that are included in your installation of Zenoss Core. It also provides access to the [ZenPack catalog](#), which provides detailed descriptions of all of the ZenPacks developed by Zenoss.

You may also create your own ZenPacks, or download and install ZenPacks developed by others. The following list identifies ZenPack resources:

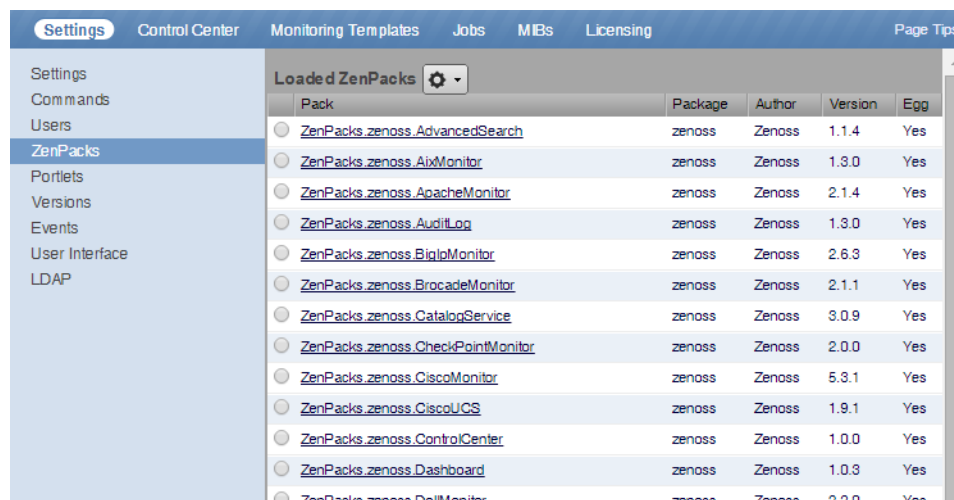
- [ZenPack SDK](#)
- [Zenoss Community](#), which includes a ZenPack development forum
- [Public Zenoss repositories on GitHub](#)

## Displaying installed ZenPacks in Zenoss Core

To display the pre-installed ZenPacks on Zenoss Core:

- 1 In the browser interface, select the **ADVANCED** tab.
- 2 In the left column, select **ZenPacks**.

The following figure shows an example list of ZenPacks.



| Pack  | Package | Author | Version | Egg |
|---|---------|--------|---------|-----|
| <a href="#">ZenPacks.zenoss.AdvancedSearch</a>    | zenoss  | Zenoss | 1.1.4   | Yes |
| <a href="#">ZenPacks.zenoss.AixMonitor</a>        | zenoss  | Zenoss | 1.3.0   | Yes |
| <a href="#">ZenPacks.zenoss.ApacheMonitor</a>     | zenoss  | Zenoss | 2.1.4   | Yes |
| <a href="#">ZenPacks.zenoss.AuditLog</a>          | zenoss  | Zenoss | 1.3.0   | Yes |
| <a href="#">ZenPacks.zenoss.BigIpMonitor</a>      | zenoss  | Zenoss | 2.6.3   | Yes |
| <a href="#">ZenPacks.zenoss.BrocadeMonitor</a>    | zenoss  | Zenoss | 2.1.1   | Yes |
| <a href="#">ZenPacks.zenoss.CatalogService</a>    | zenoss  | Zenoss | 3.0.9   | Yes |
| <a href="#">ZenPacks.zenoss.CheckPointMonitor</a> | zenoss  | Zenoss | 2.0.0   | Yes |
| <a href="#">ZenPacks.zenoss.CiscoMonitor</a>      | zenoss  | Zenoss | 5.3.1   | Yes |
| <a href="#">ZenPacks.zenoss.CiscoUCS</a>          | zenoss  | Zenoss | 1.9.1   | Yes |
| <a href="#">ZenPacks.zenoss.ControlCenter</a>     | zenoss  | Zenoss | 1.0.0   | Yes |
| <a href="#">ZenPacks.zenoss.Dashboard</a>         | zenoss  | Zenoss | 1.0.3   | Yes |
| <a href="#">ZenPacks.zenoss.DellMonitor</a>       | zenoss  | Zenoss | 2.2.0   | Yes |

- 3 To monitor infrastructure that does not appear in the **Loaded ZenPacks** list, download the required ZenPack from the [ZenPack catalog](#).

Once the ZenPack is installed, you can then add the infrastructure to Zenoss Core.

## Preparing network devices

This chapter provides instructions for preparing devices for monitoring.

## Preparing switches and routers

To prepare a switch or router device for monitoring, verify that an SNMP agent is installed and currently running on the device.

---

**Note** The rest of this section describes how to prepare Zenoss network devices for monitoring. For other device types, refer to the [ZenPack catalog](#) documentation.

---

## Preparing Cisco UCS network devices

Zenoss Core uses SNMP to provide customized or generalized support for many Zenoss products.

The following table associates Zenoss products with the customized Zenoss Core device types that support them. Device types are listed in the **Network** area of the **Add Infrastructure** wizard, which is both part of the setup wizard and available through the Zenoss Core browser interface.

---

**Note** The following device considerations apply:

- Some supported devices, such as the Cisco Nexus 7000 and 9000 switches, represent a large number of discrete monitoring endpoints. If you are unsure which Zenoss Core deployment size supports the number of high-density devices you wish to monitor, contact your Zenoss representative.
- To monitor Cisco Nexus 9000 Series devices, you must first enable NX-API with the `feature manager CLI` command on the device. For detailed instructions on performing this task, refer to the [Cisco documentation](#) for the Nexus 9000.

---

| Cisco product  | Device type                        |
|--|------------------------------------|
| Cisco Catalyst 6500 and 3560 Series Switches         | Cisco 6500 (SNMP)                  |
| Cisco Nexus 5000 Series Switches                     | Cisco Nexus 5000 (SNMP + Netconf)  |
| Cisco Nexus 7000 Series Switches                     | Cisco Nexus 7000 (SNMP + Netconf)  |
| Cisco Nexus 1000v Series Switches                    | Cisco Nexus 1000V (SNMP + Netconf) |
| Cisco Nexus 3000 Series Switches                     | Cisco Nexus 3000 (SNMP + Netconf)  |
| Cisco Nexus 9000 Series Switches                     | Cisco Nexus 9000 (NX-API)          |
| Cisco Catalyst 6500 Series Virtual Switching Systems | Cisco VSS (SNMP)                   |
| Cisco MDS 9000 Series Multilayer Switches            | Cisco MDS 9000 (SNMP)              |

---

In addition, Zenoss Core provides two generalized device types.

| Cisco product                         | Device type                  |
|---------------------------------------|------------------------------|
| Cisco CatOS-based switches or routers | Generic Switch/Router (SNMP) |
| Cisco IOS-based switches or routers   | Cisco IOS (SNMP)             |

---

## Preparing storage devices

---

This section describes how to prepare NetApp and EMC storage devices for monitoring.

For other device types, refer to the [ZenPack catalog](#) documentation.

## Legacy NetApp filers

Zenoss Core uses SNMP to monitor legacy NetApp filers that do not support the Data ONTAP® API (ZAPI).

The data gathered are approximate because the values for many objects (Aggregate, Volume, Plex, and RAID group) are not exposed by the NetApp MIB.

To prepare a legacy NetApp filer for monitoring, verify that SNMPv2 is installed, and then start an SNMP agent.

## Recent NetApp filers

Zenoss Core uses HTTP to monitor NetApp filers that support the Data ONTAP® API (ZAPI).

To prepare a recent NetApp filer for monitoring, verify the following conditions:

- The filer is running in 7-Mode or C-Mode.
- A supported version of ZAPI is installed and enabled. The minimum required version is 8.x.
- The user name and password of your account on the filer is authorized to use ZAPI.

## EMC storage arrays

Zenoss Core uses the Web-Based Enterprise Management (WBEM) protocol to send queries to EMC Storage Management Initiative Specification (SMI-S) providers that are associated with EMC VMAX and VNX storage arrays.

To prepare EMC arrays for monitoring:

- At least one EMC SMI-S provider must be running for each type of array to monitor. (The VMAX and VNX data models are different.)
- Before adding an SMI-S provider to Zenoss Core, Zenoss recommends that you confirm that it is responding to requests.
- You need the following information:
  - user name and password for an account that is authorized to collect data on each SMI-S provider
  - IP address of each SMI-S provider
  - port number at which each SMI-S provider listens for requests
  - whether to use SSL

---

**Note** When statistics logging is disabled on the EMC device, graphs for component types of EMC arrays display NaN. The logging feature has a low default timeout value and must be set to a higher value or turned on again periodically.

---

## Verifying an SMI-S provider on EMC devices

To perform this procedure, you need a Linux host that has a network path to the SMI-S providers of the arrays to monitor.

---

**Note** Do not perform this procedure on the Zenoss Core host.

---

Perform this procedure to verify that the SMI-S providers associated with EMC arrays are configured correctly, and are responding to WBEM queries from command line tools.

- 1 Log in to a Linux host as `root`, or as a user with superuser privileges.
- 2 Install a WBEM command-line interface package, such as `wbemcli`.

- 3 Verify the SMI-S provider. Replace the variables with values that are valid in your environment.

```
wbemcli IP-Address:Port -u admin \
-p 'Password' -n root/emc --no-sslei('EMC_DiskDrive')
```

The expected result is a list of Disk Drive classes.

## Preparing server devices

This section describes how to prepare Linux and Windows servers for monitoring.

---

**Note** For other device types, refer to the [ZenPack catalog](#) documentation.

---

### Preparing Linux servers for monitoring

Zenoss Core uses SNMP or SSH to monitor Linux servers.

For SNMP monitoring, install an SNMP package on the server (for example, [Net-SNMP](#)) and start the agent.

For SSH monitoring:

- Install an SSH server package (for example, [OpenSSH](#)) and start the SSH daemon.
- Monitoring Linux servers requires the ability to run the `pvs`, `vgs`, `lvs`, `systemctl`, `initctl`, and `service` commands remotely on your Linux server(s) using SSH. By default, most of these commands are only allowed to be run locally by the `root` user. If you want the `root` user to remotely run these commands, perform the following:

- 1 Install the `sudo` package on your server.
- 2 Allow the `root` user to execute commands via SSH without a TTY.
  - a Edit the `/etc/sudoers` file.
  - b Find the line containing `root ALL=(ALL) ALL`.
  - c Add the following line beneath it:

```
Defaults:root !requiretty
```

- d Save the changes and exit.

Alternately, you can also set up a non-root user to remotely run these commands. Perform the following:

- 1 Create a user named `zenmonitor` on your Linux servers for monitoring purposes.
- 2 Install the `sudo` package on your server.
- 3 Allow the `zenmonitor` user to run the commands via SSH without a TTY.
  - a Edit `/etc/sudoers.d/zenoss` or `/etc/sudoers`, if `sudoers.d` is not supported and add the following lines to the bottom of the file:

```
Defaults:zenmonitor !requiretty
Cmdnd_Alias ZENOSS_LVM_CMDS = /sbin/pvs, /sbin/vgs, /sbin/lvs, \
    /usr/sbin/pvs, /usr/sbin/vgs, /usr/sbin/lvs
Cmdnd_Alias ZENOSS_SVC_CMDS = /bin/systemctl list-units *, \
    /bin/systemctl status *, /sbin/initctl list, /sbin/service --
status-all, \
    /usr/sbin/dmidecode
```

```
zenmonitor ALL=(ALL) NOPASSWD: ZENOSS_LVM_CMDS, ZENOSS_SVC_CMDS
```

- b** Save the changes, ensuring all the paths for these commands are correct.

## Preparing Windows servers for monitoring

Zenoss Core uses SNMP or WinRM to monitor Microsoft Windows systems as follows:

- Microsoft Windows Server 2106 - WinRM only.  
SNMP support does not exist for Windows Server 2106.
- Microsoft Windows Server 2012 and 2012 R2 - WinRM only.  
SNMP support does not exist for Windows Server 2012 .
- Microsoft Windows Server 2008 R2 - SNMP v1/v2 or WinRM.  
SNMP v3 support does not exist for Windows Server 2008 R2.

To prepare a Windows 2008 system for SNMP monitoring, start the SNMP service.

To prepare a Windows system for WinRM monitoring, refer to the [support article](#) that describes the options and provides the procedures for configuring your systems.

To prepare a Windows system for WinRM monitoring, refer to the appendix, "Preparing Windows Systems."

## Preparing hypervisor devices

---

This section describes how to prepare vSphere and Hyper-V hypervisors for monitoring.

---

**Note** For other device types, refer to the [ZenPack catalog](#) documentation.

---

### vSphere endPoint

Zenoss Core uses SOAP to monitor VMware vSphere servers running the following versions of vSphere:

- 4.1
- 5.0
- 5.1
- 5.5
- 6.0

To prepare to monitor a VMware vSphere server:

- Verify that you are running a supported version of the software.
- Obtain the user name and password of an account on the server that is authorized to use the vSphere API.
- Determine whether to use SSL.

### Hyper-V

Zenoss Core uses WinRM to monitor the following Microsoft Hyper-V systems:

- Microsoft Hyper-V Server 2016
- Microsoft Hyper-V Server 2012 and 2012 R2
- Microsoft Hyper-V Server 2008 and 2008 R2

To prepare a Hyper-V system for WinRM monitoring, refer to the [support article](#) that describes the options and provides the procedures for configuring your systems.

## Validating configuration using Inspector tool

Once you have set up your environment, you can validate your configuration using Inspector. The Inspector tool is typically installed on the Control Center master host and performs read-only checks on your environment and provides advice on resolving potential issues.

For more information on the Inspector tool, including download and installation instructions see the following knowledge base article: [Inspector: A tool to validate configuration](#).

## Optional: Enabling monitoring on IPv6 networks

This procedure describes how to configure Zenoss Core to enable monitoring of devices that are located on an IPv6 network. The network must be reachable from the IPv4 network environment in which Control Center is deployed.

Use this procedure to route an IPv6 address block to Control Center using Docker's virtual bridge interface, `docker0`. Zenoss Core can monitor IPv6 devices that have addresses in the routed block.

To perform this procedure, each Control Center host needs a unique IPv6 prefix routed to it by an upstream router, and the Docker service on each Control Center host must be configured to forward IPv6 packets.

For example, a multi-host deployment with one master host and three delegates could have the IPv6 configuration in the following table.

| Control Center host | IPv6 link prefix           | IPv6 routed prefix      |
|---------------------|----------------------------|-------------------------|
| Master              | 2001:DB8:ABCD:1000::500/64 | 2001:DB8:ABCD:2000::/64 |
| Delegate 1          | 2001:DB8:ABCD:1000::501/64 | 2001:DB8:ABCD:2001::/64 |
| Delegate 2          | 2001:DB8:ABCD:1000::502/64 | 2001:DB8:ABCD:2002::/64 |
| Delegate 3          | 2001:DB8:ABCD:1000::503/64 | 2001:DB8:ABCD:2003::/64 |

The following example shows how to configure the static routes in the preceding table on an upstream Cisco router:

```
ipv6 route 2001:DB8:ABCD:2000::/64 2001:DB8:ABCD:1000::500
ipv6 route 2001:DB8:ABCD:2001::/64 2001:DB8:ABCD:1000::501
ipv6 route 2001:DB8:ABCD:2002::/64 2001:DB8:ABCD:1000::502
ipv6 route 2001:DB8:ABCD:2003::/64 2001:DB8:ABCD:1000::503
```

Perform the following steps on each Control Center host:

- 1 Log on to the Control Center host as `root`, or as a user with superuser privileges.
- 2 Configure IPv6 packet forwarding.
  - a Open `/etc/sysctl.d/ipv6.conf` with a text editor.
  - b Add or edit the following line:

```
net.ipv6.conf.all.forwarding=1
```

- c Save the file, and then close the text editor.



- 3 Enable IPv6 packet forwarding without rebooting the host.

```
sysctl -w net.ipv6.conf.all.forwarding=1
```

- 4 Configure Docker for IPv6 communications.

- a Open `/etc/sysconfig/docker` with a text editor.
- b Add the following flags to the end of the *OPTIONS* declaration.  
Replace *Subnet-Block* with the IPv6 subnet to route to Control Center, in CIDR notation:

```
--ipv6 --fixed-cidr-v6="Subnet-Block"
```

- c Change the delimiter of the *OPTIONS* declaration to the apostrophe character (`'`).  
The default delimiter of the *OPTIONS* declaration is the quotation mark character (`"`), which is the same delimiter used with the `--fixed-cidr-ipv6` flag.
- d Save the file, and then close the text editor.

- 5 Restart the Docker service.

```
systemctl restart docker
```

After all Control Center hosts are configured, test IPv6 by using the Docker container of the **zenping** service to ping a known address:

```
serviced service attach zenping ping6 -c 1 ipv6.google.com
```

If the ping is successful, Docker is able to resolve IPv6 addresses and you can monitor devices on the IPv6 network.

## Modeling devices

---

To model devices, the system can use:

- SSH
- WinRM
- SNMP (legacy option)

---

**Note** SSH and WinRM are the recommended options.

---

The modeling method you select depends on your environment, and on the types of devices you want to model and monitor.

By default the system remodels each known device every 720 minutes (12 hours).

---

**Note** You can change the frequency with which devices are remodeled. Edit the value of the Modeler Cycle Interval in the collector's configuration.

---

For larger deployments, modeling frequency may impact performance. In such environments, you should set the `startat` configuration setting inside the `zenmodeler.conf` file to change the scheduling of the daemon. The `startat` value only dictates the initial start time of `zenmodeler`. Each subsequent run interval is determined by the `zenmodeler` cycle time (number of minutes between runs) configured on the daemon settings page inside the parent's collector folder which can be accessed in Control Center. See the following KB article for more information: [How To Edit The Zenmodeler File To Configure Model Scheduling In Zenoss 5.x](#)

---

## Configuring Windows devices to provide data through SNMP

---

To monitor Microsoft Windows Server 2008 R2 systems, Zenoss Core uses SNMP v1/v2 or WinRM. (There is no SNMP v3 support.) For Windows 2012, there is no SNMP support.

By default, Windows may not have SNMP installed. To install SNMP on your particular version of Windows, please refer to the Microsoft documentation.

After setting up and configuring the SNMP service, you must set the `zSnmpCommunity` string in Zenoss Core to match, to obtain SNMP data.

If you want processor and memory monitoring, install [SNMP-Informant](#) on the device.

To collect Windows event logs or log files from a Windows box using `syslog`, install the [SyslogAgent](#) Windows add-on.

## Configuring Linux devices to provide data through SNMP

---

To configure a Linux machine for monitoring, it must have SNMP installed. A good Linux SNMP application is net-snmp. Download, install, and configure net-snmp to then use SNMP to monitor Linux devices.


## Modeling devices using SSH/CMD

---

You can gather additional information by running commands on the remote device and interpreting the results. This provides a more scalable and flexible way to gather information that may not be available through any other means.

Each built-in modeling command plugin is differentiated by the platform on which it runs. To determine the platform for the device you want to model, run the `uname` command in a shell on the device.

To model a device using command plugins, first add the device by using the protocol "none," and then choose the plugins you want to apply:

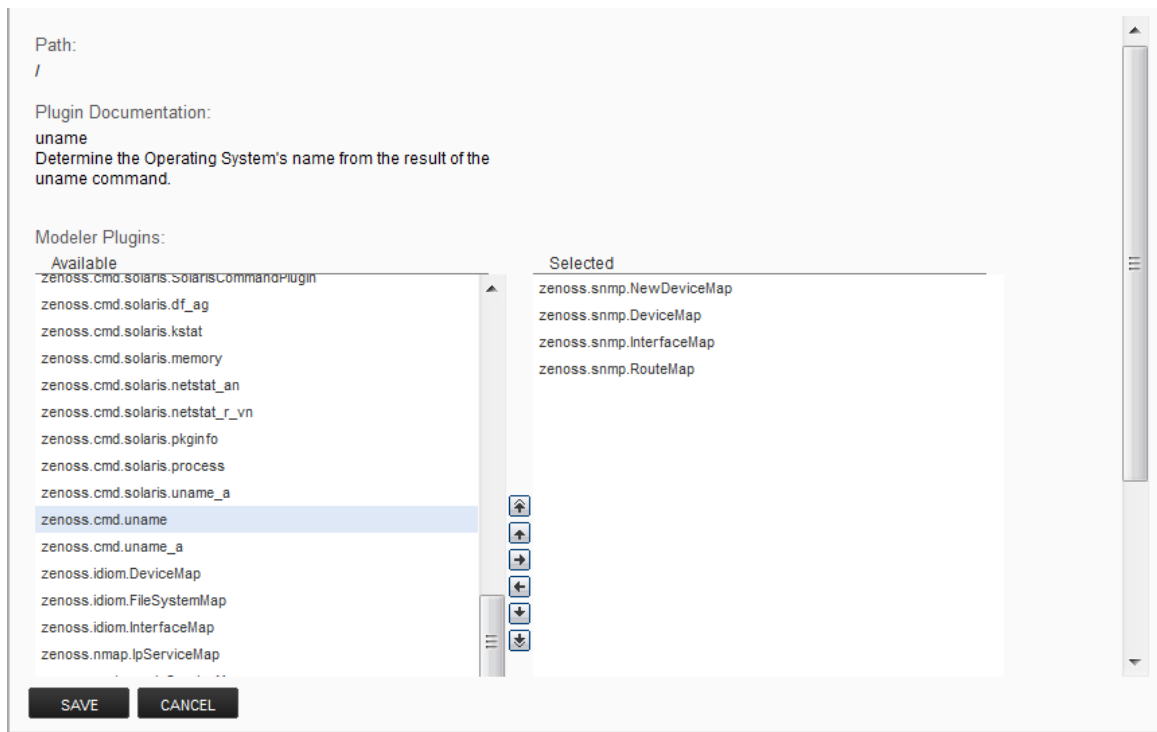
- 1 From the Navigation menu, select **Infrastructure**.
- 2 Click the Add Devices  icon and select **Add a Single Device** from the drop-down list. The Add a Single Device window appears.
- 3 Enter values for Name or IP and Device Class.
- 4 Clear the Model Device option.
- 5 Click **Add**.
- 6 After adding the device, select the device name in the devices list. The Device Overview page appears.
- 7 In the left panel, select **Configuration Properties**.
- 8 If necessary, set the values of the `zCommandUsername` and `zCommandPassword` configuration properties to the user name and password of the device (or set up authentication by using RSA/DSA keys.)

---

**Note**     `~/.ssh/id_rsa`

---

- 9 In the left panel, select **Modeler Plugins**. The list of plugins appears. The left column displays available plugins; the right column shows those currently selected.
- 10 Select `zenoss.cmd.uname` from the Available list, and then use the right arrow control to move it to the Selected list on the right. Use the controls to place it at the top of the list.

**Figure 4: Add plugin**

- 11 Use the left arrow control to move the other Selected plugins from the Selected list to the Available list.
- 12 Click **Save**.
- 13 Model the device by clicking the **Model Device** button.

## Using device class to monitor devices using SSH

The `/Server/Cmd` device class is an example configuration for modeling and monitoring devices using SSH. The `zCollectorPlugins` have been modified (see the section titled "Modeling Using SSH/Command"), and the device, file system, and Ethernet interface templates used to gather data over SSH have been created. You can use this device class as a reference for your own configuration; or, if you have a device that needs to be modeled or monitored via SSH/Command, you can place it in this device class to use the pre-configured templates and configuration properties. You also must set the `zCommandUsername` and `zCommandPassword` configuration properties to the appropriate SSH login information for each device.

## Using the `/Server/Scan` device class to monitor with port scan

The `/Server/Scan` device class is an example configuration for modeling devices by using a port scan. You can use this device class as a reference for your own configuration; or, if you have a device that will use only a port scan, you can place it under this device class and remodel the device.

## Modeling devices using port scan

You can model IP services by doing a port scan, using the [Nmap Security Scanner](#). You must provide the full path to your system's `nmap` command.

To determine where `nmap` is installed, at the command line, enter:

```
which nmap
```

If your system returns a result similar to:

```
/usr/bin/which: no nmap in (/opt/zenoss/bin:/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/opt/zenoss/bin)
```

then `nmap` is not installed. Install it, and then try again.

After locating the `nmap` command (including the directory beginning with `/`), enter the following as the `zenoss` user on the Zenoss Core server:

```
cd $ZENHOME/libexec ln -s
    Full_Path_to_nmap
```

---

**Note** To execute a command using `$ZENHOME` (`/opt/zenoss` for the `zenoss` user), you must be attached to the container holding the Zenoss Core application. See the Control Center documentation for `serviced` commands.

---

To model a device using a port scan:

- 1 Select the device in the device list.
- 2 In the left panel, select **Modeler Plugins**.
- 3 Select the `zenoss.nmap.ipServiceMap` plugin in the list of Available plugins, and then use the right arrow control to move it to the list of Selected plugins.
- 4 Click **Save**.
- 5 Remodel the device by clicking the **Model Device** button.

## About modeler plugins

---

Zenoss Core uses plug-in maps to map real world information into the standard model. Input to the plug-ins can come from SNMP, SSH or Telnet. Selection of plug-ins to run against a device is done by matching the plug-in name against the `zCollectorPlugins` configuration property.

- **DeviceMap**– Collects basic information about a device, such as its OS type and hardware model.
- **InterfaceMap**– Collects the list of network interfaces on a device.
- **RouteMap**– Collects the network routing table from the device.
- **IpServicesMap**– Collects the IP services running on the device.
- **FileSystemMap**– Collects the list of file systems on a device.

## Viewing and editing modeler plugins for a device

Plugins are controlled by regular expressions that match their names. To view a list of plugins for any device:

- 1 Click the device name in the devices list.
- 2 In the Device summary page, select **Modeler Plugins**.

The Modeler Plugins page appears.

## Adding plugins

To add a plugin to a device:

- 1 Use the right arrow control to move one or more plugins from the Available list (on the left) to the Selected list (on the right).
- 2 Click **Save**.

## Reordering plugins

Plugins run in the order in which they are listed. To re-order plugins, use the up and down arrow controls, and then click **Save**.

## Deleting plugins from a device

To delete a plugin from a device, use the left arrow control to move the plugin from the Selected list to the Available list.

# Debugging the modeling process

---

You can run the modeler from the command line against a single device. This feature is useful when debugging issues with a plugin.

By passing the `--collect` command to the modeler, you can control which modeler plugins are used. For example, the following command runs only the interface plugin against the `build.zenoss.loc` device:

- 1 Log in to the Control Center host as a user with `serviced` CLI privileges.
- 2 Attach to the `zenmodeler` service.

```
serviced service attach zenmodeler
```

- 3 Change to the `zenoss` user.

```
su - zenoss
```

- 4 Run the `zenmodeler` command.

```
$ zenmodeler run -v10 --collect=IpInterface -d build.zenoss.loc
```

If the command returns any stack traces, check the community forums for assistance.

## Next steps

---

Zenoss Core is now configured to monitor your IT infrastructure. Your next steps in the monitoring process may include some of the following items:

- Customize the Dashboard
- Review events in the Events Console
- Organize devices and infrastructure in to logical groupings on the Infrastructure page
- View data collection graphs from the Infrastructure page
- Generate and review reports on the Reports page
- Refine data collection on the Advanced page

For more information on these and other procedures, refer to the *Zenoss Core Administration Guide*.



## External HBase configuration

---

Zenoss Core can be configured to use an external HBase cluster, rather than the cluster that is included in the application.

---

**Note** If you do not already have an external HBase cluster, there is no need to create one. The procedures in this section are for customers who wish to use an existing HBase cluster for Zenoss Core data.

---

The version of HBase installed in your external HBase cluster must be compatible with the version of OpenTSDB used by the Zenoss Core application. The minimum supported version of HBase is 0.92.

Perform the procedures in the following sections in order.

### Configuring OpenTSDB for an external HBase cluster

---

To perform this procedure, install and start Zenoss Core.

This procedure configures OpenTSDB to use an external HBase cluster, rather than the HBase cluster that is included in the Zenoss Core application.

- 1 Log in to the Control Center browser interface.
- 2 In the **Applications** table, click **Zenoss.resmgr**.
- 3 Scroll down to the **Services** table and locate the OpenTSDB services **reader** and **writer**.  
If you do not see **reader** and **writer**, expand the OpenTSDB service node.
- 4 Click **reader** or **writer**.  
You will repeat the procedure for the other service.
- 5 On the service details page, scroll down to the **Configuration Files** table and in the **Actions** column, click **Edit**.
- 6 In the **Edit Configuration** dialog box, replace the value of the `tsd.storage.hbase.zk_quorum` key with the ZooKeeper quorum of the external HBase cluster.
  - a Delete the existing value.  
The default value is a *Go language template* expression.
  - b Specify the ZooKeeper quorum of the external HBase cluster.  
To specify a ZooKeeper quorum, create a comma-separated list of all quorum members. Specify each member of the quorum with a hostname or IP address, the colon character (:), and then the port number on which the ZooKeeper service is listening.

---

**Note** If you use hostnames, the Control Center master host must be able to resolve them to IPv4 addresses, either through a nameserver on the network or through entries in `/etc/hosts`.

---

The following example shows the correct syntax for a 3-member ZooKeeper quorum:

```
zk-1.example.com:2181, zk-2.example.com:2181, zk-3.example.com:2181
```

- c Click **Save**.
- 7 At the top of the page, click **Stop**, and then click **Start**.
- 8 For the other OpenTSDB service (**reader** or **writer**), repeat the preceding steps.

## Configuring the OpenTSDB service startup command

---

This procedure configures the OpenTSDB service to use the external HBase cluster on startup.

- 1 Log in to the Control Center browser interface.
- 2 In the **Applications** table, click **Zenoss.resmgr**.
- 3 Scroll down to the **Services** table and locate the OpenTSDB services **reader** and **writer**.  
If you do not see **reader** and **writer**, expand the OpenTSDB service node.
- 4 Click **reader** or **writer**.  
You will repeat the procedure for the other service.
- 5 Near the top of the service details page, click **Edit Service**.
- 6 In the **Edit Service** dialog box, change the value of the **Startup Command** field.
  - a Delete the *Go language template* expression.  
The expression is everything after `start-opentsdb.sh`.
  - b Specify the ZooKeeper quorum of the external HBase cluster.  
To specify a ZooKeeper quorum, create a comma-separated list of all quorum members. Specify each member of the quorum with a hostname or IP address, the colon character (:), and then the port number on which the ZooKeeper service is listening. Between `start-opentsdb.sh` and the ZooKeeper quorum list, include at least one empty space.

---

**Note** If you use hostnames, the Control Center master host must be able to resolve them to IPv4 addresses, either through a nameserver on the network or through entries in `/etc/hosts`.

---

The following example shows the correct syntax for a 3-member ZooKeeper quorum:

```
zk-1.example.com:2181, zk-2.example.com:2181, zk-3.example.com:2181
```

- 7 Click **Save Changes**.
- 8 At the top of the page, click **Stop**, and then click **Start**.
- 9 For the other OpenTSDB service (**reader** or **writer**), repeat the preceding steps.

## Disabling the Zenoss Core HBase cluster

---

This procedure disables the HBase cluster that is included in the Zenoss Core application.

- 1 Log in to the Control Center master host as `root`, or as a user with superuser privileges.
- 2 Stop the Zenoss Core HBase cluster.

```
serviced service stop HBase
```

- 3 Disable automatic start of the HBase services.



- a Change the configuration of each service.

```
for svc in hmaster regionserver zookeeper
do
    serviced service list $svc | \
    sed -e 's/"Launch": "auto"/"Launch": "manual"/' | \
    serviced service edit $svc
done
```

The `serviced` command displays the new configuration after each edit.

- b Verify that each service is set to manual start.

```
for svc in hmaster regionserver zookeeper
do
    serviced service list $svc | egrep '"Launch":'
done
```

- 4 Remove the OpenTSDB prerequisite for the Zenoss Core HBase cluster.

Depending on your version of Control Center, the OpenTSDB service is either `opentsdb` or two separate services, `reader` and `writer`.

- a Edit `opentsdb`, or one of `reader` or `writer`.

```
serviced service edit reader
```

The `serviced` command opens the service's configuration in the default text editor.

- b Locate the `Prereqs` section, and then remove everything between the left square bracket (`[`) and the right square bracket (`]`) characters.

The following lines show an example `Prereqs` section:

```
"Prereqs": [
  {
    "Name": "HBase Regionservers up",
    "Script": "{{with $rss := (child (child (parent) \"HBase
\")).Instances }}"
  }
],
```

After editing, the section should look like the following example:

```
"Prereqs": [],
```

- c Save the file, and then exit the text editor.
- d If your version of Zenoss Core includes two OpenTSDB services (**reader** and **writer**) repeat the preceding substeps for the other service.